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REFERENCE MANUAL

GRADE CROSSING PREDICTOR
MODEL 4000

December 2006 (Revised April 17, 2007)

DOCUMENT NO. SIG-00-02-02
VERSION D.1

Safetran Systems Corporation, California Division
10655 7th Street, Cucamonga, California 91730
1-800-793-SAFE

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SAFETRAN SYSTEMS CORPORATION
CALIFORNIA DIVISION
10655 7th STREET
RANCHO CUCAMONGA, CALIFORNIA 91730
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CHANGE NOTICE

The following changes have been incorporated into **Versions D** and **D.1** of the Reference Manual for the Model 4000 Grade Crossing Predictor, Document No. SIG-00-02-02.

December, 2006 (R1) version D:
Minor formatting changes throughout document.

Glossary:

- Added CCN, CDL, OCCN, OCE, Pac File, USB Port and USB Drive. Expanded DT definition.

Section 1:

- Paragraph 1.1 – Modified Features for April 2006.
- Added New and Enhanced Features for October 2006.
- Paragraph 1.9 – Expanded information on LonTalk Protocol (Echelon) LAN Interface.
- Updated all Case drawings (where applicable) with new CPU II+ front panel and Display Module with USB port..

Section 2:

- Updated all Case drawings (where applicable) with new CPU II+ front panel and Display Module with USB port..
- Updated Paragraph 2.1.3 and added warning about securing SSCC IIIi module.
- Added slot numbers in Figure 2-6 Single Five Track Case.
- Expanded caption for Figure 2-15.
- Figure 2-24 - added graphic showing display module S1 & S2 switch locations.
- Paragraph 2.8.7.1 - updated warning to "avoid gates hitting vehicles or pedestrians".
- Paragraph 2.8.8.1 - updated warning as above.
- Paragraph 2.8.11 – corrected assy# for ECD.
- Paragraph 2.8.13 - added sub-headings for each module type connector detailed.
- Paragraph 2.8.13.1 – added note about using Flash Sync with SSCC's.
- Paragraph 2.8.13.3 - added RIO-2 & -3 mylar drawings and details concerning their use.
- Updated Table 2-25 for RIO -2 & -3 pinouts. Added Safetran part numbers for each mylar.
- Added paragraph 2.9.2 – Rules for using Echelon LAN.
- Page 2-77 –
    - Added Figure 2-29 for LAN bus wiring.
    - Added Caution about no Echelon surge protection.
    - Added Note to contact Safetran Tech Support for additional Echelon LAN information.

Section 3:

- No change to content.

Section 4:

- Paragraph 4.1 – expanded DT overview.
- Updated all display screens to show new System / SSCC status bar and Track Function Status indicator examples where appropriate.
- Replaced all instances of CPF with Pac file.
- Paragraph 4.1.4 – added details about Connect/Disconnect buttons on display based DT screens and updated Figures 4-2 A & B.
- Expanded Status Screen paragraphs 4.1.5, 4.1.5.1, 4.1.5.1.1 and added 4.1.5.1.2 Track Function Status to explain “ed”, “m”, and “w” status icons.
- Figures 4-3 A and 4-4 – updated to show Track Function Status icons.
- Paragraph 4.1.5.1.4.4 – added warning about taking a track circuit out of service.
- Paragraph 4.1.5.1.4.4.1 – expanded detail concerning time interval between 1 and 23 hours.
- Paragraph 4.1.5.1.4.4.3 – added warning about restoring tracks to service.
- Paragraph 4.1.5.2 – expanded AND function status bar detail to include Wrapping.
- Added paragraph 4.1.5.4 for SSCC Status Bar.
- Paragraph 4.1.5.5 – added DT Status Bar message examples.
- Paragraph 4.1.5.6.3.1 – expanded history log details throughout paragraph.
- Paragraph 4.1.5.6.3.2 – expanded maintenance log details.
- Paragraph 4.1.5.6.3.3 – expanded status log details.
- Replaced all instances of perimeter with parameter.
- Paragraph 4.1.5.6.7.7 – added information pertaining to DT in the remote mode.
- Paragraph 4.1.5.6.8.3 – modified and expanded details for AND Detail View.
- Paragraph 4.2 – updated Office Configuration Editor overview to include Pac file.
- Paragraph 4.2.3 - added figures 4-61 A & B and 4-62 A & B.
- Paragraph 4.2.3.1 – expanded detail concerning Pac file.
- Minor modifications to paragraph 4.2.4 and procedures 4-5 and 4-6.
- Added figures 4-65 A & B for opening a Pac file on the OCE.
- Added new paragraph 4.3 for Display DT USB Wizard. Includes new sub-paragraphs and figures.
- Added new paragraph 4.4 for DT – Installing Software on GCP 4000. Includes new sub-paragraphs and figures.

Section 5:

- Updated initial and secondary configuration file menus (pages 5-168 and 5-170).
- Paragraph 5.13.4 – added note concerning SEAR IIi physical input connections to connectors on GCP 4000 Case front. Note references Configuration Summary for SEAR IIi, which is included at the front of this manual.

Section 6:

- Paragraph 6.1 – expanded note concerning turning off enhanced detection.
- Updated all display screens to show new System / SSCC status bar and Track Function Status indicator where applicable.
- Paragraph 6.6 – expanded note concerning lamp voltage edit button.
- Procedure 6-5 – expanded step 4 concerning edit button activation.

Section 7:

- Updated table 7-8 to clarify RECV indication as RECOVERY.
- Updated figure 7-8 to show display module with USB port.
- Paragraph 7.2.6 – added note after table 7-24 about using Flash Sync with SSCC's.
- Added paragraph 7.2.10 Troubleshooting Maintenance Call (MC) Light Problems.
- Added paragraph 7.2.11 Troubleshooting Problems on PC Based DT, including new sub-paragraphs and figures.

Section 8:

- Paragraph 8.2.2 – expanded detail to include pulse width modulation with example drawing.
- Updated figure 8-6 with new CPU II+ front panel and display module with USB port.
- Added Paragraph 8.5.7 – Flash Sync Connections to External Controllers.
- Added paragraph 8.8.1.2 – Lamp Voltage Measurement Example 2.

Section 9:

- Updated figure 9-2 with current SEAR IIi PCB.
- Page 9-17 – corrected CDL definition in note.
- Added paragraph 9.6 – SEAR IIi Downloads, including new sub-paragraphs and graphics.

Section 10:

- Inserted all new section – GCP 4000 System Cutover Test Procedure and Check-Off Sheet.

Section 11:

- Moved Section 10 (Troubleshooting Flow Chart & History Card) to new Section 11 to retain history card at end of manual.
- No content changes to Flow Chart or History Card.

April 17, 2007 version D.1:

Section 4:

- Inserted new paragraph 4.3.1 – USB Drive Recommendation, and noted that Safetran recommends SimpleTech STI-UFD/512 USB drive. Safetran p/n: Z927-00270-0000.
- Updated TOC and this Change Notice.

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NOTES, CAUTIONS, AND WARNINGS

Throughout this manual, notes, cautions, and warnings are frequently used to direct the reader's attention to specific information. Use of the three terms is defined as follows:

NOTE	Generally used to highlight certain information relating to the topic under discussion.
CAUTION	REFERS TO PROPER PROCEDURES OR PRACTICES WHICH IF NOT STRICTLY OBSERVED, COULD RESULT IN A POTENTIALLY HAZARDOUS SITUATION AND/OR POSSIBLE DAMAGE TO EQUIPMENT. CAUTIONS TAKE PRECEDENCE OVER NOTES AND ALL OTHER INFORMATION, EXCEPT WARNINGS.
WARNING	**INDICATES A POTENTIALLY HAZARDOUS SITUATION WHICH, IF NOT AVOIDED, COULD RESULT IN DEATH OR SERIOUS INJURY. WARNINGS ALWAYS TAKE PRECEDENCE OVER NOTES, CAUTIONS, AND ALL OTHER INFORMATION.**

If there are any questions, contact Safetran Technical Support.

ELECTROSTATIC DISCHARGE (ESD) PRECAUTIONS

Static electricity can damage electronic circuitry, particularly low voltage components such as the integrated circuits commonly used throughout the electronics industry. Therefore, procedures have been adopted industry-wide which make it possible to avoid the sometimes invisible damage caused by electrostatic discharge (ESD) during the handling, shipping, and storage of electronic modules and components. Safetran has instituted these practices at its manufacturing facility and encourages its customers to adopt them as well to lessen the likelihood of equipment damage in the field due to ESD. Some of the basic protective practices include the following:

- Ground yourself before touching card cages, assemblies, modules, or components.

- Remove circuit boards (modules) from card cages by the ejector lever only. If an ejector lever is not provided, grasp the edge of the circuit board but avoid touching circuit traces or components.

- Handle circuit boards by the edges only.

- Never physically touch circuit board or connector contact fingers or allow these fingers to come in contact with an insulator (e.g., plastic, rubber, etc.).

- When not in use, place circuit boards in approved static-shielding bags, contact fingers first. Remove circuit boards from static-shielding bags by grasping the ejector lever or the edge of the board only. Each bag should include a caution label on the outside indicating static-sensitive contents.

- Cover workbench surfaces used for repair of electronic equipment with static dissipative workbench matting.

- Use integrated circuit extractor/inserter tools designed to remove and install electrostatic-sensitive integrated circuit devices such as PROM's (OK Industries, Inc., Model EX-2 Extractor and Model MOS-40 Inserter (or equivalent) are highly recommended).

- Utilize only anti-static cushioning material in equipment shipping and storage containers.

For information concerning ESD material applications, please contact the Safetran California Division Technical Support Staff in Rancho Cucamonga, California. ESD Awareness Classes and additional ESD product information are also available through the Technical Support Staff.

GLOSSARY

Advance Preemption:	Notification of an approaching train is forwarded to the highway traffic signal controller by railroad equipment in advance of activating the railroad active warning devices.
Advance Preemption Time:	This period of time is the difference in the Maximum Preemption Time required for highway traffic signal operation and the Minimum Warning Time needed for railroad operation.
AND:	AND circuits require all inputs to be energized for the output to be energized.
AND ENABLE:	An internal function that can be used to 'connect' an input to an AND circuit.
AND 1 XR:	The AND function that controls the local crossing. Is equivalent to the XR relay.
AND 2 thru 8:	Internal functions that are used to combine inputs.
ATCS:	Advanced Train Control System – An industry standard used in the 4000 GCP for communications.
CCN:	Configuration Check Number – The 32 bit CRC of the configuration data.
CDL:	Control Descriptor Language – The programming language used by application engineers to customize the operation, settings, and behavior of a SEAR II/IIi.
CHK:	CHECK receiver on a track module connected to transmit wires that perform track wire integrity checks.
CHK EZ:	Check EZ is a signal value compared to main receiver EZ that is useful in troubleshooting.
CIC:	Chassis Identification Chip - A non-volatile memory chip that is installed adjacent to the ECD on the GCP backplane. Stores site specific information for both Main and Standby operations.
Computed Approach Distance:	The track approach length calculated by the GCP. The calculated distance between the wire connections on the rail and the termination shunt connections.
CP:	Communications Processor – One of two microprocessors on the CPUII+ module, processes external communications for the GCP 4000.
CRC:	Cyclical Redundancy Check - Used to determine that data has not been corrupted.
CRTU:	Cellular Remote Telemetry Unit

DAX:	Acronym for Downstream Adjacent Crossing (Xing). DAX outputs are used to send prediction information from an upstream GCP to a downstream GCP when insulated joints are in the approach circuit.
DIAG:	Diagnostic
DOT Number:	Department Of Transportation crossing inventory number assigned to every highway-railroad crossing that consists of six numbers with an alpha suffix.
DT:	Diagnostic Terminal – The Diagnostic Terminal (DT) is a Safetran developed Windows® based software that can run on the Display Module or on a PC, which allows the user to perform programming, calibration, and troubleshooting.
DTMF:	Dual Tone Multi-Frequency - The tones on a telephone or radio keypad.
ECD:	External Configuration Device – The non-volatile memory device on the GCP backplane used for storing the module configuration file.
Echelon:	A Local Area Network, LAN, used by the 4000 GCP.
Enhanced Detection:	User selectable process that detects nonlinear fluctuations in track signal due to poor shunting and temporarily switches the track module from predictor to motion sensor.
EX:	The EX value is a numerical indication of track ballast conditions relative to the leakage resistance between the rails. A value of 100 represents nominal good ballast. A value of 39 represents very poor ballast.
EZ:	The track signal value that varies with approach track impedance that indicates the relative train position within an approach. 100 represents nominal value with no train in the approach, 0 represents nominal value for a train occupying the island.
FAR GATE:	On the same surge panel, the 'far gate' is the flashing light signal or gate with the largest voltage drop in the cable circuit. In general, if both signals have the same number and type of lamps and the same size cable conductors, the 'far gate' is the location with the longest cable run. The 'far gate' circuit on the surge panel does not have an adjustable resistor in series with L1 and L2 that provides voltage adjustment.
FLASH SYNC:	The two wire circuit that synchronizes the alternating flash of an external crossing controller with the internal crossing controller, SSCC IIIi.
GC:	Gate Control

GCP:	Grade Crossing Predictor – A train detection device used as part of a highway-railroad grade crossing warning system to provide a relatively uniform warning time.
GCP APP:	GCP Approach length calibration into a hardwire shunt located at the termination shunt.
GCP CAL:	GCP Calibration into a termination shunt.
GCP LIN:	Approach Linearization calibration into a hardwire shunt located at the 50% point on the approach.
GD:	Gate Down, input energized when gate arm is horizontal.
GFT:	Ground Fault Tester – An optional external device connected to the Echelon LAN that constantly monitors up to two batteries for ground faults and indicates battery status to the SEAR IIi.
GP:	Gate Position – Input energized when gate is vertical.
GU:	Gate Up – Used in a user defined SEAR IIi application program, (the same as GP).
Healthy:	The GCP system, modules and track circuit are operating as intended. Health is generally indicated by a yellow LED flashing at 1 Hz (approximately the same flash rate as the FLASH SYNC on a controller or a flashing light signal). Unhealthy conditions are indicated by faster flash rates (2 Hz and 4 Hz) or a dark Health LED.
Hz:	Hertz – Common reference for cycles per second or flashes per second.
iLOD:	Intelligent Light Out Detector – used for measuring lamp current.
IO or I/O:	Input/Output
ISL:	Island
ISL CAL:	Island calibration
kHz:	kilohertz – 1000 Hz or 1000 cycles per second.
LAMP 1 VOLTAGE:	Voltage on 1L1 or 2L1 lamp output of the crossing controller module, SSCC IIIi.
LAMP 2 VOLTAGE:	Voltage on the lamp 1L2 or 2L2 lamp output of the crossing controller module, SSCC IIIi.
LAN:	Local Area Network – A limited network where the data transfer medium is generally wires or cable.
Linearization:	The linearization procedure compensates for lumped loads in the GCP approach that affects the linearity (slope) of EZ over the length of the approach.

Linearization Steps:	A calibration value that allows the GCP to compensate for non-linear EZ values within the approach circuit.
LOS:	Loss of Shunt – Commonly due to rust and / or rail contamination. LOS timers provide a pick up delay function.
Lumped Load:	A section of track that has a lower ballast resistance than the rest of the approach because of switches, crossings, contamination, etc.
MAIN:	The primary GCP Modules (CPU, Track, and RIO Modules) that are in a dual GCP chassis.
MCF:	Module Configuration File – The GCP application logic file.
MEF:	Module Executable File – The GCP executive software program.
MS:	Motion Sensor – A train detection device used as part of a highway-railroad grade crossing warning system to provide a detection of a train approach.
MTSS:	Mini Trackside Sensor – A device located in the gate mechanism that combines input information from gate contacts, bell, and gate tip sensor and sends the information to the SEAR IIi.
NEAR GATE:	On the same surge panel, the 'near gate' is the flashing light signal or gate with the lowest voltage drop in the cable circuit. In general, if both signals have the same number and type of lamps and the same size cable conductors, the 'near gate' is the location with the shortest cable run. The 'near gate' circuit on the surge panel has an adjustable resistor in series with L1 and L2 that provides additional voltage adjustment.
OCCN:	Office Configuration Check Number – The 32 bit CRC of the configuration data, excluding items which will need to be verified and adjusted depending upon the exact site conditions.
OCE:	Office Configuration Editor – The PC version of the DT that can be used to create configuration package files (Pac files) for the GCP 4000 system.
Offset Distance:	The distance between the track circuit connections of the remote GCP (sending DAX information) to the island track connections of the UAX GCP (receiving the information).
Out Of Service:	The process for taking one or more GCP approach circuits and / or approach and island circuits out of service.
Pac File:	A GCP 4000 configuration Package File that can either be created in the office using the OCE, or downloaded from a GCP 4000 system via the CP.

Pick Up Delay:	An internal delay time between when an input receives the signal to pickup and when it actually responds.
POK:	Power Off Indication
Positive Start:	Activate crossing devices when EZ level is less than a programmed value.
Preemption:	The transfer of normal operation of traffic signals to a special control mode.
PRIME:	For each Track Module, the PRIME is an internal AND gate with inputs consisting of primary predictor (without offset distance), island circuit, UAX, and advance preemption time expired.
UAX:	Acronym for Upstream Adjacent Crossing (Xing). UAX inputs are used to receive prediction information from an upstream GCP as inputs to a downstream GCP when insulated joints are in the approach circuit.
USB Port:	Universal Serial Bus Port
USB Drive:	A memory device that plugs into a USB port which are commonly called flash drives or memory sticks.
RADIO DAX:	DAX information transmitted via Spread Spectrum Radio or other communications devices.
RIO:	Relay Input Output Module
RS232:	Industry standard serial port.
RTU:	Remote Telemetry Unit
RX:	Receive
SEAR IIi Application Program:	Programming for SEAR IIi that controls alarms.
Simultaneous Preemption:	Notification of an approaching train is forwarded to the highway traffic signal controller unit or assembly and railroad active warning devices at the same time.
SIN:	Site (Subnode) Identification Number - A twelve-digit ATCS address representing the module as a subnode on the network.
Spread Spectrum:	A method of radio transmission in which the transmitted energy is evenly spread over the complete bandwidth of the radio, resulting in a low RF profile.
SSCC:	Solid State Crossing Controller
SSR:	Spread Spectrum Radio – A radio that utilizes spread spectrum transmission.

Standby:	The GCP Backup Modules (e.g., CPU, Track, and RIO modules) that are in a dual GCP chassis.
True RMS AC+DC:	A scale on a multimeter that measures the effective combined AC and DC portions of the total voltage. Used to measure the pulsed output of a crossing controller.
TX:	Transmit
VHF Communicator:	Communications device used for remote operations and calibration as well as data communications.
VLP:	Vital Logic Processor – One of two microprocessors on the CPUII+ module, processes GCP vital system logic.
WAMS:	Wayside Alarm Management System – An office based application that communicates with and receives data from specially equipped crossings.
WCM:	Wayside Control Module – The Safetran A53105 assembly that centrally controls the functions of a Wayside Communications Package (WCP).
WRAP:	Common reference for a track circuit, or combination of track circuits that extend to or beyond the limits of a GCP approach, which provides train detection. Used to signify that a certain system function is being overridden based upon the state of a vital input.
Z Level:	An Island calibration value. A calibrated island will have a nominal Z Level of approximately 250. The Z Level approaches 0 when shunted.

SECTION 1 - INTRODUCTION

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SECTION 1 - INTRODUCTION

1.1 SYSTEM CONFIGURATIONS

The 4000 Grade Crossing Predictor (GCP) is a modular microprocessor-controlled system that is deployed to continually monitor the approach(es) to railroad grade crossings and to control the lamps, gates and bells associated with those crossings. The 4000 GCP is available in several case configurations which provide:

Standard Features -

- Up to 6 Track Modules for train detection, each track module has:
  - ♦ Nine track predictors configurable as motion sensors or predictors
    - ▪ Prime Predictor for control of local crossings
    - ▪ DAX A through DAX G Predictors for control of remote crossings
    - ▪ Preempt Predictor for interconnection with traffic signal systems
  - ♦ Two vital inputs
  - ♦ Two vital outputs
  - ♦ A multifrequency island circuit
- Eight software programmable AND gates
- Control for up to 40A of crossing lamps
- Bells and gates outputs
- RIO modules to extend I/O capability
- Redundant Main/Standby operation
  - ♦ For CPU, Track, and RIO modules only.
- Independent event recording, SEAR IIi
- SEAR IIi options:
  - ♦ Programmable alarms
  - ♦ Automated performance of crossing test functions
  - ♦ Test result reports in several formats
  - ♦ Interface to Wayside Alarm Management System (WAMS)
- Echelon communications for:
  - ♦ Radio DAXing to other locations via spread spectrum radio
  - ♦ Single person calibration and monitoring using VHF communicator
- Color-touch-screen display module for configuration, monitoring and troubleshooting

Recent Features (effective April 14, 2006) –

- Advanced Applications
  - ♦ Four Quadrant Gate control
    - ▪ Dynamic Exit Gate Operating Mode
      - External Vehicle Detector
    - ▪ Vital communications based logic with external SSCC IV Crossing Controller

- Emergency Activation Input
- Out of Service functionality
  - includes display control, input control, or both
  - by track or complete 4000 GCP case
  - flashes display and turns off Maintenance Call output
- Added Logic
  - Additional AND Enable 5 through 8
  - OR Logic
  - NOT AND logic
  - Additional internal logic states
- RIO Module can be installed in more slots, in more chassis
- Solid State Crossing Controller functions
  - Mute bell when gate down option
  - Communication based vital logic with external SSCC IV
    - Use of external (remote) inputs from SSCC IV
  - Crossing control health inputs

- Expanded ranges on many timers

New and Enhanced Features (October 2006) –

- **USB Port** - The Display will be able to recognize when a USB drive is plugged into the display module. When a USB drive is detected the DT software will enable options to:
  - Save the configuration package (Pac) file to the USB drive,
  - Save Status Log and Summary Logs to the USB drive,
  - Save the Maintainers Log, Train History and Diagnostic log to the USB drive
  - Save SEAR IIi reports, histories, and incidents to the USB drive
  - Upload a configuration package (Pac) file to the CP from the USB drive,
  - Upload MEFs from the USB drive to other modules,
  - Upload an MCF from the USB drive to the CPU module,
  - Set MCF CRC,
  - Clear CIC and ECD.
- The **Office Configuration Editor** will:
  - be able to create a configuration package file (Pac file), and allow the user to save it to a USB drive.
  - compute the configuration check number (CCN),
    - this is a 32bit CRC of each configuration record for each card in the MCF.
    - The CCN will be stored in the Pac file, and be present on reports.
  - compute the Office Configuration Check Number (OCCN),
    - this is a 32bit CRC which includes the configuration record for each MCF card, but with certain parameters are excluded – these are the ones which are flagged in the cfgviewdata.xml file in the MCF with the “Comment “ tag.
    - The purpose of the OCCN is to create a configuration check over the properties that the office sets, but exclude the properties that the user sets in the field.

- The **Diagnostic Terminal** allows the user to view the following:
  - the current OCCN,
  - the current CCN
  - the CCN from the last Pac file upload, if one is present,
  - the OCCN from the last Pac file upload, if one is present,
- **EZ/EX Storage**
  - The Display DT allows the user to select to turn-on or turn-off the saving of the EZ/EX data for selected Track modules.
    - The Display DT saves the EZ/EX data to the USB drive.
    - The DT(PC) saves the EZ/EX data to a selected permanent or removable computer drive.
- **New Display Indications**
  - Main DT Display view indicates when:
    - SSCC modules are flashing
    - A track wrap input is energized
    - An AND function is wrapped.
  - Detailed Track Status view indicates when a track wrap input is energized.
  - AND Detail View indicates when an AND function is wrapped.
  - System I/O view show the state and assigned name for internal I/O states.

1.1.1 GCP Case Configurations

The 4000 Grade Crossing Predictor (GCP) System is available in the following case configurations:

- A80445 Single Track, figure 1-1
- A80455 Basic Crossing, figure 1-2
- Single Five Track, A80440, figure 1-3
- Dual Two Track, A80465, figure 1-4
- Dual Four Track, A80400, figure 1-5
- Dual Six Track, A80460, figure 1-6

The features of each configuration are given in table 1-1.

Table 1-1. Case Configurations

Feature	Case Configuration					
	80445	80455	80440	80465	80400	80460
Track Modules	1 track	1 track	1 to 5 tracks	1 or 2 tracks	1 to 4 tracks	1 to 6 tracks
Main/ Standby Transfer System	no	no	no	yes	yes	yes
Internal SSCC IIIi Crossing Control[1]	no	0, 1 or 2	0, 1 or 2	0, 1 or 2	0, 1 or 2	0, 1 or 2
Internal SEAR IIi Recorder	no	no	yes	yes	yes	Yes
I/O Expansion[2]	no	no	0, 1 or 2	0 or 1	0, 1, 2 or 3	0, 1, 2 or 3
Echelon LAN Functions	yes	yes	yes	yes	yes	yes

[1] SSCC IIIi module controls Gates, Flashing Light Signals and Bells
[2] Relay Input Output (RIO) Module can be used in lieu of Track Module in the 2nd, 5th and/or 6th track slot

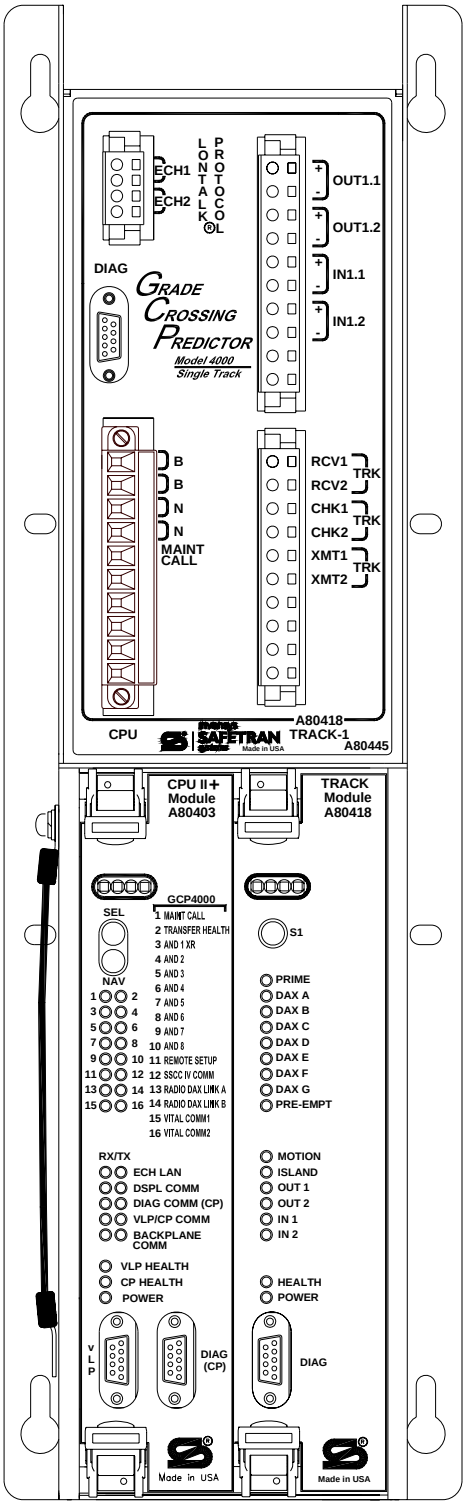

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Figure 1-1. A80445 Single Track Configuration

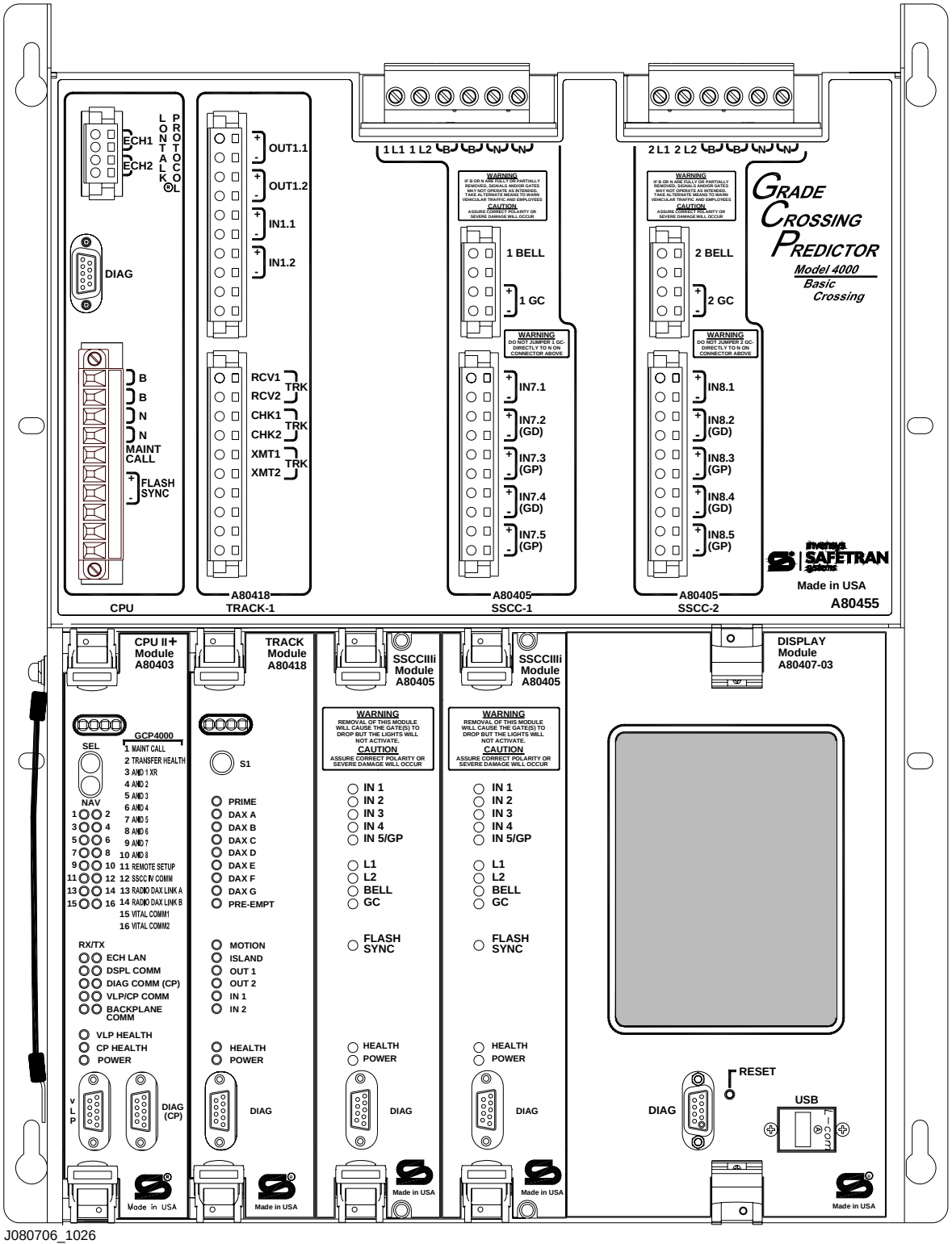

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Figure 1-2. A80455 Basic Crossing Configuration

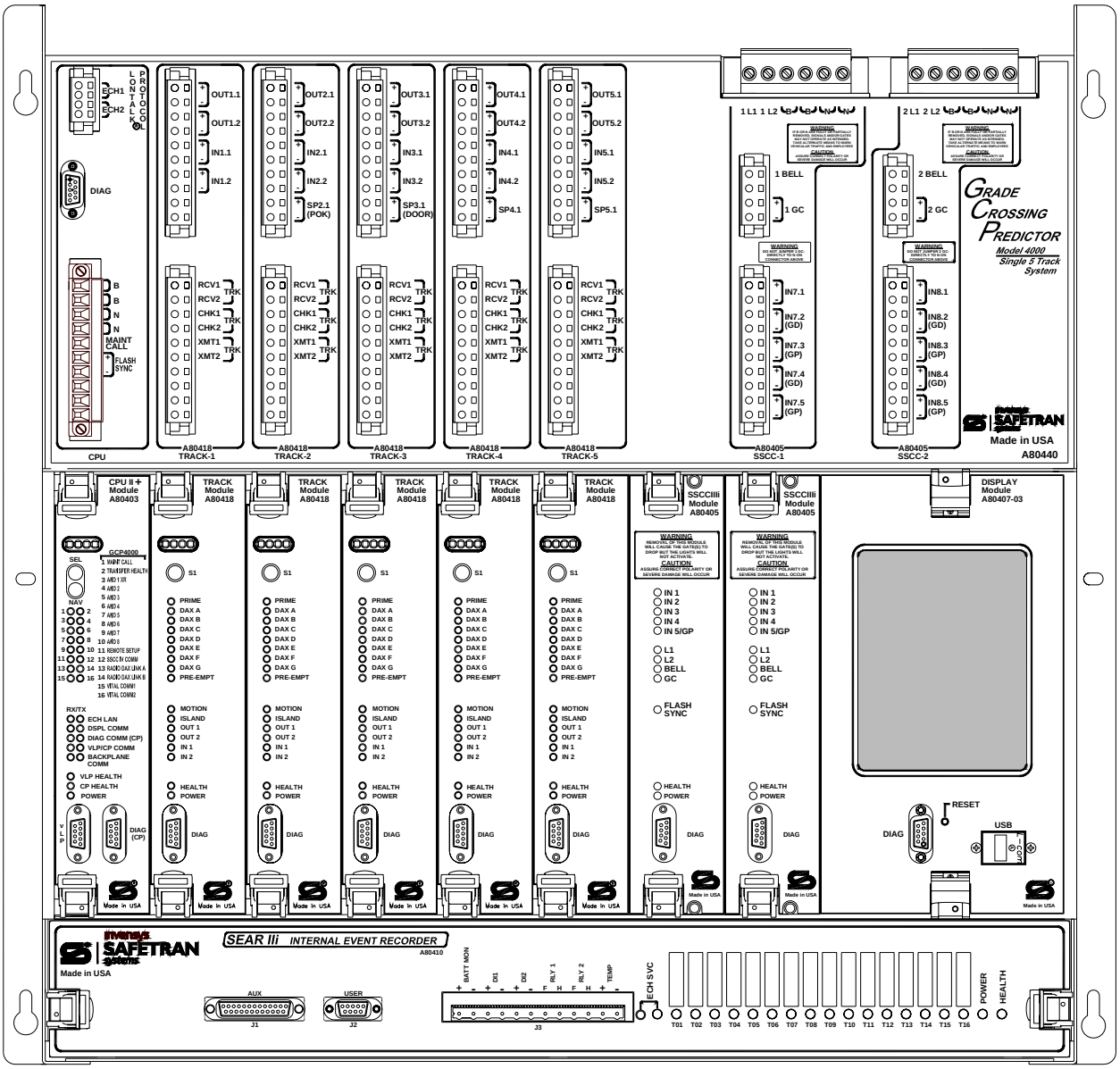

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Figure 1-3. A80440 Single Five-Track Configuration

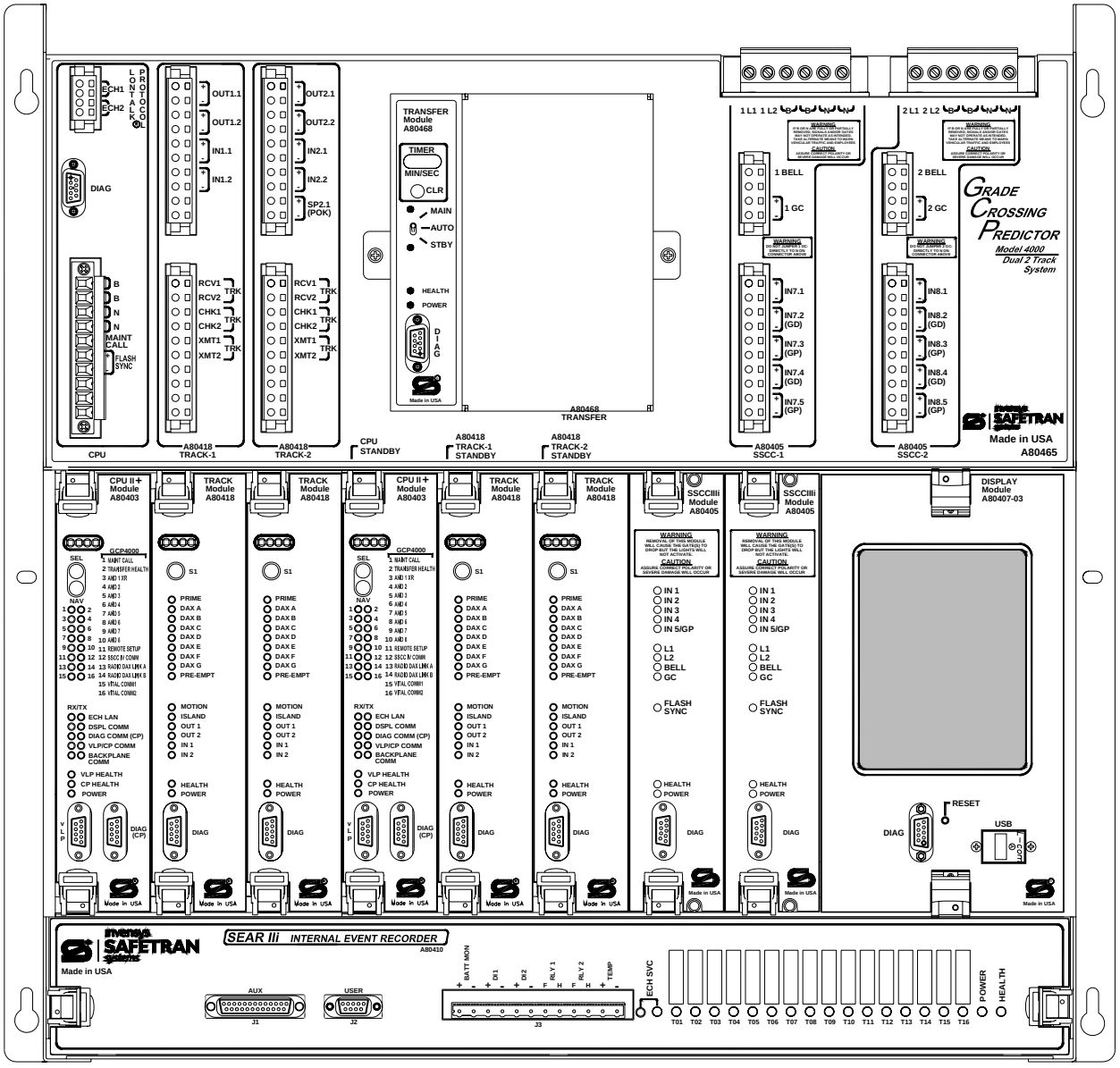

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Figure 1-4. A80465 Dual Two-Track Configuration

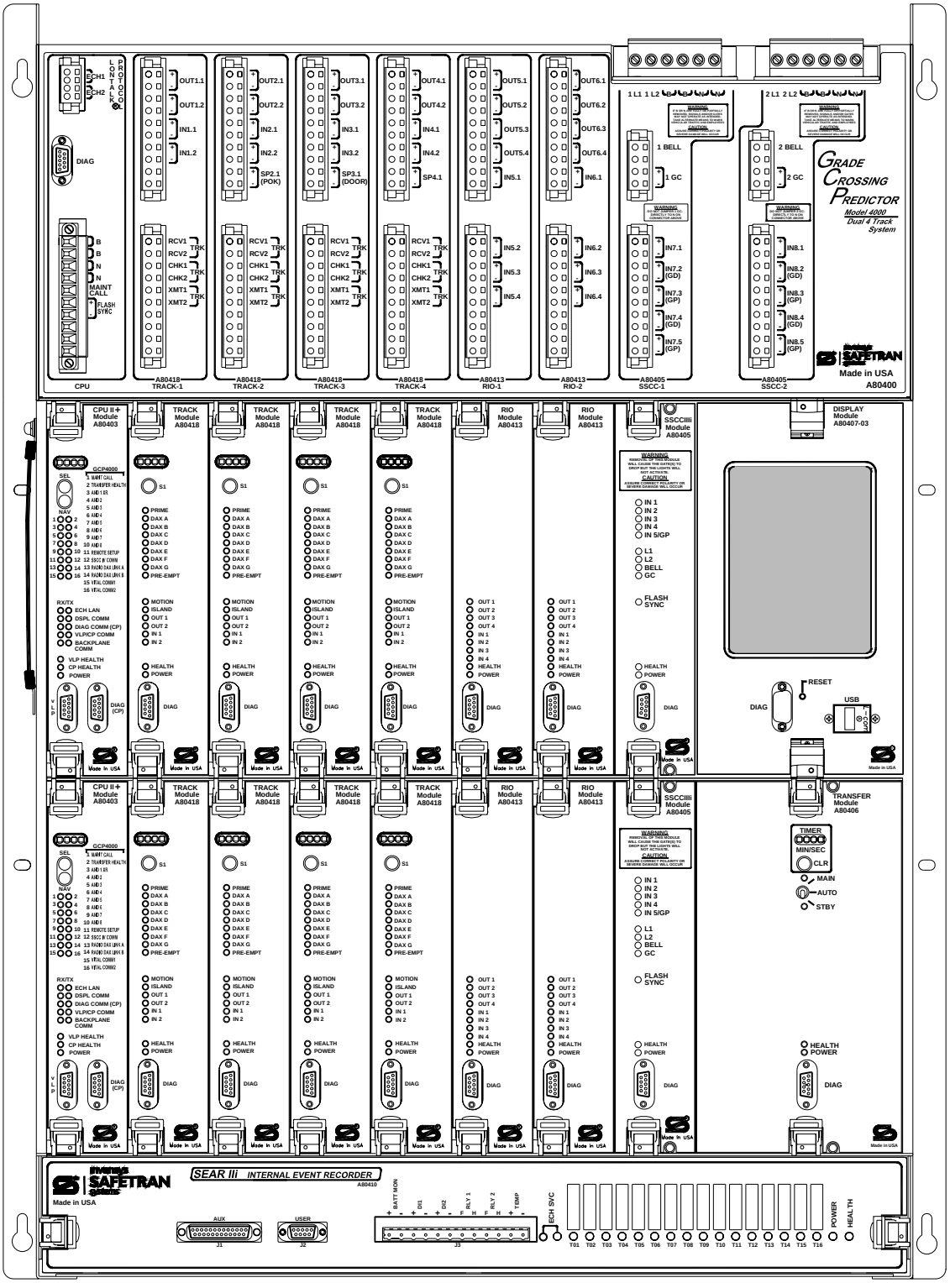

Figure 1-5. A80400 Dual Four-Track Configuration With RIO Modules

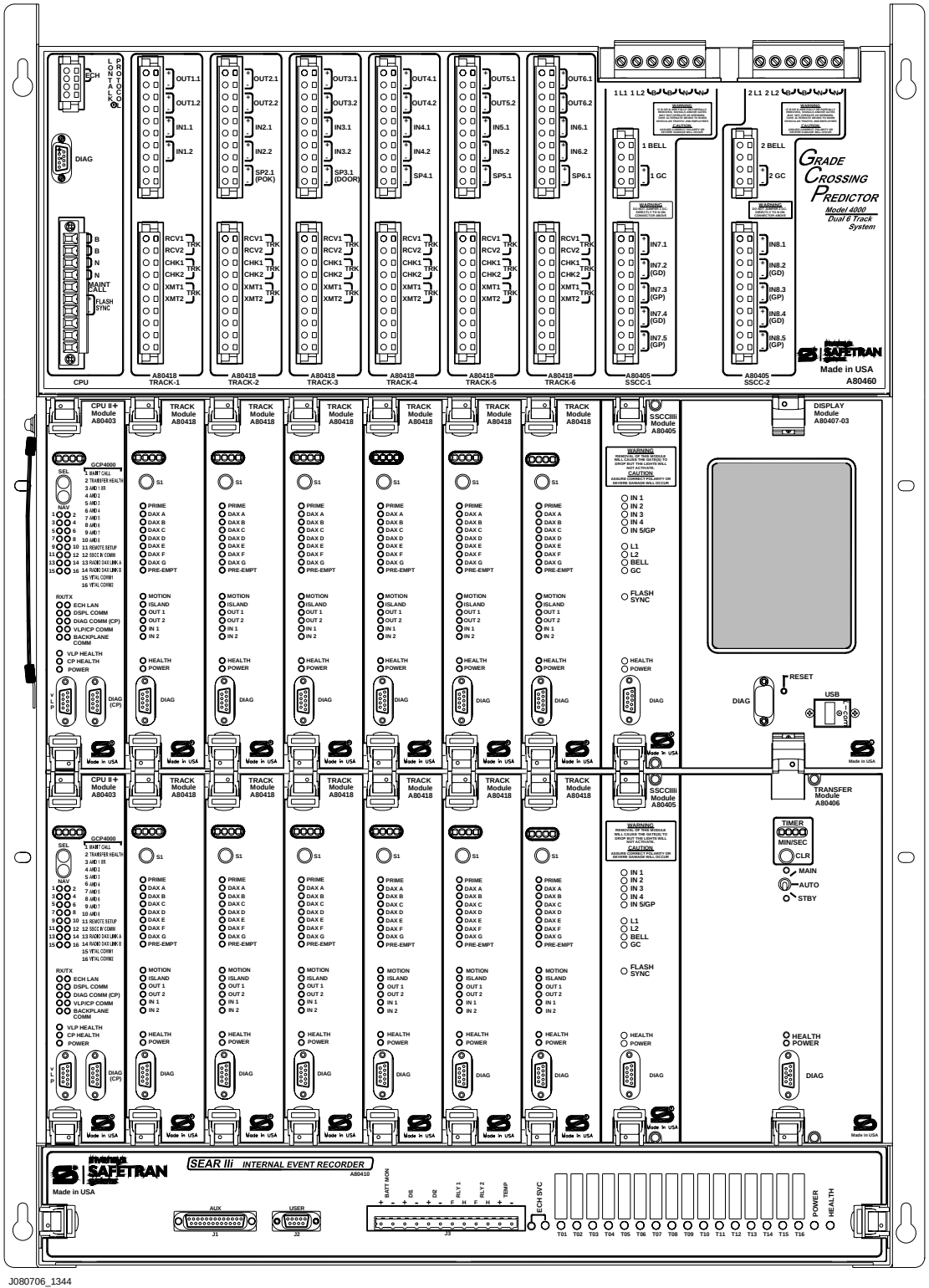

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Figure 1-6. A80460 Dual Six-Track Configuration

1.2 GCP OPERATIONAL PARAMETERS

1.2.1 Applications Supported	**Unidirectional** track circuits **Bidirectional** track circuits **Simulated Bidirectional** track circuits
1.2.2 Tracks Monitored	The number of tracks that may be monitored is determined by: • 4000 GCP case configuration • Number of Track modules installed • Track configurations • Available I/O
1.2.3 Application Modes	**Predictor** • Detects approaching trains • Computes relative train speed and distance • Predicts train arrival time at the crossing • Activates crossing-warning devices based on a programmed warning time **Motion Sensor (MS)** • Detects the motion of an approaching train when its speed exceeds a set (programmed) motion detection threshold • Activates crossing-warning devices at time of train detection
1.2.4 LAN Communications	Communication with other ATCS devices via Echelon® LAN. These other devices include: • Spread Spectrum Radio (SSR) • Safetran® Event Analyzer/Recorder (SEA/R) II • HD/LINK • VHF Communicator • iLOD • SSCC IV • 4000 GCP
1.2.5 Event Recording	Integrated Safetran Event Analyzer/Recorder (SEAR IIi) • Records 180,000 events, expandable to 390,000 • Controls non-vital I/O • Issues alarms (optional)

NOTE

The recorded speed information is intended solely as a maintenance tool.

- The speed values are relative and may be affected by track parameters that include:
  - Insulated joint proximity
  - Insulated joint couplers
  - Overlapping termination shunts
  - Lumped ballast loads
- The speed values are only intended to assist maintenance personnel in:
  - identifying slow versus fast train movements
  - distinguishing between accelerating, decelerating, and relatively constant speed train movements
- The primary function of the recording is to document warning time.
  - Speed values are secondary and may not be consistent with recordings made by devices specifically designed to record train speed.

1.3 TRAIN DETECTION

The 4000 GCP applies a constant current audio frequency (AF) signal to the track and measures the level of the resulting voltage.

1.3.1 Approach Track Signal Magnitude

GCP approach track signal magnitude (EZ) varies with approach track impedance.

1.3.2 Approach Track Impedance

Corresponds to the distance of the train from the crossing.

- When unoccupied the approach circuit has maximum impedance.
- When a train enters the approach and moves towards the crossing, the track circuit impedance continually decreases due to the low resistance shunt created by the train's wheels.
- When a train reaches the crossing, the approach circuit is reduced to minimum impedance.
- As a train moves away from the crossing, the track impedance continually increases.
- When the train exits the approach the circuit again has maximum impedance.

1.3.3 EZ Rate Change And Magnitude

The EZ is proportional to the relative distance the train is from the crossing. When no train is on a calibrated approach, the EZ is approximately 100 (see figure 1-7).

The rate at which the EZ changes is proportional to the speed of the train. The rate of change is sensed by the 4000 GCP and used to:

- Determine relative train speed
- Predict when to activate the crossing warning devices

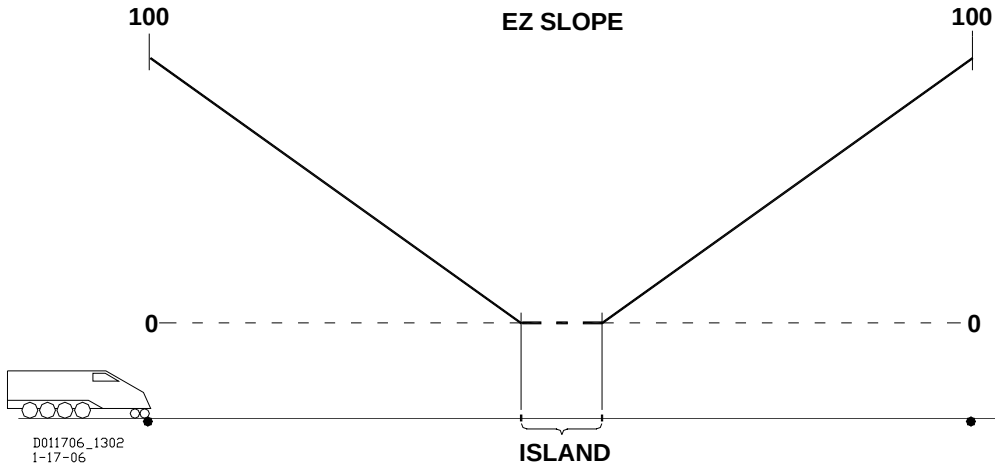

Figure 1-7. Diagram of EZ Level Compared to Train Shunt Location

1.3.4 Track Ballast Condition

The EX value is a numerical indication of track ballast conditions.

- EX corresponds to electrical leakage through track ballast.
- An EX value of 100 represents optimum track ballast conditions.
- The EX low operating threshold for the 4000 GCP is 39.
- EX normally is between 70 and 100.

1.3.5 Track Ballast Changes

The EX value can be affected by the presence of water, mud, salt or other contaminates deposited in the track ballast.

- High concentrations of these contaminates at a crossing can cause excessive leakage (lump loading).
- 4000 GCP provides automatic compensation of EZ for a wide range of lump loading conditions.

1.3.6 GCP Signal Frequencies

The constant current audio frequency (AF) signal for each track can be programmed for any of 11 Safetran standard frequencies or any of 29 offset frequencies.

NOTE

The following frequencies have been selected as the Safetran Standard:
86, 114, 156, 211, 285, 348, 430, 525, 645, 790, and 970 Hz

The following offset frequencies are available for slaving applications:

85.5, 86.5, 87, 113, 113.5, 114.5, 115, 155, 155.5, 156.5, 157, 210, 212, 284, 286, 347, 349, 429, 431, 523, 527, 643, 647, 788, 792, 968, and 972 Hz

The following “other” Frequencies are available:

44, 45, 46, 151, 250, 267, 326, 392, 452, 522, 560, 630, 686, 753, 816, 881, 979 and 999 Hz

1.4 TERMINATION SHUNTS

A shunt is placed across the rails to terminate the 4000 GCP approach circuit. The shunt presents a low impedance at the 4000 GCP operating frequency.

1.4.1 Shunt Types

Termination shunts may be:

- A Hardwire Shunt
  - ♦ Used when no other signals (AF, AC, or DC) are present on the rails
- A Wideband Shunt
  - ♦ used when steady energy DC track circuits and no AF, AC or DC coded track circuits are used
- Narrow-Band Shunt
  - ♦ Used for all applications

1.4.2 Bypassing Insulated Joints

Insulated joints are placed in the rails to electrically isolate adjacent track circuits.

- The insulated joints within bidirectional approaches may be bypassed as described in the Model 4000 GCP Application Guidelines, document number SIG-00-03-19.

⚠ WARNING

THE FEED POINT INSULATED JOINTS OF A UNIDIRECTIONAL OR A SIMULATED BIDIRECTIONAL APPROACH MUST NOT BE BYPASSED WITH ANY COUPLING DEVICE.

1.5 APPROACH APPLICATIONS

1.5.1 Bidirectional

The bidirectional configuration allows a single track module to monitor train movement in both approaches to a crossing on a single track.

- Bidirectional applications are simpler and have fewer design restrictions than unidirectional applications.
- Bidirectional approach lengths are less affected by low ballast resistance.
  - ♦ Allows longer approach length for each operating frequency.

1.5.2 Unidirectional

When configured for unidirectional operation:

- The 4000 GCP track module monitors train movements in a single track approach to a crossing
- A separate track module is required to monitor each track approach
- The approaches must be separated using insulated joints

⚠ WARNING

THE FEED POINT INSULATED JOINTS OF A UNIDIRECTIONAL OR A SIMULATED BIDIRECTIONAL APPROACH MUST NOT BE BYPASSED WITH ANY COUPLING DEVICE.

NOTE

Unidirectional applications should be considered where:

- The 4000 GCP is located in CAB signal or other track circuit territory where insulated joints cannot be bypassed.
- It is necessary to reuse frequencies.
- A bidirectional unit cannot detect an inbound train due to parked rail cars or an outbound train on the opposite side of the crossing.

1.5.3 Simulated Bidirectional

The simulated bidirectional configuration combines the operating characteristics of the unidirectional configuration with the operating benefits of a bidirectional application.

- A bidirectional coupler or narrow-band shunt in series with an adjustable inductor is connected in parallel across the unidirectional track connections.
  - Parallel circuit is set electrically equal to the actual track approach circuit distance.
  - Both circuits appear equal in length to the 4000 GCP.

NOTE

To implement the simulated bidirectional configuration, the 4000 GCP must be programmed for simulated bidirectional operation.

1.6 REMOTE PREDICTION (also known as DAX)

Remote Prediction effectively extends approaches beyond the limits imposed by insulated joints.

- Remote prediction is the transfer of prediction information from a GCP at a remote location to a GCP at a crossing.
- Transfer may be via cable or by means of spread spectrum radio (SSR).

1.6.1 Remote Prediction Use Requirements	Remote prediction is used when insulated joints limit an approach and the approach is too short to provide the required warning time or preempt prediction.
1.6.2 Remote Prediction Capability	Each Track Module of the 4000 GCP may be programmed to provide up to nine prediction output signals: • Prime • DAX A through DAX G • Preempt
1.6.3 Remote Prediction Configuration	The GCP providing the remote prediction must be configured for unidirectional or simulated bidirectional operation.
1.6.3.1 Warning Time	The required crossing warning time is programmed into the remote prediction unit.
1.6.3.2 Offset Distance	The distance between the crossing feed points and the remote 4000 GCP location is the remote start offset. • This value is programmed in the remote prediction unit.
1.6.3.3 Predictor Input	The GCP receiving the remote prediction must be enabled to receive the individual predictor outputs from the remote unit: • Prime UAX • DAX A through DAX G Enable • Preempt Enable The available local inputs must be configured for the required pickup delay.
1.6.3.4 Remote Prediction Via SSR	Data transfer between 4000 GCP and SSR is via Echelon® LAN. • Two communication channels ♦ Radio DAX Link A ♦ Radio DAX Link B • All active vital signals transferred
1.6.4 Typical Remote Prediction Operation	Remote prediction operation is normally initiated from either an adjacent crossing or a remote location that has insulated joints. • A typical GCP controlled from a remote location other than a crossing as shown in figure 1-8.

- A typical GCP controlled from an adjacent crossing as shown in figure 1-10.

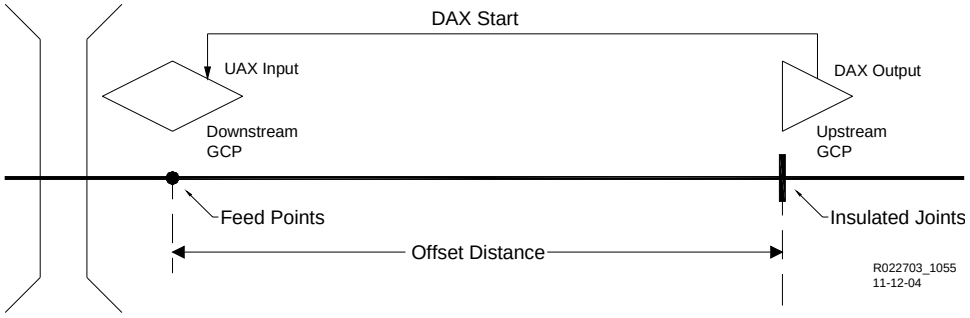

Figure 1-8. Remote Prediction From A Remote Location Other Than A Crossing

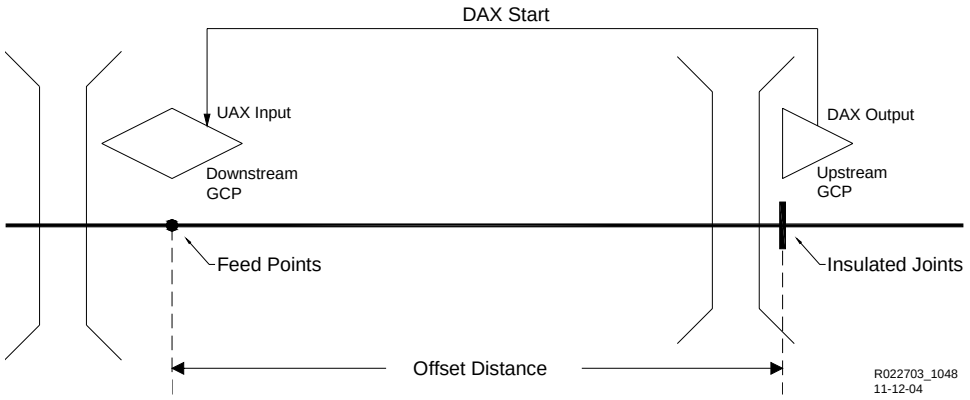

Figure 1-9. Remote Prediction From An Adjacent Crossing - Joints On Far Side Of Upstream Crossing

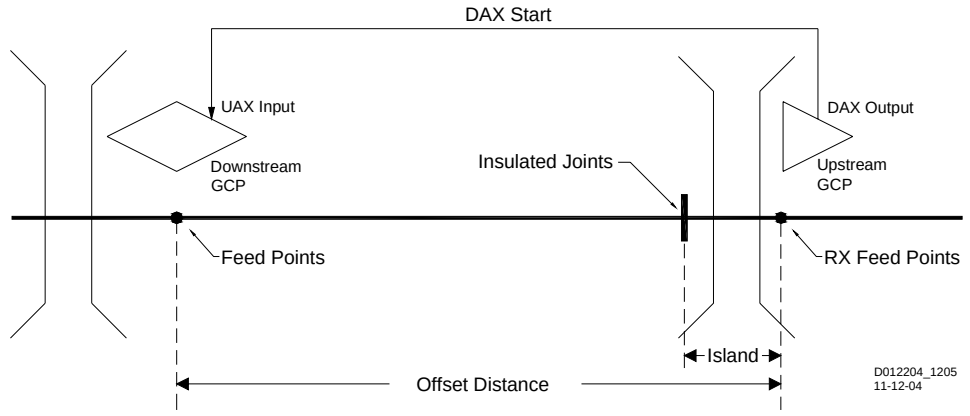

Figure 1-10. Remote Prediction From An Adjacent Crossing – Joints On Near Side Of Upstream Crossing

1.7 TRACK WIRES

Track wire placement is dependent on the track circuit configuration.

- Track wire length and size are frequency dependent and subject to the restrictions specified in the Model 4000 GCP Application Guidelines, document number SIG-00-03-19.

1.7.1 Four Track-Wire Hookup

In most installations four track wires within the restrictions specified above are used to connect the 4000 GCP to the track. In general:

- Two transmit wires are kept as short as possible
  - ♦ Placed on the side of the crossing nearest the bungalow
- Two receiver wires are placed on the other side of the crossing
- The transmit and the track check wires are connected together on the surge panel in the bungalow

NOTE

1. In unidirectional and simulated bidirectional track installations, the transmitter leads should be located adjacent to the insulated joints.
2. In track configurations where an Island circuit (see paragraph 1.8) is not involved, all track leads may be placed at one location.

1.7.2 Six Track-Wire Hookup

When transmit wires must exceed the maximum length specified in the Application Guidelines.

- Two check wires are added to the track connections
  - ♦ Connected to transmit wires in the underground within 25 feet of the transmit feed point but not at the rail connection.
  - ♦ Provides remote sensing of the transmit signal.

1.8 ISLAND CIRCUITS

An island circuit is a short, audio-frequency track circuit in the GCP 4000 Track Module that provides train detection.

1.8.1 Island Length

The island circuit length is the distance between the transmit and receiver wires on either side of a crossing.

- Island length may be between 120 and 350 feet.

1.8.2 Island Signal

A modulated, high frequency audio signal is applied to the track via the transmit wires.

- One of the following field selectable frequencies may be generated: 2.14, 2.63, 3.24, 4.0, 4.9, 5.9, 7.1, 8.3, 10.0, 11.5, 13.2, 15.2, 17.5, or 20.2 kHz

1.8.3 Island Occupancy

The 4000 GCP Island circuitry:

- Detects the presence of a train within an island circuit.
- Activates crossing warning devices while the train is detected.

1.9 SYSTEM SPECIFICATIONS

Input Power

Battery Voltage

On CPU Connector: 9.0-16.5 VDC

On SSCC IIIi Connector: 9.0-16.5 VDC

- must be 1.5 VDC greater than regulated lamp output

Maximum Ripple: 1.0 V p-p

NOTE

1. Track Module Output varies with transmitter frequency.
2. 80407 Display has a built-in heater for the LCD screen.
   - Heater turns on when temperature drops below approximately 41 °F (5 °C).
3. **Rev. B 80407 Display Modules Only**
   - The heater selection jumper (J-22) is located at the edge of the card that plugs into the chassis.
   - Three Display Module heater jumper options are available**.**
     - **NORMAL LCD HTR** (jumper positions 1 and 2**.**
     - **HI CURRENT** (jumper positions 2 and 3)
     - no jumper (heater disabled
   - Heater is enabled when jumper is set to either position.
   - Disabling the heater may result in poor LCD performance at cold temperatures.

Module Current:

	CPU Battery Connector @10V	CPU Battery Connector @13.2 V	CPU Battery Connector @16.5V
CPU II+:	0.4 A	0.5 A	0.6 A
Track:	1.8 A @ medium transmit power 2.00 A @ high transmit power • Current increases by 100mA when one 250 ohm relay output is energized	1.27 A @ medium transmit power 1.47 A @ high transmit power • Current increases by 70mA when one 250 ohm relay output is energized	1.0 A @ medium transmit power 1.2 A @ high transmit output • Current increases by 50mA when one 250 ohm relay output is energized
Minimum Output Current @ medium transmit power:	200 mA	200 mA	200 mA
Minimum Output Current @ high transmit power:	400 mA	400 mA	400 mA
RIO:	200 mA with no relay output • Current increases by 106 mA when one 500 ohm relay output is energized	186 mA with no relay output • Current increases by 79 mA when one 500 ohm relay output is energized	186 mA with no relay output • Current increases by 69 mA when one 500 ohm relay output is energized
SSCC IIIi			
Current draw from CPU battery connector:	0.020A	0.015 A	0.015 A
Current draw from SSCC IIIi battery connector:	0.540A (with no load) When crossing activated add lamp, bell, and gate control currents.	0.560 A (with no load) When crossing activated add lamp, bell, and gate control currents.	0.600 A (with no load) When crossing activated add lamp, bell, and gate control currents.

	CPU Battery Connector @10V	CPU Battery Connector @13.2 V	CPU Battery Connector @16.5V
Display:	0.41 A with Backlight off and heater off 1.08 A with Backlight on and heater off 2.01 A with Backlight off and heater on 2.70 A with Backlight on and heater on	0.31 A with Backlight off and heater off 0.80 A with Backlight on and heater off 2.47 A with Backlight off and heater on 2.97 A with Backlight on and heater on	0.25 A with Backlight off and heater off 0.63 A with Backlight on and heater off 2.27 A with Backlight off and heater on 2.67 A with Backlight on and heater on
Transfer:	0.109 A on Main 0.191A on Standby	0.116 A on Main 0.230 A on Standby	0.117 A on Main 0.230 A on Standby
SEAR IIi:	1.15A	0.8 A	0.65 A
Single Track Chassis	2.2 A (medium power) 2.4 A (high power)	1.77 A (medium power) 1.97 A (high power)	1.6 A (medium power) 1.8 A (high power)
Six Track, Dual Bay Chassis With Full Complement Of Modules: **CPU II+** **Track (6 each)** **SSCC IIIi (2 each)** **Display** **Transfer** **SEAR IIi**	12.909 A (medium transmit power and no heater) 14.109 A (high transmit power and no heater)	9.376 A (medium transmit power and no heater) 10.576 A (high transmit power and no heater)	7.647 A (medium power) 8.847 A (high power)
Additional current draw at SSCC IIIi battery connector (no load)	0.540 A	0.560 A	0.600 A

GCP Frequencies Available:	Safetran Standard frequencies: 86, 114, 156, 211, 285, 348, 430, 525, 645, 790, and 970 Hz Offset frequencies: 85.5, 86.5, 87, 113, 113.5, 114.5, 115, 155, 155.5, 156.5, 157, 210, 212, 284, 286, 347, 349, 429, 431, 523, 527, 643, 647, 788, 792, 968, and 972 Hz Other frequencies: 44, 45, 46, 151, 250, 267, 326, 392, 452, 522, 560, 630, 686, 753, 816, 881, 979 and 999 Hz
Frequency Stability:	±0.01 percent
Track Module Island Frequencies Available	2.14, 2.63, 3.24, 4.0, 4.9, 5.9, 7.1, 8.3, 10.0, 11.5, 13.2, 15.2, 17.5, or 20.2 kHz (frequencies are programmable)
Island Circuit Length	120 feet (36.58 meters) (minimum) to 350 feet (106.68 meters) (maximum)

NOTE

Island Circuit Length corresponds to the distance between the track wire connections.

MS/GCP Response Time	5 seconds
Relay Drive Outputs (VO):	400 to 1000-ohm load
Surge Protection:	Built-in secondary surge protection for all connections. • Requires external arresters and equalizers on track wires as primary surge protection. ♦ Surge panels or their electrical equivalent are required. ♦ Refer to paragraph 3.23 for battery and external cable surge protection.

Typical Monitoring and Storage:

	CPU II+	SEAR IIi
IO State Changes:	3000 minimum	180,000 minimum
Train Moves:	100 minimum	1,800 minimum

Mounting:	All 4000 GCP chassis can be wall, rack, or shelf mounted

Chassis Dimensions:

Single Track (A80445)

Width:	5.94 Inches	(15.09 centimeters)
Depth:	12.38 Inches	(31.45 centimeters)
Height:	19.09 Inches	(23.09 centimeters)

Basic Crossing (A80455)

Width:	15.0 Inches	(38.1 centimeters)
Depth:	12.38 Inches	(31.45 centimeters)
Height:	19.09 Inches	(23.09 centimeters)

Five Track (A80440) & Dual Two Track (A80465)

Width:	23.25 Inches	(59.06 centimeters)
Depth:	12.38 Inches	(31.45 centimeters)
Height:	22.15 Inches	(56.26 centimeters)

Dual Four Track (A80400) & Dual Six Track (A80460)

Width:	23.25 Inches	(59.06 centimeters)
Depth:	12.38 Inches	(31.45 centimeters)
Height:	31.47 Inches	(79.93 centimeters)

Chassis Weight:

	Empty	Full Module Complement
Single Track (A80445)	8.25 pounds (3.71 kilograms)	10.5 pounds (4.73 kilograms)
Basic Crossing (A80456)	13.33 pounds (6.0 kilograms)	26.7 pounds (12.02 kilograms)
Five Track (A80440)	26.01 pounds (11.7 kilograms)	48.6 pounds (21.87 kilograms)
Dual Two Track (A80465)	25.73 pounds (11.58 kilograms)	50.1 pounds (22.55 kilograms)
Dual Four Track (A80400)	35.59 pounds (16.02 kilograms)	67.34 pounds (30.3 kilograms)
Dual Six Track (A80460)	35.59 pounds (16.02 kilograms)	66.84 pounds (30.08 kilograms)

Module Weight:

CPU II+ (A80403)	1.25 pounds (0.56 kilograms)
Track (A80418)	1.00 pounds (0.45 kilograms)
RIO (A80413)	1.13 pounds (0.51 kilograms)
SSCC IIIi (A80405)	3.63 pounds (1.63 kilograms)
Display (A80407)	3.88 pounds (1.75 kilograms)
Transfer (A80406)	0.38 pounds (0.17 kilograms)
Transfer (A80468)	1.50 pounds (0.68 kilograms)
SEAR IIi (A80410)	5.25 pounds (2.36 kilograms)

Temperature Range: -40 °F to +160 °F (-40 °C to 70 °C)

LonTalk™ Protocol (Echelon ®) LAN Interface:

Data Transfer Rate:	1.25 Mbps
Transmission Medium:	• For normal installations within the same signal case or bungalow, use stranded twisted pair, conductor size #22 AWG (0.3 mm^2) to #16 AWG (1.3 mm^2). • Communication grade twisted pair cable NEMA Level 4 is recommended.
Topology:	Bus (direct daisy-chain)
Number of Nodes:	Maximum of: • 8 nodes in any 16-meter (53 feet) length of transmission cable • 16 nodes per network segment
Termination:	One Network Echelon Termination Unit, p/n 8000-80078-001, is recommended per network segment
Network Length:	53 feet (16 meters) • 426 feet (130 meters) maximum per network segment

⚠ CAUTION

ALL DEVICES CONNECTED TO THE LAN SHOULD BE CONTAINED ENTIRELY WITHIN THE SAME SIGNAL CASE OR BUNGALOW.

1.10 CROSSING CONTROLLER MODULE SPECIFICATIONS

Environmental

Temperature Range:	-40 °F to +158 °F (-40 °C to +70 °C)
Humidity:	95% non-condensing

Module Power Requirements

Battery:	Lead-acid or Nickel-cadmium
Battery Charger:	Constant voltage charger (with or without temperature compensation)

Connector Wire Size Requirements

Battery Wires:	Double 10 AWG wire for B and N
Lamp Wires:	10 AWG
Gate Control, Bell, and Input Wires:	16 to 12 AWG

External Battery Charger: (customer supplied)	20-Amps constant voltage. 40-Amps constant voltage charger recommended if lamp load approaches 20 amps. (With or without temperature compensation.)
Maximum Ripple Voltage:	1.0V peak-to-peak
Power Requirements	
Voltage:	13.2 to 16.5 VDC Nominal. • Must be 1.5 VDC greater than regulated lamp output.
Operating Current:	750 ma maximum
Maximum Lamp Current:	20 amps (eight 25-watt lamps)
Gate Control (GC)	
Gate DC Drive Voltage:	12 VDC nominal
Gate DC Drive Current:	10 amps Initial current dropping to 6 amps after 10 seconds
Programmable Gate Delay:	3 to 20 seconds programmable in 1-second increments
Crossing Control Vital Inputs	
Input Voltage:	20.0 VDC maximum; 12 VDC Nominal
Input States:	• Energized at voltages of 7.5 VDC and above • Deenergized when input voltage drops below nominal 4.0 VDC
Impedance:	1kΩ nominal
Bell Output:	Continuous upon activation
Voltage:	12 VDC nominal
Current:	2 amperes maximum
Built-in Isolation:	2000 VAC

1.11 SYSTEM COMPATIBILITY

1.11.1 Track Circuits

The 4000 GCP is generally compatible with the following track circuits when appropriate frequencies and applicable filters are applied:

- DC Track Circuits
- DC Coded Track Circuits
  - ♦ GEO®
  - ♦ Electro Code®
  - ♦ Microcode™
  - ♦ Genrakode™
  - ♦ MicroTRAX®
  - ♦ Dual Polarity (Polar)
    - ▪ See Warning
- Relay based DC coded track
  - ♦ Single polarity code
  - ♦ Dual polarity code (see note below)
- AC coded track
  - ♦ Electronic cab signal (60, 100, 156, 250 Hz)
- Relay Coded DC Track with 60 and 100 Hz CAB signals
- 100 Hz Non-coded steady energy cab circuit
- Audio Overlay Track Circuits
  - ♦ PSO II
  - ♦ PSO III
  - ♦ AFTAC

⚠ WARNING

WHEN THE 4000 GCP IS USED WITH GRS/ALSTOM TRAKODE POLAR CIRCUITS, TIME DELAY (TD) RELAYS MUST BE USED AT EACH CODE LOCATION.

NOTE

Contact Safetran Technical Support for assistance prior to using the 4000 GCP in applications with the following track circuits:

- ➢ Dual Polarity DC Coded Circuits
- ➢ 60 Hz And 100 Hz Coded Circuits

Electro Code® is a registered trademark of GE Transportation, Genrakode™ is a trademark of ALSTOM, MicroTRAX® is a registered trademark of Union Switch & Signal, Inc., Microcode™ is a trademark of Union Switch & Signal, Inc., GEO® is a registered trademark of Safetran® Systems Corporation.

1.12 APPROACH LENGTH VERSUS TRACK BALLAST

Maximum approach length for any given frequency is governed by the lowest expected ballast resistance conditions.

1.12.1 Bidirectional Approaches

The bidirectional approach distances for each standard 4000 GCP operating frequency and designated ballast conditions are presented in table 1-2.

NOTE

1. Minimum approach lengths for any given frequency are the shortest reliable operating distance for that frequency.
2. Maximum Distances should be reduced if Lumped Loading near the crossing is expected.
3. Lumped Loading may result from:
   - poor drainage
   - salted highways
   - salted station platforms

Table 1-2. Ballast Resistance Vs. Approach Length by Frequency, Bidirectional Applications

4000 GCP Operating Frequency (Hz)	Bidirectional Approach Length (Feet)					
	2 Ohms/1,000 Feet Distributed Ballast		4 Ohms/1,000 Feet Distributed Ballast		6 Ohms/1,000 Feet Distributed Ballast	
	Min.	Max.	Min.	Max.	Min.	Max.
86	1,000	5,350	1,000	7,950	1,000	9,280
114	750	4,525	750	6,450	750	7,448
156	600	3,925	600	5,550	600	6,349
211	475	3,350	475	4,800	475	5,494
285	400	2,950	400	4,225	400	4,762
348	400	2,625	400	3,675	400	4,151
430	400	2,300	400	3,350	400	3,785
525	400	2,150	400	3,150	400	3,641
645	400	1,950	400	2,800	400	3,175
790	400	1,725	400	2,475	400	2,808
970	400	1,550	400	2,175	400	2,472

1.12.2 Unidirectional Approaches

The unidirectional approach distances for each standard 4000 GCP operating frequency and designated ballast conditions are presented in table 1-3.

Table 1-3. Ballast Resistance Vs. Approach Length by Frequency, Unidirectional Applications

4000 GCP Operating Frequency (Hz)	Unidirectional Approach Length (Feet)					
	2 Ohms/1,000 Feet Distributed Ballast		4 Ohms/1,000 Feet Distributed Ballast		6 Ohms/1,000 Feet Distributed Ballast	
	Min.	Max.	Min.	Max.	Min.	Max.
86	700	4,375	700	6,175	700	7,080
114	525	3,850	525	5,550	525	6,360
156	420	3,325	420	4,875	420	5,520
211	400	2,750	400	4,100	400	4,680
285	400	2,250	400	3,500	400	3,960
348	400	1,925	400	3,025	400	3,420
430	400	1,725	400	2,650	400	3,000
525	400	1,500	400	2,275	400	2,580
645	400	1,300	400	1,950	400	2,220
790	400	1,125	400	1,650	400	1,860
970	400	1,050	400	1,550	400	1,710

SECTION 2 – PRIMARY EQUIPMENT DESCRIPTION

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SECTION 2 - PRIMARY EQUIPMENT DESCRIPTION

2.1 GENERAL PHYSICAL DESCRIPTION

Each 4000 GCP consists of:

- a case assembly
- motherboard
- plug-in circuit modules

plug-in external wiring connectors

2.1.1 Case Assemblies

Each 4000 GCP case assembly consists of :

powder-coated steel case

backplane-mounted motherboard

Refer to table 2-1 for key features of each case configuration.

Table 2-1. 4000 GCP Case Feature Overview

	FEATURE						
CASE PART NUMBER	Number of Track Modules	Main/ Standby Transfer System	Internal SSCC IIIi Crossing Control Module[1]	Internal SEAR IIi Recorder	I/O Expansion (RIO Module)[2]	Echelon LAN Functions	Reference Paragraph
80445	1 track	no	no	no	no	yes	2.2
80455	1 track	no	0, 1 or 2	no	no	yes	2.3
80440	1 to 5 tracks	no	0, 1 or 2	yes	0, 1 or 2	yes	2.4
80465	1 or 2 tracks	yes	0, 1 or 2	yes	0 or 1	yes	2.5
80400	1 to 4 tracks	yes	0, 1 or 2	yes	0, 1, 2 or 3	yes	2.6
80460	1 to 6 tracks	yes	0, 1 or 2	yes	0, 1, 2 or 3	yes	2.7

[1] SSCC IIIi module controls Gates, Flashing Light Signals and Bells

[2] Relay Input Output (RIO) Module can be used in lieu of Track Module in the 2nd, 5th and/or 6th track slot

2.1.2 Motherboard

The Motherboard for each assembly provides:

- GCP unit wiring
- Circuit module connectors
- External Configuration Device Connector(s)
- Chassis Identification Chip socket(s)
- **DIAG** (diagnostic) port connector
- Interface connectors for external wiring connectors Echelon **LONTALK® PROTOCOL** LAN connector

2.1.3 Plug-In Circuit Modules

Each 4000 GCP plug-in circuit module is equipped with:

- a dual 43-pin connector on one edge which plugs into a corresponding edge connector on the motherboard.
- locking ejector levers at the top and bottom of each module to facilitate removal from the case.
- SSCC IIIi Modules include screw locking mechanism for securing modules.

⚠ WARNING

SSCC IIIi MODULES MUST BE SECURED IN PLACE BY SCREW LOCKING MECHANISM. ACCIDENTAL REMOVAL OF SSCC IIIi MODULE WILL CAUSE THE GATES TO DROP WITHOUT GATE DELAY AND FLASHING LIGHTS WILL NOT ACTIVATE.

2.1.4 External Wiring Connectors & Wire Size

All external wiring to a 4000 GCP Assembly is by means of plug-in connectors.

The orange cage-clamp connectors for the signal circuits should use 16 to 12 AWG wire.

The orange cage-clamp connector for the Echelon Lon Talk should use communication grade twisted wires of at least 20 AWG.

The green Screw-Lock connectors for the CPU and the SSCC should use 10 AWG wire.

NOTE

Generic spare connectors that are not keyed for specific modules may be ordered.

Refer to the catalog for ordering information.

2.1.5 Wire Preparation

Strip insulation from the end of the wire as follows:

Connector Type	Strip Length
Screw terminal	0.28” (7 mm)
Cage clamp	0.32” – 0.35” (8 – 9 mm)

NOTE

Use a stripping tool to accurately set the strip length.
The addition of ferrules is not required.

2.1.6 Screw-terminal Connector Wire Insertion

Wires are secured to the screw-terminal connector as follows:

Insert the stripped end of a wire into the wire receptor of the connector until it stops

Tighten the screw to a torque of 4.5 inch pounds (0.508 Newton meters)

2.1.7 Cage-clamp Connector Wire Insertion

Wires are secured to the cage-clamp connector as follows:

Place a flat bladed screwdriver in the rectangular slot in the connector next to the wire receptor (see figure below).

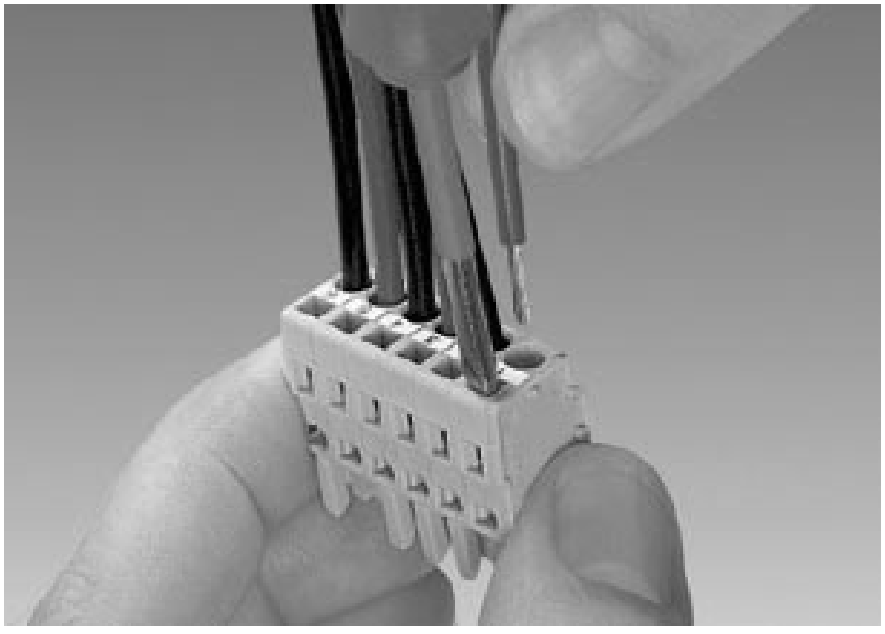
Use a screwdriver blade 0.10 in. wide and 0.020 in. thick (2.5mm x 0.5mm)

Lever the wire cage clamp open by pressing straight down on the screwdriver

Insert the stripped end of a wire into the fully-open wire receptor until it stops

Hold the wire in place and release the screwdriver blade pressure

The wire receptor closes on the stripped end of the wire



2.2 A80445 SINGLE TRACK CASE

2.2.1 Single Track Case Interface Connectors

The A80445 Single Track case is shown in figure 2-1.

The relationships between the Single Case modules and the interface connectors are described in table 2-2.

NOTE

The module slot allocations shown below the module connectors are assigned for discussion purposes only and do not appear on the actual case assembly.

Table 2-2. Single Track Case Module to Interface Connector Relationship

Module	Slot Position	Interface Connector
A80403	M1	CPU
A80418	M2	TRACK-1

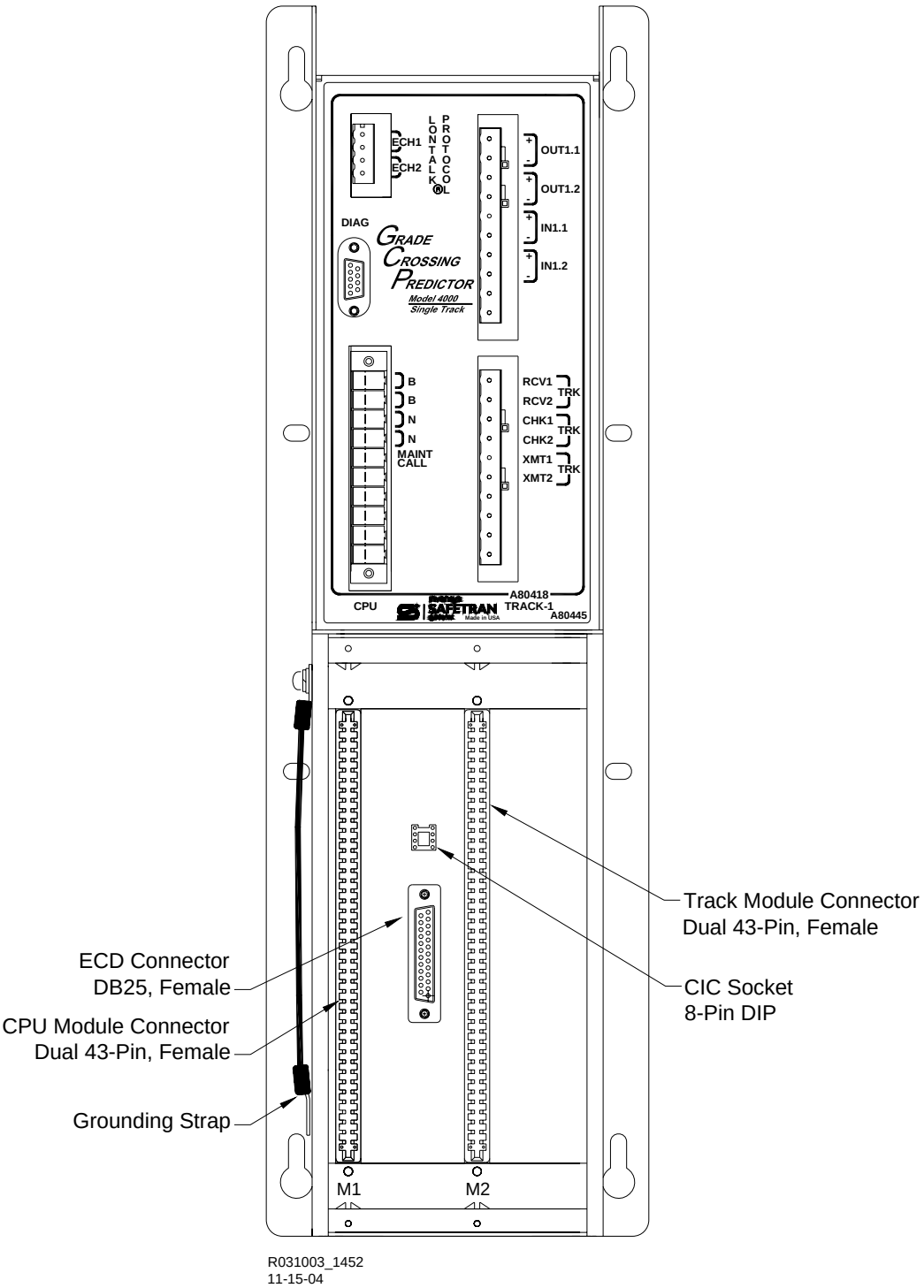


Figure 2-1. A80445 Single Track Case

2.2.2 Single Track Case Modules and External Wiring Connectors

The A80445 Single Track case with modules and external wiring connectors installed is shown in figure 2-2.

Two modules:

Central Processor Unit module in slot position M1.

A80403 (CPU II+)

- A80418 Track module in slot position M2

Four external wiring connectors:

See table 2-3.

Table 2-3. Single Case External Wiring Connectors

Ref. No.	Connector Description	Connector Designation	Safetran Part Number
1	4-pin cage clamp, female	**LONTALK® PROTOCOL**	Z715-09099-0000
2	10-pin screw lock, female	**CPU**	Z715-02101-0007
3	Keyed 10-pin cage clamp, female	Upper **TRACK**	Z715-02101-0001
4		Lower **TRACK**	Z715-02101-0008

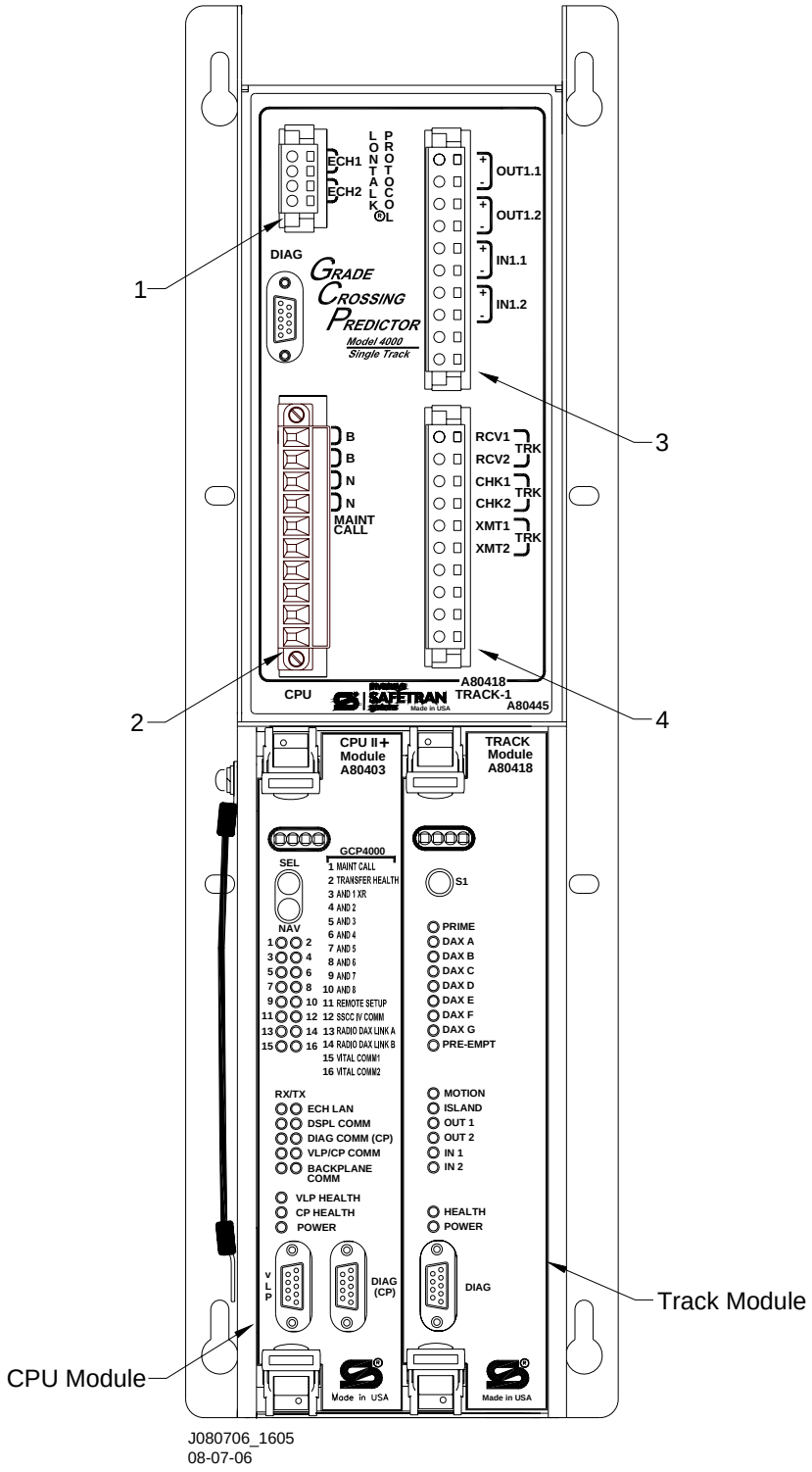


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Figure 2-2. Single Track Case With Modules and External Wiring Connectors Installed

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2.3 A80455 CROSSING PACKAGE

The A80455 Basic Crossing case is shown in figure 2-3.

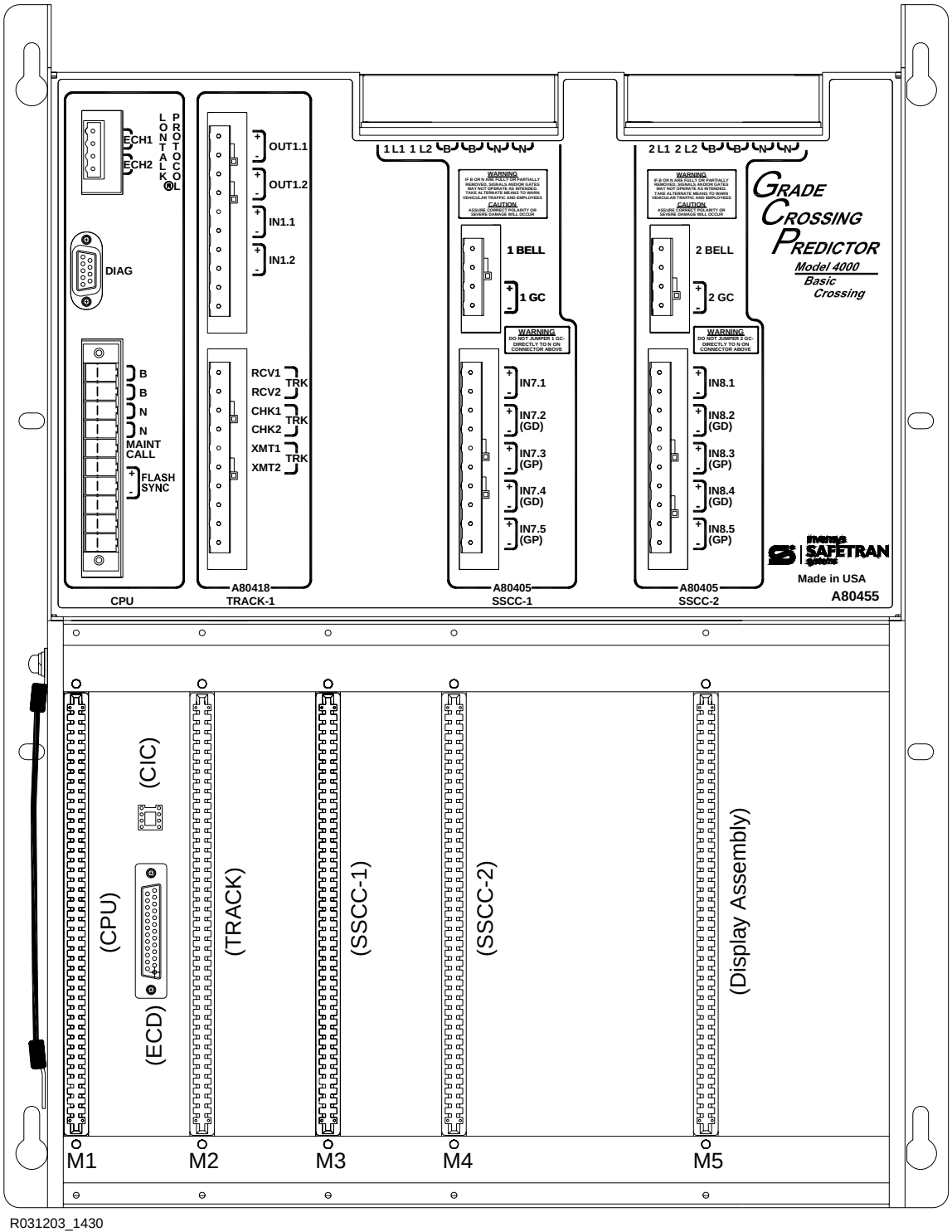

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Figure 2-3. A80455 Basic Crossing Case

NOTE

The module slot allocations shown below the module connectors are assigned for discussion purposes only and do not appear on the actual case assembly.

2.3.1 Basic Crossing Case Modules

The A80455 Basic Crossing case with modules installed is shown in figure 2-4.

A80403 Central Processor Unit (CPU II+) module in slot position M1:

A80418 Track module in slot position M2

A80405 Solid State Crossing controller Module in slot position M3

A80405 Solid State Crossing controller Module in slot position M4

A80407 Display Module in slot position M5

2.3.2 Basic Crossing Case Interface Connector to Module Relationship

The relationship between the interface connectors and the Basic Crossing Case modules is shown in table 2-4.

Table 2-4. Basic Crossing Case Module to Interface Connector Relationship

Module	Slot Position	Interface Connector
A80403	M1	CPU
A80418	M2	TRACK-1
A80405	M3	SSCC-1
A80405	M4	SSCC-2
A80407	M5	Display

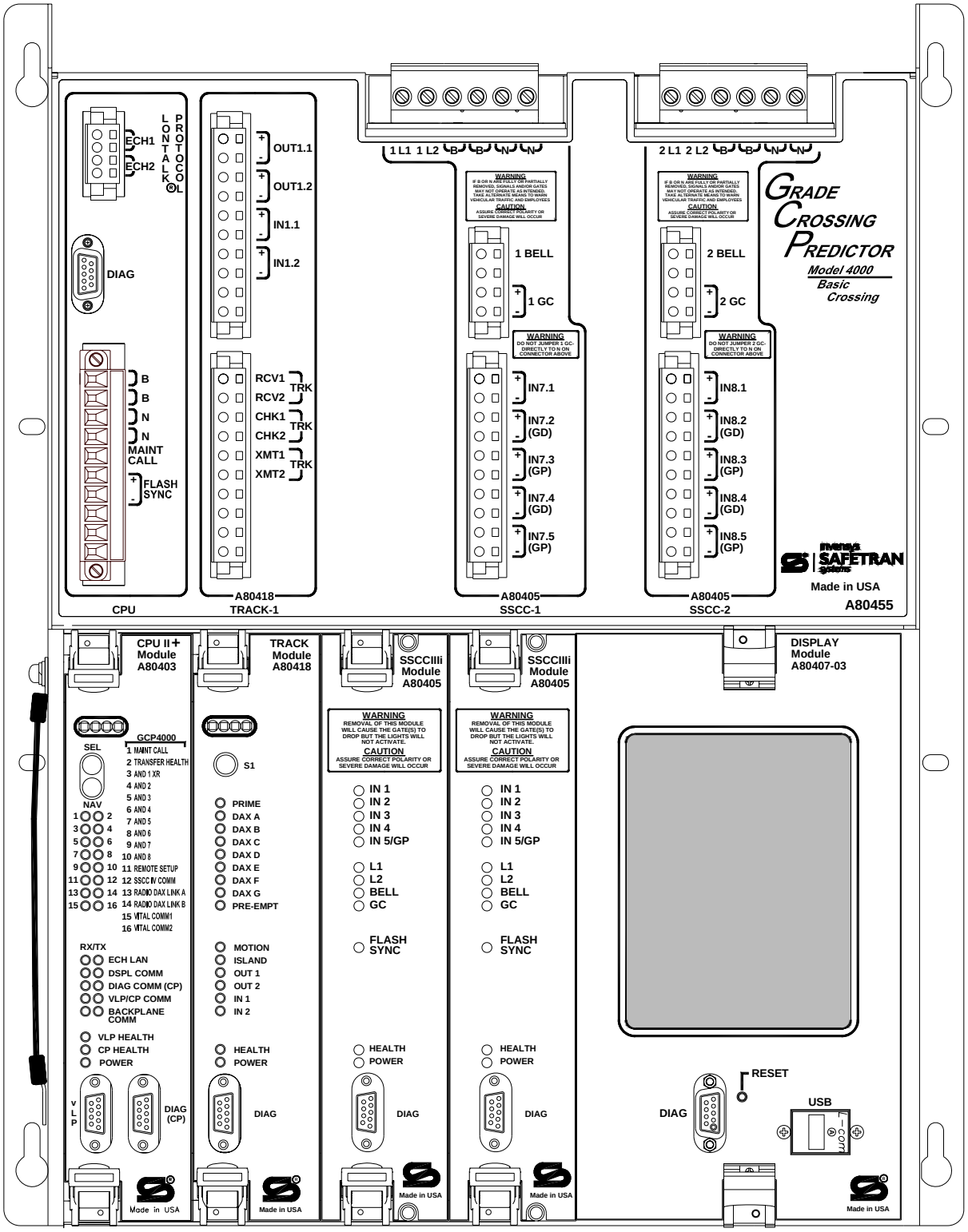

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Figure 2-4. Basic Crossing Case With Connectors and Modules Installed

2.3.3 Basic Crossing External Wiring Connectors

The external wiring connectors of the Basic Crossing Case are shown in figure 2-5 and described in table 2-5.

Table 2-5. Basic Crossing External Wiring Connectors

Ref. No.	Connector Description	Connector Designation	Safetran Part Number
1	4-pin cage clamp, female	**LONTALK® PROTOCOL**	Z715-09099-0000
2	Keyed 10-pin cage clamp, female	Upper **TRACK**	Z715-02101-0001
3	6-pin screw terminal, female	**SSCC-1** power and lamp	Z715-02118-0001
4	Keyed 4-pin cage clamp, female	Upper **SSCC-1**	Z715-02106-0001
5	6-pin screw terminal, female	**SSCC-2** power and lamp	Z715-02118-0002
6	Keyed 4-pin cage clamp, female	Upper **SSCC-2**	Z715-02106-0002
7	Keyed 10-pin cage clamp, female	Lower **SSCC-2**	Z715-02101-0015
8		Lower **SSCC-1**	Z715-02101-0014
9		lower **TRACK**	Z715-02101-0008
10	10-pin cage clamp, female	**CPU**	Z715-02101-0007

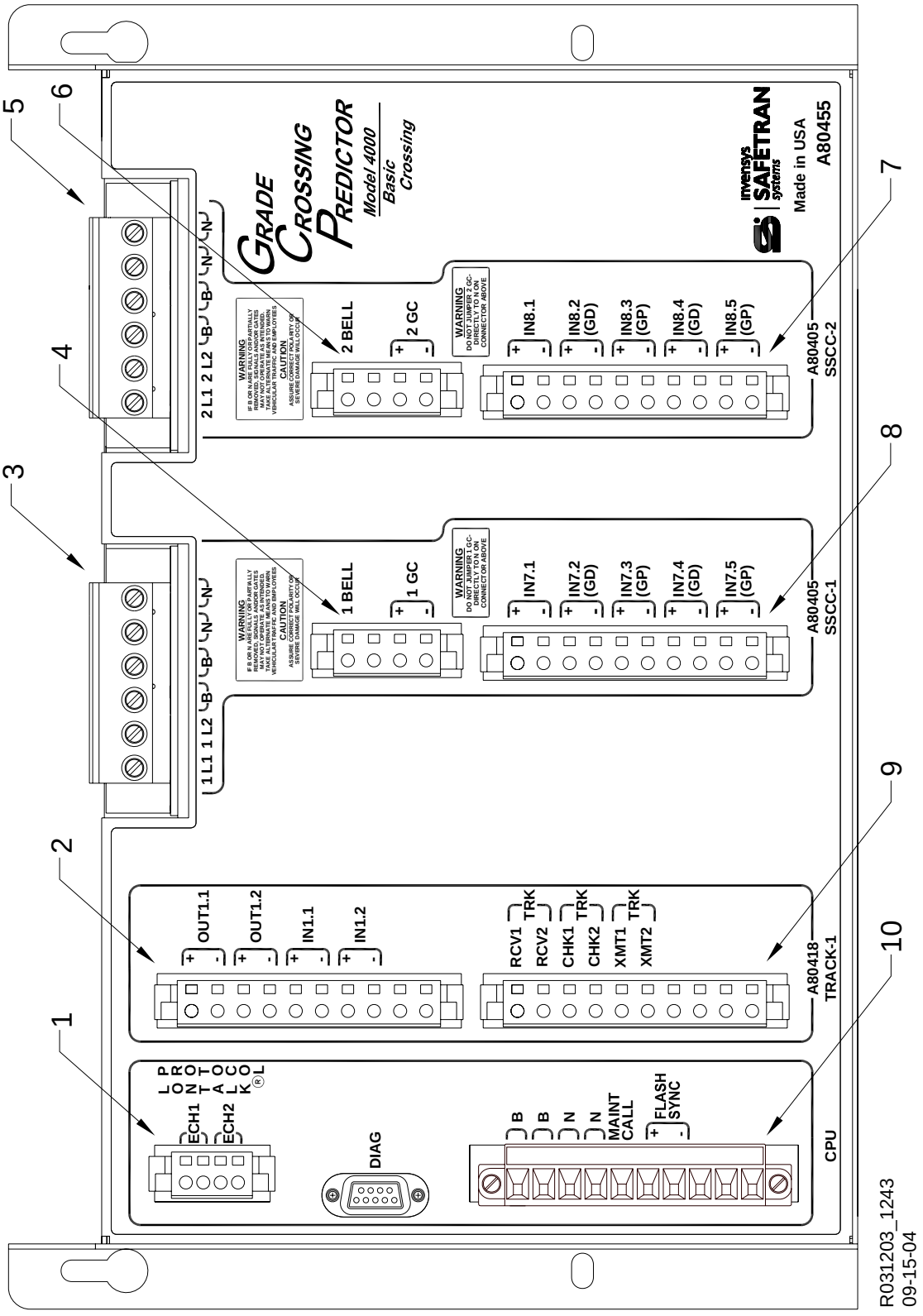

Figure 2-5 Basic Crossing Case External Wiring Connectors

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2.4 A80440 SINGLE FIVE TRACK CASE

The Single Five Track case is shown in figure 2-6.

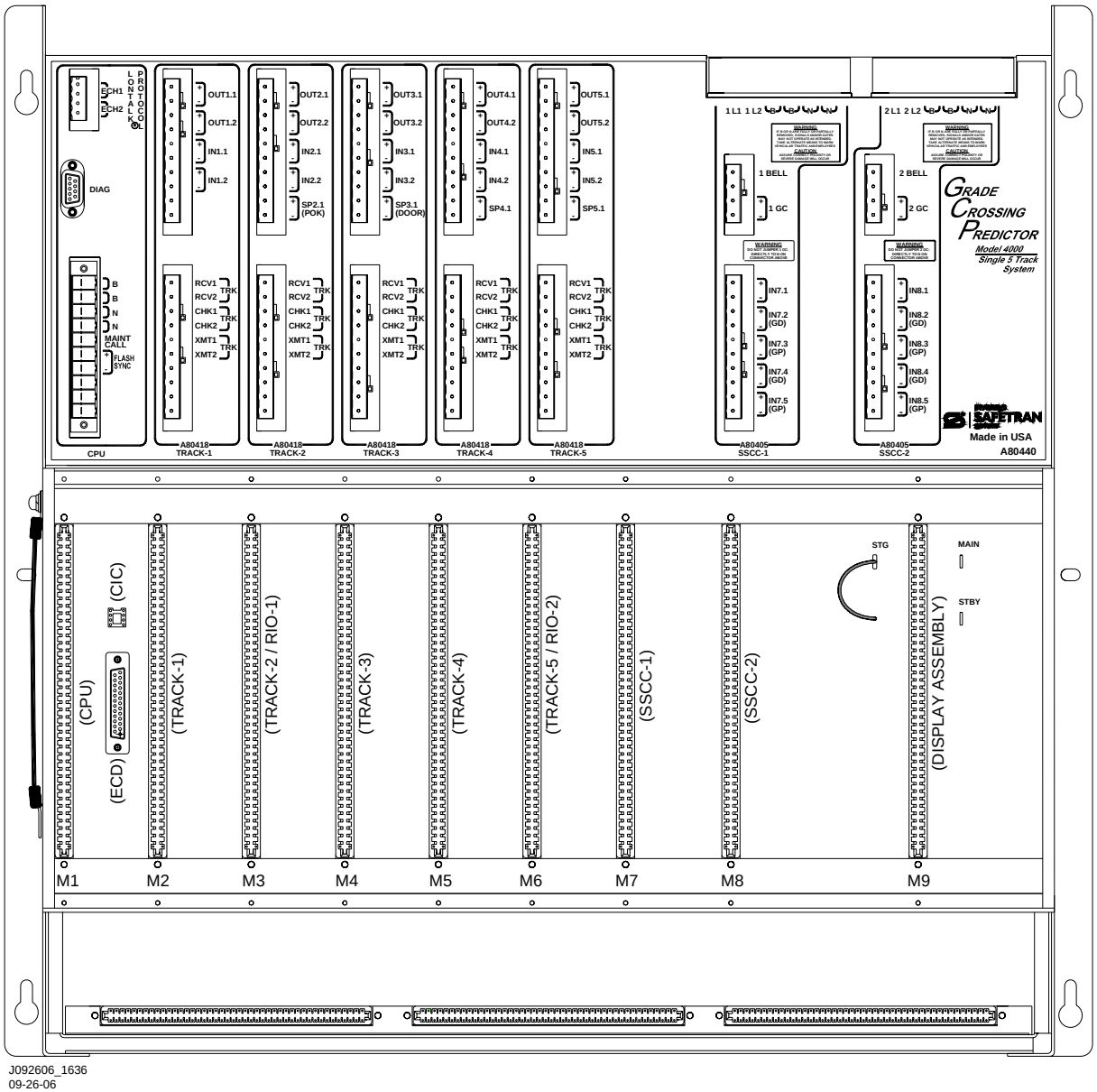

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Figure 2-6. Single Five Track Case

NOTE

The module slot allocations shown below the module connectors are assigned for discussion purposes only and do not appear on the actual case assembly.

2.4.1 Single Five Track Case Modules and Subassembly

The A80440 Single Five Track case with the following modules installed is shown in figure 2-7.

A80403 Central Processor Unit Plus (CPU II+) module in slot position M1.

Five A80418 Track modules in slot positions M2 through M6.

Two A80405 Solid State Crossing controller Modules in slot positions M7 and M8

A80407 Display Module in slot position M9

A80410 Safetran Event Analyzer Recorder IIi (SEAR IIi) subassembly in bay below modules

NOTE

The A80413 RIO module may be used in place of the Track module in slot positions M3 and M6.

2.4.2 Single Five Track Case Interface Connector to Module Relationship

The relationship between the interface connectors and the Single Five Track Case modules is shown in table 2-6.

Table 2-6. Single Five Track Case Module to Interface Connector Relationship

Module	Slot Position	Interface Connector
A80403	M1	CPU
A80418	M2	Track-1
A80418	M3*	Track-2 / RIO-1
A80418	M4	Track-3
A80418	M5	Track-4
A80418	M6*	Track-5 / RIO-2
A80405	M7	SSCC-1
A80405	M8	SSCC-2
A80407	M9	Display

*Note: A80413 RIO may be used in slots M3 and M6.

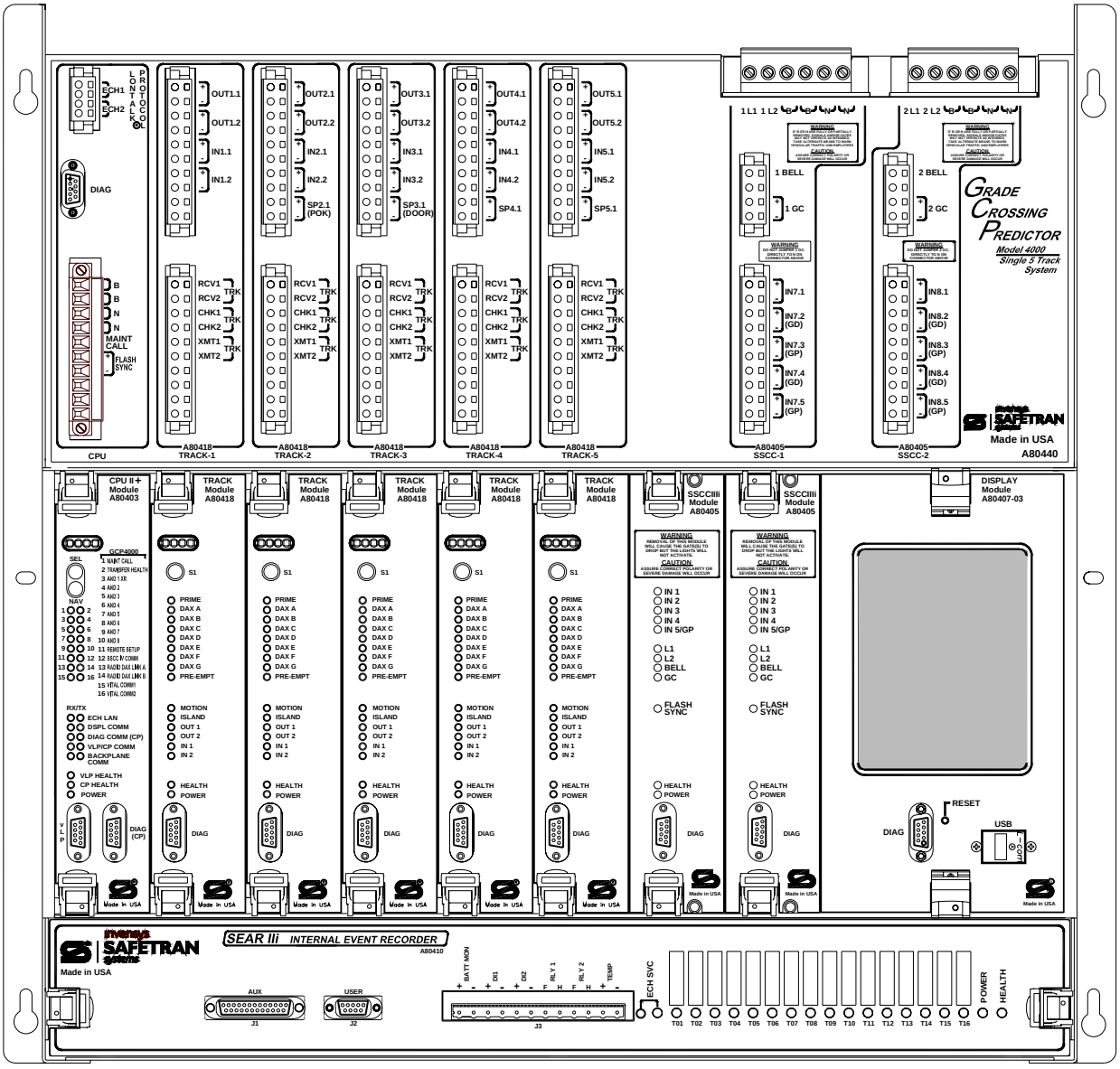

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Figure 2-7. A80440 Single Five Track Case With Modules and SEAR IIi Installed

2.4.3 Single Five Track Case External Wiring Connectors

The external wiring connectors of the Single Five Track Case are shown in figure 2-8 and described in table 2-7.

Table 2-7. Single Five Track Case External Wiring Connectors

Ref. No.	Connector Description	Connector Designation	Safetran Part Number
1	4-pin cage clamp, female	**LONTALK® PROTOCOL**	Z715-09099-0000
2	Keyed 10-pin cage clamp, female	Upper **TRACK-1**	Z715-02101-0001
3		Upper **TRACK-2**	Z715-02101-0002
4		Upper **TRACK-3**	Z715-02101-0003
5		Upper **TRACK-4**	Z715-02101-0004
6		Upper **TRACK-5**	Z715-02101-0005
7	6-pin screw terminal, male	**SSCC-1** power and lamp	Z715-02118-0001
8	Keyed 4-pin cage clamp, female	Upper **SSCC-1**	Z715-02106-0001
9	6-pin screw terminal, male	**SSCC-2** power and lamp	Z715-02118-0002
10	Keyed 4-pin cage clamp, female	Upper **SSCC-2**	Z715-02106-0002
11	10-pin cage clamp, female	**CPU**	Z715-02101-0007
12	Keyed 10-pin cage clamp, female	lower **TRACK-1**	Z715-02101-0008
13		lower **TRACK-2**	Z715-02101-0009
14		lower **TRACK-3**	Z715-02101-0010
15		lower **TRACK-4**	Z715-02101-0011
16		lower **TRACK-5**	Z715-02101-0012
17		Lower **SSCC-1**	Z715-02101-0014
18		Lower **SSCC-2**	Z715-02101-0015

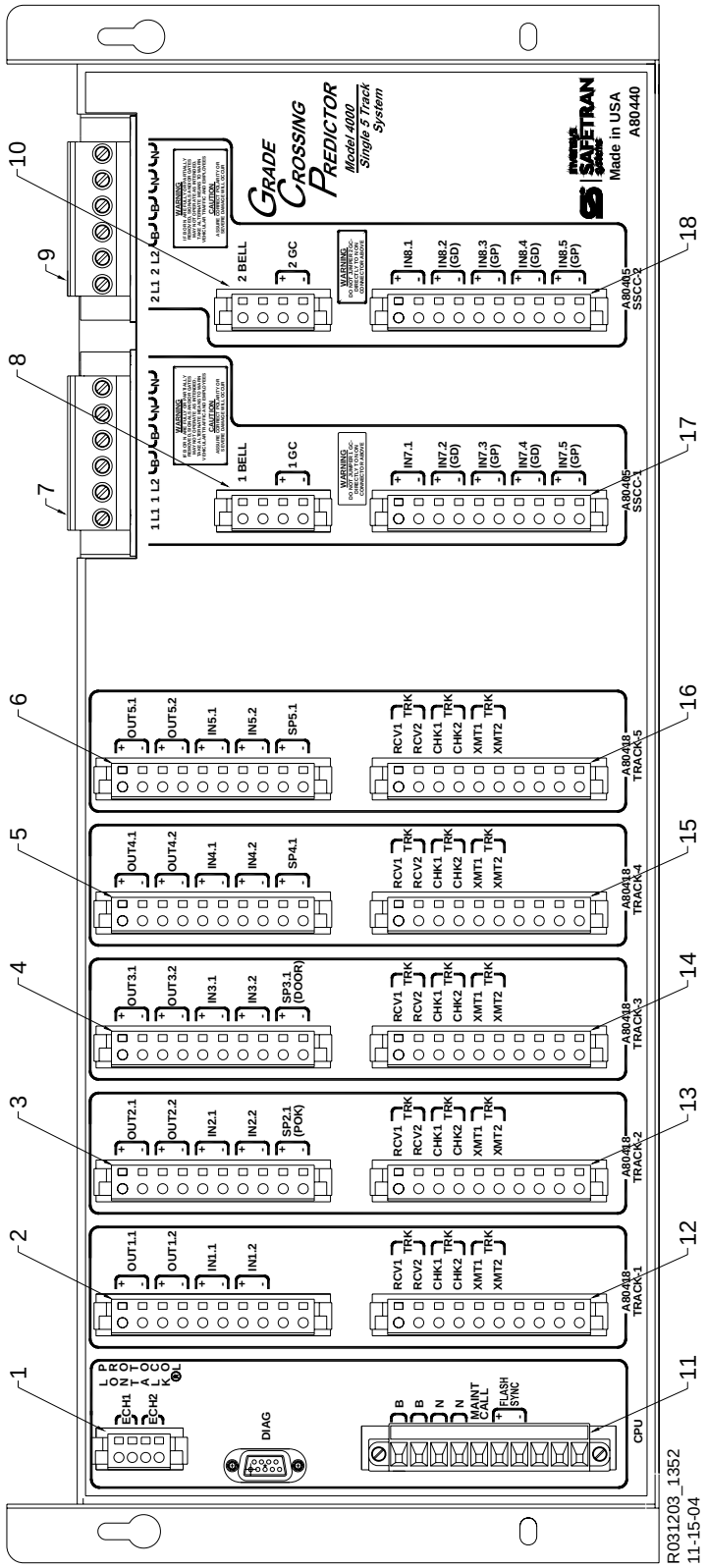

Figure 2-8 Single Five Track Case External Wiring Connectors

2.5 A80465 DUAL TWO TRACK CASE

The Dual Two Track case is shown in figure 2-9.

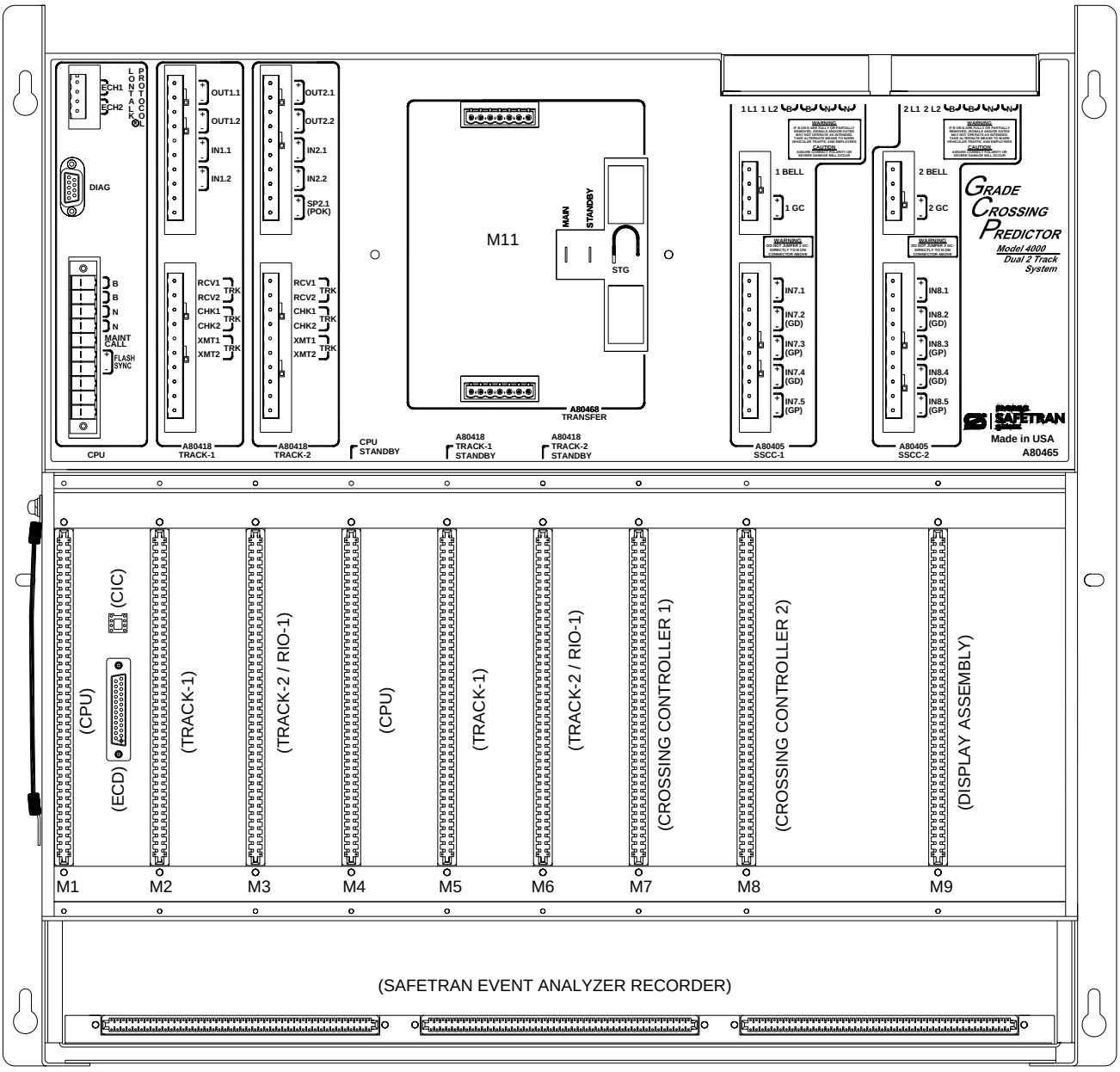

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Figure 2-9. A80465 Dual Two Track Case

NOTE

The module slot allocations shown below the module connectors are assigned for discussion purposes only and do not appear on the actual case assembly.

2.5.1 Dual Two Track Case Modules and Subassembly

The A80465 Dual Two Track case with the following modules installed is shown in figure 2-10.

A80403 Central Processor Unit Plus (CPU II+) modules in slot positions M1 and M4

Four A80418 Track modules in slot positions M2, M3, M5 and M6

Two A80405 Solid State Crossing controller Modules in slot positions M7 and M8

A80407 Display Module in slot position M9

A80468 Transfer module located in the center of the top connector interface panel (slot position M11)

A80410 Safetran Event Analyzer Recorder IIi (SEAR IIi) subassembly in bay below modules

NOTE

The A80413 RIO module may be used in place of the Track module in slot positions M3 and M6.

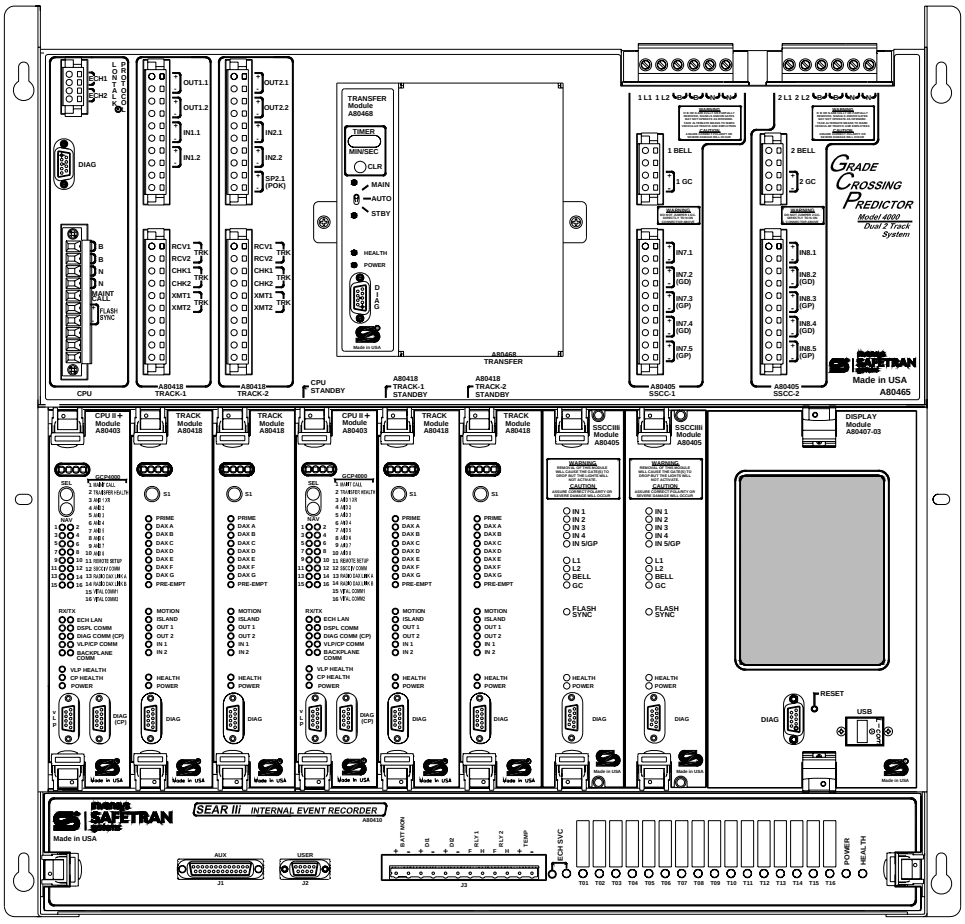

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Figure 2-10. A80465 Dual Two Track Case With Modules and SEAR IIi Installed

⚠ WARNING

GATES WILL BEGIN TO LOWER IMMEDIATELY (WITHOUT GATE DELAY TIME) WHEN THE TRANSFER SWITCH IS USED TO SWAP BETWEEN HEALTHY UNITS. USE CAUTION WHEN TRANSFERRING CONTROL TO AVOID GATES HITTING VEHICLES OR PEDESTRIANS.

NOTE

During normal operation power is applied to the module set selected from the A80468 Transfer assembly (see paragraph 2.8.8).

Power is applied to the main module set when the A80468 is set to **MAIN**.

Power is applied to the standby module set when the A80468 is set to **STBY**.

Power is initially applied to the main modules when the A80468 is set to **AUTO** and is automatically transferred to the standby modules when a main module failure is detected.

The transfer jumper, see figure 2-11, is connected to the **STG** (storage) terminal when the Transfer module is used.

When the Transfer assembly is not used power application is controlled by the position of the transfer jumper.

Power is applied to the main module set when the jumper is connected to the **MAIN** terminal.

Power is applied to the standby module set when jumper is connected to the **STBY** terminal.

Backup (standby) modules are not provided for the:

1. A80405 State Crossing Controller (SSCC IIIi) modules
2. A80407 Display module assembly
3. A80468 Transfer assembly

   A80410 Safetran Event Analyzer Recorder IIi (SEAR IIi) assembly

Refer to paragraph 6.17 for selecting Transfer Interval Time.

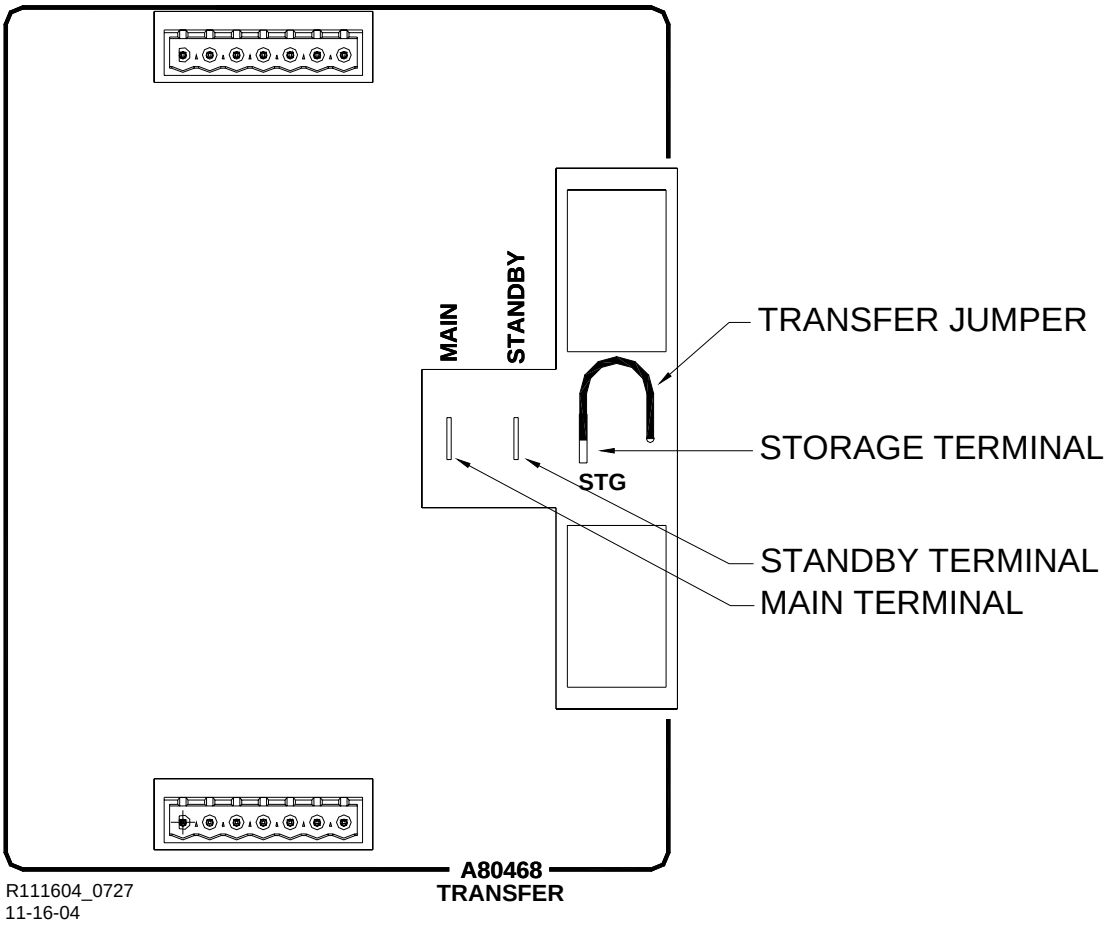

Figure 2-11. Dual Two Track Case Transfer Jumper Terminals

2.5.2 Dual Two Track Case Interface Connector to Module Relationship

The relationship between the interface connectors and the Dual Two Track Case modules is shown in table 2-8.

Table 2-8. Dual Two Track Case Module to Interface Connector Relationship

Module	Slot Position	Interface Connector
A80403	M1	CPU
A80418	M2	Track-1
A80418	M3*	Track-2 / RIO-1
A80403	M4	CPU Standby
A80418	M5	Track-1 Standby
A80418	M6*	Track-2 / RIO-1 Standby
A80405	M7	SSCC-1
A80405	M8	SSCC-2
A80407	M9	Display
A80468	Top Center	Transfer

*Note: MAIN and STANDBY may use RIO in Track-2 slots (M3 and M6).

2.5.3 Dual Two Track Case External Wiring Connectors

The external wiring connectors of the Dual Two Track Case are shown in figure 2-12 and described in table 2-9.

Table 2-9. Dual Two Track Case External Wiring Connectors

Ref. No.	Connector Description	Connector Designation	Safetran Part Number
1	4-pin cage clamp, female	**LONTALK® PROTOCOL**	Z715-09099-0000
2	Keyed 10-pin cage clamp, female	Upper **TRACK-1**	Z715-02101-0001
3		Upper **TRACK-2**	Z715-02101-0002
4	6-pin screw terminal, male	**SSCC-1** power and lamp	Z715-02118-0001
5	Keyed 4-pin cage clamp, female	Upper **SSCC-1**	Z715-02106-0001
6	6-pin screw terminal, male	**SSCC-2** power and lamp	Z715-02118-0002
7	Keyed 4-pin cage clamp, female	Upper **SSCC-2**	Z715-02106-0002
8	10-pin cage clamp, female	**CPU**	Z715-02101-0007
9	Keyed 10-pin cage clamp, female	lower **TRACK-1**	Z715-02101-0008
10		lower **TRACK-2**	Z715-02101-0009
11		Lower **SSCC-1**	Z715-02101-0014
12		Lower **SSCC-2**	Z715-02101-0015

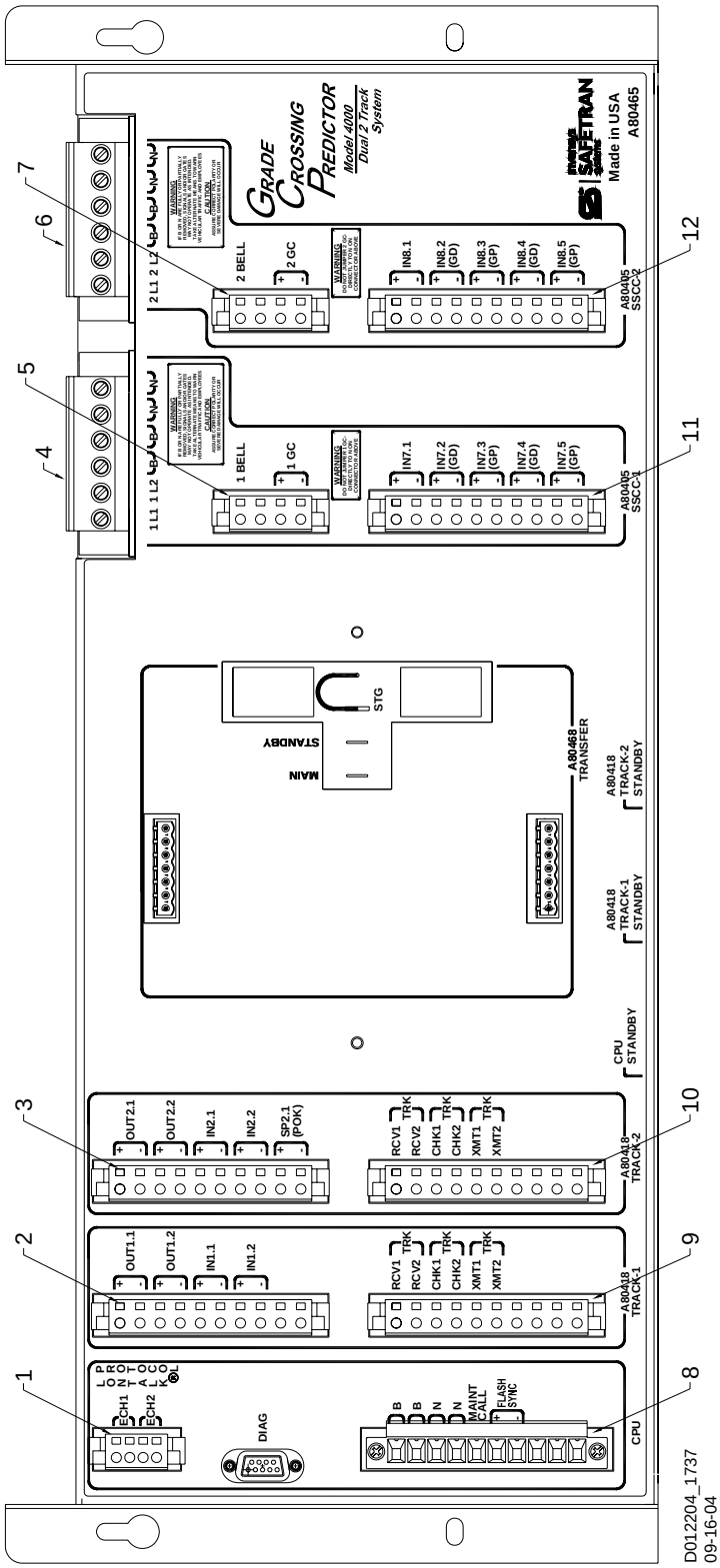

Figure 2-12. Dual Two Track Case External Wiring Connectors

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2.6 A80400 DUAL FOUR TRACK CASE The Dual Four Track case is shown in figure 2-13.

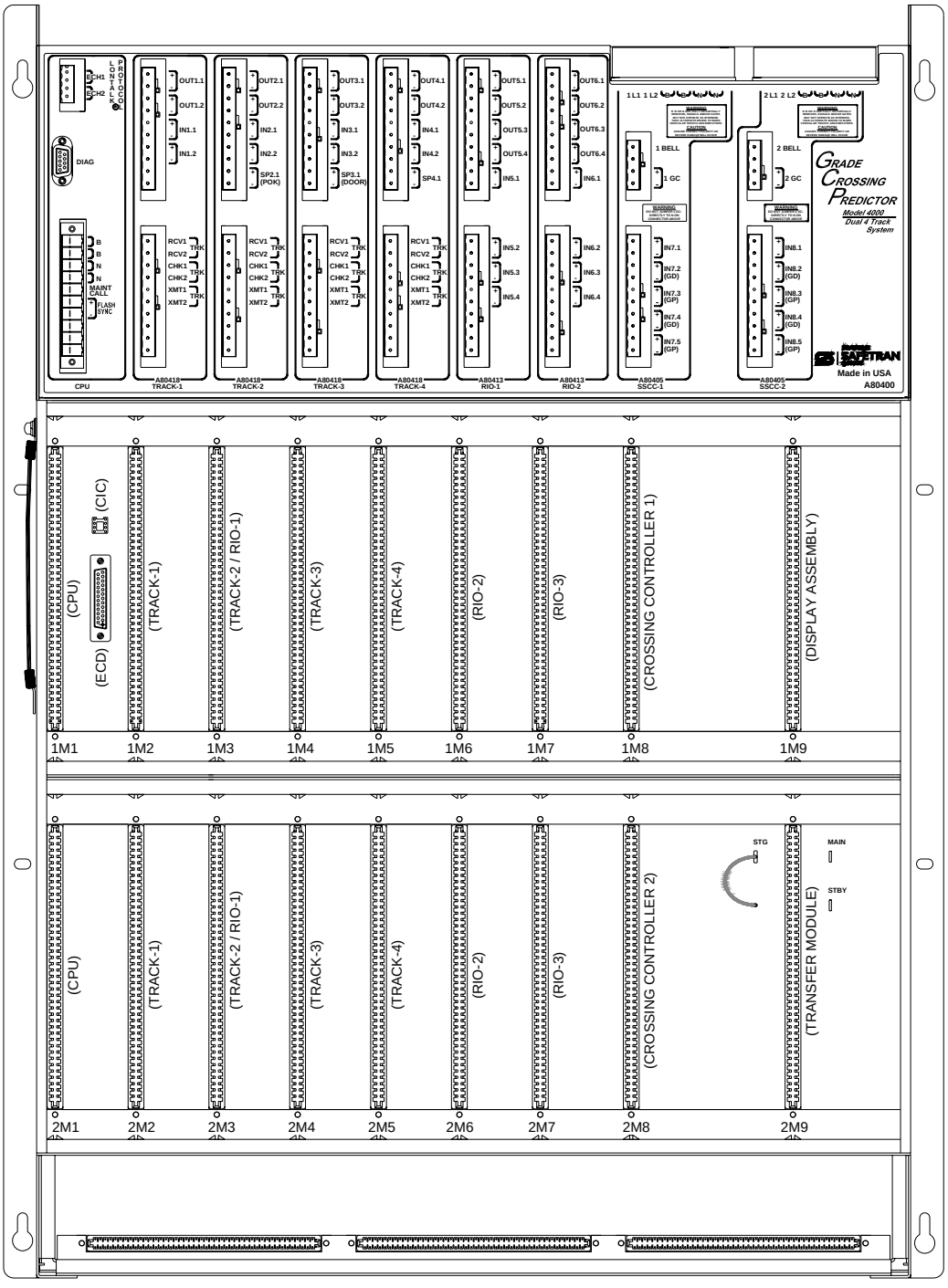

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Figure 2-13. A80400 Dual Four Track Case

NOTE

1. Module slot position numbers shown in figure 2-13 are assigned for discussion purposes only and do not appear on the actual case assembly.
2. The module slots are numbered from left to right as viewed from the front of the case.
   - upper module slots designated 1M1 through 1M9
     lower module slots designated 2M1 through 2M9

2.6.1 Dual Four Track Case Modules

The Dual Four Track Case with a full complement of modules installed is shown in figure 2-14.

The upper module set is designated as the main module set. A main module set consists of:

- A80403 Central Processor Unit Plus (CPU II+) module in slot 1M1
- Four A80418 Track modules, slots 1M2 through 1M5
- Two A80413 Relay Input/Output (RIO) modules in slots 1M6 and 1M7
- Two A80405 Solid State Crossing Controller IIIi (SSCC IIIi) in slots 1M8 and 2M8
- A80407 Display module assembly in slot 1M9
- A80406 Transfer module in slot 2M9
- A80410 Safetran Event Analyzer Recorder IIi (SEAR IIi) module assembly

The lower module set is designated as the standby module set. A standby module set consists of:

- A80403 Dual Central Processor Unit II Plus (CPU II+) module in slot 2M1
- Four A80418 Track modules, slots 2M2 through 2M5
- Two A80413 Relay Input/Output (RIO) modules in slots 2M6 and 2M7

NOTE

The A80413 RIO module may be used in place of the Track module in slot positions 1M3 and 2M3.

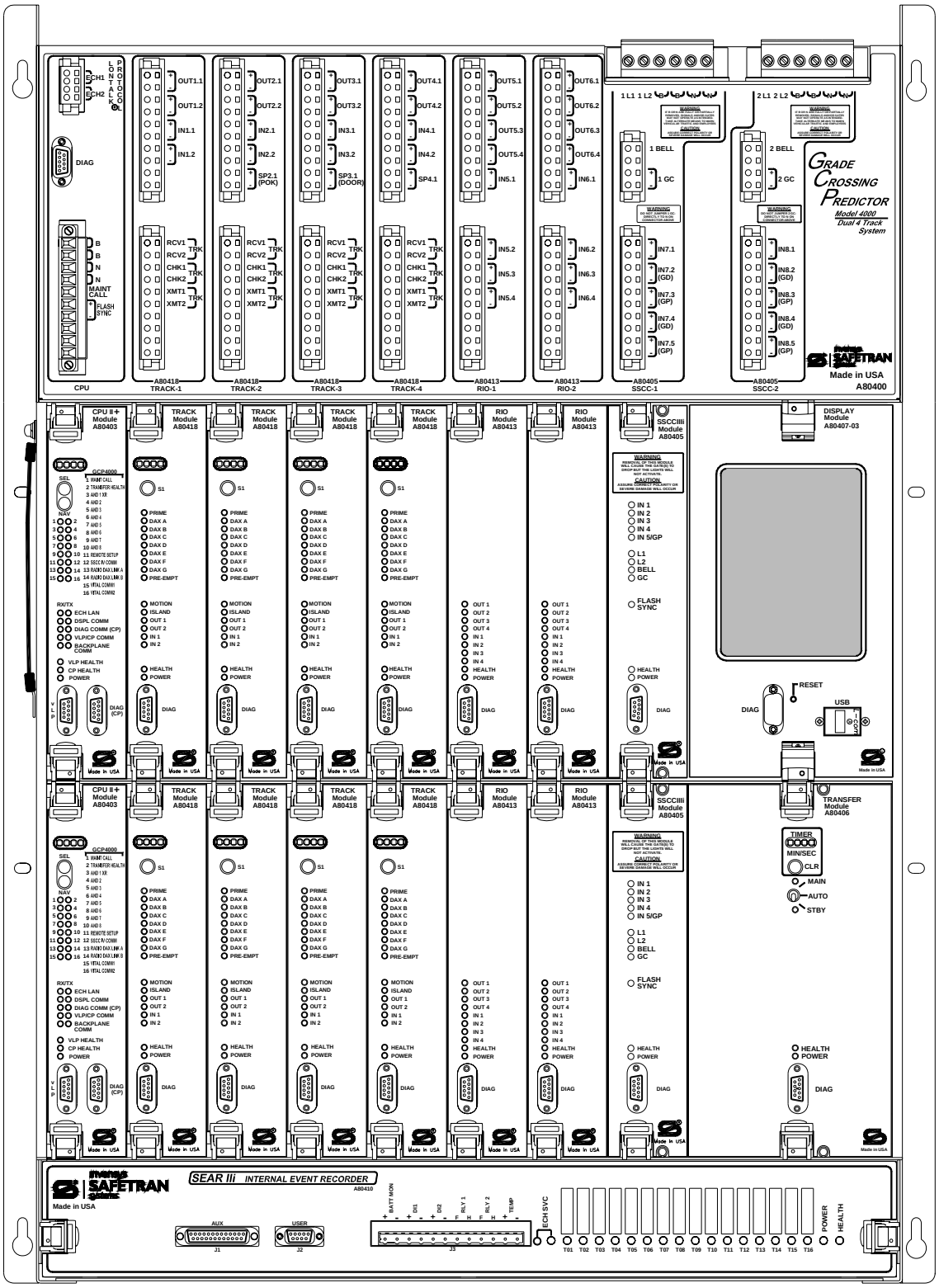

Figure 2-14. Dual Four Track Case With Modules Installed

⚠ WARNING

GATES WILL BEGIN TO LOWER IMMEDIATELY (WITHOUT GATE DELAY TIME) WHEN THE TRANSFER SWITCH IS USED TO SWAP BETWEEN HEALTHY UNITS. USE CAUTION WHEN TRANSFERRING CONTROL TO AVOID GATES HITTING VEHICLES OR PEDESTRIANS.

NOTE

1. During normal operation power is applied to the module set selected from the A80406 Transfer assembly (see paragraph 2.8.7).

   Power is applied to the main module set when the A80406 is set to **MAIN**.

   Power is applied to the standby module set when the A80406 is set to **STBY**.

   Power is initially applied to the main modules when the A80406 is set to **AUTO** and is automatically transferred to the standby modules when a main module failure is detected.

The transfer jumper, see figure 2-15 on the next page, is connected to the **STG** (storage) terminal when the Transfer module is used.

When the Transfer assembly is not used power application is controlled by the position of the transfer jumper.

Power is applied to the main module set when the jumper is connected to the **MAIN** terminal.

Power is applied to the standby module set when jumper is connected to the **STBY** terminal.

Backup (standby) modules are not provided for the:

4. A80405 State Crossing Controller (SSCC IIIi) modules
5. A80407 Display module assembly
6. A80468 Transfer assembly

   A80410 Safetran Event Analyzer Recorder IIi (SEAR IIi) assembly

Refer to paragraph 6.17 for selecting Transfer Interval Time.

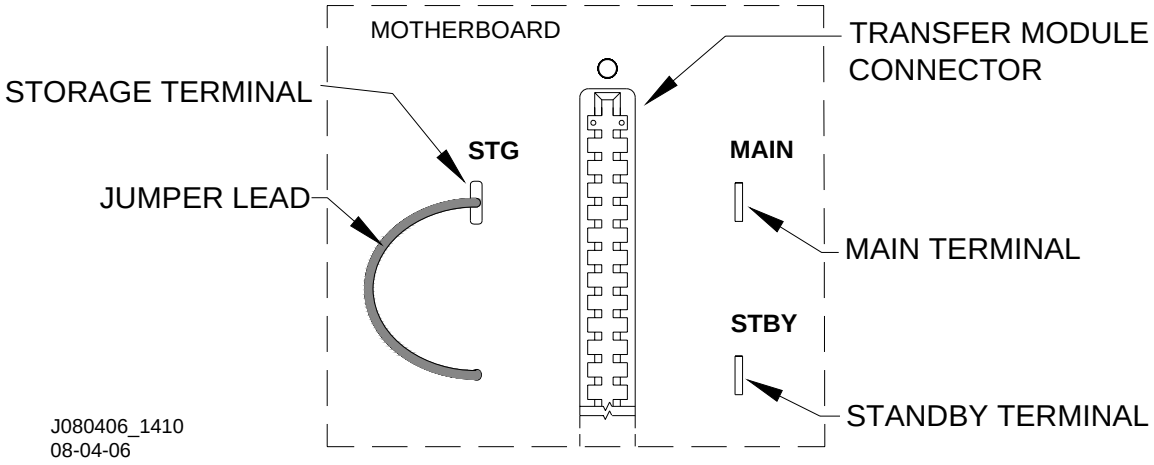

Figure 2-15. Dual Four & Six Track Case Transfer Jumper Terminals on Motherboard

2.6.2 Dual Four Track Case Interface Connectors to Module Relationship

The relationship between the interface connectors and the Dual Four Track Case modules is described in table 2-10.

Table 2-10. Dual Four Track Case Interface Connector to Module Relationship

Module	Slot Position	Interface Connector
A80403	1M1	CPU
A80418	1M2	TRACK-1
A80418	1M3*	TRACK-2 / RIO-1
A80418	1M4	TRACK-3
A80418	1M5	TRACK-4
A80413	1M6	RIO-2
A80413	1M7	RIO-3
A80405	1M8	SSCC-1
A80407	1M9	Display
A80403	2M1	CPU
A80418	2M2	TRACK-1
A80418	2M3*	TRACK-2 / RIO-1
A80418	2M4	TRACK-3
A80418	2M5	TRACK-4
A80413	2M6	RIO-2
A80413	2M7	RIO-3
A80405	2M8	SSCC- 2
A80406	2M9	Transfer

*Note: MAIN and STANDBY may contain additional RIO in Track-2 slot (M3).

2.6.3 Dual Four Track Case External Wiring Connectors

The external wiring connectors of the Dual Four Track Case are shown in figure 2-16 and described in table 2-11.

Table 2-11. Dual Four Track Case External Wiring Connectors

Ref. No.	Connector Description	Connector Designation	Safetran Part Number
1	4-pin cage clamp, female	**LONTALK® PROTOCOL**	Z715-09099-0000
2	Keyed 10-pin cage clamp, female	Upper **TRACK-1**	Z715-02101-0001
3		Upper **TRACK-2**	Z715-02101-0002
4		Upper **TRACK-3**	Z715-02101-0003
5		Upper **TRACK-4**	Z715-02101-0004
6		Upper **RIO-1**	Z715-02101-0005
7		Upper **RIO-2**	Z715-02101-0006
8	6-pin screw terminal, male	**SSCC-1** power and lamp	Z715-02118-0001
9	Keyed 4-pin cage clamp, female	Upper **SSCC-1**	Z715-02106-0001
10	6-pin screw terminal, male	**SSCC-2** power and lamp	Z715-02118-0001
11	Keyed 4-pin cage clamp, female	Upper **SSCC-2**	Z715-02106-0002
12	10-pin screw clamp, female	**CPU**	Z715-02101-0007
13	Keyed 10-pin cage clamp, female	lower **TRACK-1**	Z715-02101-0008
14		lower **TRACK-2**	Z715-02101-0009
15		lower **TRACK-3**	Z715-02101-0010
16		lower **TRACK-4**	Z715-02101-0011
17		lower **RIO-1**	Z715-02101-0012
18		lower **RIO-2**	Z715-02101-0013
19		Lower **SSCC-1**	Z715-02101-0014
20		Lower **SSCC-2**	Z715-02101-0015

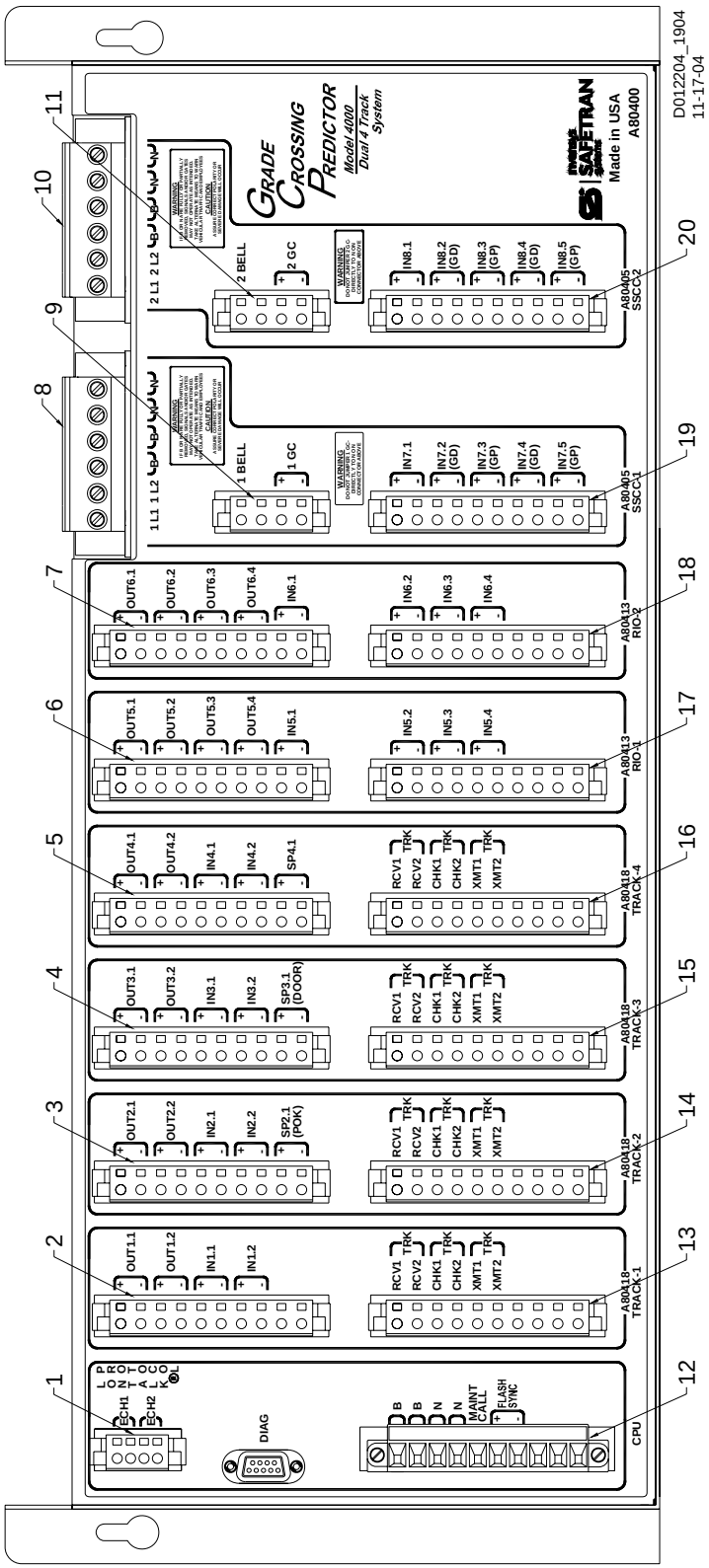

Figure 2-16. Dual Four Track Case External Wiring Connectors

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2.7 A80460 DUAL SIX TRACK CASE

The Dual Six Track case is shown in figure 2-17.

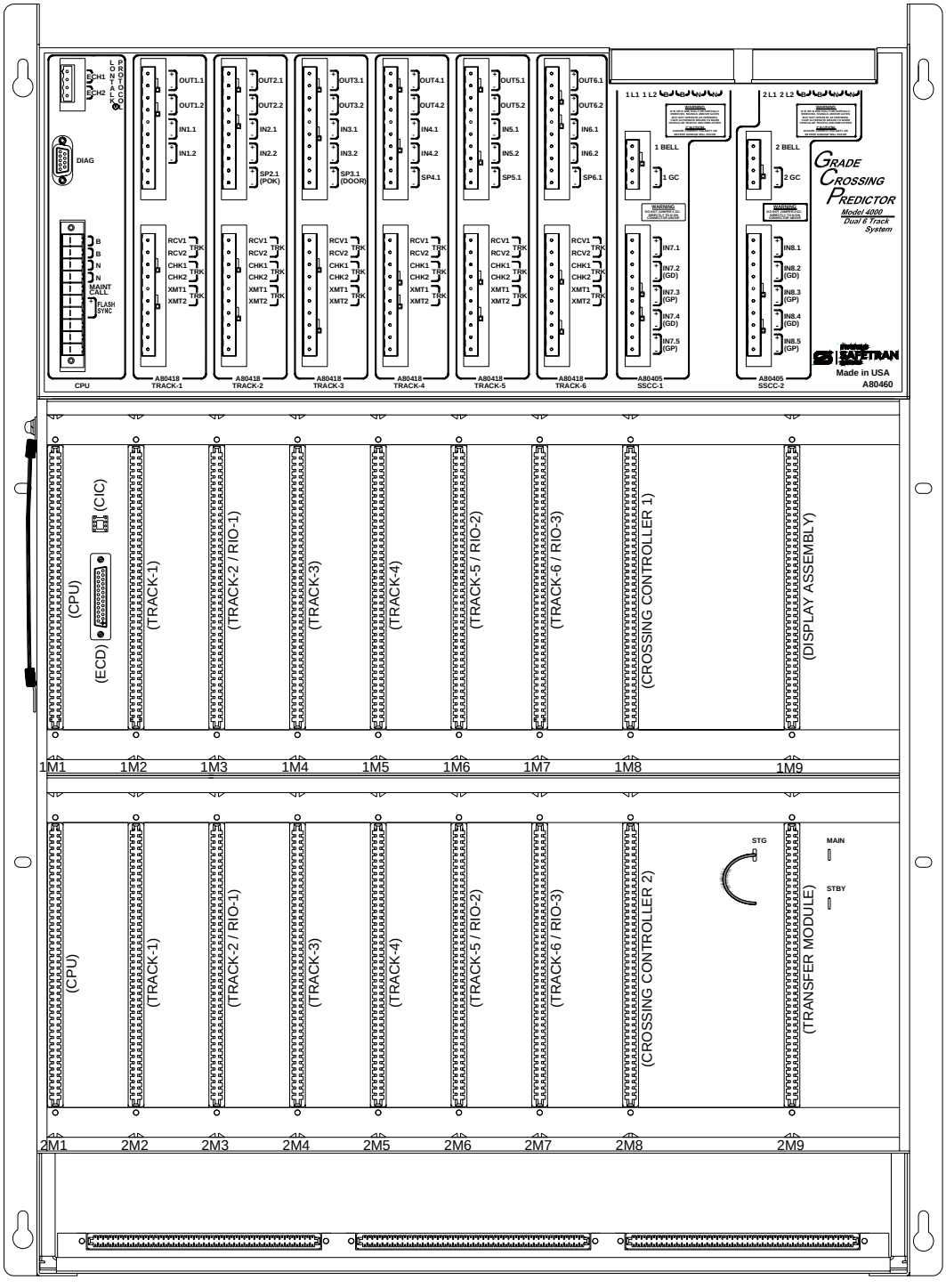

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Figure 2-17. A80460 Dual Six Track Case

NOTE

1. Module slot position numbers shown in figure 2-17 are assigned for discussion purposes only and do not appear on the actual case assembly.
2. The module slots are numbered from left to right as viewed from the front of the case.
   - upper module slots designated 1M1 through 1M9
     lower module slots designated 2M1 through 2M9

2.7.1 Dual Six Track Case Modules

The Dual Six Track Case with a full complement of modules installed is shown in figure 2-18.

The upper module set is designated as the main module set. A main module set consists of:

- A80403 Central Processor Unit Plus (CPU II+) module in slot position 1M1
- Six A80418 Track modules in slot positions 1M2 through 1M7
- Two A80405 Solid State Crossing Controller IIIi (SSCC IIIi) in slot positions 1M8 and 2M8
- A80407 Display module assembly in slot position 1M9
- A80406 Transfer module in slot position 2M9
- A80410 Safetran Event Analyzer Recorder IIi (SEAR IIi) module assembly

The lower module set is designated as the standby module set. A standby module set consists of:

- A80403 Dual Central Processor Unit II Plus (CPU II+) module in slot position 2M1
- Six A80418 Track modules in slot positions 2M2 through 2M7

NOTE

The A80413 RIO module may be used in place of the Track module in slot positions 1M3, 1M6, 1M7, 2M3, 2M6 and 2M7.

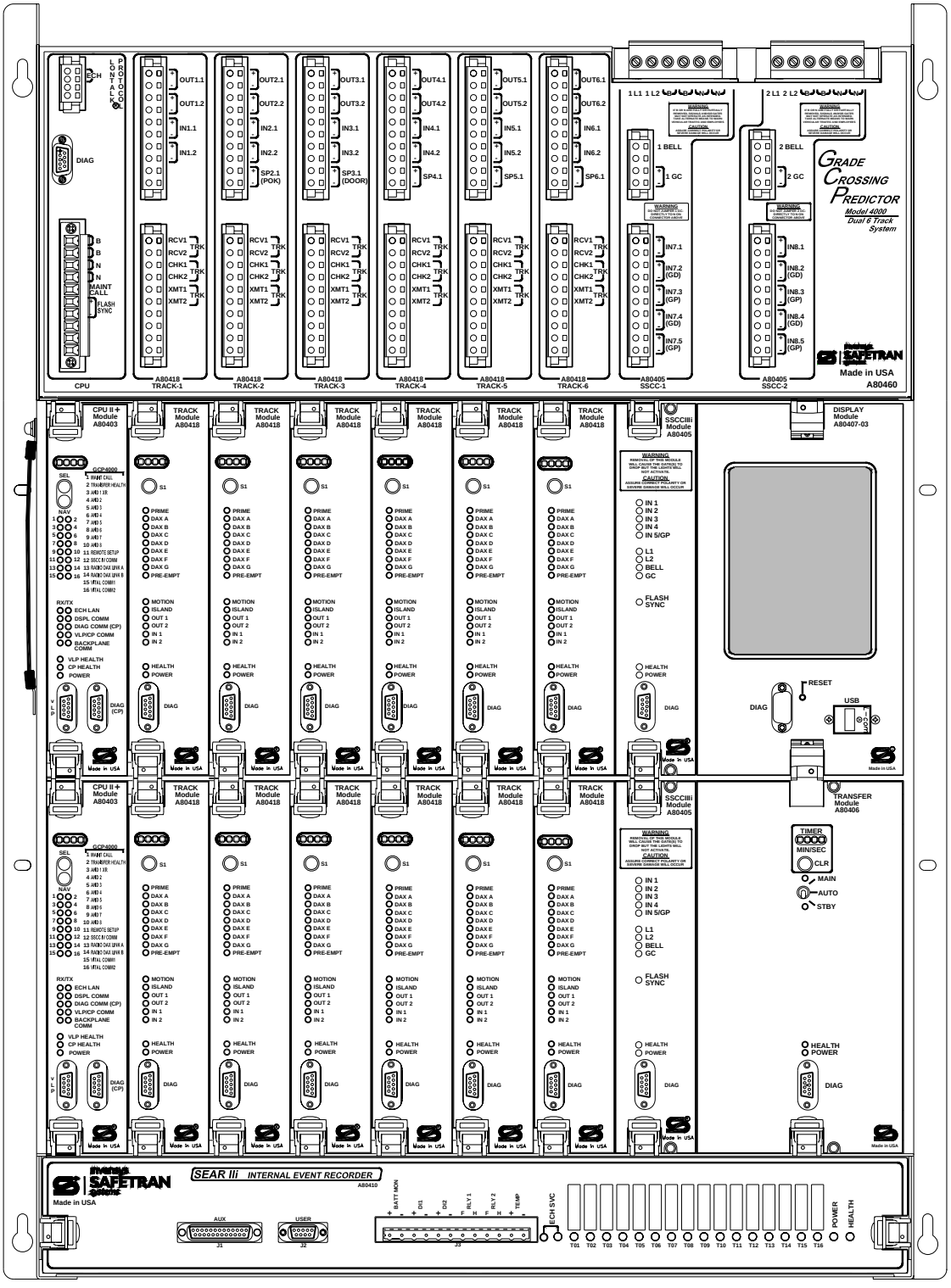

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Figure 2-18. Dual Six Track Case With Modules Installed

⚠ WARNING

GATES WILL BEGIN TO LOWER IMMEDIATELY (WITHOUT GATE DELAY TIME) WHEN THE TRANSFER SWITCH IS USED TO SWAP BETWEEN HEALTHY UNITS. USE CAUTION WHEN TRANSFERRING CONTROL TO AVOID GATES HITTING VEHICLES OR PEDESTRIANS.

NOTE

1. During normal operation power is applied to the module set selected from the A80406 Transfer module (see paragraph 2.8.7).

   Power is applied to the main module set when the A80406 is set to **MAIN**.

   Power is applied to the standby module set when the A80406 is set to **STBY**.

   Power is initially applied to the main modules when the A80406 is set to **AUTO** and is automatically transferred to the standby modules when a main module failure is detected.

2. The transfer jumper, see figure 2-15, is connected to the **STG** (storage) terminal when the Transfer module is used.

When the Transfer assembly is not used power application is controlled by the position of the transfer jumper.

Power is applied to the main module set when the jumper is connected to the **MAIN** terminal.

Power is applied to the standby module set when jumper is connected to the **STBY** terminal.

4. Backup (standby) modules are not provided for the:
   7. A80405 State Crossing Controller (SSCC IIIi) modules
   8. A80407 Display module assembly
   9. A80406 Transfer module

   A80410 Safetran Event Analyzer Recorder IIi (SEAR IIi) assembly

5. Refer to paragraph 6.17 for selecting Transfer Interval Time.

2.7.2 Dual Six Track Case Interface Connectors to Module Relationship

The relationship between the interface connectors and the Dual Six Track Case modules are described in table 2-12.

Table 2-12. Dual Six Track Case Interface Connector to Module Relationship

Module	Slot Position	Interface Connector
A80403	1M1	CPU
A80418	1M2	TRACK-1
A80418	1M3*	TRACK-2 / RIO-1
A80418	1M4	TRACK-3
A80418	1M5	TRACK-4
A80418	1M6*	TRACK-5 / RIO-2
A80418	1M7*	TRACK-6 / RIO-3
A80405	1M8	SSCC-1
A80407	1M9	Display
A80403	2M1	CPU
A80418	2M2	TRACK-1
A80418	2M3*	TRACK-2 / RIO-1
A80418	2M4	TRACK-3
A80418	2M5	TRACK-4
A80418	2M6*	TRACK-5 / RIO-2
A80418	2M7*	TRACK-6 / RIO-3
A80405	2M8	SSCC- 2
A80406	2M9	Transfer

*Note: MAIN and STANDBY may use RIO in slots M3, M6 and M7

2.7.3 Dual Six Track Case External Wiring Connectors

The external wiring connectors of the Dual Six Track Case are shown in figure 2-19 and described in table 2-13.

Table 2-13. Dual Six Track Case External Wiring Connectors

Ref. No.	Connector Description	Connector Designation	Safetran Part Number
1	4-pin non- locking screw clamp, female	**LONTALK® PROTOCOL**	Z715-09099-0000
2	Keyed 10-pin cage clamp, female	Upper **TRACK-1**	Z715-02101-0001
3		Upper **TRACK-2**	Z715-02101-0002
4		Upper **TRACK-3**	Z715-02101-0003
5		Upper **TRACK-4**	Z715-02101-0004
6		Upper **TRACK-5**	Z715-02101-0005
7		Upper **TRACK-6**	Z715-02101-0006
8	6-pin screw terminal, male	**SSCC-1** power and lamp	Z715-02118-0001
9	Keyed 4-pin cage clamp, female	Upper **SSCC-1**	Z715-02106-0001
10	6-pin screw terminal, male	**SSCC-2** power and lamp	Z715-02118-0001
11	Keyed 4-pin cage clamp, female	Upper **SSCC-2**	Z715-02106-0002
12	10-pin cage clamp, female	**CPU**	Z715-02101-0007
13	Keyed 10-pin cage clamp, female	lower **TRACK-1**	Z715-02101-0008
14		lower **TRACK-2**	Z715-02101-0009
15		lower **TRACK-3**	Z715-02101-0010
16		lower **TRACK-4**	Z715-02101-0011
17		lower **TRACK-5**	Z715-02101-0012
18		lower **TRACK-6**	Z715-02101-0013
19		Lower **SSCC-1**	Z715-02101-0014
20		Lower **SSCC-2**	Z715-02101-0015

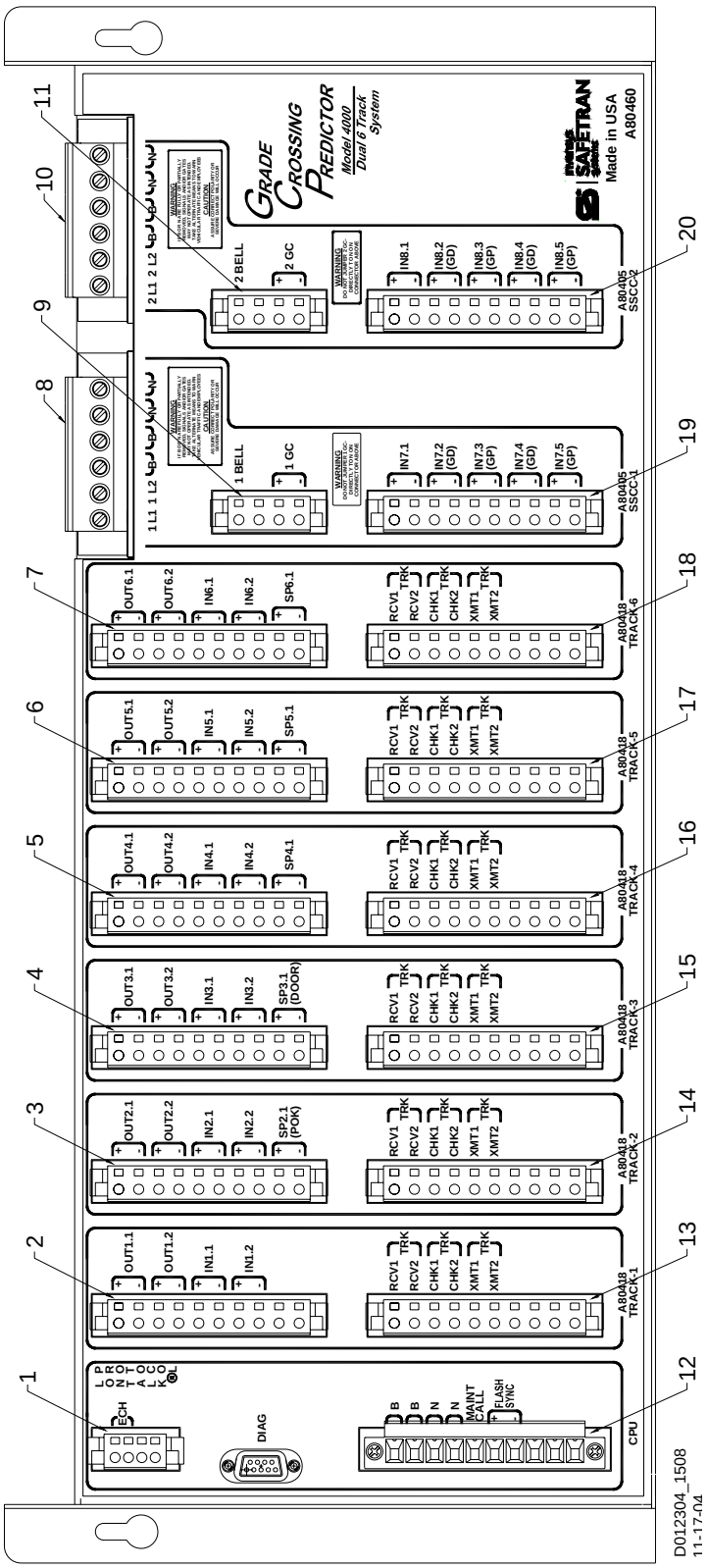


Figure 2-19. Dual Six Track Case External Wiring Connectors

2.8 PLUG-IN MODULES AND SUBASSEMBLIES

2.8.1 A80403 CPU II+ Module

The A80403 CPU II+ Module is a central processing unit that:

- provides all vital logic processing functions for all 4000 GCP chassis
- ➢ controls GCP LAN and vital and non-vital serial communications
- ➢ interfaces with front panel CPU connectors

2.8.1.1 CPU II+ Module User Interface

The CPU II+ front panel is shown in figure 2-20.

- ♦ The CPU II+ user interface is described in table 2-14.

(Refer to Section 7 for diagnostics and troubleshooting)

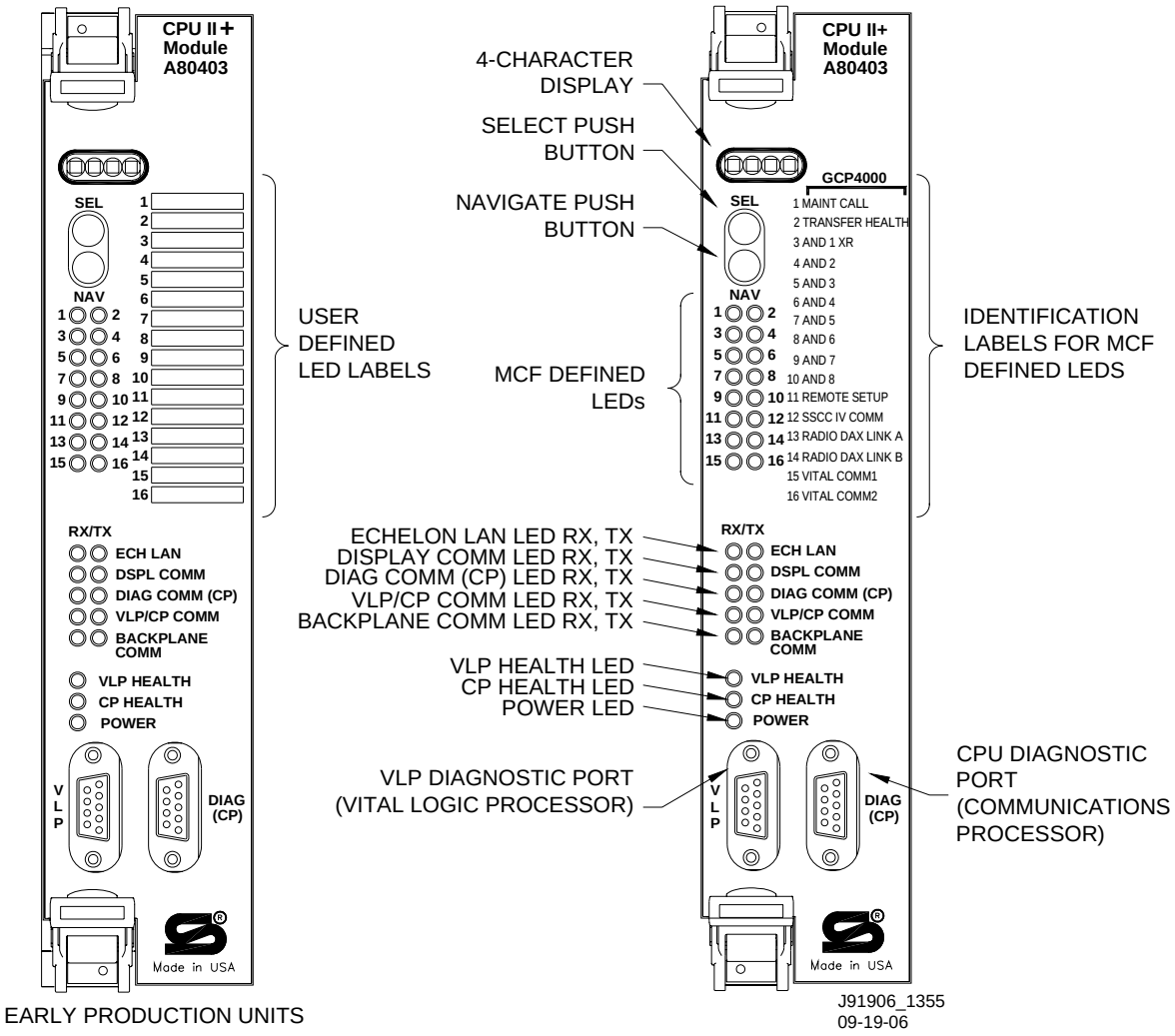


Figure 2-20. CPU II+ Front Panel

Table 2-14. CPU II+ User Interface

Component	Function		
4-Character Display	Displays alphanumeric representation of currently selected function menu item. (Refer to table 7-3 for diagnostic messages.)		
Select Push Button (**SEL**)	Used to select menu item displayed on 4-Character Display.		
Navigate Push Button (**NAV**)	Used to select an available function menu.		
16 MCF Defined LEDs	Color	Function	Indication
1 (MAINT CALL)	Red	Maintenance Call see maintenance call logic section	On – maintenance call output on Off – maintenance call output off
2 (TRANSFER HEALTH)	Red	Transfer Output see transfer output section	On – transfer signal is being generated transfer card should not be counting down Off – transfer signal is not being generated If transfer card is in **AUTO** it should be counting down
3 (AND 1 XR)	Red	AND 1 XR	On – AND 1 XR is energized Off – AND 1 XR is Deenergized
4 (AND 2)	Red	AND 2	On – AND 2 is Energized Off – AND 2 is Deenergized or Not Used
5 (AND 3)	Red	AND 3	On – AND 3 is Energized Off – AND 3 is Deenergized or Not U sed
6 (AND 4)	Red	AND 4	On – AND 4 is Energized Off – AND 4 is Deenergized or Not Used
7 (AND 5)	Red	AND 5	On – AND 5 is Energized Off – AND 5 is Deenergized or Not Used
8 (AND 6)	Red	AND 6	On – AND 6 is Energized Off – AND 6 is Deenergized or Not Used
9 (AND 7)	Red	AND 7	On – AND 7 is Energized Off – AND 7 is Deenergized or Not Used
10 (AND 8)	Red	AND 8	On – AND 8 is Energized Off – AND 8 is Deenergized or Not Used
11 (REMOTE SETUP)	Red	Remote Setup Session	On – the GCP has been primed for a remote one person setup see section 6-10. Off – No remote setup is in progress

Table 2-14 Concluded

Component	Function		
12 (SSCC IV COMM)	Red	Remote Setup Active	On – a remote setup action (GCP Approach calibration etc) is in progress Off – no remote setup action is in progress
13 (RADIO DAX LINK A)	Red	Radio DAX Link A	On – Radio DAX Link A is in session Off – Radio DAX Link A is not used or not in session
14 (RADIO DAX LINK B)	Red	Radio DAX Link B	On – Radio DAX Link B is in session Off – Radio DAX Link B is not used or not in session
15 (VITAL COMM1)	Red	Vital Comm 1	On – Vital Comm1 is in session Off – Vital Comm1 is not used or not in session
16 (VITAL COMM2)	Red	Vital Comm 2	On – Vital Comm2 is in session Off – Vital Comm2 is not used or not in session
ECH LAN LEDs	**TX** flashes red when the CPU II+ is transmitting an ATCS message via the **LONTALK® LAN**.		
	RX flashes green when the CPU II+ is receiving an ATCS message via the **LONTALK® LAN**.		
DSPL COMM LEDs	**TX** flashes red when the CPU II+ is transmitting data to the Display Panel.		
	RX flashes green when the CPU II+ is receiving data from the Display Panel.		
DIAG COMM (CP) LEDs	**TX** flashes red when the CPU II+ is transmitting data on the communications processor diagnostic (**DIAG CP**) serial port.		
	RX flashes green when the CPU II+ is receiving data from the communications processor diagnostic (**DIAG CP**) serial port.		
VLP/CP COMM LEDs	**TX** flashes red when the Vital Logic Processor (VLP) is transmitting data to the Communications Processor (CP).		
	RX flashes green when the Vital Logic Processor (VLP) is receiving data from the Communications Processor (CP).		
BACKPLANE COMM LEDs	**TX** flashes red when the Vital Logic Processor (VLP) is sending data onto the serial bus.		
	RX flashes green when the Vital Logic Processor (VLP) is receiving data from the serial bus.		
VLP HEALTH LED	Flashes yellow to indicate that the Vital Logic Processor is functioning normally.		
CP HEALTH LED	Flashes yellow to indicate that the Communications Processor is functioning normally.		
POWER LED	Lights green to indicate that power is applied to the CPU II+ module.		
VLP Serial Port	9-pin diagnostic serial port for Vital Logic Processor.		
DIAG (CP) Serial Port	9-pin diagnostic serial port for Communications Processor.		

2.8.2 A80418 Track Module

The A80418 Track module performs the predictor and island train detection functions.

GCP frequency can be any frequency listed in table 2-15.

Island circuit frequency can be any of fourteen frequencies listed in table 2-16.

- Vital I/O functions
  - 2 isolated vital inputs
  - 2 isolated vital outputs

Table 2-15. Track Frequencies

Standard Frequencies
86, 114, 156, 211, 285, 348, 430, 525, 645, 790, and 970 Hz
Offset Frequencies
85.5, 86.5, 87, 113, 113.5, 114.5, 115, 155, 155.5, 156.5, 157, 210, 212, 284, 286, 347, 349, 429, 431, 523, 527, 643, 647, 788, 792, 968, and 972 Hz
Other Frequencies (for compatibility with other manufacturer's equipment and for areas where power line interference is a problem)
44, 45, 46, 151, 250, 267, 326, 392, 452, 522, 560, 630, 686, 753, 816, 881, 979, 999 Hz

Table 2-16. Island Frequencies

2.14, 2.63, 3.24, 4.0, 4.9, 5.9, 7.1, 8.3, 10.0, 11.5, 13.2, 15.2, 17.5, or 20.2 kHz

2.8.2.1 Track Module Front Panel

The Track module front panel is shown in figure 2-21. The user interface is described in table 2-17.

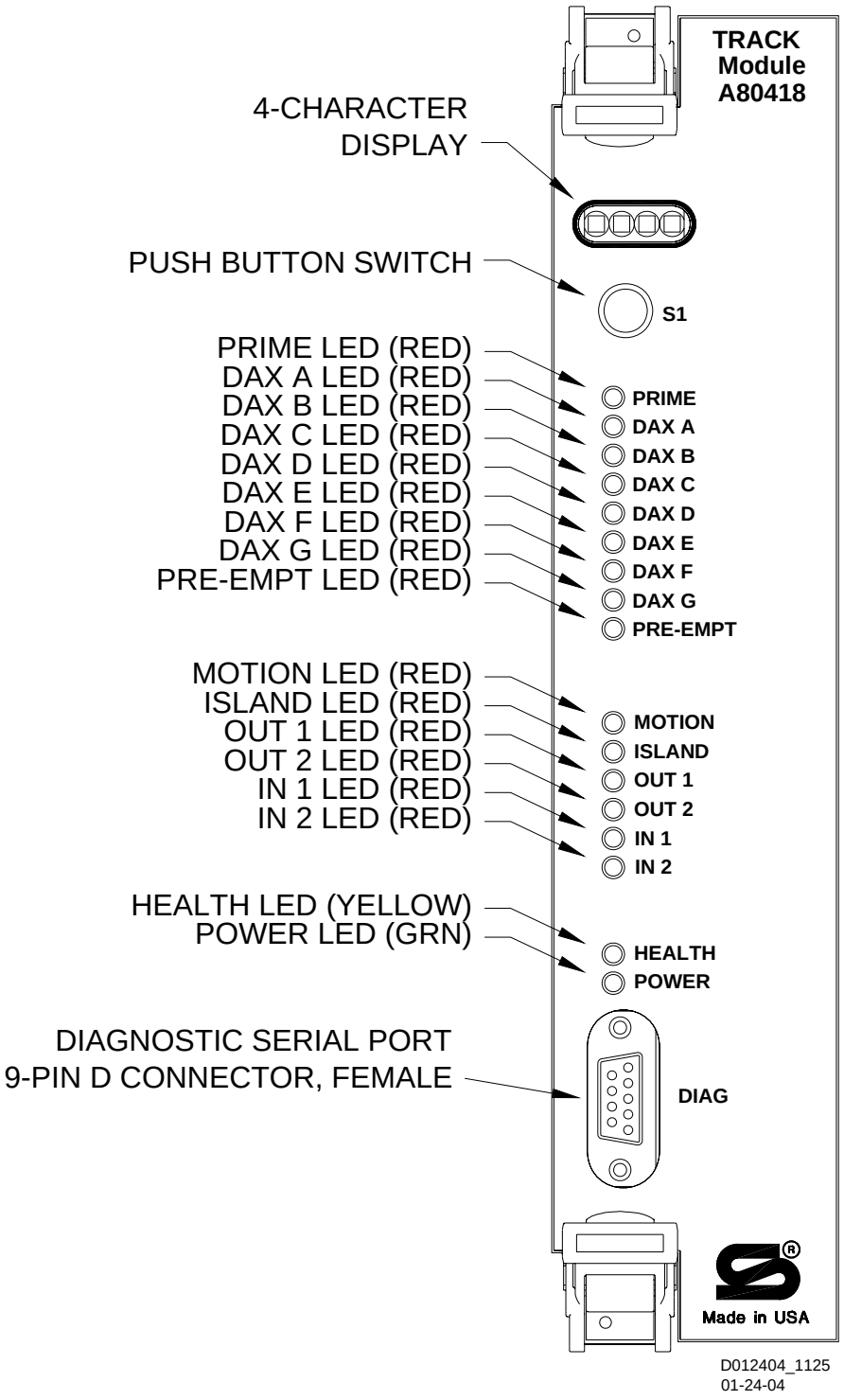


Figure 2-21. Track Module Front Panel

Table 2-17. Track Module User Interface

Component	Function
4-Character Display	Displays module and track status and diagnostic messages. Refer to: Table 7-6, Normal Messages Table 7-7, Calibration Messages Table 7-8, Diagnostic Messages
S1 Push Button Switch	For future applications.
PRIME LED (red)	On – Prime predictor is energized Off – Prime predictor is de-energized or not used Flashing – Prime predictor is running the programmed pickup delay
DAX A – DAX G LEDS (red)	On – DAX A predictor is energized Off – DAX A predictor is de-energized or not used Flashing – DAX A predictor is running its pickup delay
PRE-EMPT LED (red)	On – Preempt predictor is energized Off – Preempt predictor is de-energized or not used Flashing – Preempt predictor is running its pickup delay
MOTION LED (red)	On – GCP has not detected motion Off – GCP has detected motion
ISLAND LED (red)	On – Island is unoccupied Off – Island is occupied Flashing – Island is running its pickup delay
OUT 1 LED (red)	On – output energized Off – output de-energized or not used
OUT 2 LED (red)	On – output energized Off – output de-energized or not used
IN 1 LED (red)	On – input energized Off – input de-energized or not used
IN 2 LED (red)	On – input energized Off – input de-energized or not used
HEALTH LED (yellow)	Slow (1Hz) – module is healthy and communicating with CPU Fast (2Hz) – module is healthy but not communicating with CPU Very Fast (4Hz) – module is unhealthy and communicating with CPU
POWER LED (green)	LED is on steady when power is applied to the module
DIAG Serial Port	9-pin diagnostic serial port for Track module.

2.8.3 A80413 RIO Module

The A80413 RIO module provides four vital inputs and four vital outputs.

I/O functions are selected by the user
Four isolated vital inputs
Four isolated vital outputs

2.8.3.1 RIO Module User Interface

The RIO module front panel is shown in figure 2-22.

- The user interface is described in table 2-18.

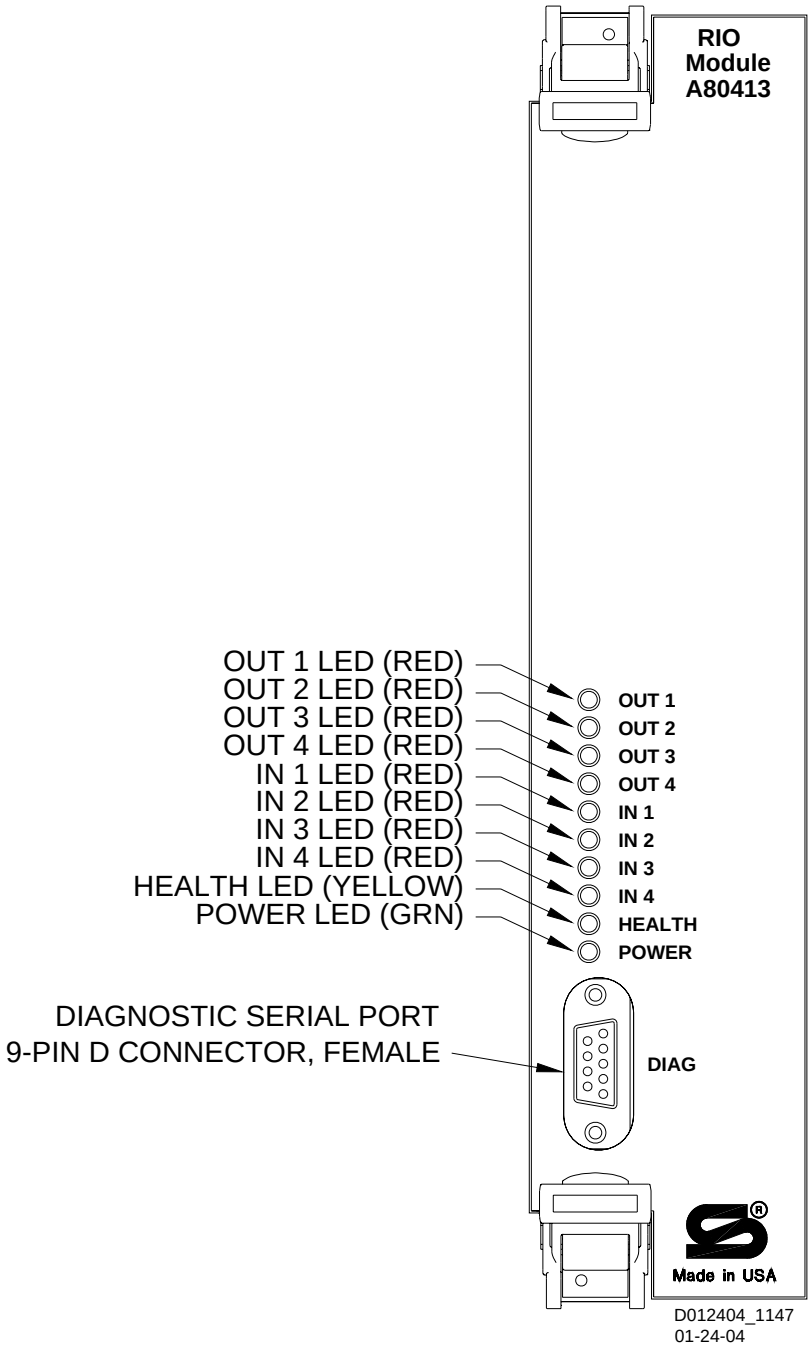


Figure 2-22. RIO Module Front Panel

Table 2-18. RIO Module User Interface

Component	Function
OUT 1 LED	Lights red when vital Output 1 is energized.
OUT 2 LED	Lights red when vital Output 2 is energized.
OUT 3 LED	Lights red when vital Output 3 is energized.
OUT 4 LED	Lights red when vital Output 4 is energized.
IN 1 LED	Lights red when vital Input 1 is energized.
IN 2 LED	Lights red when vital Input 2 is energized.
IN 3 LED	Lights red when vital Input 3 is energized.
IN 4 LED	Lights red when vital Input 4 is energized.
HEALTH LED	Lights yellow. Flashes approximately 1 pulse per second when module is fully operational, 2 pulses per second when module is not communicating with the CPU, and approximately 8 pulses per second when fault is detected within the module.
POWER LED	Lights green to indicate that power is applied to the RIO module.
DIAG Diagnostic Serial Port	9-pin diagnostic serial port for RIO module.

2.8.4 A80405 Solid State Crossing Controller

The A80405 Solid State Crossing Controller (SSCC IIIi), is activated by crossing activation logic from the GCP CPU module and provides operational control for the following grade crossing equipment:

- gates, including gate delay
- lamps
- bells

⚠ WARNING

TAKE ALTERNATE MEANS TO WARN VEHICULAR TRAFFIC, PEDESTRIANS AND EMPLOYEES IF:

THE SSCC IIIi MODULE OR B OR N ARE FULLY REMOVED. THE SIGNALS WILL BE DARK AND GATES WILL LOWER IMMEDIATELY WITHOUT GATE DELAY TIME.

B OR N ARE FULLY OR PARTIALLY REMOVED. SIGNALS AND/OR GATES MAY NOT OPERATE AS INTENDED.

⚠ CAUTION

ENSURE CORRECT POLARITY OF B AND N OR SEVERE DAMAGE WILL OCCUR TO THE MODULE.

REFER TO SECTION 8 FOR DETAILED INSTRUCTIONS ON THE SSCC IIIi BEFORE APPLYING POWER TO THE SSCC IIIi POWER CONNECTOR(S).

2.8.5 SSCC IIIi User Interface

The SSCC IIIi module front panel is shown in figure 2-23.

- The user interface is described in table 2-19.

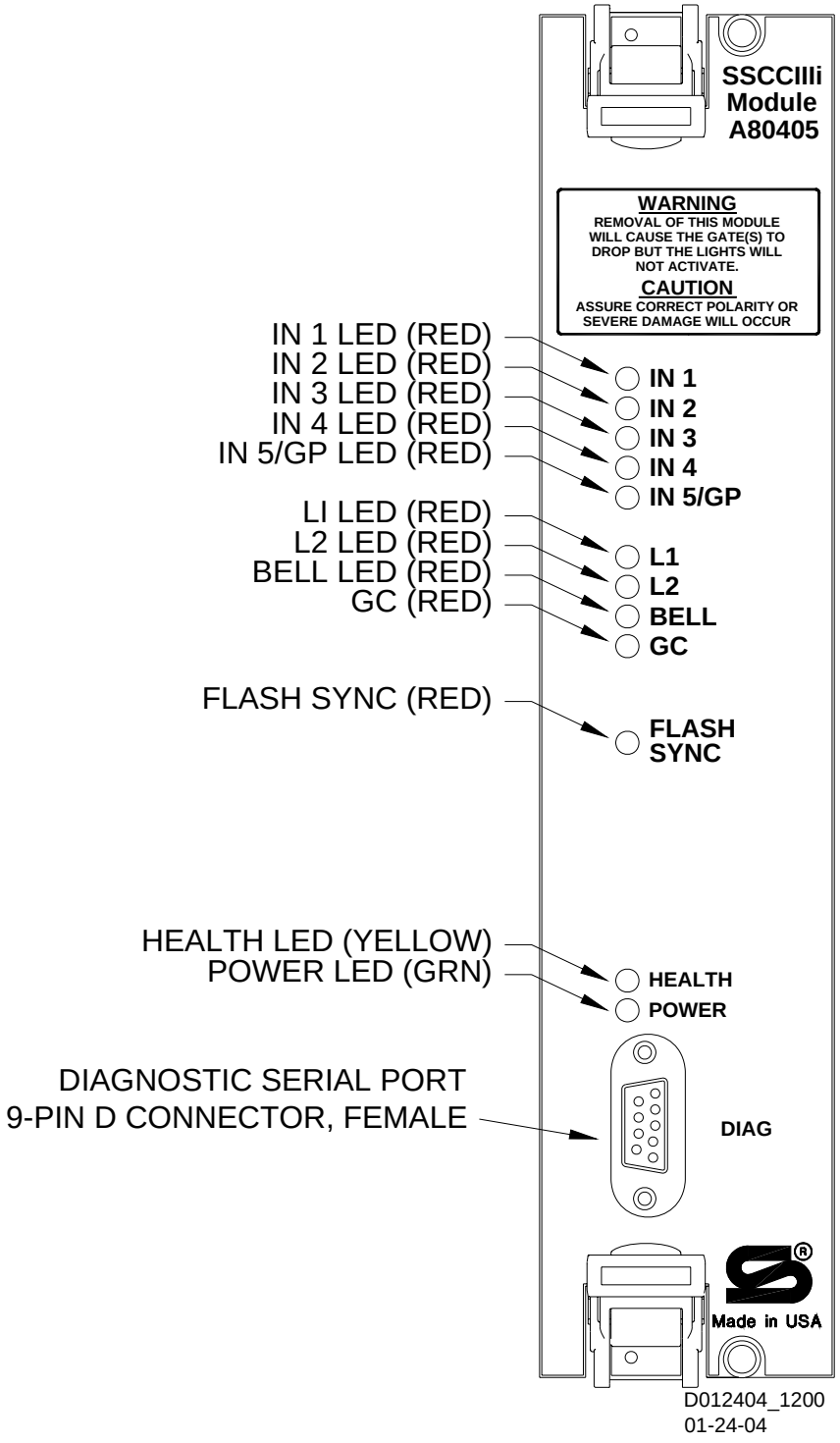


Figure 2-23. SSCC IIIi Front Panel

Table 2-19. SSCC IIIi Module User Interface

Component	Function
IN 1 LED	Lights red when crossing input to 1 is energized.
IN 2 LED	Lights red when crossing input to 2 is energized.
IN 3 LED	Lights red when crossing input to 3 is energized.
IN 4 LED	Lights red when crossing input to 4 is energized.
IN 5/GP LED	Lights red when crossing input to 5 is energized.
L1 LED	Lights red when Lamp Output L1 is on.
L2 LED	Lights red when Lamp Output L2 is on.
BELL LED	Lights red when bell output is on.
GC LED	Lights red when gate control (GC) output is energized.
FLASH SYNC LED	Flashes red when sync pulse is present at **FLASH SYNC** input/output.
HEALTH LED	Lights yellow. Flashes approximately 1 pulse per second when module is fully operational, 2 pulses per second when module is not communicating with the CPU, and approximately 8 pulses per second when fault is detected within the module.
POWER LED	Lights green to indicate that power is applied to the SSCC IIIi module.
DIAG Diagnostic Serial Port	9-pin diagnostic serial port for the SSCC IIIi module.

2.8.6 A80407 Display Module

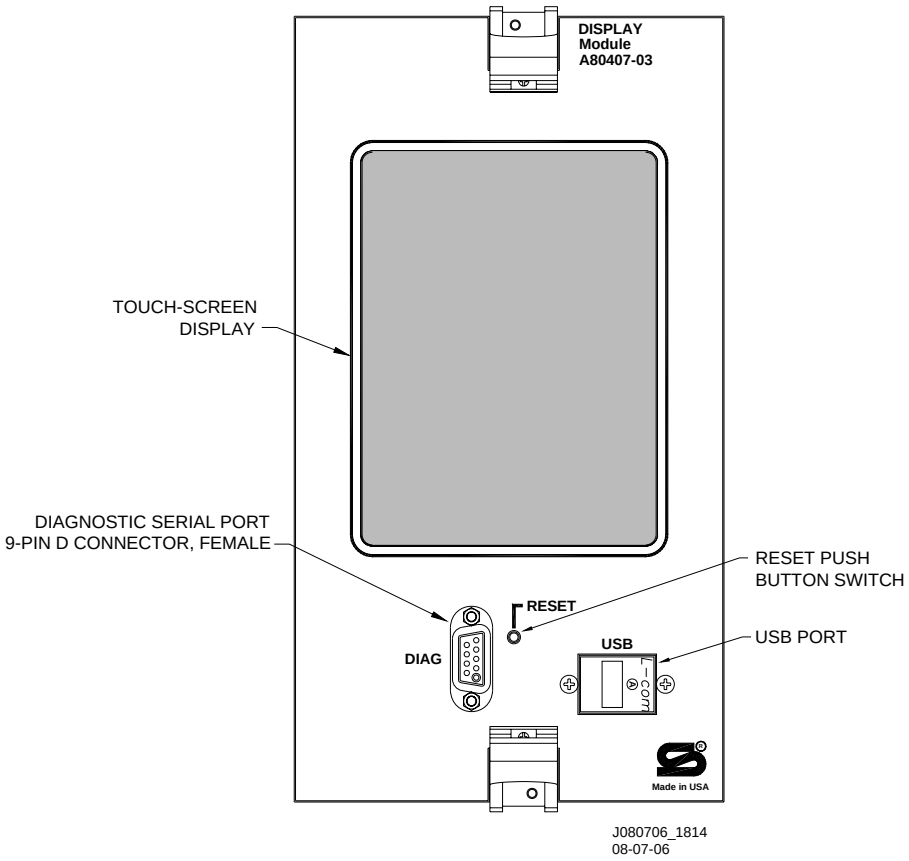
The A80407 display module, figure 2-24, provides a touch-screen display to allow:

- configuration programming
- application programming
- calibration programming
- system diagnostics
- system parameter display
- track status display

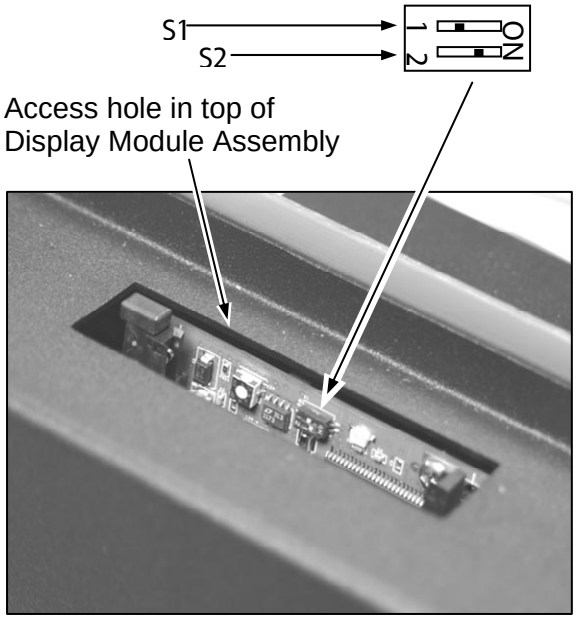
The display module is reset by actuation of the **RESET** push button switch.

NOTE

Refer to Section 4, Diagnostic Terminal, for detailed instructions on the Display module.



A



B

Figure 2-24. Display Module Front Panel and S1 & S2 Switch Locations

2.8.7 A80406 Transfer Module

The A80406 Transfer module provides operational switchover from the main modules to the standby GCP modules when main module failure is detected.

Switchover occurs after a set transfer delay interval.

NOTE

The standby modules are powered off and disconnected from the interface connectors until switchover occurs.

2.8.7.1 Transfer Module User Interface

The Transfer module front panel is shown in figure 2-25.

The user interface is described in table 2-20.

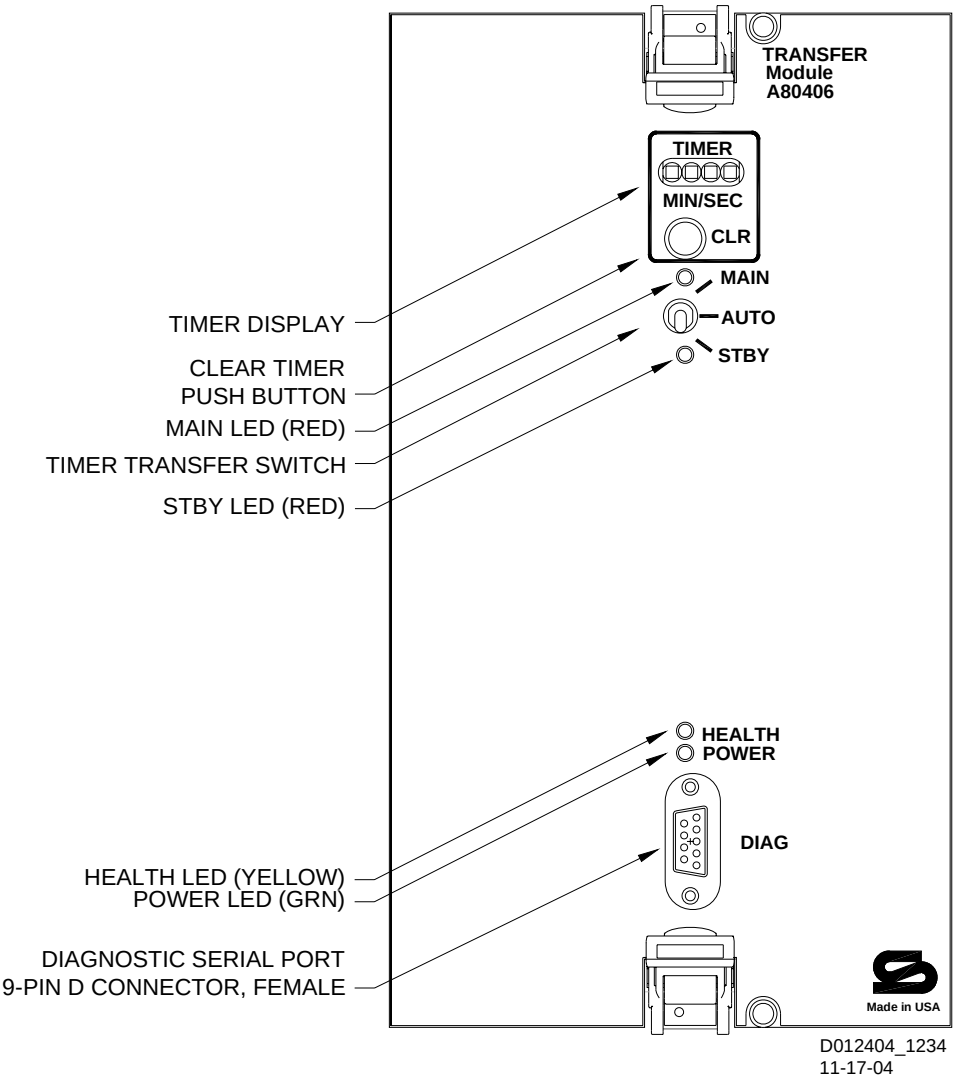


Figure 2-25. Transfer Module Front Panel

Table 2-20. Transfer Module User Interface

Component	Function
Timer Display	When transfer delay is set using the DIP switch (S3), the **TIMER** Display: 1. shows the set transfer delay in minutes and seconds 2. shows transfer timer delay count down in 1 sec. increments
CLR (Clear Timer) push button	Clears transfer delay time from counter. When pressed during timer countdown: • sets the timer to the selected Transfer Delay Interval, and • initiates immediate transfer of GCP operation to opposite modules.
MAIN LED	Lights red when: • main modules are enabled while Transfer Timer Switch is set to **AUTO**. • Timer Transfer Switch is set to **MAIN** position.
Timer Transfer Switch	Three-position toggle switch: • **MAIN** position enables only main module operation and will not automatically transfer. • **AUTO** position enables automatic switch over to opposite set of modules: transfers from main modules to standby modules when main module failure is detected, or transfers from standby modules to main modules when standby module failure is detected. **STBY** position enables only standby module operation and will not automatically transfer. To switch from one set of modules (**MAIN** or **STBY**) to the other set of modules when the transfer time is not counting down, move the switch from **AUTO** to the desired position (**MAIN** or **STBY**). Then return switch to **AUTO.**

⚠ WARNING

GATES WILL BEGIN TO LOWER IMMEDIATELY (WITHOUT GATE DELAY TIME) WHEN THE TRANSFER SWITCH IS USED TO SWAP BETWEEN HEALTHY UNITS. USE CAUTION WHEN TRANSFERRING CONTROL TO AVOID GATES HITTING VEHICLES OR PEDESTRIANS.

NOTE

Under normal conditions in the AUTO Transfer mode, gate delay time will run when the gates initially operate. If the trouble continues, the gates will already be lowered when the Transfer Module later swaps units.

Table 2-20 continued

Component	Function
STANDBY LED	Lights red when: • standby modules are enabled while Transfer Timer Switch is set to **AUTO.** • Timer Transfer Switch is set to **STBY** position.
HEALTH LED	Flashes yellow to indicate that the Transfer module is functioning normally.
POWER LED	Lights green to indicate that power is applied to the Transfer module.
DIAG Diagnostic Port	9-pin diagnostic serial port for Transfer module.

NOTE

1. A switchover interval ranging from 1 to 31 minutes is selectable from the Transfer module
   - The module is set at the factory for a switchover delay of 3 minutes.
2. During the switchover period, the crossing gates, lights, and bells are activated.

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2.8.8 A80468 Transfer Assembly

The A80468 Transfer assembly provides operational switchover from the main modules to the standby GCP modules when main module failure is detected.

Switchover occurs after a set transfer delay interval.

NOTE

The standby modules are powered off and disconnected from the interface connectors until switchover occurs.

2.8.8.1 Transfer Assembly User Interface

The Transfer assembly front panel is shown in figure 2-26.

The user interface is described in table 2-21.

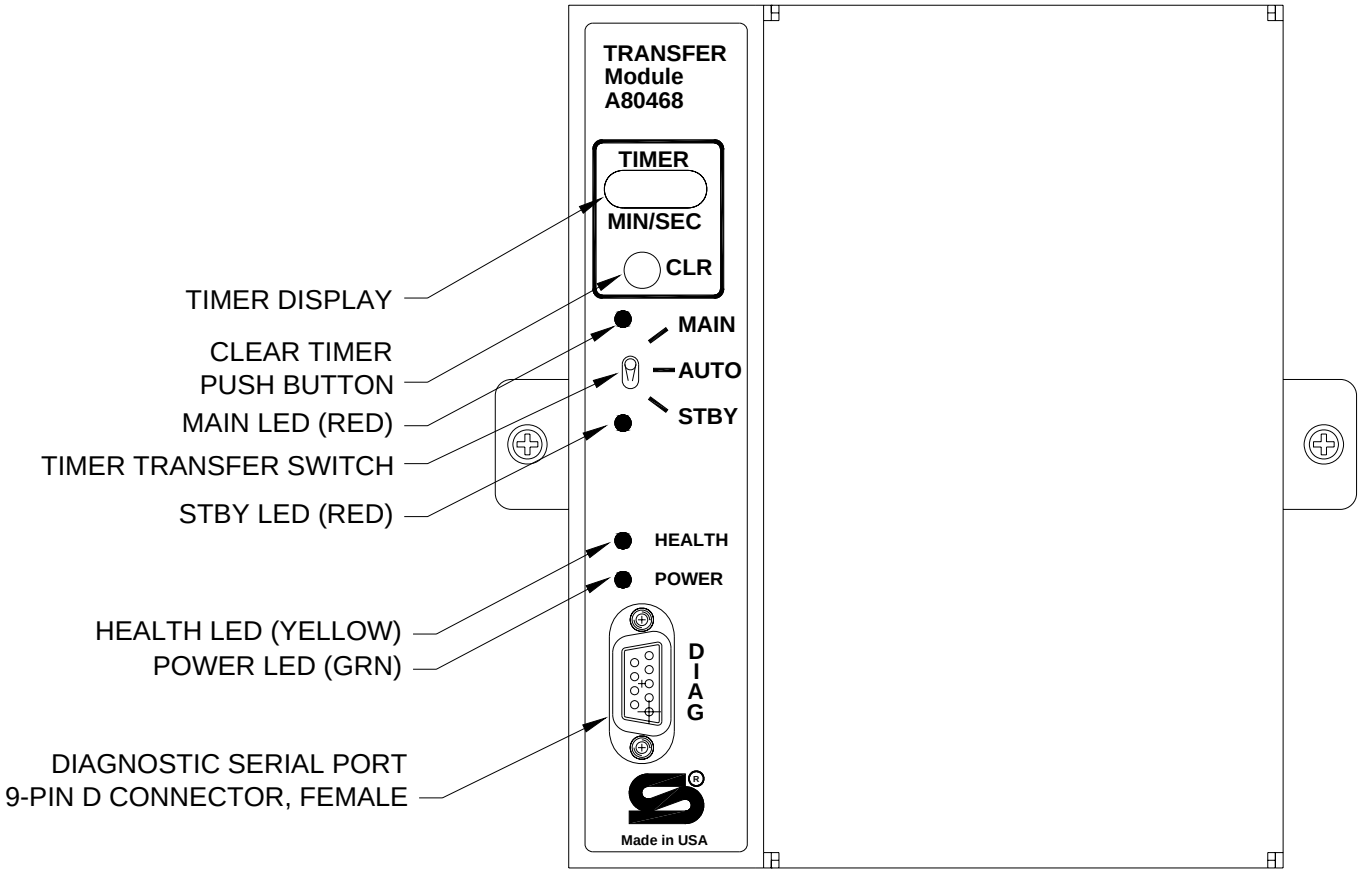

Figure 2-26. Transfer Assembly Front Panel

Table 2-21. Transfer Module User Interface

Component	Function
Timer Display	When transfer delay is set using the DIP switch (S3), the **TIMER** Display: 3. shows the set transfer delay in minutes and seconds 4. shows transfer timer delay count down in 1 sec. increments
CLR (Clear Timer) push button	Clears transfer delay time from counter. When pressed during timer countdown: • sets the timer to the selected Transfer Delay Interval, and • initiates immediate transfer of GCP operation to opposite modules.
MAIN LED	Lights red when: • main modules are enabled while Transfer Timer Switch is set to **AUTO**. • Timer Transfer Switch is set to **MAIN** position.
Timer Transfer Switch	Three-position toggle switch: • **MAIN** position enables only main module operation and will not automatically transfer. • **AUTO** position enables automatic switch over to opposite set of modules: transfers from main modules to standby modules when main module failure is detected, or transfers from standby modules to main modules when standby module failure is detected. **STBY** position enables only standby module operation and will not automatically transfer. To switch from one set of modules (**MAIN** or **STBY**) to the other set of modules when the transfer time is not counting down, move the witch from **AUTO** to the desired position **MAIN** or **STBY**). Then return switch to **AUTO.**

⚠ WARNING

GATES WILL BEGIN TO LOWER IMMEDIATELY (WITHOUT GATE DELAY TIME) WHEN THE TRANSFER SWITCH IS USED TO SWAP BETWEEN HEALTHY UNITS. USE CAUTION WHEN TRANSFERRING CONTROL TO AVOID GATES HITTING VEHICLES OR PEDESTRIANS.

NOTE

Under normal conditions in the AUTO Transfer mode, gate delay time will run when the gates initially operate. If the trouble continues, the gates will already be lowered when the Transfer Module later swaps units.

Table 2-21 continued

Component	Function
STANDBY LED	Lights red when: standby modules are enabled while Transfer Timer Switch is set to **AUTO.** Timer Transfer Switch is set to **STBY** position.
HEALTH LED	Flashes yellow to indicate that the Transfer module is functioning normally.
POWER LED	Lights green to indicate that power is applied to the Transfer module.
DIAG Diagnostic Port	9-pin diagnostic serial port for Transfer module.

NOTE

1. A switchover interval ranging from 1 to 31 minutes is selectable from the Transfer module
   - The module is set at the factory for a switchover delay of 3 minutes.
2. During the switchover period, the crossing gates, lights, and bells are activated.

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2.8.9 Safetran Event Analyzer Recorder IIi (SEAR IIi)

The A80410 SEAR IIi provides continuous real-time status monitoring and event recording of the 4000 GCP and the grade crossing devices controlled by the GCP. (See to Section 9)

2.8.10 SEAR IIi User Interface

The SEAR IIi module front panel is shown in figure 2-27. The user interface is described in table 2-22.

Table 2-22. SEAR IIi Module User Interface

Component	Function
Identification Labels For User Programmable LEDs **T01** through **T16**	Each label corresponds to a User Programmable LED and may be inscribed to identify a user-defined event.
ECH SVC LED	Flashes red until SEAR IIi is initialized.
ECH SVC Push button	Not used
POWER LED	Lights green when power is applied to SEAR IIi
HEALTH LED	Flashes green if backup battery output is within acceptable voltage range. Flashes yellow if backup battery is below minimum acceptable voltage. Remains off when SEAR IIi is inoperative.
User Programmable LEDs **T01** through **T16**	Each LED lights to Identify the occurrence of a user-defined event. LED color (red, green, or yellow) determined by programming.
AUX J1	Female DB-25 connector for RS232/RS422 serial interface to radio or telephone modem
USER J2	Female DB-9 connector for RS232 serial interface to printer or PC
J3	12-pin male I/O connector, providing the following functions: • Two isolated digital inputs (**DI1**, **DI2**) • Each input may be used to monitor up to 120V AC/DC • Two isolated contact relay outputs (**RLY 1**, **RLY 2**) • Temperature monitor input (**TEMP**) • Battery monitor input (**BATT MON**)

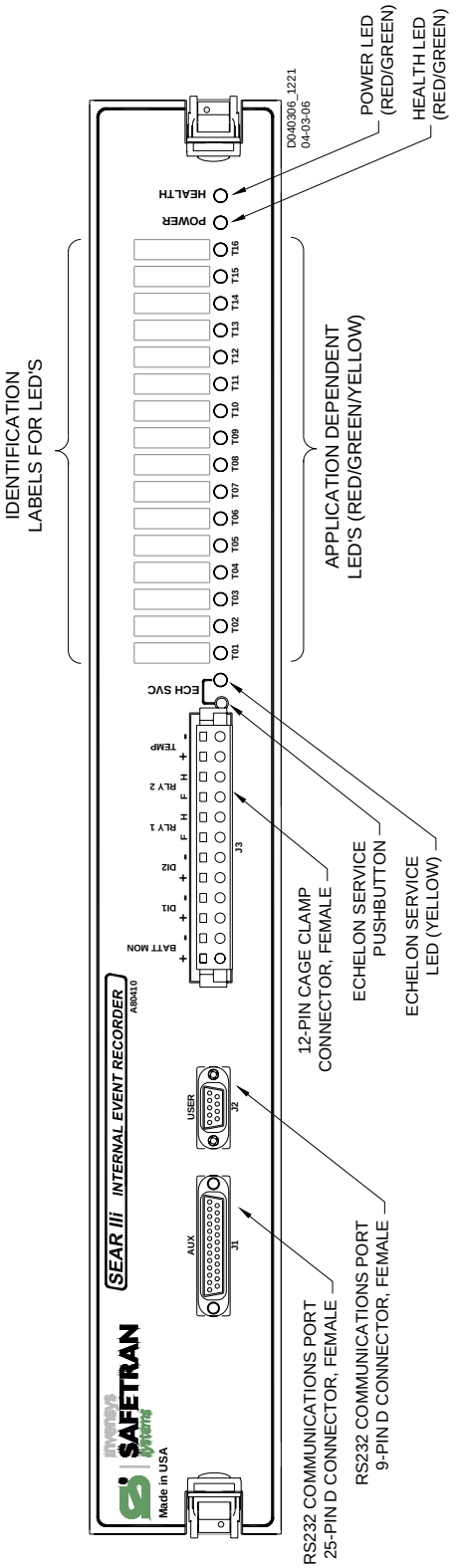

Figure 2-27. SEAR IIi Front Panel

2.8.11 A80435 External Configuration Device (ECD)

The ECD is a factory installed plug-in device on the 4000 GCP backplane (see figure 2-28)

The ECD stores the module configuration file (MCF). application program for the 4000 GCP

Both the Main and the Standby CPU Modules copy the MCF from the ECD.

Used for vital system operation.

⚠ WARNING

IF AN ECD IS REPLACED WITH AN ECD CONTAINING A DIFFERENT MCF, THE GCP WILL COPY THE NEW MCF INTO THE FLASH ON THE CPU MODULES AND SET THE SYSTEM BACK TO DEFAULT VALUES.

2.8.12 Chassis Identification Chip (CIC)

The CIC is:

- ♦ a non-volatile memory chip
- installed adjacent to the ECD on the GCP backplane (see figure 2-28).

Each CIC stores site specific information for both Main and Standby vital operations.

⚠ WARNING

IF THE CIC IS REPLACED, THE USER MUST SET THE SYSTEM BACK TO DEFAULTS AND REPROGRAM THE SYSTEM. FAILURE TO DO THIS COULD RESULT IN THE SYSTEM RUNNING WITH THE WRONG CONFIGURATION FOR THE SITE.

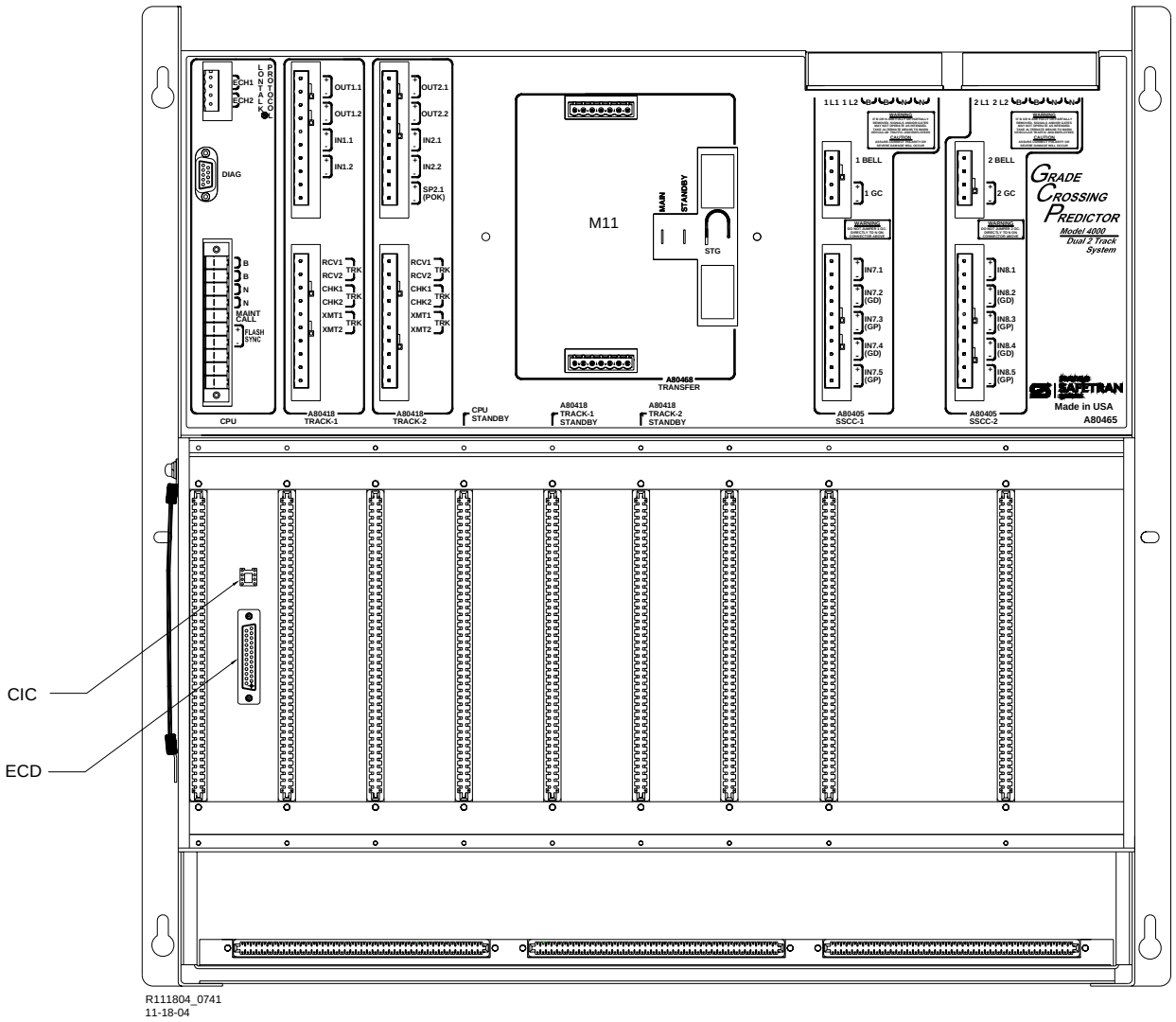

Figure 2-28. Typical ECD & CIC Locations On Backplane

2.8.13 Interface Connector Functions

The 4000 GCP interface connector functions are described in tables 2-23 through 2-26.

2.8.13.1 CPU Connectors

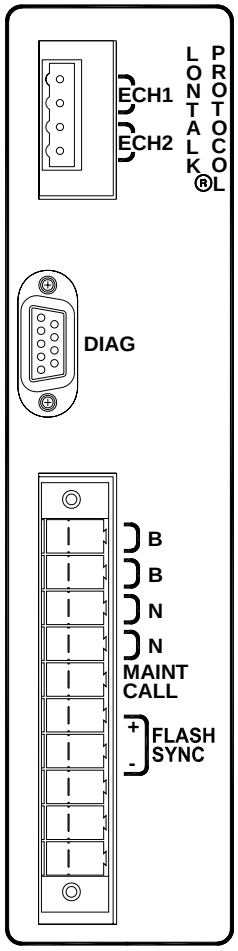

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Table 2-23. CPU Connectors

Connector	Pinout	Function
LONTALK® PROTOCOL	**ECH1**	LAN Twisted pair
	ECH2	LAN Twisted pair
DIAG	2	DT_TX
	3	DT_RX
	4	GROUND
CPU	**B**	Battery B input to GCP
	N	Battery N input to GCP
	MAINT CALL	Output to Maintenance Call lamp in crossing bungalow. ♦ When no problem is detected within the GCP, the maintenance call output is held at the Battery N voltage level, causing the lamp to light. ♦ When a problem is detected within the GCP, the voltage is removed and the lamp is extinguished.
	FLASH SYNC	Crossing Controller lamp flash rate synchronizing signal. Used to synchronize the flash sequence and rate of multiple external controllers.

NOTE

1. Effective with Revision D of the SSCCIIIi, **FLASH SYNC** is an isolated two-wire output.
   - If two Revision D or later SSCC IIIi units in the same chassis are operated by separate batteries, the FLASH SYNC returns are connected internally and no additional connection is required.
   - Revision D SSCC IIIi Modules can be identified by:
     - "D" located at end of Part Number / Bar Code tag.
     - Large metal bracket located on component side of module.
2. When using Revision C SSCC IIIi or earlier, or when external SSCC units are connected to a master SSCC IIIi and operated from a different battery, the following wiring must be provided for FLASH SYNC Return:
   - If two Revision C SSCCIIIi units in the same chassis are operated by separate batteries, the **N** pins of the SSCCIIIi power and lamp connectors must be wired together.
   - If an external SSCC IIIA, SSCC III PLUS, or SSCC IV is connected to a master SSCC IIIi:
     - If the SSCC IIIi is Revision C or earlier, the negative terminals of the master SSCC IIIi and external SSCC must be wired together.
     - If the SSCC IIIi is Revision D or later, the SSCC IIIi **FLASH SYNC** return (-) must be connected to **N** on the external SSCC.
3. The terminology for flash sync control differs between a GCP 4000 and an external SSCC device. The GCP 4000 terms Master and Slave SSCC, are called "Flash Sync Out" and "Flash Sync In" respectively in an external SSCC (Slave = Flash Sync In).

2.8.13.2 Track Connectors

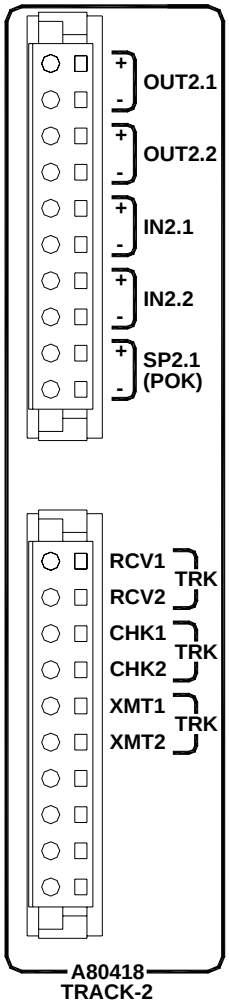

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Table 2-24. Track Connectors

Connector	Pinout*		Function
TRACK-1 TRACK-2 TRACK-3 TRACK-4 TRACK-5 TRACK-6	+	OUT2.1	Vital output 1
	-		
	+	OUT2.2	Vital output 2
	-		
	+	IN2.1	Vital input 1
	-		
	+	IN2.2	Vital input 2
	-		
	+	SP2.1	Spare input connection mapped to SEAR IIi for all Track Modules except Track 1
	-		
	TRK RCV1		Receiver input from track
	TRK RVC2		
	TRK CHK1		Check input from track
	TRK CHK2		
	TRK XMT1		Transmit output to track
	TRK XMT2		

* See following Note

NOTE

The digit preceding the decimal point in input and output connector labels indicates the track number; e.g., **OUT2.1** designates vital output 1 of **TRACK-2** connector.

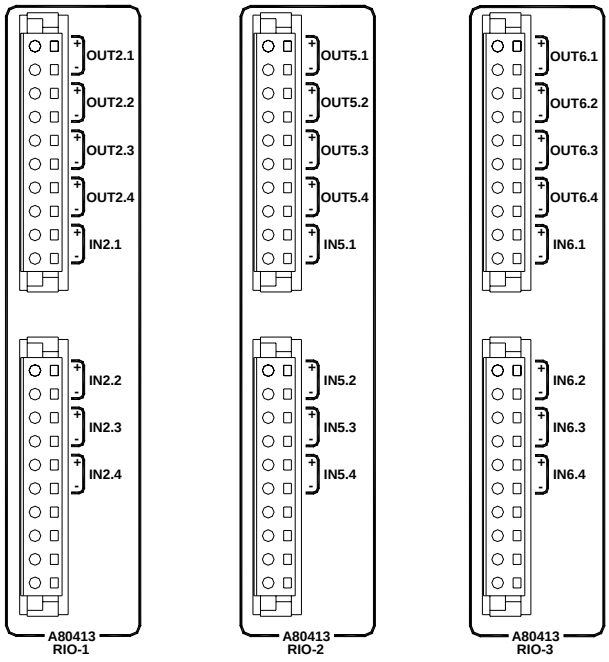
On all multi-track chassis, a spare connection is provided on the top track connector for TRACK 2 and higher that is mapped to the SEAR IIi; e.g., **SP2.1** (**POK**) of **TRACK-2** connector.

2.8.13.3 RIO Connectors

RIO Modules and their associated front panel connector groups provide additional Vital I/O. The dual 4-track chassis (A80400) comes standard with two RIO connector groups. RIO Modules may also be substituted for Track 2, Track 5 and Track 6 Modules in single 5-track, dual 2-track, dual 4-track and dual 6-track chassis when needed. The track module slots must then be configured as RIO modules in the system programming.

The 4000 GCP software will automatically designate the RIO in the track 2 slot as RIO 1, the RIO in the track 5 slot as RIO 2 and the RIO in the track 6 slot as RIO 3. The RIO modules may be installed in any order. See Table 2-25 for connector pinouts.

If a RIO Module is installed in place of a Track Module, the corresponding RIO mylar overlay should be affixed over the existing Track Module connector position to reflect proper connector nomenclature. Safetran has three mylars available for RIO connectors, as shown below with their Safetran part numbers.



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Slot 1	Slot 5	Slot 6
Safetran P/Ns: Z610-39589-0001	Z610-39589-0002	Z610-39589-0003

Table 2-25. RIO Connectors

Connector		Pinouts* -01	-02	-03	Function
RIO-1 RIO-2 RIO-3	+	OUT2.1	OUT5.1	OUT6.1	Vital output 1
	-				
	+	OUT2.2	OUT5.2	OUT6.2	Vital output 2
	-				
	+	OUT2.3	OUT5.3	OUT6.3	Vital output 3
	-				
	+	OUT2.4	OUT5.4	OUT6.4	Vital output 4
	-				
	+	IN2.1	IN5.1	IN6.1	Vital input 1
	-				
	+	IN2.2	IN5.2	IN6.2	Vital input 2
	-				
	+	IN2.3	IN5.3	IN6.3	Vital input 3
	-				
	+	IN2.4	IN5.4	IN6.4	Vital input 4
	-				

* See following Note

NOTE

The digit preceding the decimal point in input and output connector labels indicates module slot number in chassis; e.g., **OUT6.1** is associated with **TRACK 6/ RIO 3** in slot position 7.

2.8.13.4 Crossing Controller Connectors

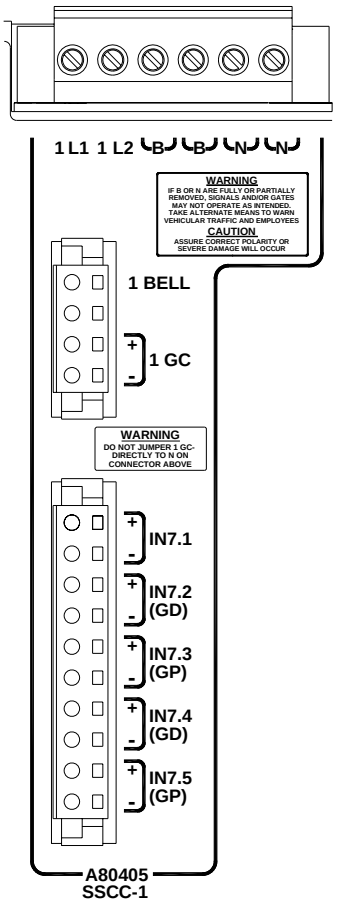

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Table 2-26. Crossing Controller Connectors

Connector	Pinout*		Function
SSCC-1 SSCC-2	1L1		Lamp output 1
	1L2		Lamp output 2
	B		Battery positive input
	N		Battery negative input
	1 BELL		Bell output
	+	1 GC	Gate output
	-		
	+	IN7.1	Vital crossing input 1
	-		
	+	IN7.2 (GD)	Vital crossing input 2 (gate down input)
	-		
	+	IN7.3 (GP)	Vital crossing input 3 (gate position input)
	-		
	+	IN7.4 (GD)	Vital crossing input 4 (gate down input)
	-		
	+	IN7.5 (GP)	Vital crossing input 5 (gate position input)
	-		

* See following Note

NOTE

1. The number preceding the lamp output connector labels indicates the SSCC associated with the connector; e.g., **1L1** is associated with **SSCC-1**.
2. The digit preceding the decimal point in input connector labels indicates the chassis SSCC slot; e.g., **IN8.1** is associated with **SSCC-2**.

2.9 LAN COMMUNICATIONS

Each 4000 GCP may communicate with other Safetran equipment via LONTALK® LAN (Echelon®).

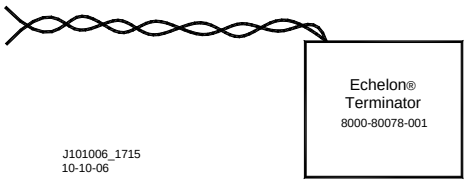
2.9.1 ATCS Vital Protocol

Vital ATCS serial protocol data may be incorporated with the LONTALK® protocol to facilitate:

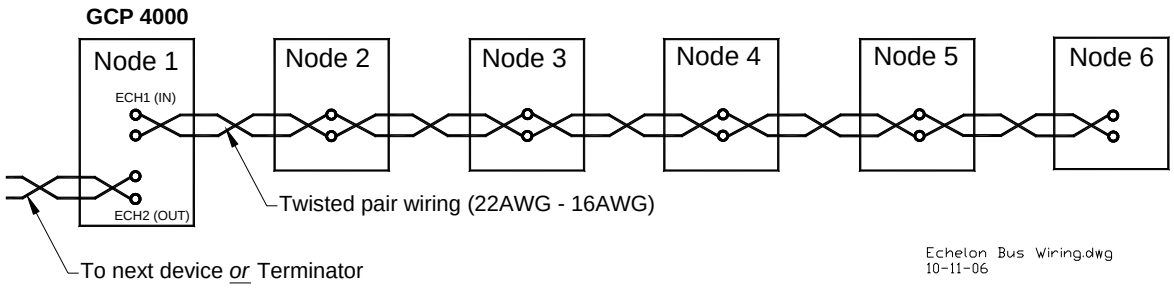
- crossing control functions
  remote prediction operations via Spread Spectrum Radio (SSR)
  vital communications with other Safetran vital controllers

2.9.2 Rules for Using Echelon® LAN

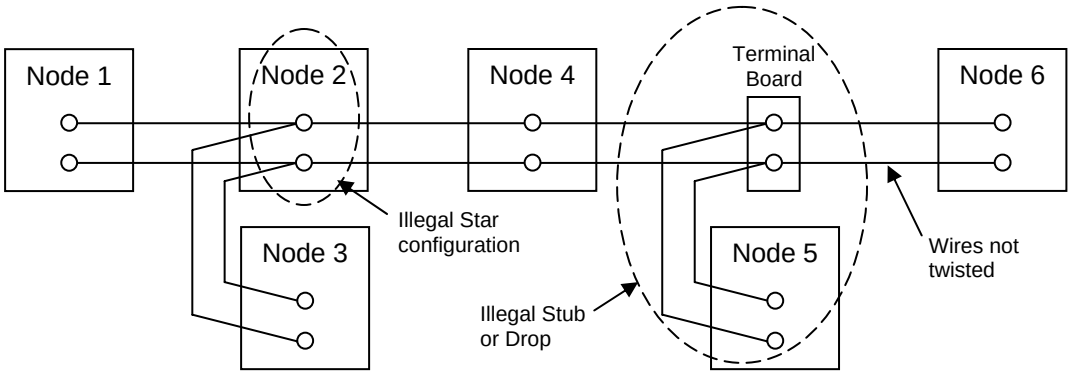
- Wire size is from #22AWG to #16AWG, stranded twisted pair.
- Each connection (node) must be wired in a daisy-chained bus configuration, no drops allowed (see Figure 2-29).
- Maximum wiring length of LAN bus wiring is 425 feet (130m) within a signal case or bungalow, but wiring should be kept as short as practical.
- A maximum of 8 connection (nodes) is recommended within 53 feet (16m) of cable. If necessary additional cable may be added so that no more than 8 nodes are located within any 53 foot length. If additional connections are required, contact Safetran California Technical Support for assistance.
- In general, Echelon network requires a terminator for proper data transmission performance.



  - ♦ The Echelon network can be connected to ECH1 on the 4000 GCP
  - ♦ The Echelon terminator can be connected to ECH2 on the 4000 GCP
  - ♦ Order Network Echelon Termination Unit, part number 8000-80078-001



CORRECT BUS WIRING



EXAMPLES OF INCORRECT WIRING

Figure 2-29. LAN Bus Wiring

⚠ CAUTION

BECAUSE THE ECHELON® INTERFACE IS NOT SURGE PROTECTED, NETWORK CONNECTIONS MUST BE RESTRICTED TO THE EQUIPMENT CONTAINED INSIDE A SIGNAL CASE OR BUNGALOW.

NOTE

For additional information concerning the Echelon® LAN, contact Safetran California Technical Support.

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SECTION 3 - AUXILIARY EQUIPMENT

3.1 BIDIRECTIONAL SIMULATION COUPLER, 62664-MF

The Bidirectional Simulation Coupler, figure 3-1, is used to configure a unidirectional installation for simulated bidirectional operation.

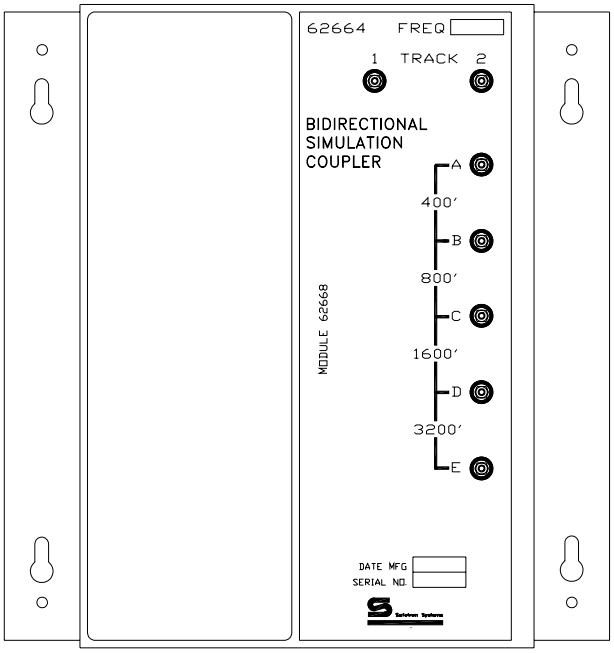

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Figure 3-1. Bidirectional Simulation Coupler, 62664-Mf

3.1.1 Functional Description

The Bidirectional Simulation Coupler consists of a:

- narrow-band shunt plug-in module
  - ♦ available in 12 fixed frequencies (Hz)
- variable inductor (simulated track).

⚠ WARNING

1. THE 62664 BIDIRECTIONAL SIMULATION COUPLER MUST NOT BE USED AS A TERMINATION SHUNT.
2. THE MODEL 3000 AND THE MODEL 4000 GCP ARE THE ONLY UNITS THAT ARE CAPABLE OF PERFORMING REMOTE PREDICTION FUNCTIONS WHILE OPERATING UNIDIRECTIONALLY IN A SIMULATED BIDIRECTIONAL MODE.
3. THE 62664 PLUG-IN MODULE FREQUENCY MUST BE THE SAME AS THE GCP FREQUENCY.
4. WHEN THE COUPLER IS UESD, THE CORRESPONDING GCP TRACK MUST BE PROGRAMMED FOR "SIM BIDIRNL".

3.1.2 Available Narrow Band Shunt Frequencies (Hz)

86	**156**	249	**348**	522	**645**	816
114	172	267	392	**525**	686	881
149	210	**285**	**430**	560	753	**970**
151	**211**	326	452	630	**790**	979

Safetran Standard GCP Frequencies shown in bold type.

3.1.3 Variable Inductor

The variable inductor consists of:

- four series-connected, toroid-wound inductors:
  - tapped and connected to the front panel terminals
  - each inductor simulates a specific track length

3.1.4 Front Panel Terminals

The front panel terminals allow simulated approach distances to be selected that closely match the actual track approach:

- Approach distances ranging from 400 to 6,000 feet may be selected using terminal shorting straps.
- The available simulated approach distances and the corresponding shorting strap terminal positions for the 62664 are shown in table 3-1.

Table 3-1. Approach Distance Selection Strapping For Bidirectional Simulation Coupler, 62664-Mf

Distance (Feet)	Strap Terminals	Distance (Feet)	Strap Terminals
400	B-C, C-D, D-E	3600	B-C, C-D
800	A-B, C-D, D-E	4000	A-B, C-D
1200	C-D, D-E	4400	C-D
1600	A-B, B-C, D-E	4800	A-B, B-C
2000	B-C, D-E	5200	B-C
2400	A-B, D-E	5600	A-B
2800	D-E	6000	No Straps
3200	A-B, B-C, C-D		

3.1.5 Four-Wire Simulated Bidirectional Applications Connections

In standard four-wire simulated bidirectional installations:

- the Bidirectional Simulation Coupler should be connected directly to the track connections of the transmitter track lead

3.1.6 Six-Wire Simulated Bidirectional Applications Connections

In six-wire simulated bidirectional configuration installations:

- the Bidirectional Simulation Coupler must be connected to the check (CHK) wires

⚠ WARNING

IN A SIX-WIRE CONFIGURATION THE 62664-MF MUST NOT BE CONNECTED TO THE TRANSMIT (XMT) WIRES.

- **IF THE COUPLER IS CONNECTED TO THE TRANSMIT WIRES OF THIS CONFIGURATION, AN OPEN TRANSMITTER TRACK WIRE WILL NOT BE DETECTED.**

3.1.7 Bidirectional Simulation Coupler Specifications

Environmental Temperature Range:	-40 °F to +160 °F (-40 °C to +71 °C)
Dimensions:	8.75 inches (22.2 centimeters) high 8.50 inches (21.6 centimeters) wide 9.25 inches (23.5 centimeters) deep
Weight:	5 pounds (2.27 kilograms) (approximate)
Simulated Approach Range:	400 to 6000 feet

NOTE

The simulated approach distance must be within ±10% of actual approach distance to the termination shunt.

3.1.8 Mounting Dimensions

The Bidirectional Simulation Coupler is housed in a brushed aluminum case designed for shelf or backboard mounting. The unit mounting dimensions are provided in figure 3-2.

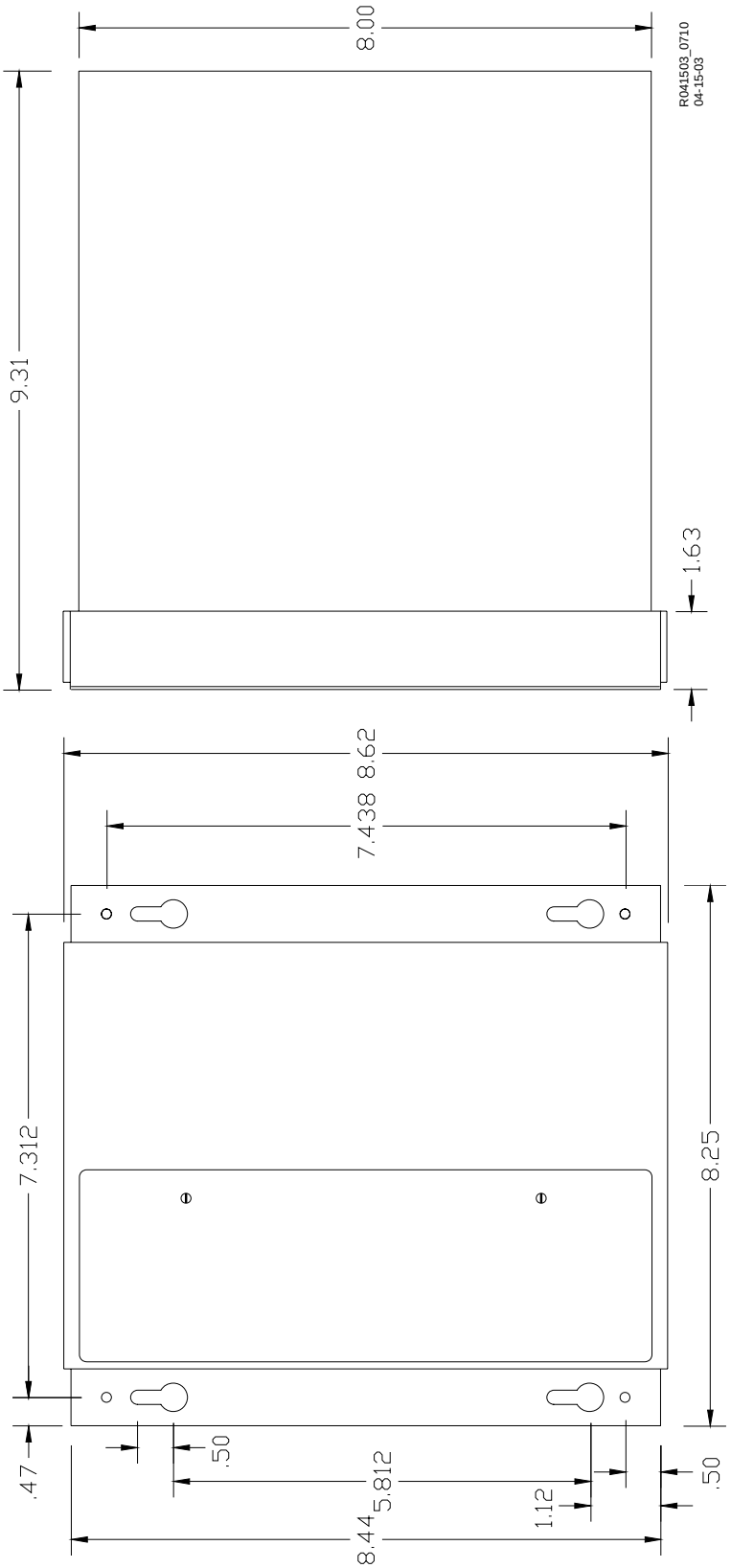


Figure 3-2. Bidirectional Simulation Coupler Assembly Mounting Dimensions

Figure 3-2. Bidirectional Simulation Coupler Assembly Mounting Dimensions

3.2 DC SHUNTING ENHANCER PANEL, 80049

The Safetran 80049 DC Shunting Enhancer Panel, figure 3-3, is used to apply a DC voltage to the track at dark territory crossings. This operation:

- breaks down insulating rust film on rails
- improves track shunting

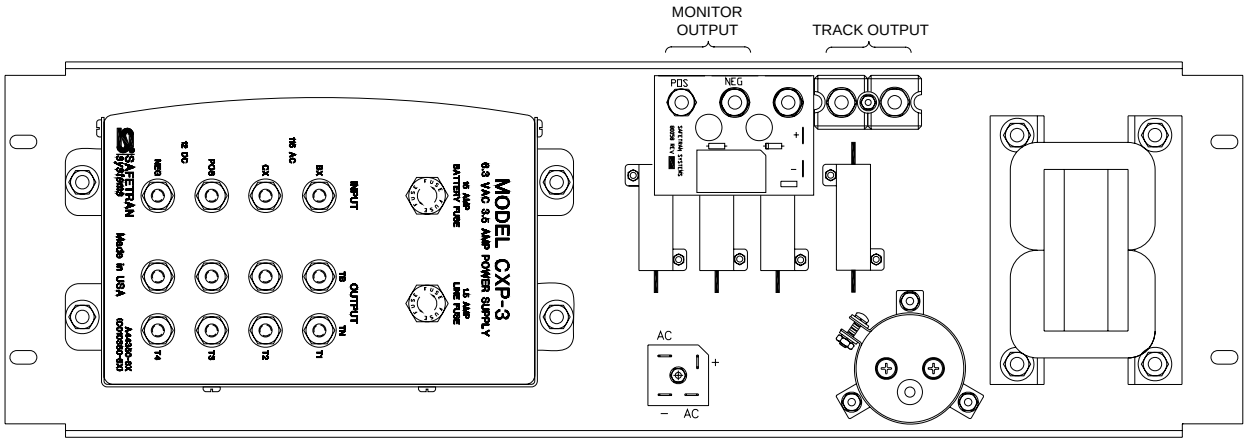


Figure 3-3. DC Shunting Enhancer Panel, 80049

3.2.1 Track Output Voltage

The DC Track Output voltage is isolated from battery and is generated from:

- 110 volt AC step-down transformer when AC is present
- battery powered DC-to-AC inverter when AC is off
  - ♦ The panel switches automatically to the DC-to-AC inverter output if AC is lost.

3.2.2 Monitor Output Voltage

The Monitor Output voltage is applied to a 4000 GCP vital input programmed as AND 1 XR Enable.

- Loss of the Monitor Output voltage will activate the crossing.
- The AND 1 XR enable must be programmed with a minimum of 5 second pickup delay.

3.2.3 Track Requirements

Installation of the Safetran 80049 DC Shunting Enhancer Panel requires:

- placement of at least one joint at the far end of each approach
  - ♦ insulated joints are required to confine the DC track voltage to the crossing
  - ♦ insulated joints can be located beyond the approach narrow-band shunt termination as desired
- approaches terminated by narrow-band shunts, not hardwire or wideband shunts
  - ♦ 62775 or 62780
- GCP transmit wires must first be routed to the Enhancer Panel track connections and then on to the track (see figure 3-4)

NOTE

The DC Shunting Enhancer Panel can be used with applications involving overlapping approaches from two or more crossings without the use of additional insulated joints.

➢ A typical DC Shunting Enhancer Panel application drawing for two overlapping crossings is provided in Section 1 of the Applications Guidelines, Safetran Document Number SIG-00-03-19.

⚠ CAUTION

WHEN TWO OR MORE DARK TERRITORY CROSSINGS OVERLAP, ENSURE:

➢ THAT EACH 4000 GCP CROSSING HAS A 80049 PANEL IN OPERATION

➢ THE POLARITY OF THE TRACK VOLTAGE TO THE RAIL FROM ALL 80049 PANELS IS THE SAME AT EACH CROSSING.

3.2.4 Interface Terminal Connections

The DC Shunting Enhancer Panel is equipped with eight user interface terminals.

- These terminals are connected as shown in figure 3-4.

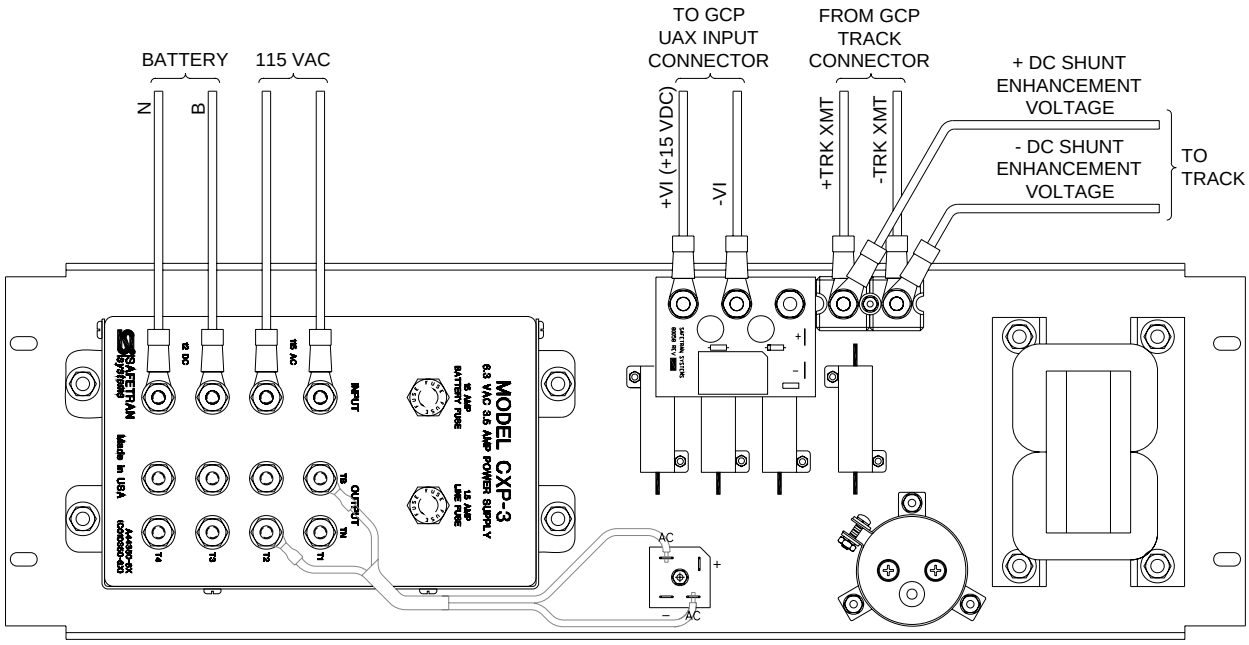


Figure 3-4. DC Shunting Enhancer Panel Interface Terminal Connections

3.2.5 DC Shunting Enhancer Panel Specifications

CXP Input Power:

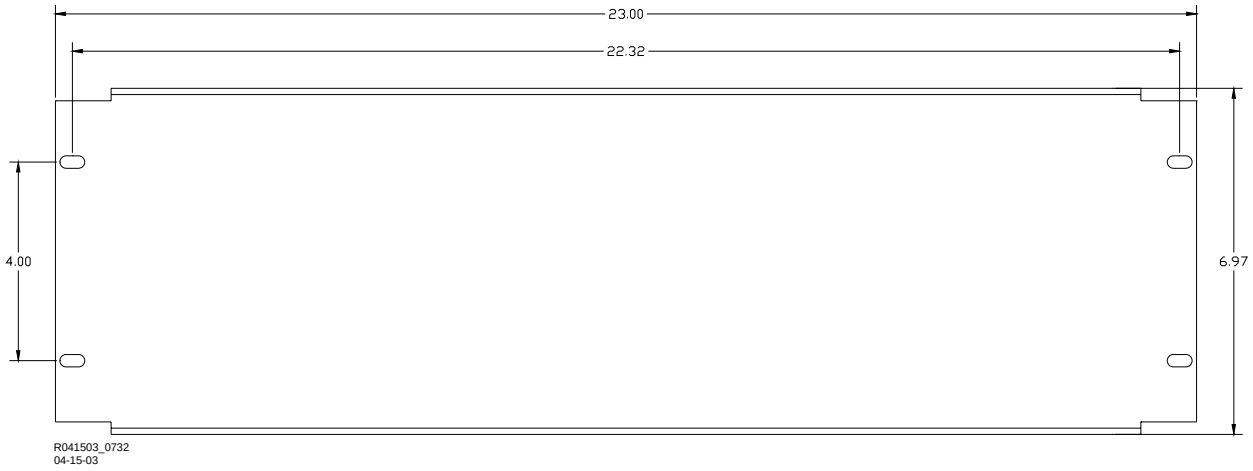
AC Voltage:	95 to 130 VAC
DC Voltage:	11 to 16 VDC
DC Current (AC present):	0 amps
DC Current (AC not present):	0.25 amps with no train and high ballast resistance 2.5 amps with train shunting track
Environmental Temperature Range:	-40 °F to +160 °F (-40 °C to +71 °C)
UAX Output:	+15.0 ± 0.2 VDC
Surge Protection:	Primary protection required for AC input and battery Secondary protection provided internally
Humidity:	95%, non-condensing
Dimensions:	
-1 unit:	6.97 inches (17.7 centimeters) high 23.0 inches (58.42 centimeters) wide 10.75 inches (27.3 centimeters) deep
-5 unit:	6.97 inches (17.7 centimeters) high 23.0 inches (58.42 centimeters) wide 5.75 inches (14.6 centimeters) deep
Weight:	-1 unit: 32 pounds (14.4 kilograms) (approximate) -5 unit: 17 pounds (7.65 kilograms) (approximately)

Mounting Dimensions

The DC Shunting Enhancer Panel can be rack, wall, or shelf mounted.

- The Panel mounting dimensions are provided in figure 3-5.

Figure 3-5. DC Shunting Enhancer Panel Mounting Dimensions



3.2.6 DC Shunting Enhancer Panel Configuration Options

Two DC Shunting Enhancer Panel configuration options are available.

- These configurations are described in table 3-2.

Table 3-2. DC Shunting Enhancer Panel Configuration Options

Part Number	Option Description
8000-80049-0001	Panel with CXP-3 DC-to-AC Inverter
8000-80049-0005	Panel without CXP-3 DC-to-AC Inverter • Used in two track applications

3.2.7 Two Track Applications

When two 80049 Panels are required with applications involving two tracks at a crossing:

- The first panel is an 80049-0001
- the second panel may be an 80049-0001 or 80049-0005

NOTE

When the –5 panel is used, it must be connected to the isolated 6.3 VAC inverter output of the first panel as shown in figure 3-6.

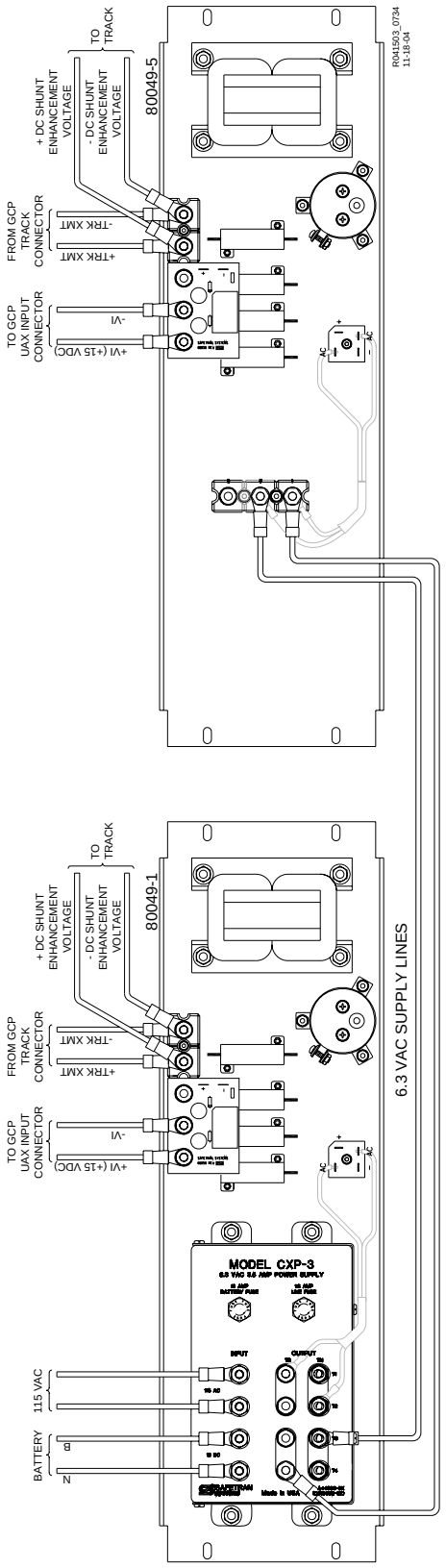


Figure 3-6. DC Shunting Enhancer Panels for Two Track Crossing

Figure 3-6. DC Shunting Enhancer Panels for Two Track Crossing

3.3 NARROW-BAND SHUNT, 62775-F

The 62775-f Narrow-band Shunt is designed to terminate specific track frequencies in areas where other audio frequencies or DC coded track circuits are present.

3.3.1 Physical Description

The 62775-f Narrow-band Shunt, figure 3-7, is housed in a hermetically sealed, cylindrical case:

- a pair of 10-foot leads extend from one end

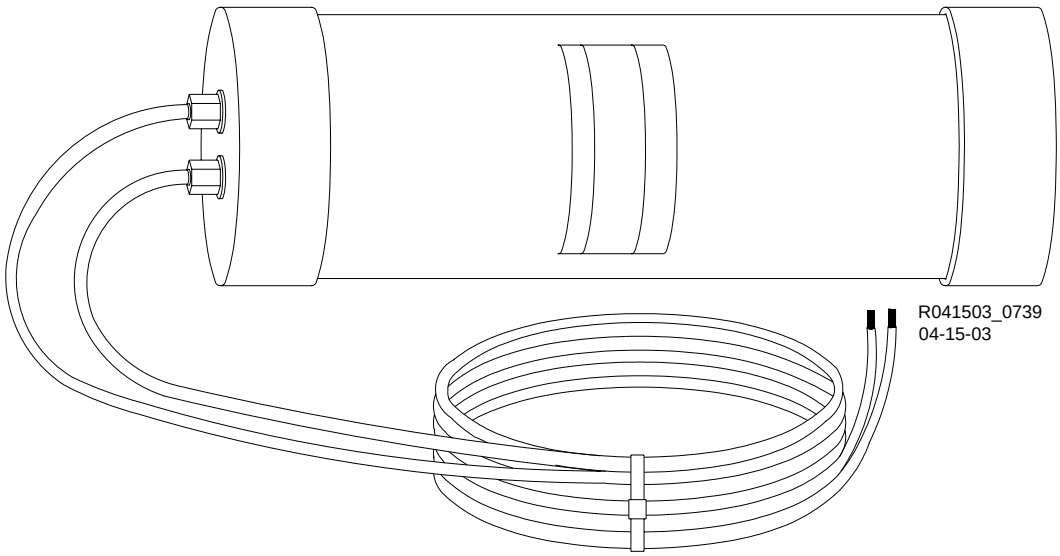


Figure 3-7. Narrow-band Shunt , 62775-f/62780-f

3.3.2 Shunt Use

The 62775-f Shunt:

- requires no special tuning
- may be used for most applications
  - ♦ bidirectional
  - ♦ unidirectional
  - ♦ simulated bidirectional

⚠ WARNING

THE 62775 NARROW-BAND SHUNT MAY NOT BE USED IF A 4000 GCP APPROACH OVERLAPS A MODEL 300 OR MODEL 400 GCP APPROACH. USE THE 62780 SHUNT INSTEAD.

⚠ CAUTION

THE 62775-F NARROW-BAND SHUNT SHOULD BE:

- ➢ CONNECTED AS CLOSE AS POSSIBLE TO THE RAILS
- ➢ ENCASED IN A PROTECTIVE ENCLOSURE OR BURIED AT AN APPROPRIATE DEPTH TO PROVIDE MAXIMUM PROTECTION FROM PHYSICAL DAMAGE

NOTE

It is not necessary to bury the 62775-f Narrow-band Shunt below the frost line.

3.3.3 62775-F Narrow-band Shunt Specifications:

Dimensions:

16 inches (40.6 centimeters) long
5 inches (12.7 centimeters) in diameter

Weight:

10 pounds (4.54 kilograms) (approximate)

Shunt Frequencies:

86	149	**211**	392	560	**790**
100	151	267	**430**	630	816
114	**156**	**285**	452	**645**	881
134	172	326	522	686	**970**
141	210	**348**	**525**	753	979

Frequencies shown in **boldface** type are Safetran Standard GCP frequencies.

Leads:

Dual, number 6 AWG:

- stranded wire
- black PVC insulation
- 10 feet (304.8 centimeters) long

3.4 NARROW-BAND SHUNT, 62780-F

The 62780-f Narrow-band Shunt:

- is used when other AC signals or coded DC is present on the rails
- produces less loading effect on adjacent frequencies (10 ohms reactance) than the 62775-f Shunt:
- can be used in territories with overlapping Model 300 and Model 400 GCP approaches.

3.4.1 Physical Description

The 62780-f Narrow-band Shunt (see figure 3-8) is housed in a hermetically sealed, cylindrical case:

- a pair of 10-foot leads extend from one end.

3.4.2 Shunt Use

The 62780-f Shunt:

- requires no special tuning
- is compatible with all Safetran Motion Sensors and GCPs.

⚠ CAUTION

THE 62780-F NARROW-BAND SHUNT SHOULD BE:

- ➢ CONNECTED AS CLOSE AS POSSIBLE TO THE RAILS
- ➢ ENCASED IN A PROTECTIVE ENCLOSURE OR BURIED AT AN APPROPRIATE DEPTH TO PROVIDE MAXIMUM PROTECTION FROM PHYSICAL DAMAGE

NOTE

It is not necessary to bury the 62780-f Narrow-band Shunt below the frost line.

3.4.3 62780-F Narrow-band Shunt Specifications:

Dimensions:

14.125 inches (35.9 centimeters) long
4.125 inches (10.5 centimeters) in diameter

Weight:

7 pounds (3.18 kilograms) (approximate)

Shunt Frequencies:

86	**156**	**285**	**430**	560	753	**970**
100	210	326	452	630	**790**	979
114	**211**	**348**	522	**645**	816	
151	267	392	**525**	686	881	

Frequencies shown in **boldface** type are Safetran Standard GCP frequencies.

Leads:

Dual, number 6 AWG:

- stranded wire
- black PVC insulation
- 10 feet (304.8 centimeters) long

3.5 MULTIFREQUENCY NARROW-BAND SHUNT, 62775-XXXX

The 62775-XXXX Multifrequency Narrow-band Shunt, like its single single-frequency counterpart (paragraph 3.3), is designed to terminate specific track frequencies in areas where other audio frequencies or DC coded track circuits are present.

3.5.1 Physical Description

The 62775-XXXX Multifrequency Narrow-band Shunt, figure 3-8, is:

- slightly longer than its single-frequency counterpart
- housed in a hermetically sealed, cylindrical case:
  - ♦ a pair of 10-foot leads extend from one end
  - ♦ seven AREMA binding posts extend from opposite end
    - ▪ terminals covered by removable, pliable end cap
    - ▪ secured in place by a sturdy stainless steel clamp

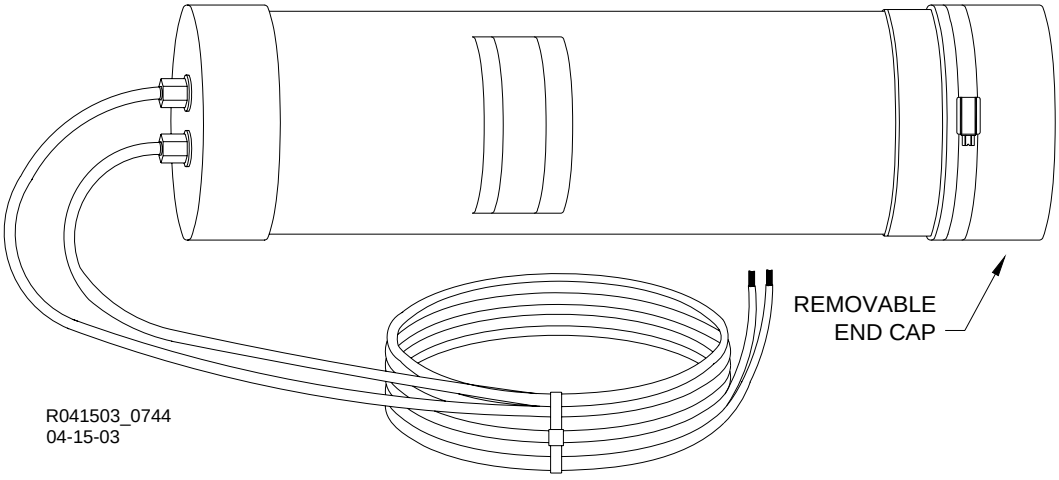


Figure 3-8. Multifrequency Narrow-band Shunt, 62775/62780-XXXX

⚠ WARNING

THE 62775-XXXX NARROW-BAND SHUNT MAY NOT BE USED IF A 4000 GCP APPROACH OVERLAPS A MODEL 300 OR MODEL 400 GCP APPROACH. USE THE 62780-XXXX SHUNT INSTEAD.

3.5.2 Frequency Selection

The Multifrequency Narrow-band Shunt is available in eight multiple frequency versions:

- frequency of each is selected by means of seven standard AREMA binding posts
- AREMA binding posts are labeled A through G (see figure 3-9)
  - ♦ jumpers select the desired shunting frequency (see table 3-3).

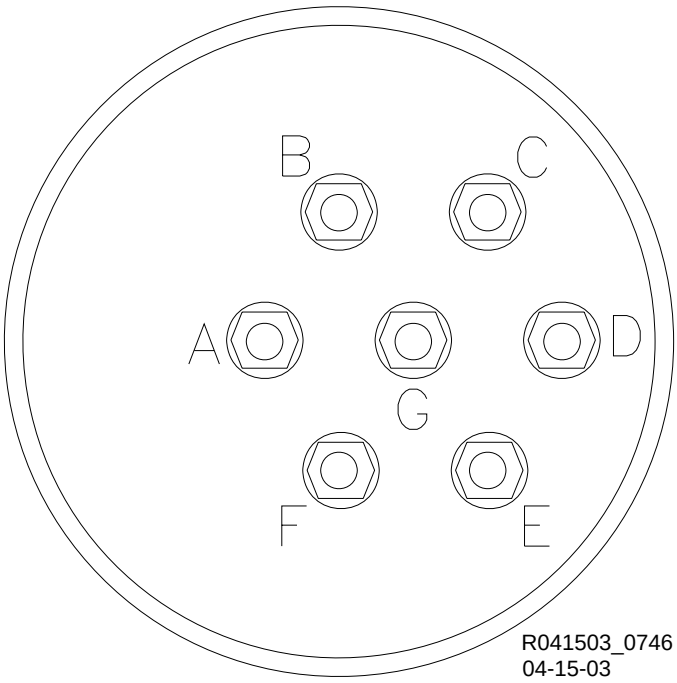


Figure 3-9. Multifrequency Narrow-band Shunt AREMA Binding Posts

NOTE

1. Terminal jumper hardware is supplied with each Shunt.
2. The Shunt is shipped with no factory jumpers installed
   - ➢ is electrically open
   - ➢ does not load any frequency on the track.
3. Install jumpers for the desired frequency before placing the unit in service.
   - ➢ A label located inside the removable end cap identifies the terminal jumpers required for each frequency.

Table 3-3. Multifrequency Narrow-Band Shunt, 62775, Frequency Selection Jumpers

Shunt Part Number	Frequency (Hz)	Jumper Shunt Terminals
62775-8621	86	A-F, G-D, D-E, E-F
	114	B-G, G-D, D-E
	156	C-D, D-G
	211	C-D
62775-1543	156	A-F, G-C, C-D, D-E, E-F
	211	A-G, G-C, C-D, D-E
	285	B-C, C-D, D-G,
	348	B-C, C-D
	430	B-C
62775-3497	348	A-B, B-C, C-D, D-E, E-F, F-G
	430	A-B, B-C, C-D, D-E, E-F
	525	A-B, B-C, C-D, D-E
	645	A-B, B-C, C-D
	790	A-B, B-C
	970	A-B
62775-2132	211	A-F, G-C, C-D, D-E, E-F
	267	B-G, G-C, C-D, D-E
	285	B-C, C-D, D-G
	313	B-C, C-D
	326	B-C
62775-2152	211	A-F, G-C, C-D, D-E, E-F
	285	B-C, C-D, D-E, E-G
	348	B-C, C-D, D-G
	430	B-C, C-D
	525	B-C
62775-3448	348	A-B, B-C, C-D, D-E, E-F, F-G
	389	A-B, B-C, C-D, D-E, E-F
	392	A-B, B-C, C-D, D-E
	430	A-B, B-C, C-D
	452	A-B, B-C
	483.5	A-B
62775-5274	522	A-B, B-C, C-D, D-E, E-F, F-G
	525	A-B, B-C, C-D, D-E, E-F
	560	A-B, B-C, C-D, D-E
	645	A-B, B-C, C-D
	669.9	A-B, B-C
	746.8	A-B
62775-7910	790	A-B, B-C, C-D, D-E, E-F, F-G
	816	A-B, B-C, C-D, D-E, E-F
	832.5	A-B, B-C, C-D, D-E
	970	A-B, B-C, C-D
	979	A-B, B-C
	1034	A-B

⚠ WARNING

CAREFULLY TIGHTEN ALL NUTS ON ALL FREQUENCY JUMPERS, THEN INSTALL A SECOND NUT TO SECURELY LOCK THE ASSEMBLY.

⚠ CAUTION

THE 62775-XXXX NARROW-BAND SHUNT SHOULD BE:

- CONNECTED AS CLOSE AS POSSIBLE TO THE RAILS
- ENCASED IN A PROTECTIVE ENCLOSURE OR BURIED AT AN APPROPRIATE DEPTH TO PROVIDE MAXIMUM PROTECTION FROM PHYSICAL DAMAGE

NOTE

It is not necessary to bury the 62775-XXX Narrow-band Shunt below the frost line.

3.5.3 62775 Multifrequency Narrow-band Shunt Specifications:

Dimensions:

22 inches (55.9 centimeters) long
5 inches (12.7 centimeters) in diameter

Weight:

10 pounds (4.54 kilograms) (approximate)

Shunt Frequencies:

See table 3-3

Leads:

Dual, number 6 AWG:

- stranded wire
- black PVC insulation
- 10 feet (304.8 centimeters) long

3.6 MULTIFREQUENCY NARROW-BAND SHUNT, 62780-XXXX

The 62780-XXXX Multifrequency Narrow-band Shunt, like its single single-frequency counterpart (paragraph 3.4),

- is used when other AC signals or coded DC is present on the rails
- produces less loading effect on adjacent frequencies (10 ohms reactance) than the 62775-XXXX Shunt:
- can be used in territories with overlapping Model 300 and Model 400 GCP approaches.

3.6.1 Physical Description

The 62780-XXXX Multifrequency Narrow-band Shunt, figure 3-8, is:

- longer than its single-frequency counterpart
- housed in a hermetically sealed, cylindrical case:
  - ♦ a pair of 10-foot leads extend from one end
  - ♦ seven standard AREMA binding posts extend from opposite end
    - ▪ terminals covered by removable, pliable end cap
    - ▪ secured in place by a sturdy stainless steel clamp

3.6.2 Frequency Selection

The Multifrequency Narrow-band Shunt is available in four multiple frequency versions:

- frequency of each is selected by means of seven standard AREMA binding posts
- AREMA binding posts are labeled A through G (see figure 3-9)
  - ♦ AREMA binding posts are jumpered to select the desired shunting frequency (see table 3-4).

NOTE

1. Terminal jumper hardware is supplied with each Shunt.
2. The Shunt is shipped with no factory jumpers installed
   - ➢ is electrically open
   - ➢ does not load any frequency on the track.
3. Install jumpers for the desired frequency before placing the unit in service.
   - ➢ A label located inside the removable end cap identifies the terminal jumpers required for each frequency.

Table 3-4. Multifrequency Narrow-Band Shunt, 62780 Frequency Selection Jumpers

Shunt Part Number	Frequency (Hz)	Jumper Shunt Terminals
62780-8621	86	A-F, G-D, D-E, E-F
	114	B-G, G-D, D-E
	156	C-D, D-G
	211	C-D
62780-1543	156	A-F, G-C, C-D, D-E, E-F
	211	A-G, G-C, C-D, D-E
	285	B-C, D-G, C-D
	348	B-C, C-D
	430	B-C
62780-2152	211	A-F, G-C, C-D, D-E, E-F
	285	B-C, C-D, D-E, C-G
	348	B-C, C-D, D-G
	430	B-C, C-D
	525	B-C
62780-5297	525	A-B, B-C, C-D, D-E
	645	A-B, B-C, C-D
	790	A-B, B-C
	970	A-B

⚠ WARNING

CAREFULLY TIGHTEN ALL NUTS ON ALL FREQUENCY JUMPERS THEN INSTALL A SECOND NUT TO SECURELY LOCK THE ASSEMBLY.

⚠ CAUTION

THE 62780-XXXX NARROW-BAND SHUNT SHOULD BE:

- CONNECTED AS CLOSE AS POSSIBLE TO THE RAILS
- ENCASED IN A PROTECTIVE ENCLOSURE OR BURIED AT AN APPROPRIATE DEPTH TO PROVIDE MAXIMUM PROTECTION FROM PHYSICAL DAMAGE.

NOTE

It is not necessary to bury the 62780-XXX Narrow-band Shunt below the frost line.

3.6.3 62780 Multifrequency Narrow-band Shunt Specifications:

Dimensions:
22 inches (55.9 centimeters) long
5 inches (12.7 centimeters) in diameter

Weight:
10 pounds (4.54 kilograms) (approximate)

Shunt Frequencies:
See table 3-4

Leads:
Dual, number 6 AWG:

- stranded wire
- black PVC insulation
- 10 feet (304.8 centimeters) long

3.7 WIDEBAND SHUNT, 8A076A

The 8A076A Wideband Shunt provides an effective short circuit to AC but presents an open circuit to DC. This shunt may be used:

- as a termination shunt where no other frequencies (other than the GCP) are present
- to bypass existing insulated joints required for DC signaling purposes within the track circuit

3.7.1 Physical Description

The 8A076A Wideband Shunt, figure 3-10, is:

- housed in a hermetically sealed, cylindrical case
  - ♦ a pair of 10-foot leads extend from one end

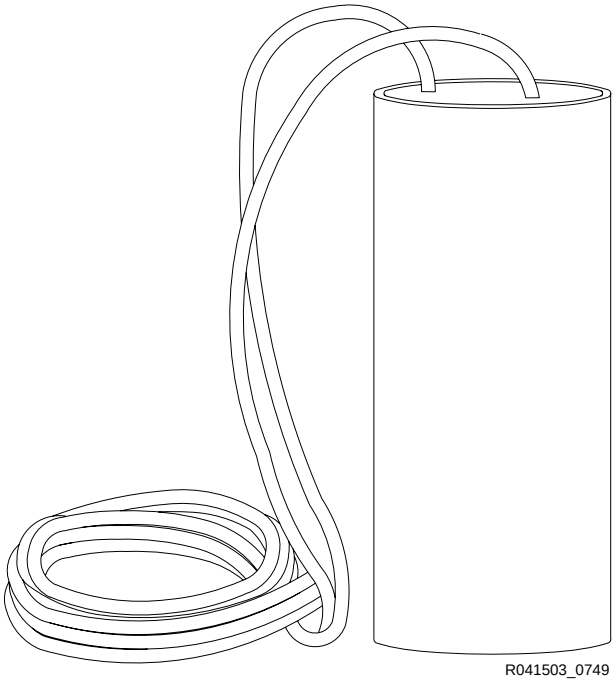


Figure 3-10. Wideband Shunt, 8A076A

⚠ WARNING

THE 8A076A WIDEBAND SHUNT MUST NOT BE USED TO BYPASS INSULATED JOINTS IN DC CODED TRACK CIRCUITS OR WHERE AC OR CODED AC CIRCUITS EXIST.

⚠ CAUTION

THE 8A076A WIDEBAND SHUNT SHOULD BE:

- ➢ CONNECTED AS CLOSE AS POSSIBLE TO THE RAILS
- ➢ ENCASED IN A PROTECTIVE ENCLOSURE OR BURIED AT AN APPROPRIATE DEPTH TO PROVIDE MAXIMUM PROTECTION FROM PHYSICAL DAMAGE.

NOTE

It is not necessary to bury the 8A076A Wideband Shunt below the frost line.

3.7.2 8A076A Wideband Shunt Specifications:

Dimensions:

7.5 inches (19.1 centimeters) long
3.35 inches (8.5 centimeters) in diameter

Weight:

7 pounds (3.18 kilograms) (approximate)

Leads:

Dual, number 6 AWG:

- stranded wire
- black PVC insulation
- 10 feet (304.8 centimeters) long

3.8 SIMULATED TRACK INDUCTOR, 8V617

The 8V617 Simulated Track Inductor is used with Safetran's Multifrequency Narrow-band Shunts (62775/62780-XXXX):

- to balance the approaches of a bidirectional application when the approaches differ by more than 10%

3.8.1 Description

The 8V617 Simulated Track Inductor, figure 3-11:

- consists of an insulated, toroid-wound coil with:
  - pair of 4-inch number 18 AWG stranded wire leads
  - ¼-inch ring-lug connectors
- is supplied in 21 configurations to simulate track lengths:
  - 200 to 4,000 feet in 200-foot increments plus 4,400 feet.
- is identified with the basic part number followed by a dash number as listed in table 3-5
  - dash number indicates the simulated distance in feet

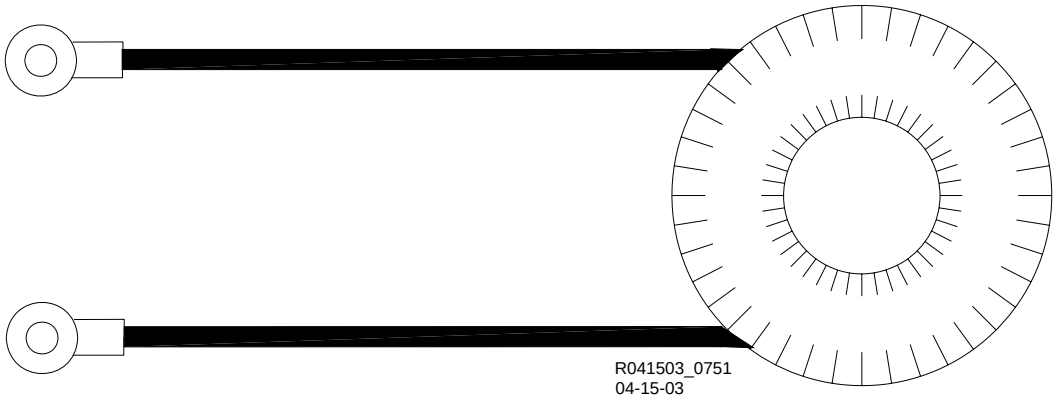


Figure 3-11. Simulated Track Inductor, 8V617

Table 3-5. Simulated Track Inductor Part Number Listing

Basic Part No.	Dash Number = Distance (Feet)		
8V617	-0200	-1600	-3000
	-0400	-1800	-3200
	-0600	-2000	-3400
	-0800	-2200	-3600
	-1000	-2400	-3800
	-1200	-2600	-4000
	-1400	-2800	-4400

3.8.2 Balancing Bidirectional Approaches

The 8V617 Simulated Track Inductor is used with the Shunt of the shorter approach to compensate for the unequal distance as shown in figure 3-12.

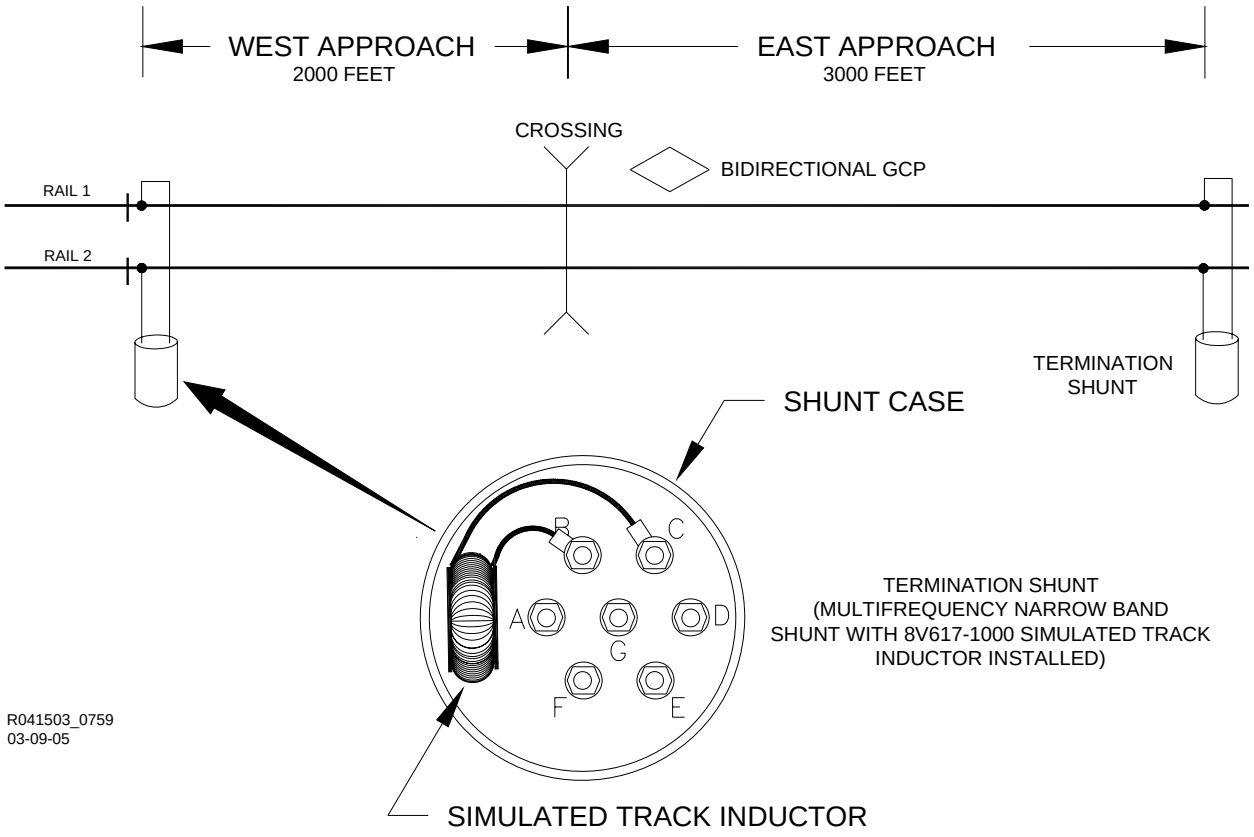


Figure 3-12. Simulated Track Inductor Used With Termination Shunt

3.8.3 Simulated Track Inductor Specifications:

Diameters: 1.875 inches (4.76 centimeters)

Thickness: 0.875 inch (2.22 centimeters)

Weight: 5 ounces (141.75 grams)

3.8.4 Simulate Track Inductor Installation

The 8V617 Simulated Track Inductor may be used to balance approaches using both the 62775-XXXX and 62780-XXXX Multifrequency Narrow-band shunts.

- The Inductor may be installed in both shunts as described in procedure 3-1.

⚠ WARNING

1. **BEFORE INSTALLING IN A MULTIFREQUENCY NARROW-BAND SHUNT, VERIFY THAT THE 8V617 INDUCTOR IS THE CORRECT DISTANCE VALUE FOR THE APPLICATION.**
2. **ENSURE THAN 8V617 INDUCTOR IS CONNECTED TO THE CORRECT TWO TERMINALS AND THAT NO JUMPER LINKS ARE INSTALLED BETWEEN THESE TWO TERMINALS. REFER TO TABLE 3-6 FOR THE CORRECT TWO TERMINALS TO USE FOR THE APPLICABLE FREQUENCY AND SHUNT TYPE.**

NOTE

To perform procedure 3-1, refer to the small chart inside the end cap for terminal strapping information.

- If the chart is missing or illegible, refer to tables 3-3 (62775) or 3-4 (62780)

Procedure 3-1. SIMULATED TRACK INDUCTOR INSTALLATION

Step 1	Determine the Shunt frequency and the compensating distance required.
Step 2	Loosen the clamp and remove the end cap from the Shunt to gain access to the frequency-selection terminals.
Step 3	Refer to table 3-6 and note the inductor mounting terminals for the applicable shunt and frequency.
Step 4	Remove the nuts, washers, and shorting link from the shunt terminals indicated. • Discard the shorting link.
Step 5	Connect the inductor leads to the two terminals.
Step 6	Restore all other jumpers to their correct frequency allocation.
Step 7	Install the washers and nuts and tighten securely.
Step 8	Wrap the inductor in the foam insulation (included with the inductor) as shown in figure 3-13.
Step 9	Carefully insert into the Shunt housing between the terminals and case at the approximate location shown. • Position the inductor with the leads extending horizontally toward the side (not upward) to prevent interference with the Shunt end cap.
Step 10	Return the end cap to its original position on the Shunt and tighten the clamp securely.

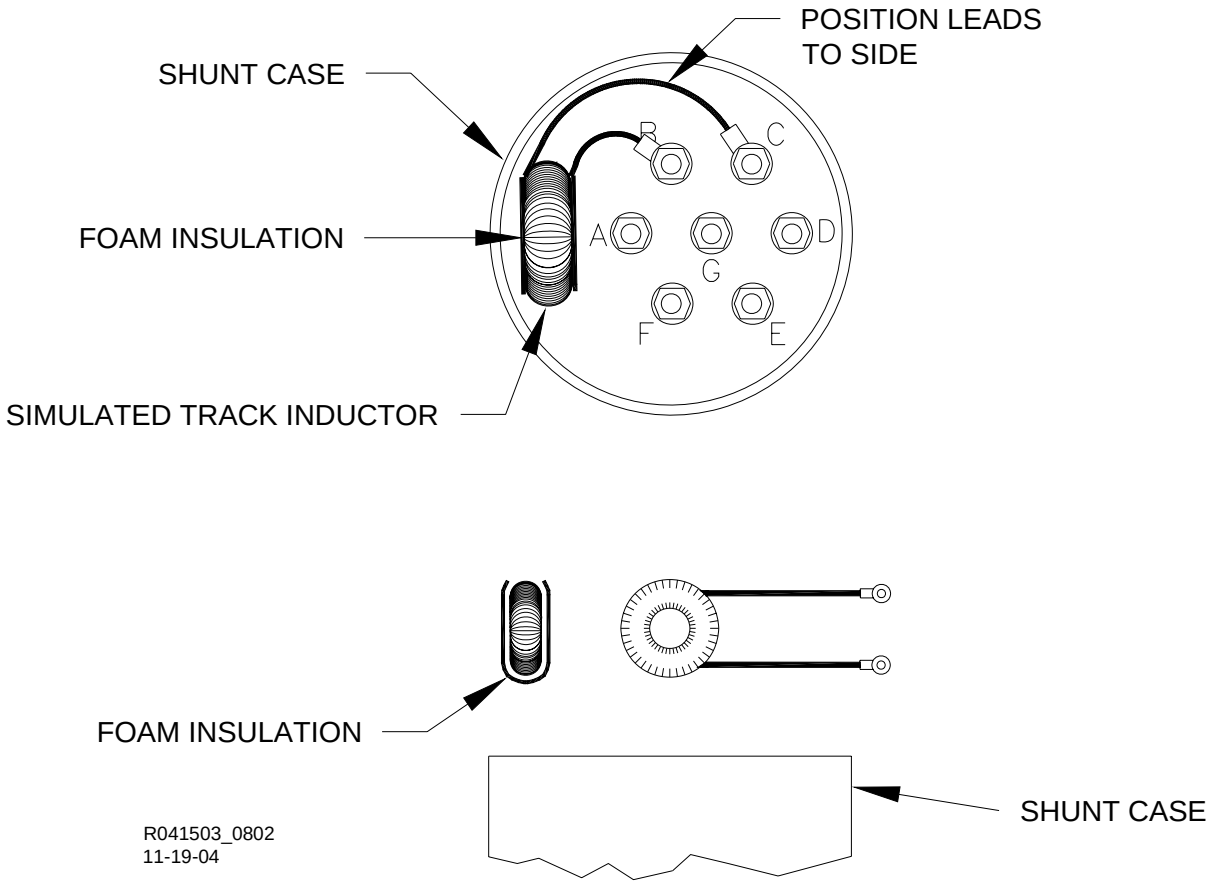


Figure 3-13. Typical Installation of 8V617 in 62775/62780 Shunt

Table 3-6. 8v617 Simulated Track Inductor Mounting Terminals

Multifrequency Narrow-band Shunt Part No.	Frequency (Hz)	Remove Shorting Link And Connect Inductor Leads Between Shunt Terminals
62775/62780-8621	86	A and F
	114	B and G
	156	C and D
	211	C and D
62775/62780-1543	156	A and F
	211	A and G
	285	B and C
	348	B and C
	430	B and C
62775-3497	348	A and B
	430	A and B
	525	A and B
	645	A and B
	790	A and B
	970	A and B

Table 3-6 Concluded

Multifrequency Narrow-band Shunt Part No.	Frequency (Hz)	Remove Shorting Link And Connect Inductor Leads Between Shunt Terminals
62780-5297	525	A and B
	645	A and B
	790	A and B
	970	A and B
62775-2132*	211	A and F
	267	B and G
	285	B and C
	313	B and C
	326	B and C
62775/62780-2152*	211	A and F
	285	B and C
	348	B and C
	430	B and C
	525	B and C
62775-3448*	348	A and B
	389	A and B
	392	A and B
	430	A and B
	452	A and B
	483.5	A and B
62775-5274*	522	A and B
	525	A and B
	560	A and B
	645	A and B
	669.9	A and B
	746.8	A and B
62775-7910*	790	A and B
	816	A and B
	832.5	A and B
	970	A and B
	979	A and B
	1034	A and B
*Available for special applications only		

3.9 ADJUSTABLE INDUCTOR ASSEMBLY, 8A398-6

The 8A398 Adjustable Inductor Assembly is used with Safetran's Single-frequency Narrow-band Shunts (62775-f/62780-f):

- to balance the approaches of a bidirectional application when the approaches differ by more than 10%

3.9.1 Description

The Adjustable Inductor Assembly, figure 3-14, consists of a hermetically sealed, ABS plastic enclosure with mounting brackets at the base.

- Seven AREMA binding posts extend from the top of the assembly
- AREMA binding posts are labeled A through G
  - ♦ Terminals provide connections to six series-connected, internal inductors

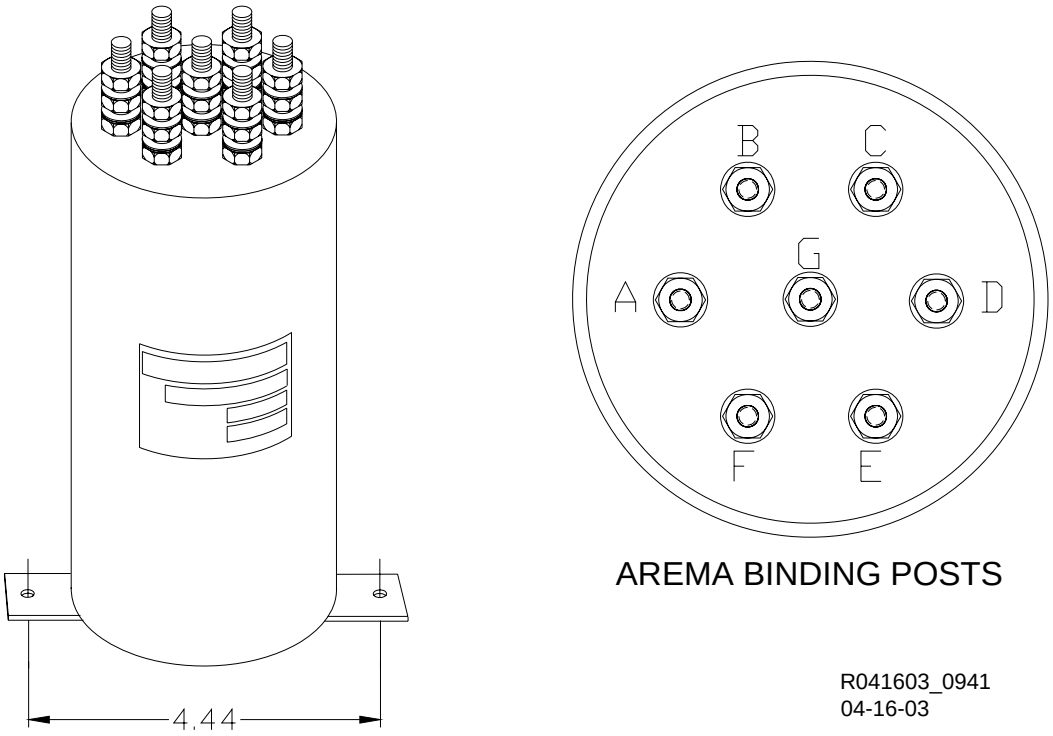


Figure 3-14. Adjustable Inductor Assembly, 8A398-6

3.9.2 Balancing Bidirectional Approaches

The 8A398-6 Inductor is used with the shunt of the shorter approach as shown in figure 3-15.

NOTE

4000 GCP approach using the Simulated Track Inductor must be balanced within 15%

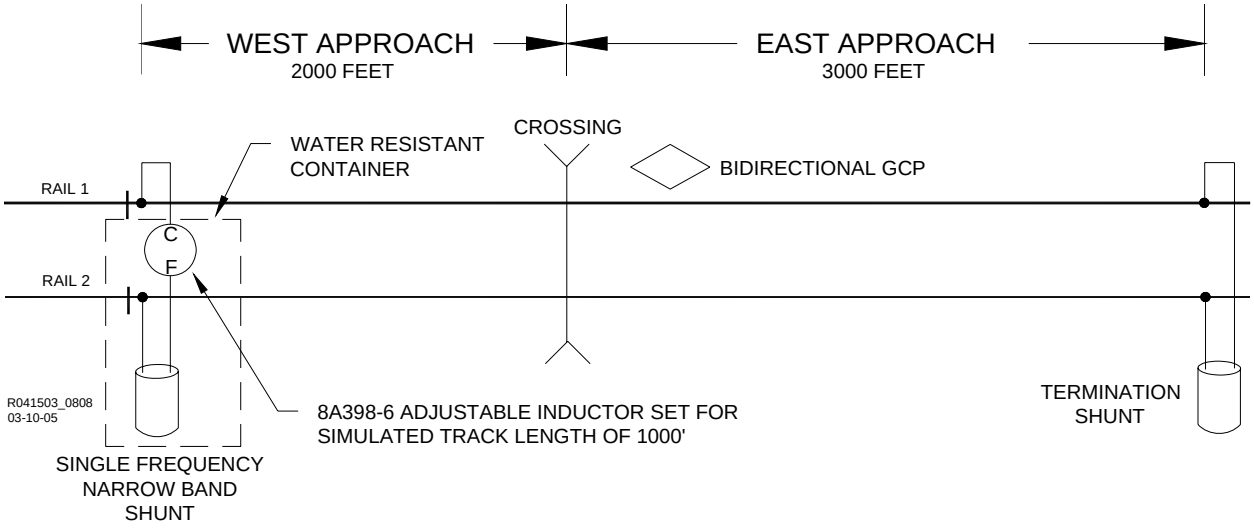


Figure 3-15. Adjustable Inductor Used With Termination Shunt

3.9.3 Adjustable Inductor Specifications:

Diameters: 3.375 inches (8.57 centimeters)

Height: 9 inches (22.86 centimeters)

Weight: 5 pounds, 12 ounces (2.59 kilograms)

3.9.4 Adjustable Inductor Installation

The 8A398-6 Adjustable Inductor may be used to balance approaches using both the 62775-f and 62780-f Narrow-band shunts.

- The Inductor may be configured for either shunt as described in procedure 3-2.

NOTE

When configuring the 8A398-6 Adjustable Inductor, simulated track length is selectable in 50-foot increments ranging from 50 to 3150 feet

Procedure 3-2. ADJUSTABLE INDUCTOR CONFIGURATION	
Step 1	Refer to table 3-7 and locate the desired simulated track length (column 1).
Step 2	Read across the table to determine which inductors (indicated by terminal pairs in column 2) are required to simulate that track length.
Step 3	Connect the track wire and the shunt wire (see figure 3-15) to the two terminals indicated in column 2.
Step 4	Install a strap between the terminal pairs indicated in column 3.

3.9.5 Adjustable Inductor Schematic

A schematic of the 8A398-6 Adjustable Inductor showing the correlation between the AREMA binding posts and the six series-connected inductors is provided in figure 3-16.

- The simulated track length is given for each inductor.

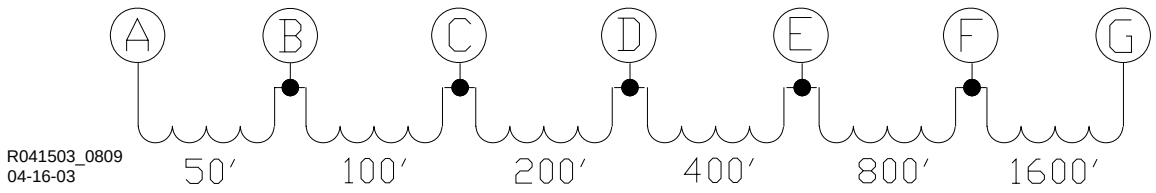


Figure 3-16. 8A398-6 Adjustable Inductor Schematic

3.9.6 Adjustable Inductor Configuration Example

Based on a simulated track length of 1000 feet, the following information is obtained using procedure 3-2:

- Track and shunt wires are connected to terminals C and F (column 2).
  - ♦ Selects a simulated track length of 1400 feet (800 + 400 + 200).
    - ▪ Refer to figure 3-15.
- A strap is connected between terminals D and E (column 3).
  - ♦ Shorts the 400-foot inductor, removing it from the series circuit.

Table 3-7. 8A398-6 Adjustable Inductor Terminals Connections

Column 1	Column 2	Column 3
Simulated Track Length (Feet)	Connect Track And Shunt Wires To These Terminals	Connect Shorting Strap(s) Between These Terminals
50	A-B	
100	B-C	
150	A-C	
200	C-D	
250	A-D	B-C
300	B-D	
350	A-D	
400	D-E	
450	A-E	B-C, C-D
500	B-E	C-D
550	A-E	C-D
600	C-E	
650	A-E	B-C
700	B-E	
750	A-E	
800	E-F	
850	A-F	B-C, C-D, D-E
900	B-F	C-D, D-E
950	A-F	C-D, D-E
1000	C-F	D-E
1050	A-F	B-C, D-E
1100	B-F	D-E
1150	A-F	D-E
1200	D-F	
1250	A-F	B-C, C-D
1300	B-F	C-D
1350	A-F	C-D
1400	C-F	
1450	A-F	B-C
1500	B-F	
1550	A-F	
1600	F-G	
1650	A-G	B-C, C-D, D-E, E-F

Table 3-7 Concluded

Column 1	Column 2	Column 3
Simulated Track Length (Feet)	Connect Track And Shunt Wires To These Terminals	Connect Shorting Strap(s) Between These Terminals
1700	B-G	C-D, D-E, E-F
1750	A-G	C-D, D-E, E-F
1800	C-G	D-E, E-F
1850	A-G	B-C, D-E, E-F
1900	B-G	D-E, E-F
1950	A-G	D-E, E-F
2000	D-G	E-F
2050	A-G	B-C, C-D, E-F
2100	B-G	C-D, E-F
2150	A-G	C-D, E-F
2200	C-G	E-F
2250	A-G	B-C, E-F
2300	B-G	E-F
2350	A-G	E-F
2400	E-G	
2450	A-G	B-C, C-D, D-E
2500	B-G	C-D, D-E
2550	A-G	C-D, D-E
2600	C-G	D-E
2650	A-G	B-C, D-E
2700	B-G	D-E
2750	A-G	D-E
2800	D-G	
2850	A-G	B-C, C-D, D-E
2900	B-G	C-D
2950	A-G	C-D
3000	C-G	
3050	A-G	B-C
3100	B-G	
3150	A-G	

3.10 BATTERY CHOKE, 62648

The 62648 Battery Choke is a low DC resistance unit designed for use in long DC track circuits where very low ballast is expected.

- This choke may also be used anywhere the track connections for a DC track circuit are located within:
  - a model 3000/4000 GCP approach
  - 2000 feet of a 3000/4000 GCP approach termination shunt

⚠ WARNING

IN APPLICATIONS WHERE THE CHOKE IS LOCATED WITHIN AN ADJACENT MODEL 300 OR MODEL 400 GCP APPROACH, THE 8A065A BATTERY CHOKE (PARAGRAPH 3.11) MUST BE USED.

3.10.1 62648 Battery Choke Description

The 62648 Battery Choke, figure 3-17, consists of a large inductance coil with two top-mounted AREMA binding posts and a mounting base.

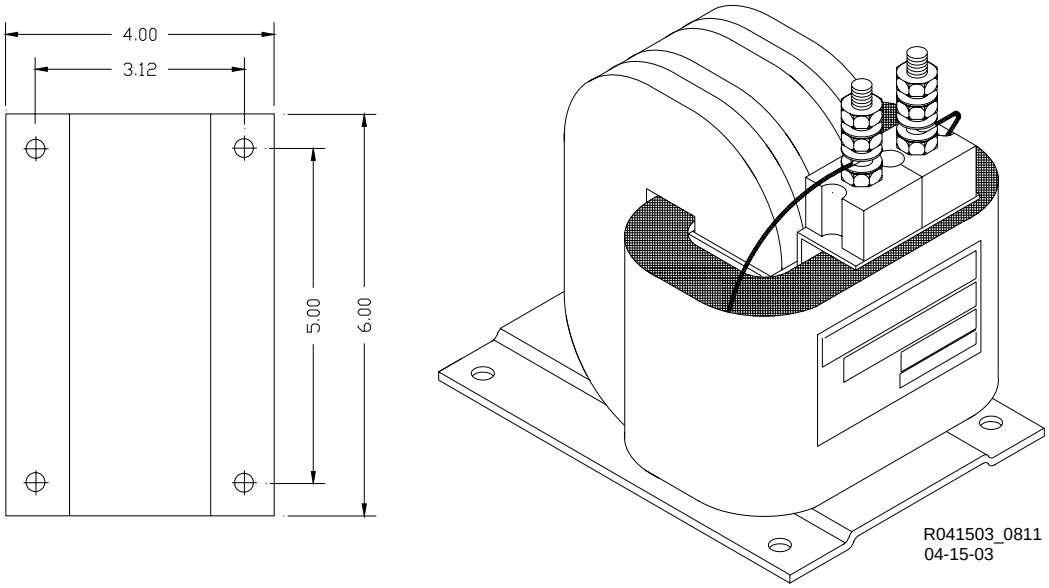


Figure 3-17. 62648 and 8A065A Battery Choke With Mounting Dimensions

3.10.2 62648 Battery Choke Specifications

DC Resistance:	0.10 ohm
Dimensions:	8.5 inches (21.59 centimeters) high (to top of terminal studs) 4.5 inches (11.43 centimeters) wide 5.0 inches (12.70 centimeters) deep
Weight:	17 pounds (7.72 kilograms) (approximate)

3.10.3 Mounting Dimensions

This choke must be mounted within a weatherproof enclosure.

- The unit mounting dimensions are provided in figure 3-17.

3.11 BATTERY CHOKE, 8A065A

The 8A065A Battery Choke is used when the track connections for a DC track circuit are located within:

- a model 3000/4000 GCP approach
- a model 300 approach
- a model 400 approach
- 2000 feet of a 3000/4000 GCP approach termination shunt

⚠ CAUTION

IN LONG DC TRACK CIRCUITS WITH VERY LOW BALLAST THE DC RESISTANCE OF THE 8A065A BATTERY CHOKE MAY ADVERSELY AFFECT TRACK CIRCUIT OPERATION.

- ➢ THE 62648 BATTERY CHOKE (PARAGRAPH 3.10) SHOULD BE USED IN THIS TYPE OF CIRCUIT.

3.11.1 8A065A Battery Choke Description

The 8A065A Battery Choke, figure 3-17, consists of a large inductance coil with two top-mounted AREMA binding posts and a mounting base.

3.11.2 8A065A Battery Choke Specifications

DC Resistance: 0.40 ohm

Dimensions: 8.5 inches (21.59 centimeters) high (to top of terminal studs)
4.5 inches (11.43 centimeters) wide
5.0 inches (12.70 centimeters) deep

Weight: 17 pounds (7.72 kilograms) (approximate)

3.11.3 Mounting Dimensions

This choke must be mounted within a weatherproof enclosure.

- The unit mounting dimensions are provided in figure 3-17.

3.12 DC CODE ISOLATION UNIT, 6A342-1

The 6A342-1 DC Code Isolation unit is a special battery choke that is used to eliminate track battery and track relay noise from 3000/4000 GCP approach circuits.

- Designed to be used with single (fixed) polarity code systems.

3.12.1 6A342-1 DC Code Isolation Unit Description

The 6A342-1 DC Code Isolation unit, figure 3-18, consists of filter components (L1, C1, R1, and CR1) and three AREMA binding posts on a mounting base.

⚠ WARNING

THE SINGLE POLARITY CODED TRACK CIRCUIT MUST BE CAREFULLY REVIEWED TO ENSURE THAT ALL TRANSMIT AND RECEIVE CODES ARE OF THE SAME POLARITY PRIOR TO INSTALLING ANY 6A341-1 UNIT.

- **IF THE POLARITY IS IN DOUBT, INSTALL TWO 6A342-3 ISOLATION UNITS AT EACH END OF THE TRACK CIRCUIT**
  - **SAME INSTALLATION AS AS THE DUAL POLARITY CODED TRACK CIRCUIT.**
- **CONTACT TECHNICAL SUPPORT FOR DETAILS.**

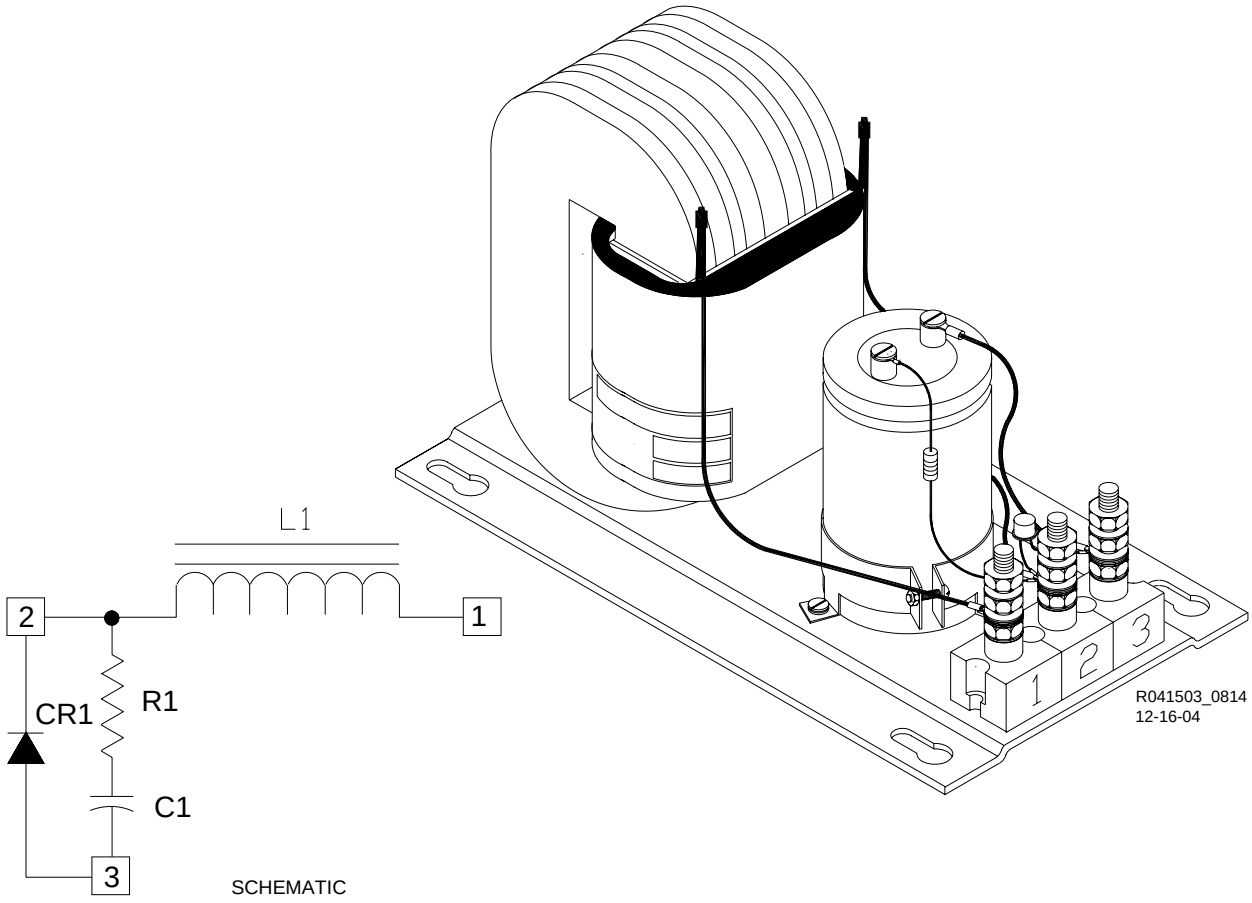


Figure 3-18. DC Code Isolation Unit, 6A342-1

3.12.2 6A342-1 DC Code Isolation Unit Specifications

Dimensions:

5.75 inches (14.60 centimeters) high
5.0 inches (12.70 centimeters) wide
9.0 inches (22.86 centimeters) deep

Weight:

15 pounds (6.81 kilograms) (approximate)

3.12.3 Mounting Dimensions

The 6A342-1 DC Code Isolation Unit must be mounted within a weatherproof enclosure.

- The unit mounting dimensions are provided in figure 3-19.

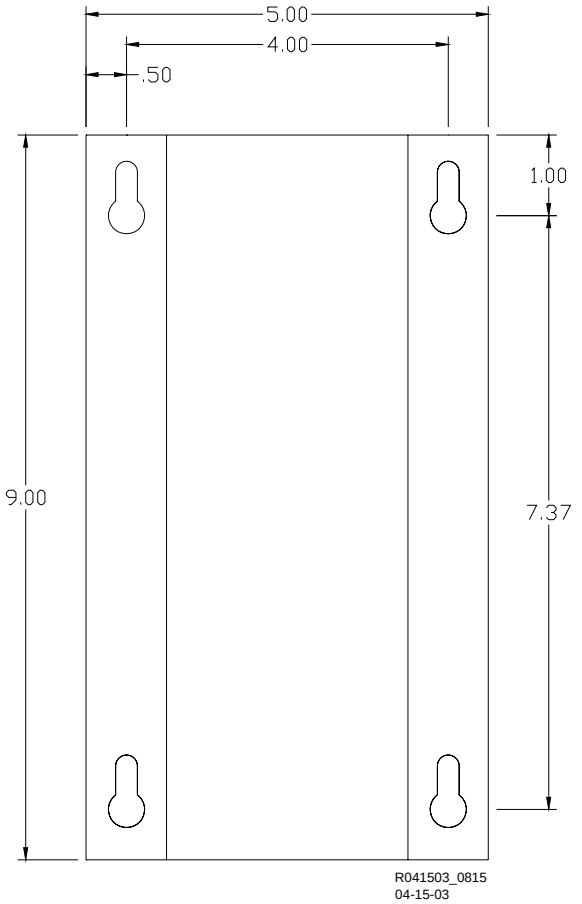


Figure 3-19. DC Code Isolation Unit Mounting Dimensions

3.13 DC CODE ISOLATION UNIT, 6A342-3

The 6A342-3 DC Code Isolation unit is a special battery choke that is used to eliminate track battery and track relay noise from 3000/4000 GCP approach circuits.

- Designed to be used with dual polarity code relay systems.
- Two 6A342-3 units must be added at each end of the track circuit.
- Contact Safetran Technical support for installation and design issues.

3.13.1 6A342-3 DC Code Isolation Unit Description

The 6A342-3 DC Code Isolation unit, figure 3-20, consists of inductor L1 and three AREMA binding posts on a mounting base.

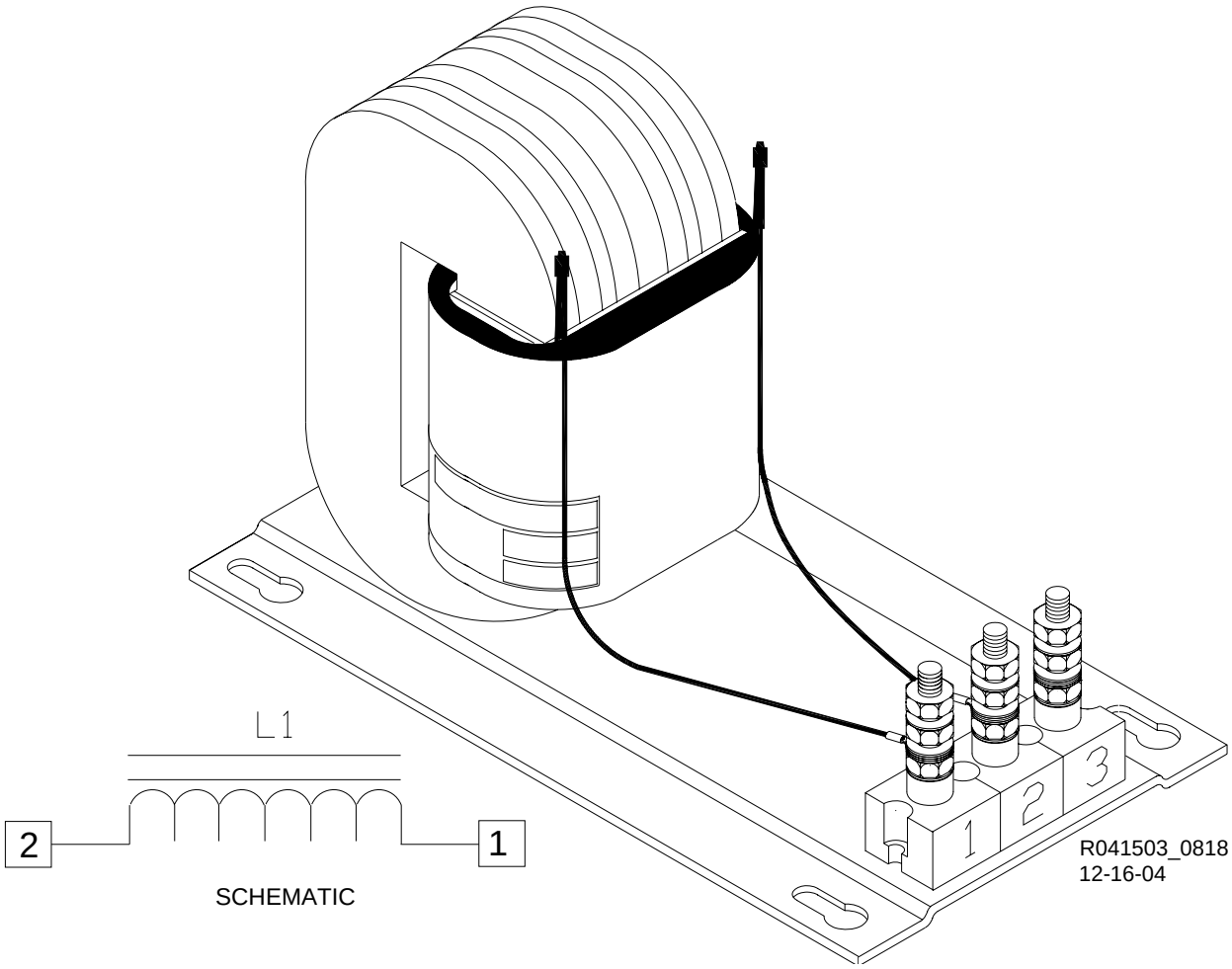


Figure 3-20. DC Code Isolation Unit, 6A342-3

3.13.2 6A342-3 DC Code Isolation Unit Specifications

Dimensions:	5.75 inches (14.60 centimeters) high 5.0 inches (12.70 centimeters) wide 9.0 inches (22.86 centimeters) deep
Weight:	15 pounds (6.81 kilograms) (approximate)

3.13.3 Mounting Dimensions

The 6A342-3 DC Code Isolation Unit must be mounted within a weatherproof enclosure.

- The unit mounting dimensions are provided in figure 3-19.

3.14 AC CODE ISOLATION UNIT, 8A466-3 (60 Hz)

The 8A466-3 AC Code Isolation unit is used:

- in 60 Hz CAB signal track circuit installations
- to reduce 60 Hz harmonics from being applied to the track
- only with GCP frequencies of 156 Hz and higher

3.14.1 8A466-3 AC Code Isolation Unit Description

The 8A466-3 AC Code Isolation unit, figure 3-21, is housed in a steel case:

- Top mounted AREMA binding posts provided for track connections.
- For design assistance contact Safetran Technical Support.

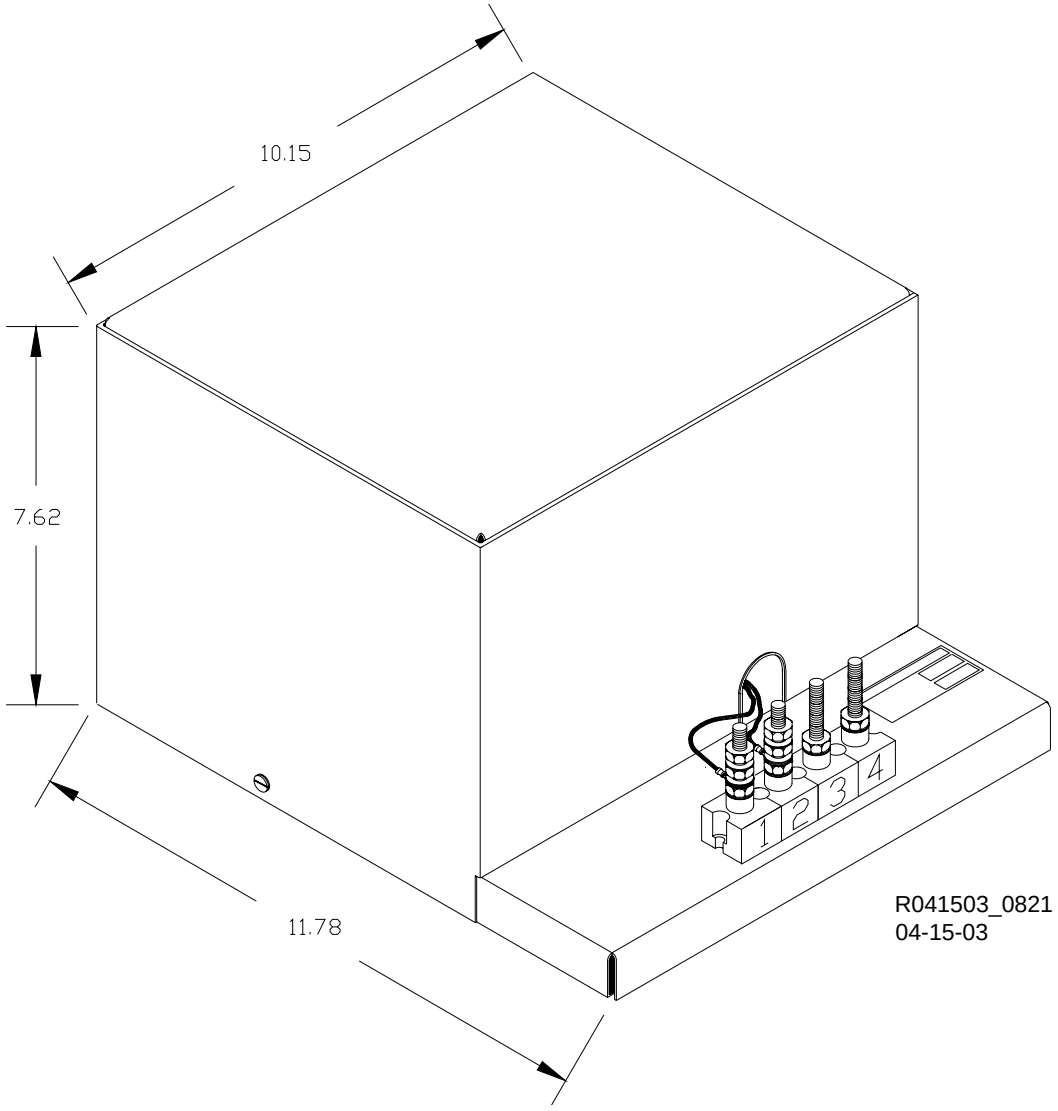


Figure 3-21. AC Code Isolation Unit, 8A466-3

3.14.2 8A466-3 AC Code Isolation Unit Specifications

Dimensions:	7.62 inches (19.35 centimeters) high 10.15 inches (25.78 centimeters) wide 11.78 inches (29.92 centimeters) deep
Weight:	26 pounds (11.8 kilograms) (approximate)

Mounting Dimensions

The 8A466-3 AC Code Isolation Unit must be mounted within a weatherproof enclosure.

- The unit mounting dimensions are provided in figure 3-21.

3.15 AC CODE ISOLATION UNIT, 8A470-100 (100Hz)

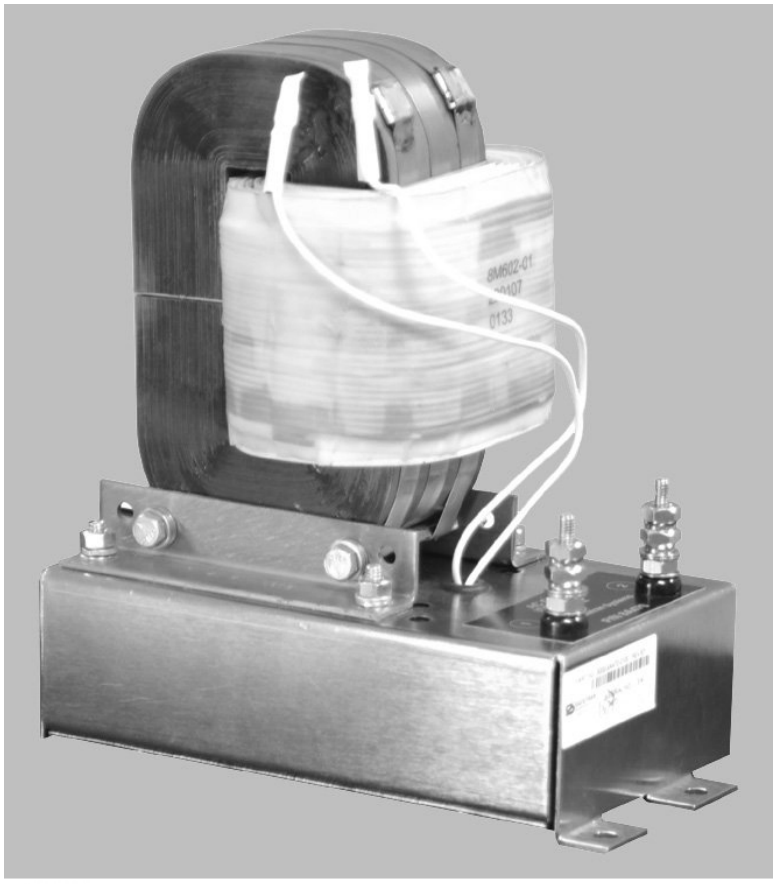
The 8A470-100 AC Code Isolation unit is used:

- in 100 Hz CAB signal track circuit installations
- to reduce 100 Hz harmonics from being applied to the track
- only with GCP frequencies of 211 Hz and higher

3.15.1 8A470-100 AC Code Isolation Unit Description

The 8A470-100 AC Code Isolation unit, figure 3-22, is mounted on an aluminum case:

- Two top mounted AREMA binding posts provided for track connections



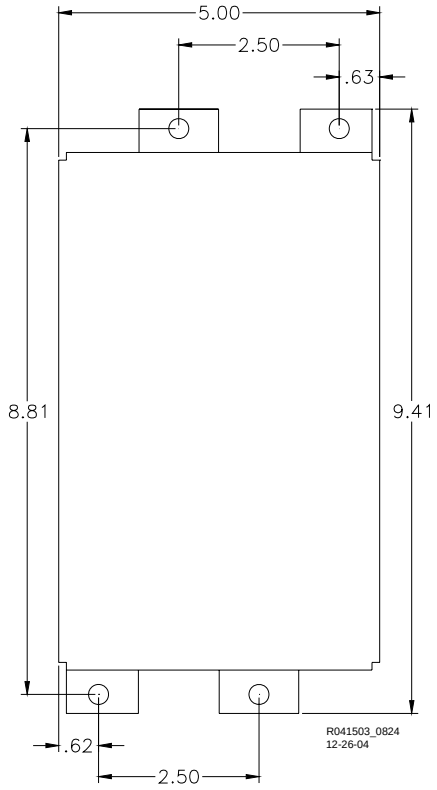


Figure 3-22. AC Code Isolation Unit, 8A470-100, With Mounting Dimensions

3.15.2 8A470-100 AC Code Isolation Unit Specifications

Dimensions:	9.23 inches (23.44 centimeters) high 5.0 inches (12.7 centimeters) wide 9.41 inches (23.88 centimeters) deep
Weight:	25.82 pounds (5.16 kilograms) (approximate)
Mounting Dimensions	The 8A470-100 AC Code Isolation Unit must be mounted within a weatherproof enclosure. The unit mounting dimensions are provided in figure 3-22.

3.16 TUNABLE INSULATED JOINT BYPASS COUPLER, 62785-F

The 62785-f Bypass Coupler is used in all 4000 GCP applications requiring the use of an insulated joint bypass coupler.

- The 62785-f Coupler is available in standard Safetran frequencies of 156 Hz through 970 Hz.

3.16.1 Physical Description

The 62785-f Coupler, figure 3-23, is housed in a hermetically sealed, 6 inch diameter , cylindrical case:

- A pair of 10-foot, number 6 AWG leads extend from one end
- Nine AREMA binding posts extend from the other end
  - terminals covered by removable, pliable end cap
  - secured in place by a sturdy stainless steel clamp

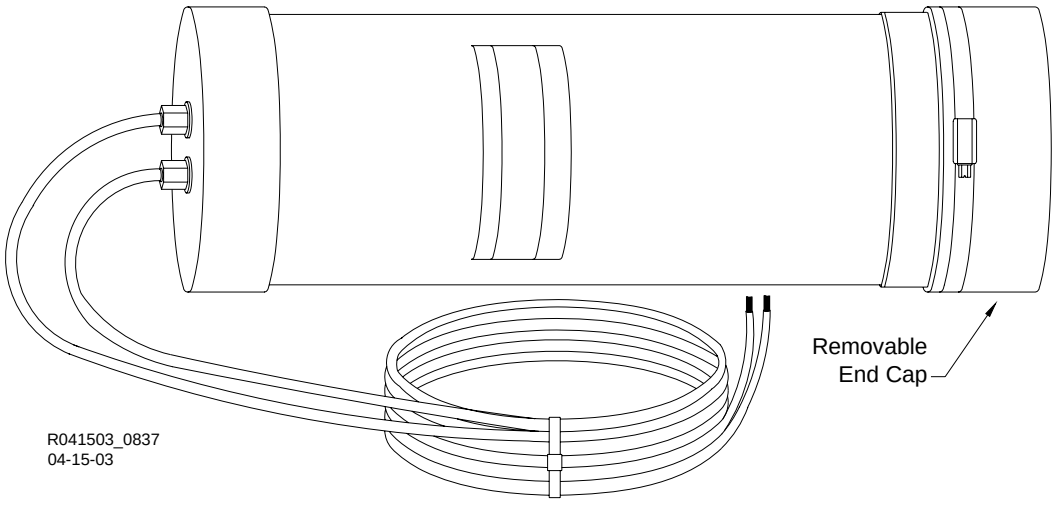


Figure 3-23. Tunable Insulated Joint Bypass Coupler, 62785-f

⚠ WARNING

WHEN THE 4000 GCP IS PROGRAMMED AS A PREDICTOR, THE 62785-F COUPLER CANNOT BE USED TO BYPASS INSULATED JOINTS WITHIN THE INNER TWO-THIRDS OF AN APPROACH, EXCEPT AS SPECIFIED IN TABLE 3-8.

Table 3-8. Minimum Distance To Insulated Joints Coupled Using 62785-F Coupler

Frequency (Hz)	Minimum Distance to 1st Set of Insulated Joints (Feet)*	Minimum Distance to 2nd Set of Insulated Joints (Feet)*
151 to 211	1500	2200
212 to 348	1000	1400
349 to 560	700	1000
561 to 790	500	800
791 to 979	400	700

* Distance applies to insulated joints located on the same side of the crossing.

NOTE: Frequencies of 86 and 114 Hz are not normally used with the 62785-f coupler. Contact Safetran Technical Support (1-800-793-7233) for these applications.

3.16.2 Coupler Tuning

The 62785-f Coupler is tuned by means of five standard AREMA binding posts

- AREMA binding posts are labeled A through E (see figure 3-24)
  - ♦ AREMA binding posts are equipped with special gold AREMA adjustment nuts

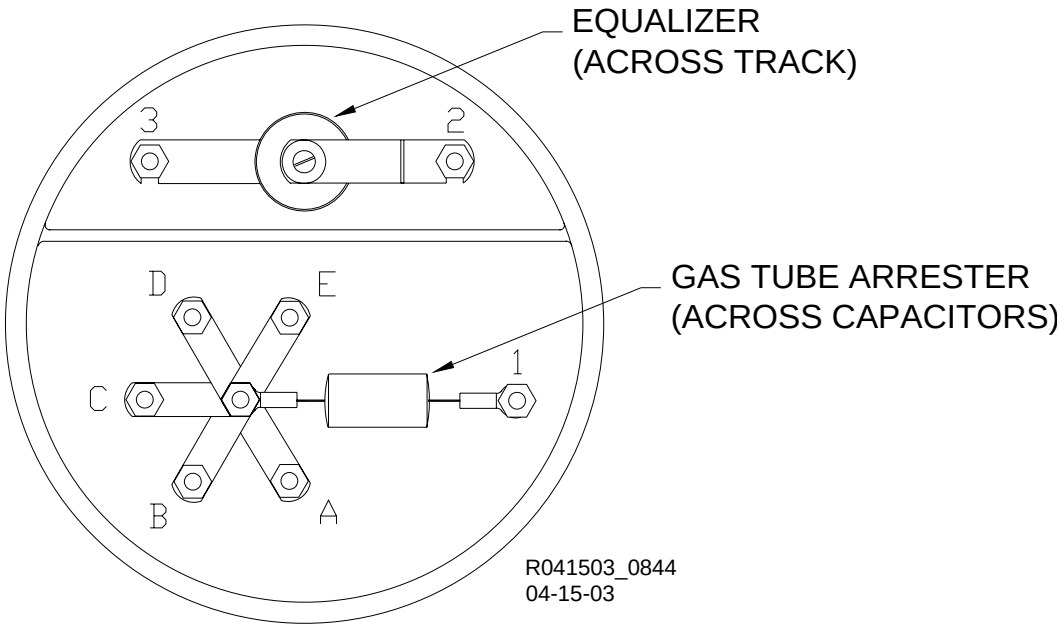


Figure 3-24. Terminal Identification, 62785-f Tunable Insulated Joint Bypass Coupler

3.16.3 62785-f Bypass Coupler Specifications:

Dimensions: 18 inches (45.7 centimeters) long
6 inches (15.2 centimeters) in diameter

Weight: 12 pounds (5.45 kilograms) (approximately)

Leads: Dual, number 6 AWG:

- stranded wire
- black PVC insulation
- 10 feet (304.8 centimeters) long

⚠ WARNING

1. **INSULATED JOINT COUPLERS SHOULD BE LOCATED AS CLOSE AS POSSIBLE TO THE BYPASSED JOINT.**
2. **LEAD WIRE LENGTH SHOULD NOT EXCEED 10 FEET AND SHOULD NOT BE SMALLER THAN 6 AWG**

3.16.4 Surge Suppressor Part Numbers

022700-21X Equalizer	Safetran No. Z803-00052-0001
Gas Tube Arrester	Safetran No. Z803-00053-0001

3.16.5 62785-f Bypass Coupler Field Tuning

In DC or coded DC track circuits the 62785-f Bypass Coupler must be field tuned to pass the 4000 GCP operating frequency around the insulating joints.

- 62785-f Bypass Coupler field tuning sequence is described in procedure 3-3.
- Refer to figure 3-25 for shunt placement locations.

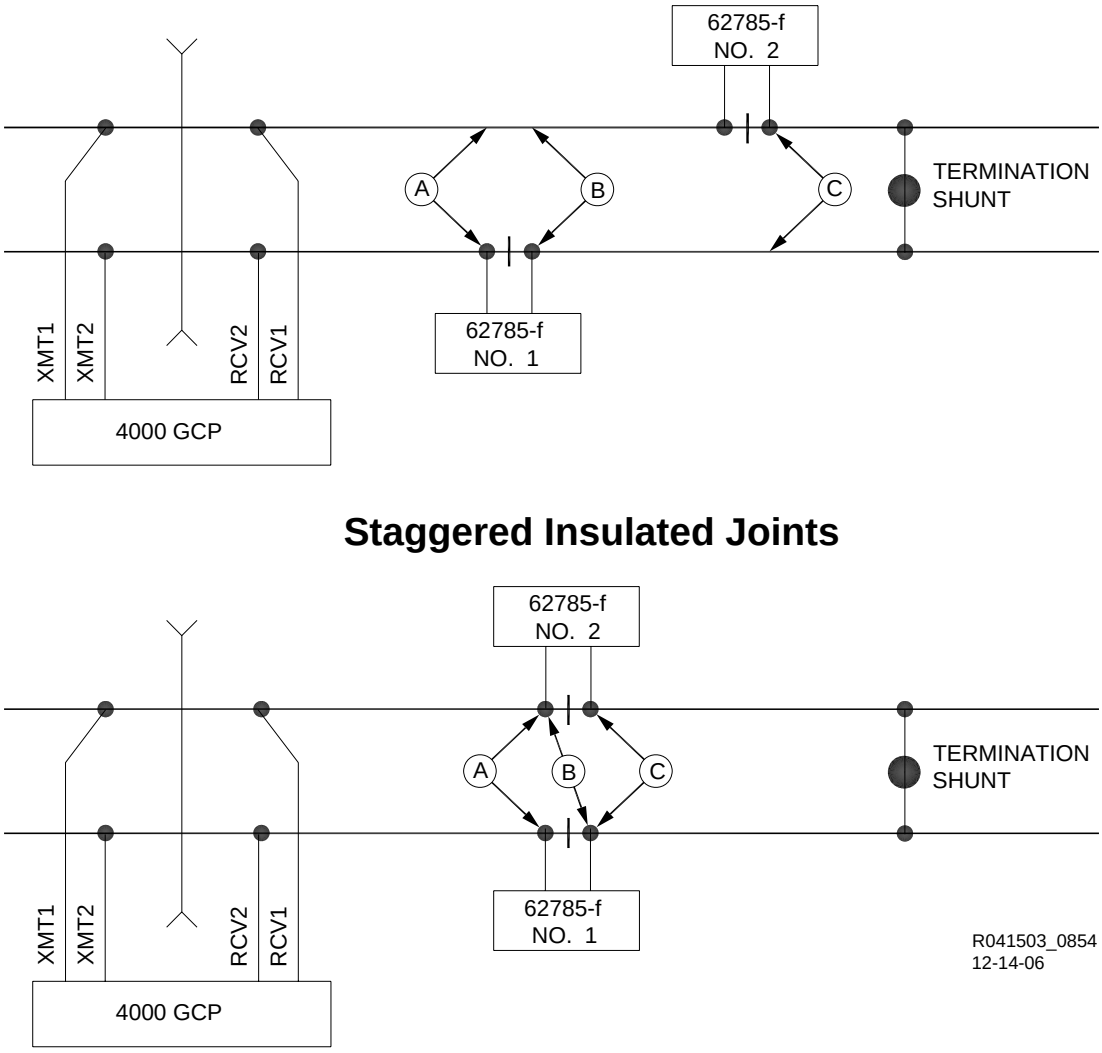


Figure 3-25. Shunt Placement Diagrams For 62785-f Bypass Coupler Field

NOTE

While field tuning the 62785-f Bypass Coupler, tightening the nut on terminal E produces maximum change in EZ value. Tightening the nut on terminal A produces minimum change.

WARNING

AT THE COMPLETION OF FIELD TUNING THE 62785-F BYPASS COUPLERS ENSURE THAT A STANDARD AREMA NUT IS TIGHTENED SECURELY AGAINST EACH GOLD NUT ON TERMINALS A THROUGH E, INCLUDING THE TERMINALS THAT ARE NOT TIGHTENED DOWN.

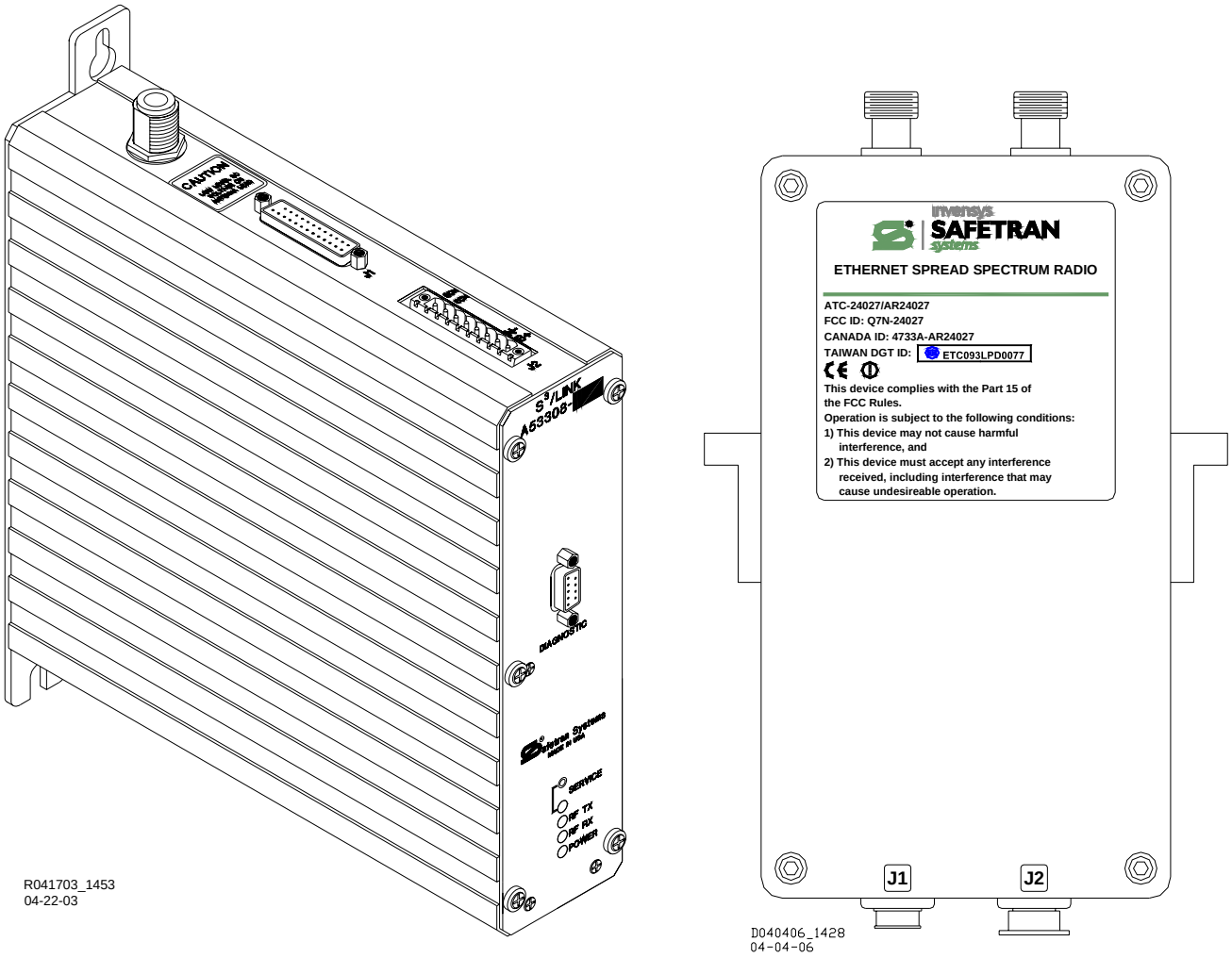
Procedure 3-3. 62785-F TUNABLE INSULATED JOINT BYPASS COUPLER FIELD TUNING

Step 1	Tighten the gold nut securely on terminal E of each coupler.
Step 2	Calibrate the 4000 GCP, setting the EZ value to 100.
Step 3	Place a hardwire test shunt across the track at location A.
Step 4	Note the EZ value appearing on the 4000 GCP display.
Step 5	Move the test shunt to location B.
Step 6	Tune the Tunable Insulated Joint Bypass Coupler #1 to the same EZ value noted in Step 4. ▪ Tighten the gold nut on the Coupler #1 terminals labeled D, C, B, and A, in sequence beginning with terminal D. ♦ If tightening a nut results in an EZ value that is lower than the value recorded in step 4, loosen the nut and tighten the next nut in sequence. ♦ If, after tightening a nut, the EZ value remains higher than the value recorded in step 4, leave the nut tightened and tighten the next nut in sequence. • Continue to tighten nuts D through A as necessary to obtain an EZ value that is approximately the same as that recorded in step 4.
Step 7	Move the test shunt to location C.
Step 8	Tune the No. 2 Tunable Insulated Joint Bypass Coupler to the EZ value noted in step 4. • Tighten the gold nut on the Coupler #2 terminals labeled D, C, B, and A, in sequence beginning with terminal D. ♦ If tightening a nut results in an EZ value that is lower than the value recorded in step 4, loosen the nut and tighten the next nut in sequence. ♦ If, after tightening a nut, the EZ value remains higher than the value recorded in step 4, leave the nut tightened and tighten the next nut in sequence. • Continue to tighten nuts D through A as necessary to obtain an EZ value that is approximately the same as that recorded in step 4.
Step 9	Remove the test shunt.
Step 10	Tighten a standard AREMA nut against each gold nut of both couplers to ensure all nuts are securely locked in position.
Step 11	Secure the end caps over the terminal end of both couplers.
Step 12	Completely recalibrate the 4000 GCP and perform all operational checks.
Step 13	Verify that a smooth change in the EZ value occurs across the couplers during a train move.

3.17 SPREAD SPECTRUM RADIOS, 53308 and 53325

Safetran Spread-Spectrum Radios may be used to provide a vital RF communications link between 4000 GCP installations.

- 53308 Spread-Spectrum Radio (SSR), figure 3-26A
  - ♦ Refer to Instruction & Installation Document, COM-00-97-21, for detailed Instructions on the 53308 SSR.
  - ♦ Many in service but no longer in production
- 53325 Ethernet Spread-Spectrum Radio (ESSR), Figure 3-26B
  - ♦ Refer to Installation & Operation Document, COM-00-05-05, for detailed Instructions on the 53325 ESSR.
  - ♦ Requires Wayside Access Gateway, 53457 (paragraph 3.18), to interface with the 4000 GCP



A **B**

Figure 3-26. Spread Spectrum Radios, 53308 and 53325

3.18 WAYSIDE ACCESS GATEWAY, 53457

The 53457 Wayside Access Gateway (WAG), figure 3-27, is used as a part of the vital Ethernet communications link between 4000 GCP installations.

- Used in conjunction with the Safetran 53325 Ethernet Spread-Spectrum Radio (paragraph 3.17).
- Refer to User's Guide Document, COM-00-05-16, for detailed Instructions on the 53457 WAG.

Figure 3-27. Wayside Access Gateway, 53457

3.19 MS/GCP TERMINATION SHUNT BURIAL KIT, 62776

The 62776 MS/GCP Termination Shunt Burial Kit is designed to protect Narrow-band Termination Shunts while they are buried in the space between adjacent railroad ties.

3.19.1 Kit Contents

The 62776 MS/GCP Termination Shunt Burial Kit, figure 3-28, consists of:

- 26.5-inch length of 6-inch diameter black PVC tube
- 7x24-inch, ¼-inch thick steel plate
- pliable rubber cap with adjustable stainless steel clamp
- two ¼x3-inch lag bolts (not shown)

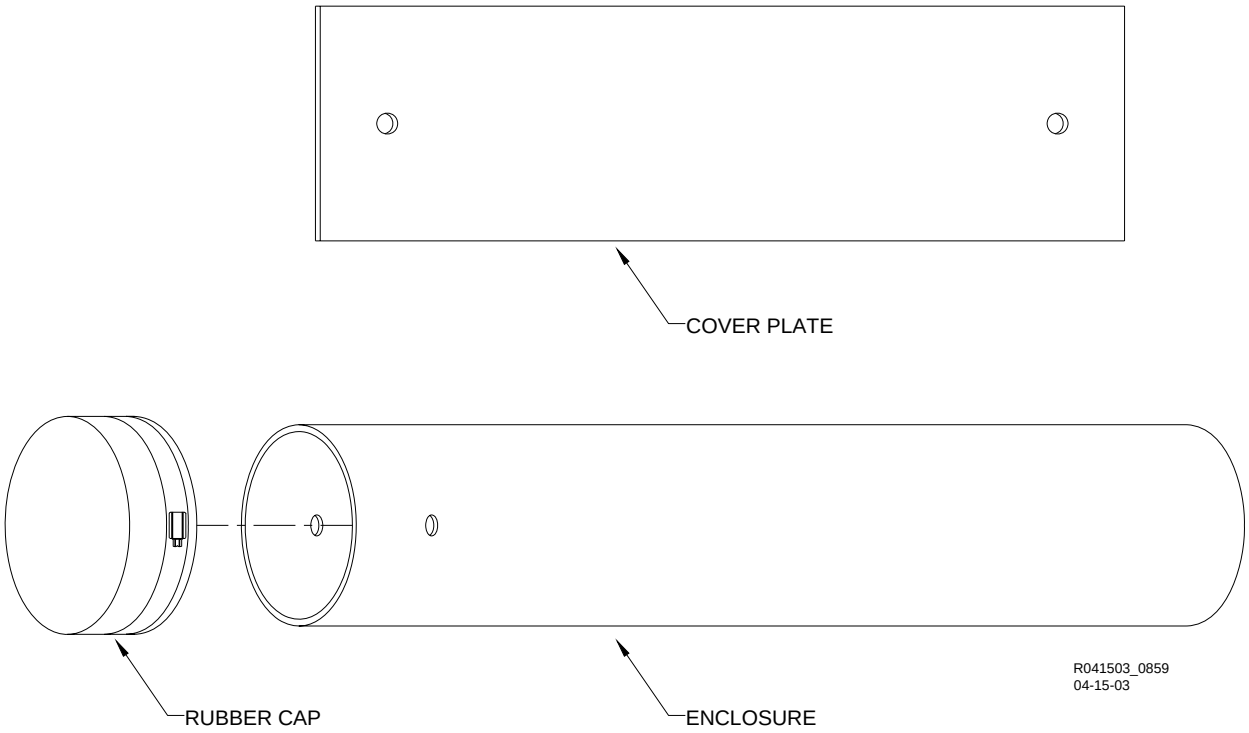


Figure 3-28. MS/GCP Termination Shunt Burial Kit, 62776

3.19.2 Kit Description

One end of the tubing is fitted with the pliable rubber cap that is secured in place by the adjustable stainless steel clamp.

- Two 5/8-inch diameter holes located near the capped end of the tube accommodate the shunt leads.

3.19.3 Kit Use

The enclosure is normally buried in a vertical position between the ties.

- The Termination Shunt is lowered into the enclosure and the two leads routed through the holes in the enclosure wall and connected to the rails using standard procedures.
- The cap is then secured over the top of the enclosure using the stainless steel clamp.
- The steel plate is centered over the buried enclosure/shunt and securely fastened to each tie using the two 1/4x3-inch lag bolts provided.

3.19.4 Shunt Kit Assemblies Specifications

Dimensions:

Enclosure (PVC):	26.5 inches (67.31 centimeters) long (without end cap) 6 inches (15.24 centimeters) outside diameter 5.59 inches (14.21 centimeters) inside diameter
Cover Plate (Steel):	24 inches (60.96 centimeters) long 7 inches (17.78 centimeters) wide 0.25 inch (0.64 centimeters) thick

Weight:

Enclosure:	5 pounds (2.27 kilograms)
Cover Plate:	12 pounds (5.44 kilograms)

3.20 VITAL AND-GATE DRIVER PANEL ASSEMBLY, 91044

The 91044 Vital AND-Gate Driver Panel Assembly provides mounting holes to accommodate from one to three 90975 Vital 2-Input AND-Gate Relay Drivers.

3.20.1 Cable Termination Panel Assembly Mounting Dimensions

91042 Cable Termination Panel Assembly mounting dimensions are provided on the figure 3-29.

3.20.2 Cable Termination Panel Assembly Specifications:

Dimensions:	6.96 inches (centimeters) high 23.00 inches (58.42 centimeters) wide 0.125 inches (centimeters) deep
Weight:	5 pounds (17.78 kilograms) (approximate)

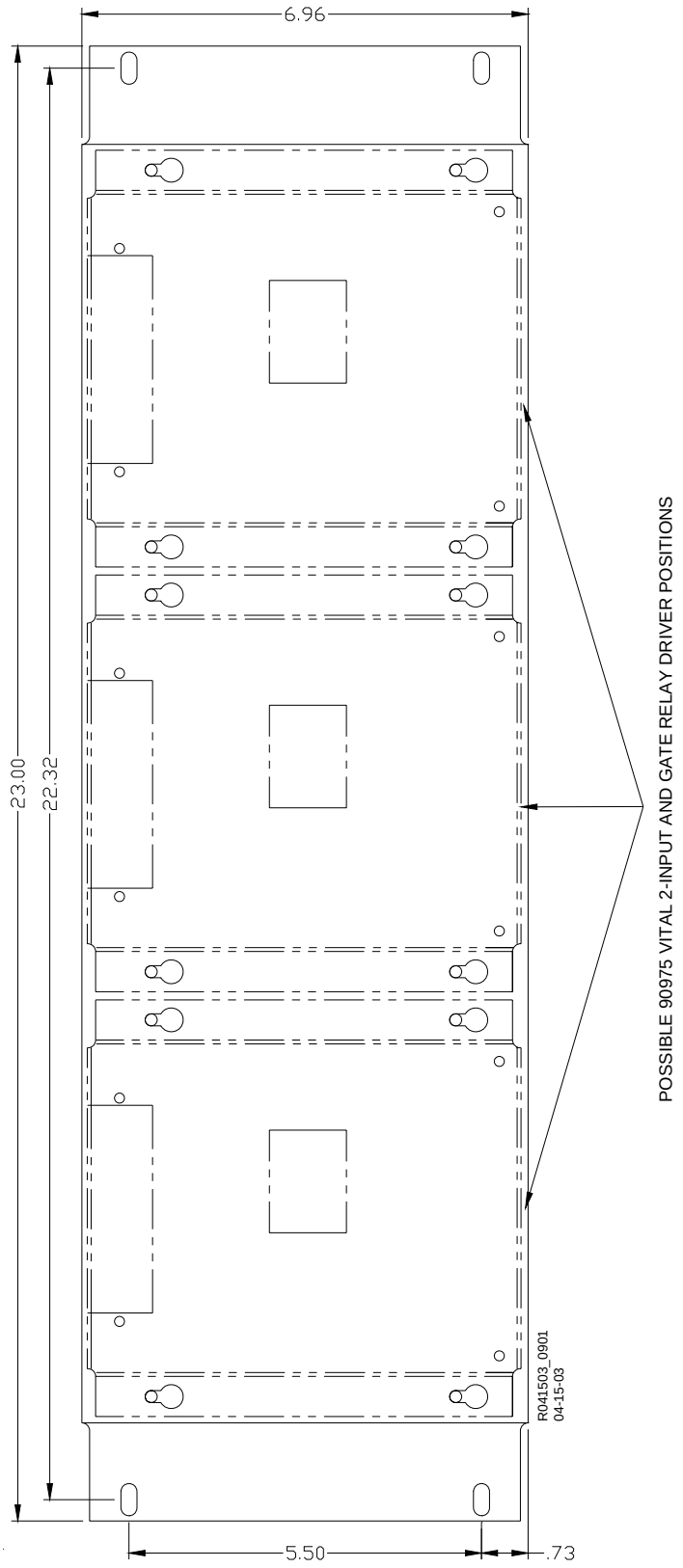


Figure 3-29. Vital AND Gate Driver Panel Assembly, 91044

3.21 VITAL 2-INPUT AND GATE, 90975

The 90975 solid-state Vital 2-input AND Gate (figure 3-30) is a logic device that combines two DC inputs to produce a single DC output.

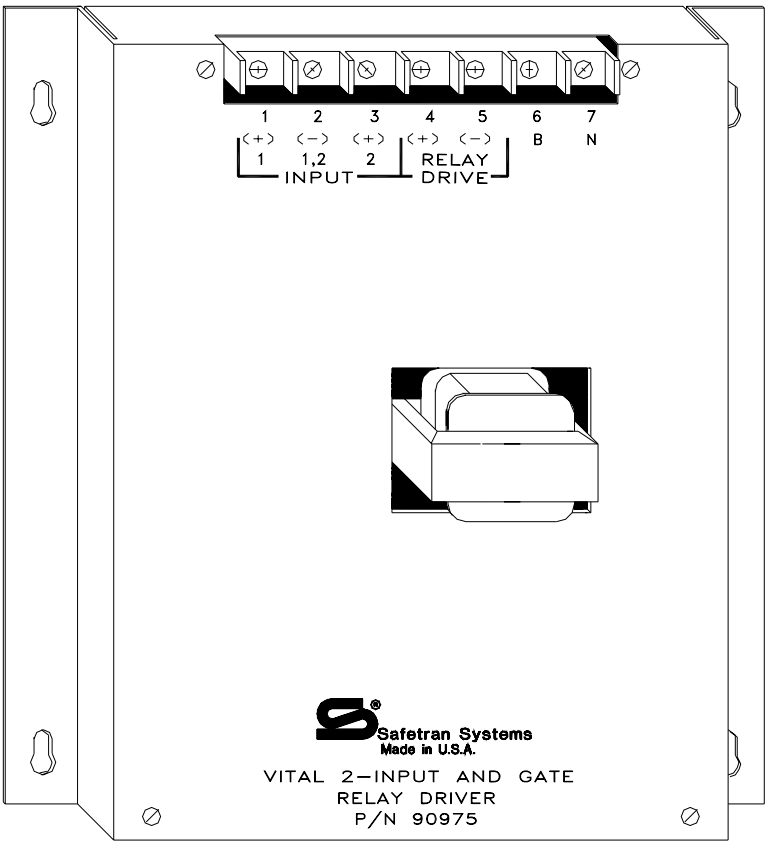


Figure 3-30. Vital 2-Input AND Gate, 90975

3.21.1 Functional Description

The 90975 solid-state Vital 2-input AND Gate combines two inputs to produce a single output.

- When a relay drive voltage is applied to both of the AND gate inputs, the drive voltage appears at the output of the gate.
- When the drive voltage is removed from one or both of the AND gate inputs, no voltage is present at the output of the gate.

NOTE

The inputs and outputs are electrically isolated from battery (B and N) within the unit.

3.21.2 Vital 2-input AND Gate Specifications

Environmental Temperature Range:	-40 °F to +160 °F (-40 °C to +71 °C)
Dimensions:	6.75 inches (17.15 centimeters) high 6.25 inches (15.9 centimeters) wide 2.50 inches (6.4 centimeters) deep
Weight:	1 pound (0.5 kilogram) (approximate)
Power Input:	
Voltage:	9.5 to 16.5 VDC
Current:	200 milliamperes
Output Voltage:	12 VDC (nominal); will drive 200 to 1,000-ohm loads
Control Inputs:	7 to 18 VDC (1,000-ohm input resistance)

3.21.3 Input/Output Protection: Floating (optically isolated and transformer coupled); surge protected

3.21.4 Mounting Dimensions

The Vital 2-input AND Gate is housed in a brushed aluminum case designed for shelf or backboard mounting.

- The unit mounting dimensions are provided in figure 3-31.

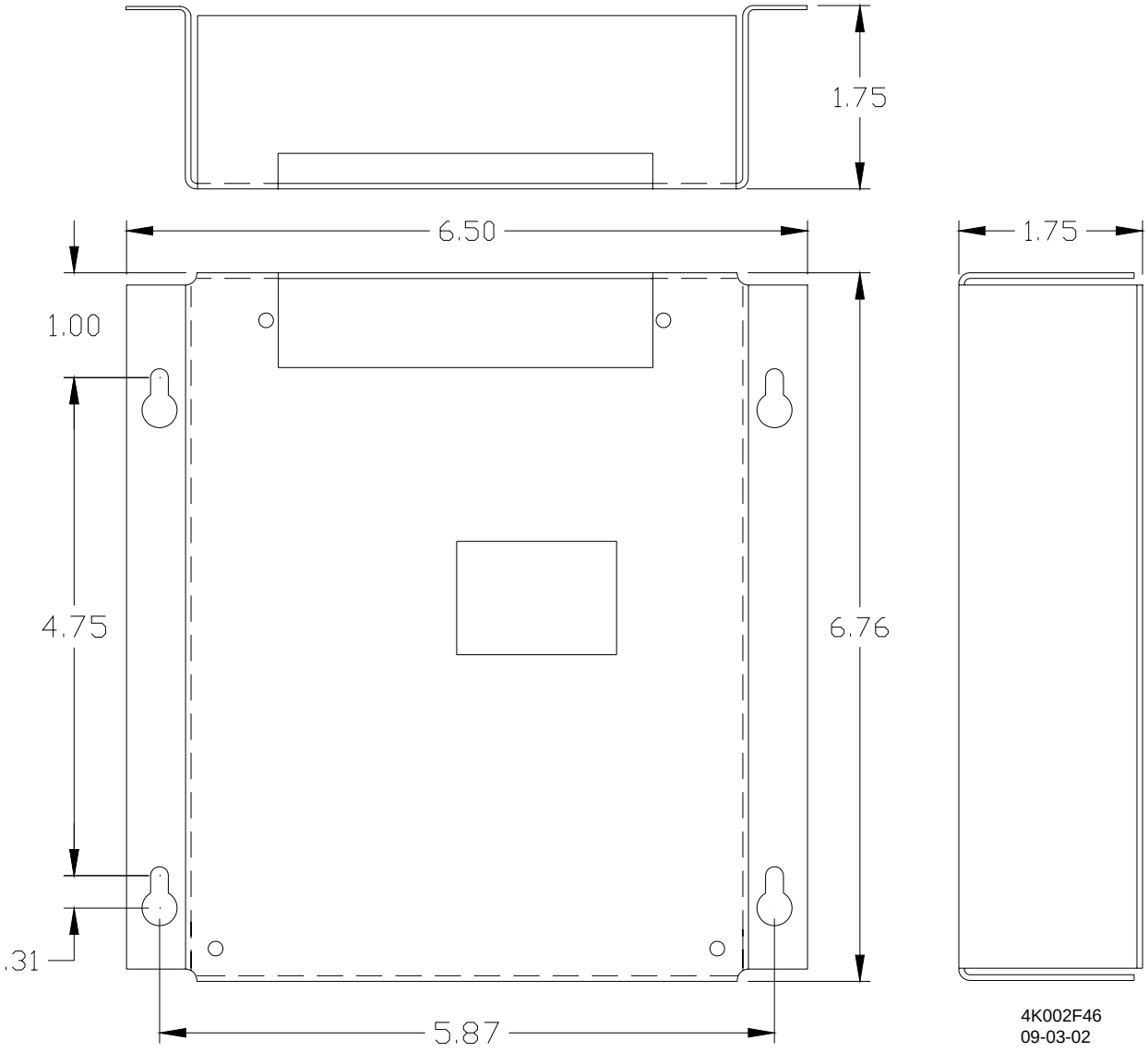


Figure 3-31. Vital 2-Input AND Gate Assembly Mounting Dimensions

3.22 4-INPUT VITAL AND GATE, 91082

The 91082 solid-state 4-input Vital AND Gate (figure 3-32) is a logic device that combines four DC inputs to produce a single DC output.

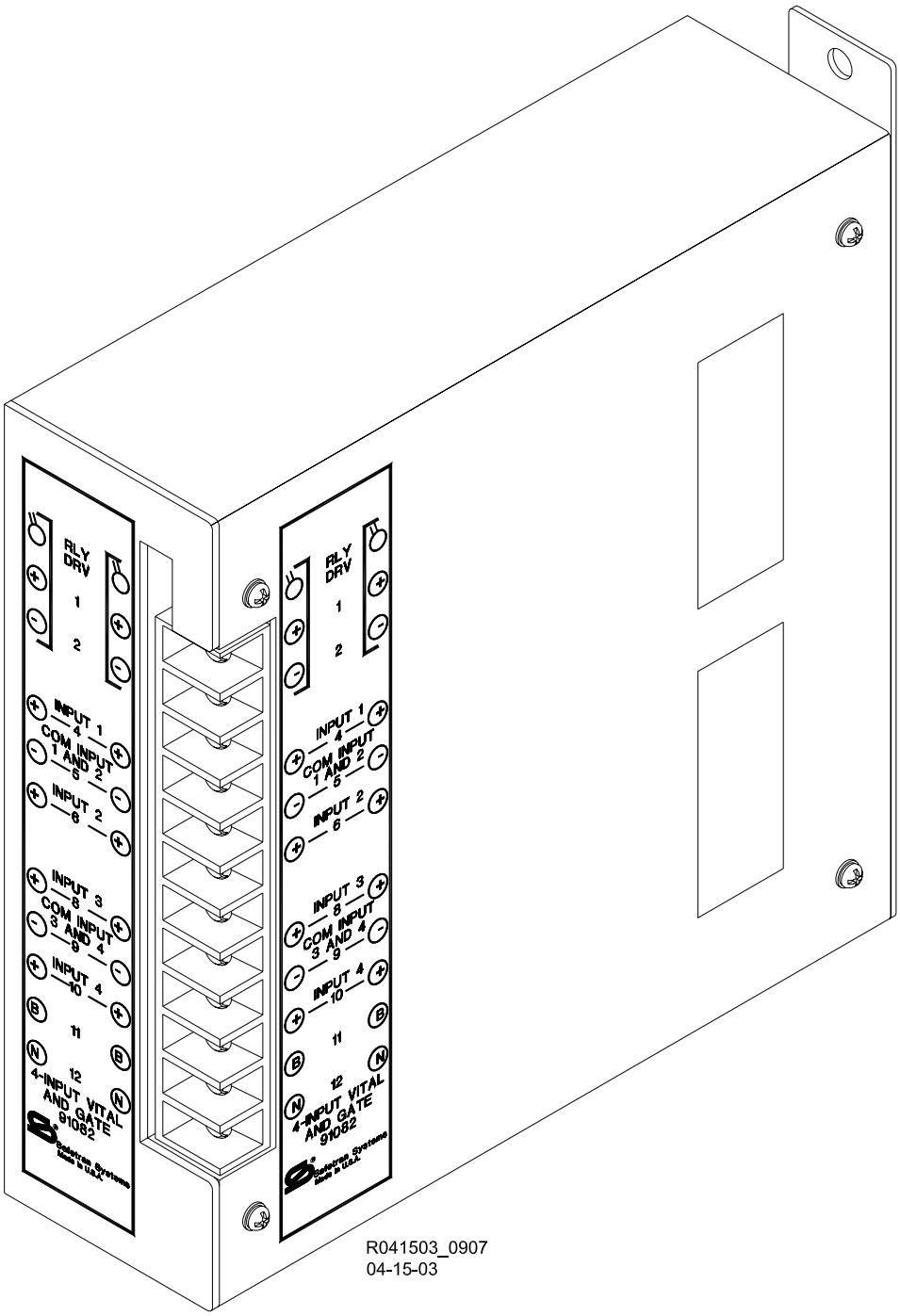


Figure 3-32. 4-Input Vital AND Gate, 91082

3.22.1 Functional Description

The 91082 solid-state 4-input Vital AND Gate combines four inputs to produce a single output.

- When a relay drive voltage is applied to all of the AND gate inputs, the drive voltage appears at the **RLY DRV** output of the gate.
- When the drive voltage is removed from any one of the AND gate inputs, voltage is removed form the **RLY DRV** output.

NOTE

The inputs and outputs are electrically isolated from battery (B and N) within the unit.

3.22.2 4-input Vital AND Gate Specifications

Environmental Temperature Range:	-40 °F to +160 °F (-40 °C to +71 °C)
Dimensions:	9.38 inches (87.89 centimeters) high 2.44 inches (20.37 centimeters) wide 8.02 inches (20.37 centimeters) deep
Weight:	4.06 pound (1.8 kilogram) (approximate)
Power Input:	
Voltage:	9.5 to 16.5 VDC
Current:	200 milliamperes
Output Voltage:	12 VDC (nominal); will drive 400 to 1,000-ohm loads
Control Inputs:	7 to 18 VDC (1,000-ohm input resistance)
Input/Output Protection:	Floating (optically isolated and transformer coupled); surge protected

Mounting Dimensions

The 4-input Vital AND Gate is housed in a brushed aluminum case designed for shelf or backboard mounting.

- The unit mounting dimensions are provided in figure 3-33.

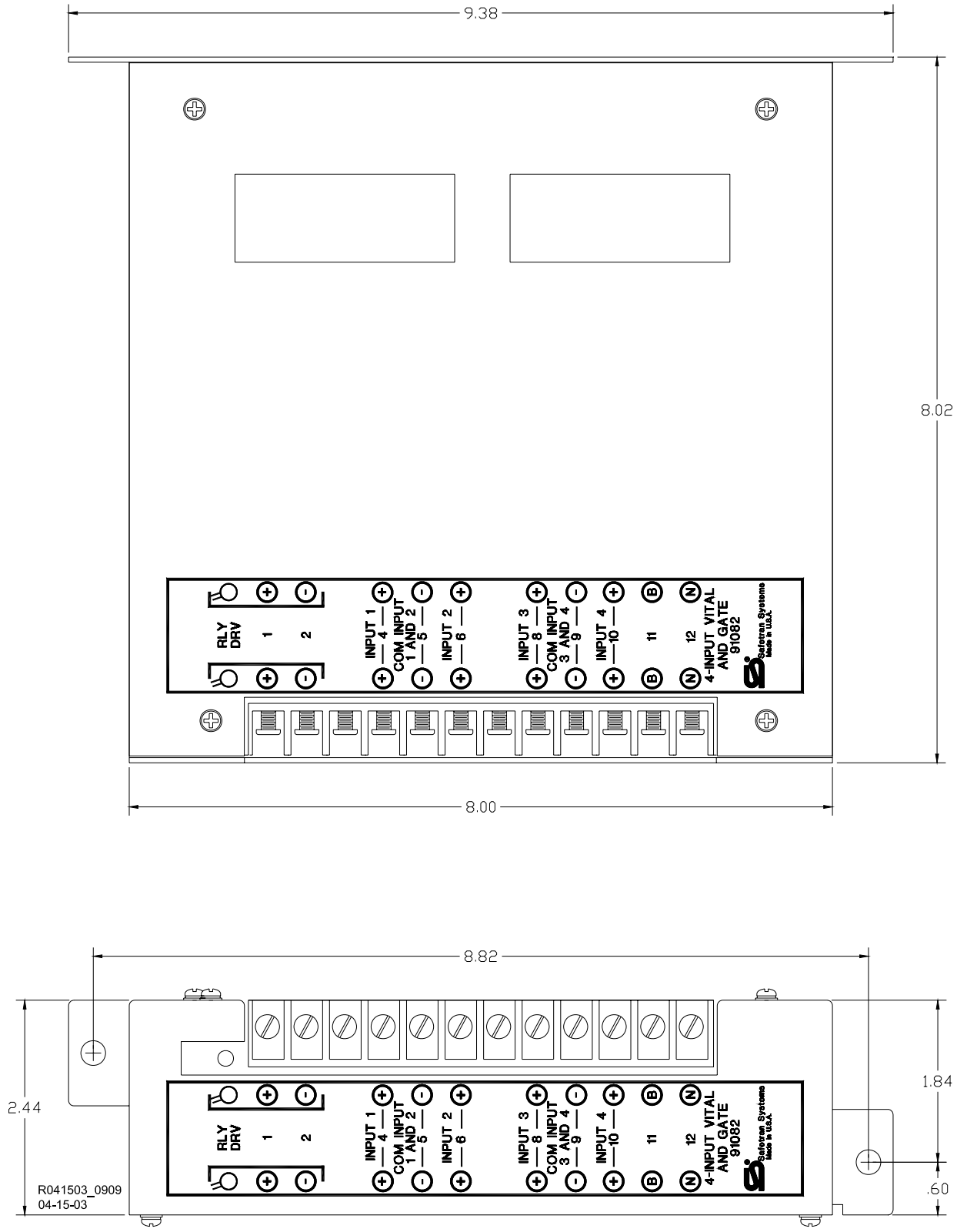


Figure 3-33. 4-input Vital AND Gate Assembly Mounting Dimensions

3.23 SURGE PANELS, 80026-XX

The 80026-XX Surge Panels are available in a combination of equalizers and arresters to provide protection for battery and/or track circuits.

⚠ WARNING

ANY ALTERNATIVE SURGE PROTECTION DEVICE MUST BE ANALYZED TO INSURE THAT FAILURE MODES OF DEVICE DO NOT COMPROMISE SAFETY OF 4000 GCP SYSTEM. FOR EXAMPLE, BUT NOT LIMITED TO:

- **UNINTENTIONAL EARTH GROUNDS ON CONTROL CIRTCUITS**
- **SHORTS ON TRACK CIRCUITS.**

3.23.1 Surge Panel Configurations

Surge Panel units are provided in a variety of configurations to meet specific customer requirements.

- Wall mount Surge Panel applications are listed in table 3-9.
- Rack mount Surge Panel applications are listed in table 3-10.

NOTE

For surge protection requirements not listed or for custom designed Surge Panels, contact Safetran Technical Support.

3.23.2 Surge Panel Nomenclature and Mounting Dimensions

Surge panel nomenclature and mounting dimensions are provided on the figures identified in tables 3-9 and 3-10.

3.23.3 Surge Panel Arresters

A typical Surge Panel arrester is shown in figure 3-34.

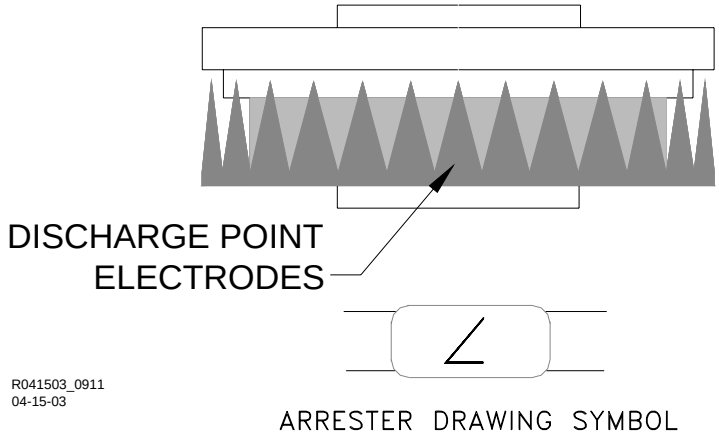


Figure 3-34. Typical 80026 Surge Panel Arrester Mounting Position

⚠ WARNING

DO NOT MOUNT ARRESTER WITH ELECTRODES POINTED IN THE DOWN POSITION TO MINIMIZE THE POTENTIAL OF SHORT CIRCUIT.

Table 3-9. Wall Mount Surge Panels

Part Number	Figure	Description
80026-01	3-35	Protects 1 battery and 1 track circuit.
80026-02	3-35	Protects 1 track circuit. • Use with –1 panel for sub-sequent track protection.
80026-22	3-35	Protects 1 track circuit. • Use for six-wire applications.

Table 3-10. Rack Mount Surge Panels

Part Number	Figure	Description
80026-31	3-36	Protects 1 track and 1 battery circuit.
80026-32	3-36	Protects 1 track and 1 battery circuit. • Use with –31 panel for subsequent track and battery circuit protection.
80026-33	3-37	Protects 1 battery circuit. • Use with –31 panel for subsequent battery circuit protection.
80026-34	3-37	Protects 1 track circuit. • Use with –31 panel for subsequent track circuit protection.
80026-35	3-38	Protects 2 track circuits.
80026-36	3-38	Protects 1 track circuit. • Use with –31 panel for subsequent track circuit protection. • Used with six-wire applications for transmit, receive, and check receive lead protection
80026-37	3-39	Protects 1 battery circuit.
80026-38	3-39	Protects 2 track circuits. • Used in applications with six wires on one track and four on the other

Table 3-10 Concluded

Part Number	Figure	Description
80026-39	3-40	Protects 4 battery circuits. • Battery input/output line protection for two DAX start or two UAX circuits. • Normally used with second battery when line circuit protection is required
80026-41	3-40	Protects 110 VAC circuits. • Used when 20-ampere solid-state crossing controller (91070A) is used in conjunction with 4000 GCP • Includes four 15-ampere resettable circuit breakers and one 15-ampere GFCI duplex outlet
80026-41A	3-40	Protects 110 VAC circuits. • Used when 40-ampere solid-state crossing controller (91075A) is used in conjunction with 4000 GCP • Includes three 15-ampere and one 25-ampere resettable circuit breakers and one 15-ampere GFCI duplex outlet
80026-47	3-41	Protects 2 battery circuits and 1 track circuit. • Used with GCP battery and second battery
80026-50	3-41	Protects 4 vital Input/output circuits • Generally used for UAX inputs or DAX start outputs

3.23.4 Surge Panel Specifications:

80026-01

Dimensions:	13.5 inches (34.29 centimeters) high 5.69 inches (14.45 centimeters) wide 3.625 inches (9.21 centimeters) deep
Weight:	6 pounds (2.72 kilograms) (approximate)

80026-02

Dimensions:	8.75 inches (22.23 centimeters) high 5.69 inches (14.45 centimeters) wide 3.625 inches (9.21 centimeters) deep
Weight:	4 pounds (1.82 kilograms) (approximate)

80026-22

Dimensions:	5.44 inches (13.82 centimeters) high 5.69 inches (14.45 centimeters) wide 3.625 inches (9.21 centimeters) deep
Weight:	3 pounds (1.36 kilograms) (approximate)

80026-31

Dimensions:	4.96 inches (12.60 centimeters) high 23.00 inches (58.42 centimeters) wide 4.535 inches (11.52 centimeters) deep
Weight:	5 pounds (2.27 kilograms) (approximate)

80026-32

Dimensions:	4.96 inches (12.60 centimeters) high 23.00 inches (58.42 centimeters) wide 4.535 inches (11.52 centimeters) deep
Weight:	6 pounds (2.72 kilograms) (approximate)

80026-33

Dimensions:	4.96 inches (12.60 centimeters) high 23.00 inches (58.42 centimeters) wide 4.535 inches (11.52 centimeters) deep
Weight:	7 pounds (3.18 kilograms) (approximate)

80026-34

Dimensions:	4.96 inches (12.60 centimeters) high 23.00 inches (58.42 centimeters) wide 4.535 inches (11.52 centimeters) deep
Weight:	6 pounds (2.72 kilograms) (approximate)

80026-35

Dimensions:	4.96 inches (12.60 centimeters) high 23.00 inches (58.42 centimeters) wide 4.535 inches (11.52 centimeters) deep
Weight:	7 pounds (3.18 kilograms) (approximate)

80026-36

Dimensions:	4.96 inches (12.60 centimeters) high 23.00 inches (58.42 centimeters) wide 4.535 inches (11.52 centimeters) deep
Weight:	6 pounds (2.72 kilograms) (approximate)

80026-37

Dimensions:	4.96 inches (12.60 centimeters) high 23.00 inches (58.42 centimeters) wide 4.535 inches (11.52 centimeters) deep
Weight:	6 pounds (2.72 kilograms) (approximate)

80026-38

Dimensions:	4.96 inches (12.60 centimeters) high 23.00 inches (58.42 centimeters) wide 4.535 inches (11.52 centimeters) deep
Weight:	8 pounds (3.64 kilograms) (approximate)

80026-39

Dimensions:	4.96 inches (12.60 centimeters) high 23.00 inches (58.42 centimeters) wide 4.535 inches (11.52 centimeters) deep
Weight:	6 pounds (2.72 kilograms) (approximate)

80026-41

Dimensions:	4.96 inches (12.60 centimeters) high 23.00 inches (58.42 centimeters) wide 5.535 inches (14.06 centimeters) deep
Weight:	9 pounds (4.09 kilograms) (approximate)

80026-41A

Dimensions:	4.96 inches (12.60 centimeters) high 23.00 inches (58.42 centimeters) wide 5.535 inches (14.06 centimeters) deep
Weight:	9 pounds (4.09 kilograms) (approximate)

80026-47

Dimensions:	4.96 inches (12.60 centimeters) high 23.00 inches (58.42 centimeters) wide 4.535 inches (11.52 centimeters) deep
Weight:	7 pounds (3.18 kilograms) (approximate)

80026-50

Dimensions:	4.96 inches (12.60 centimeters) high 23.00 inches (58.42 centimeters) wide 4.535 inches (11.52 centimeters) deep
Weight:	7 pounds (3.18 kilograms) (approximate)

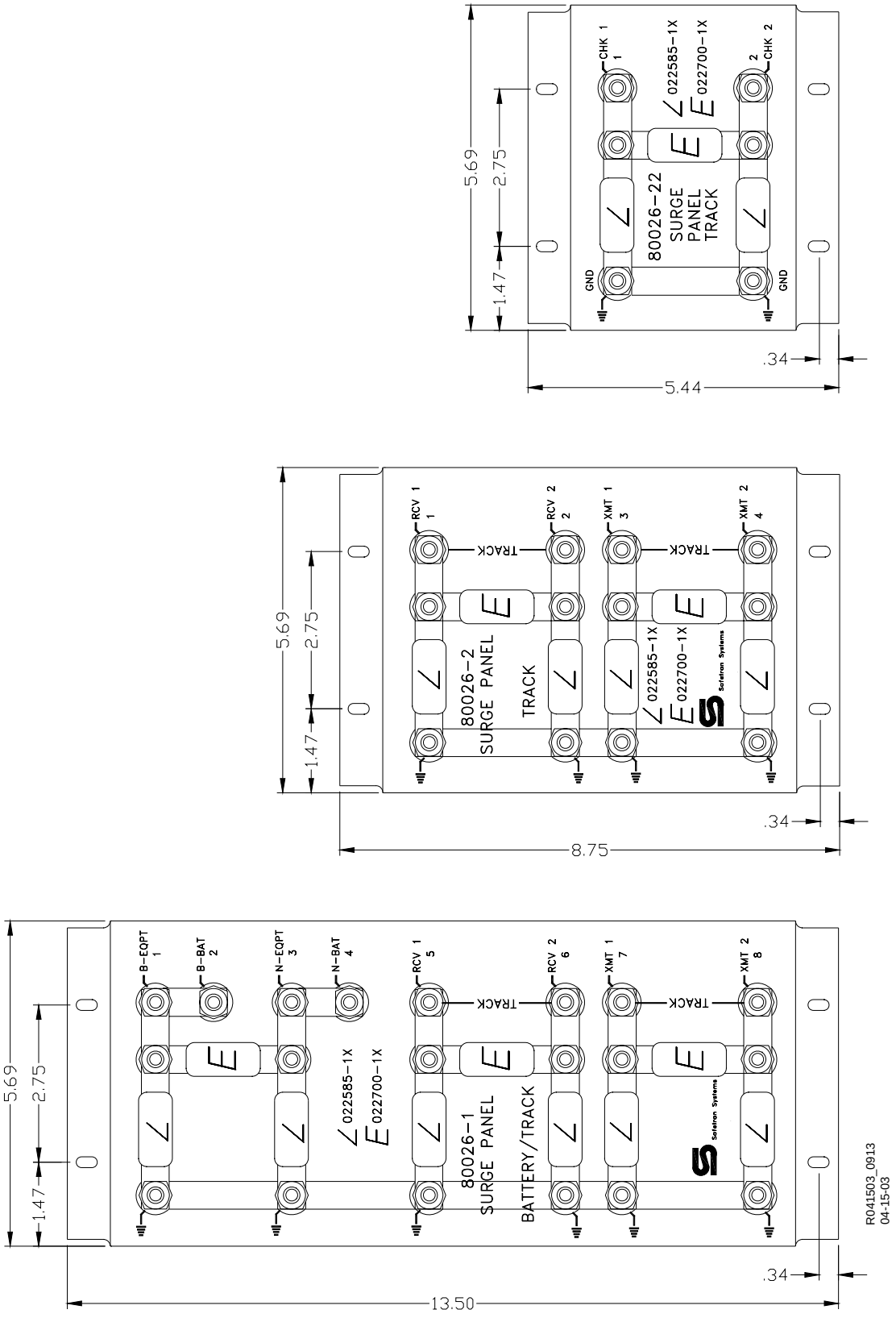


Figure 3-35. Wall Mount Surge Panels

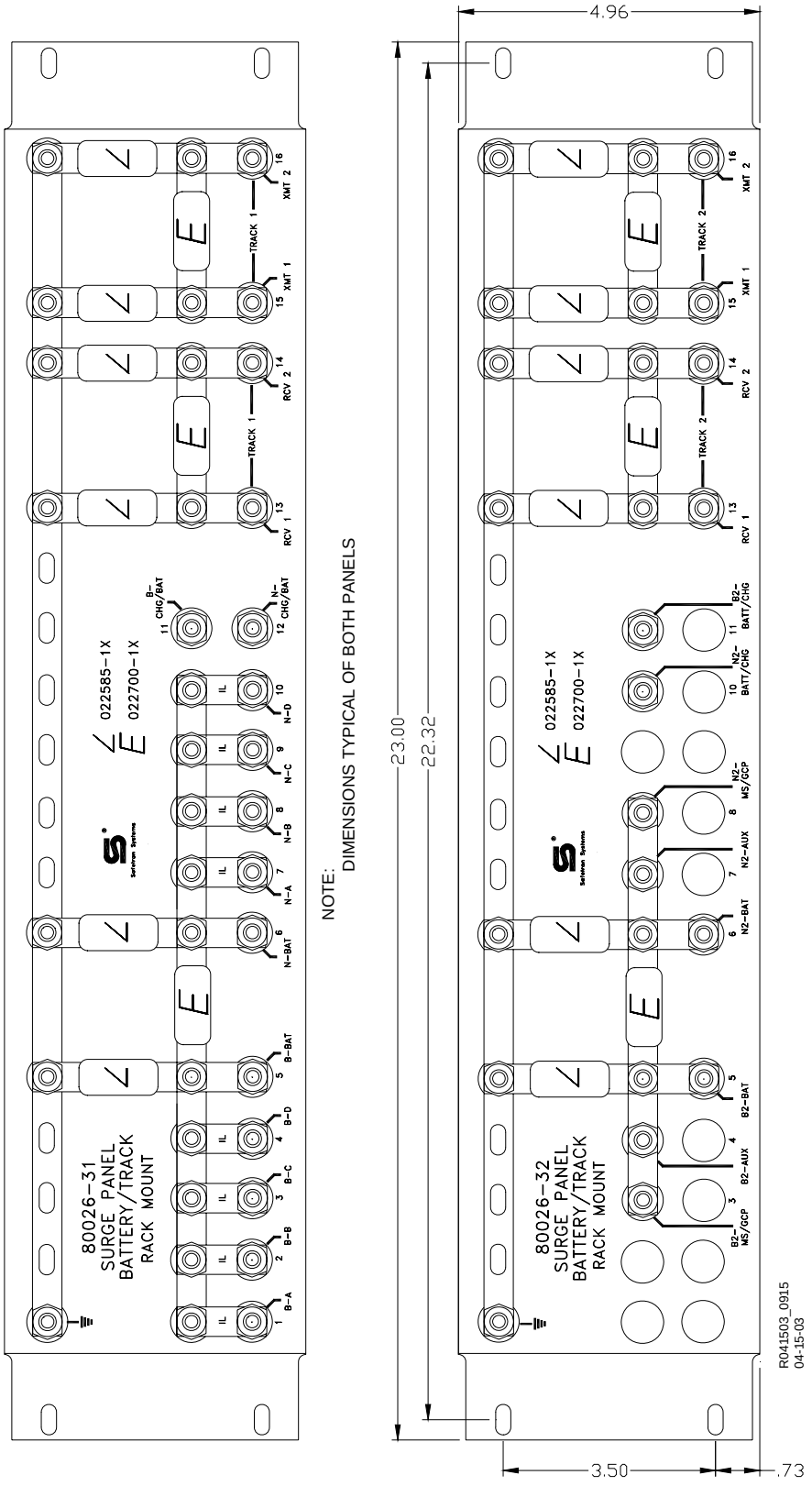


Figure 3-36. Rack Mount Surge Panels 80026-31 and 80026-32

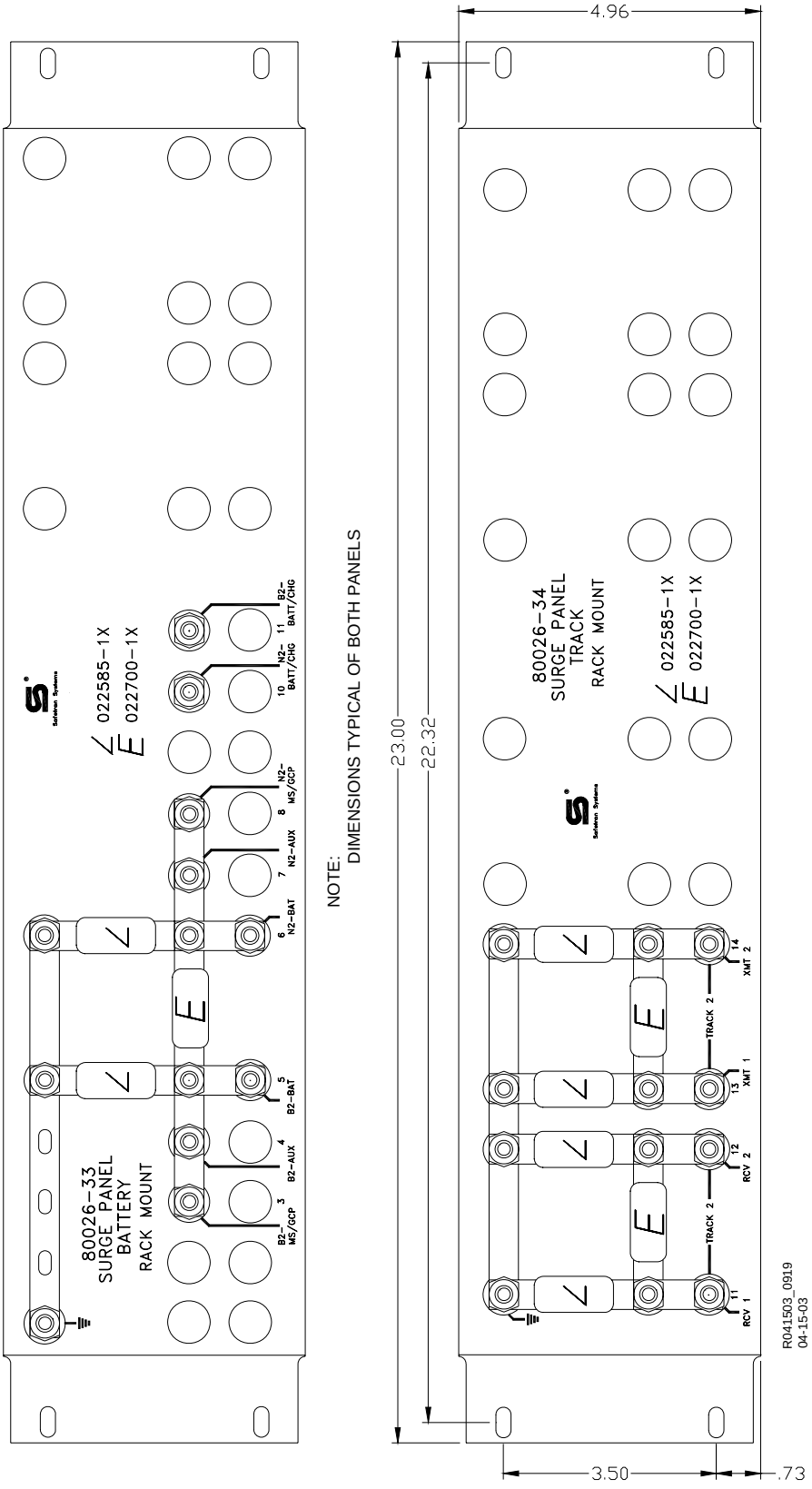


Figure 3-37. Rack Mount Surge Panels 80026-33 and 80026-34

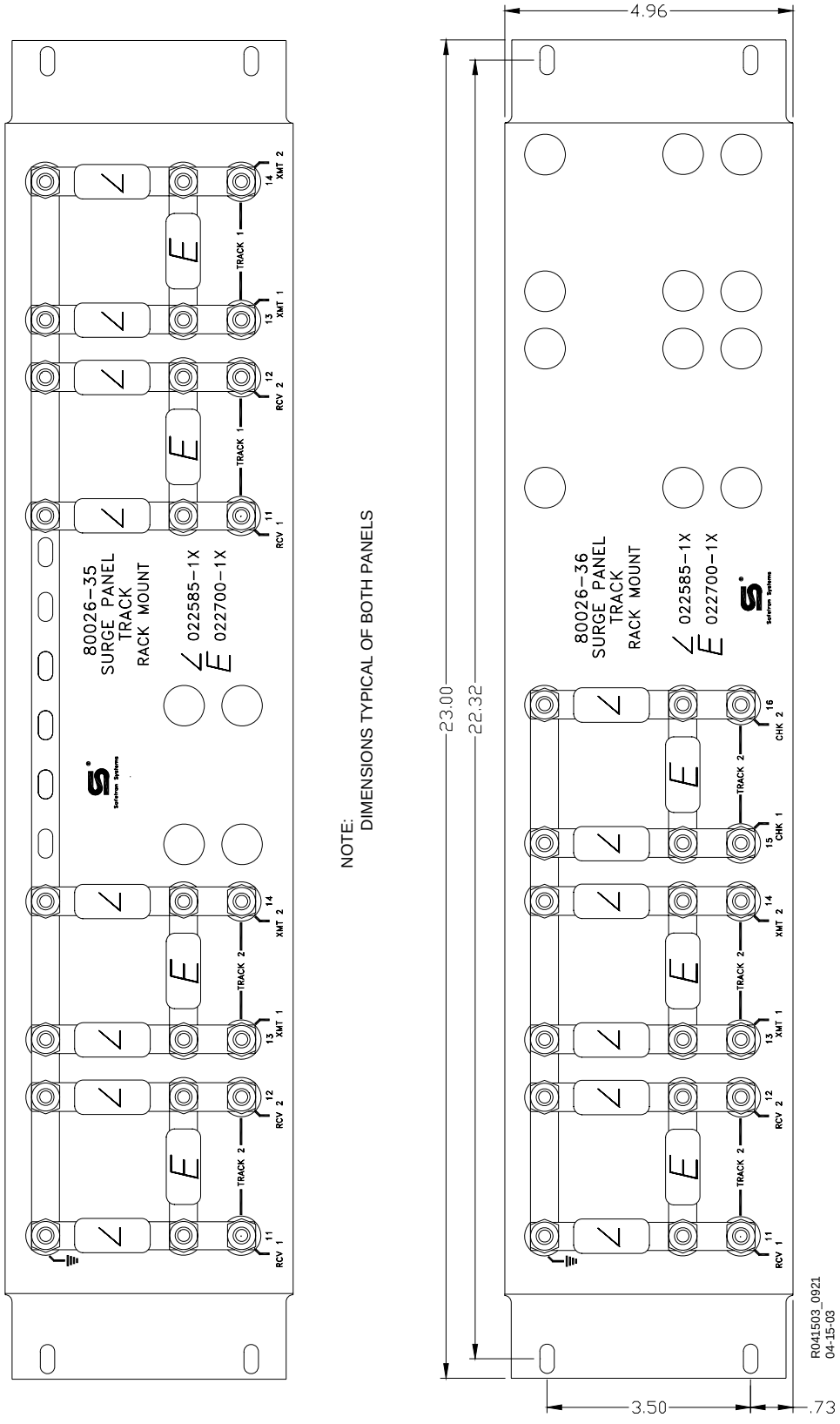


Figure 3-38. Rack Mount Surge Panels 80026-35 and 80026-36

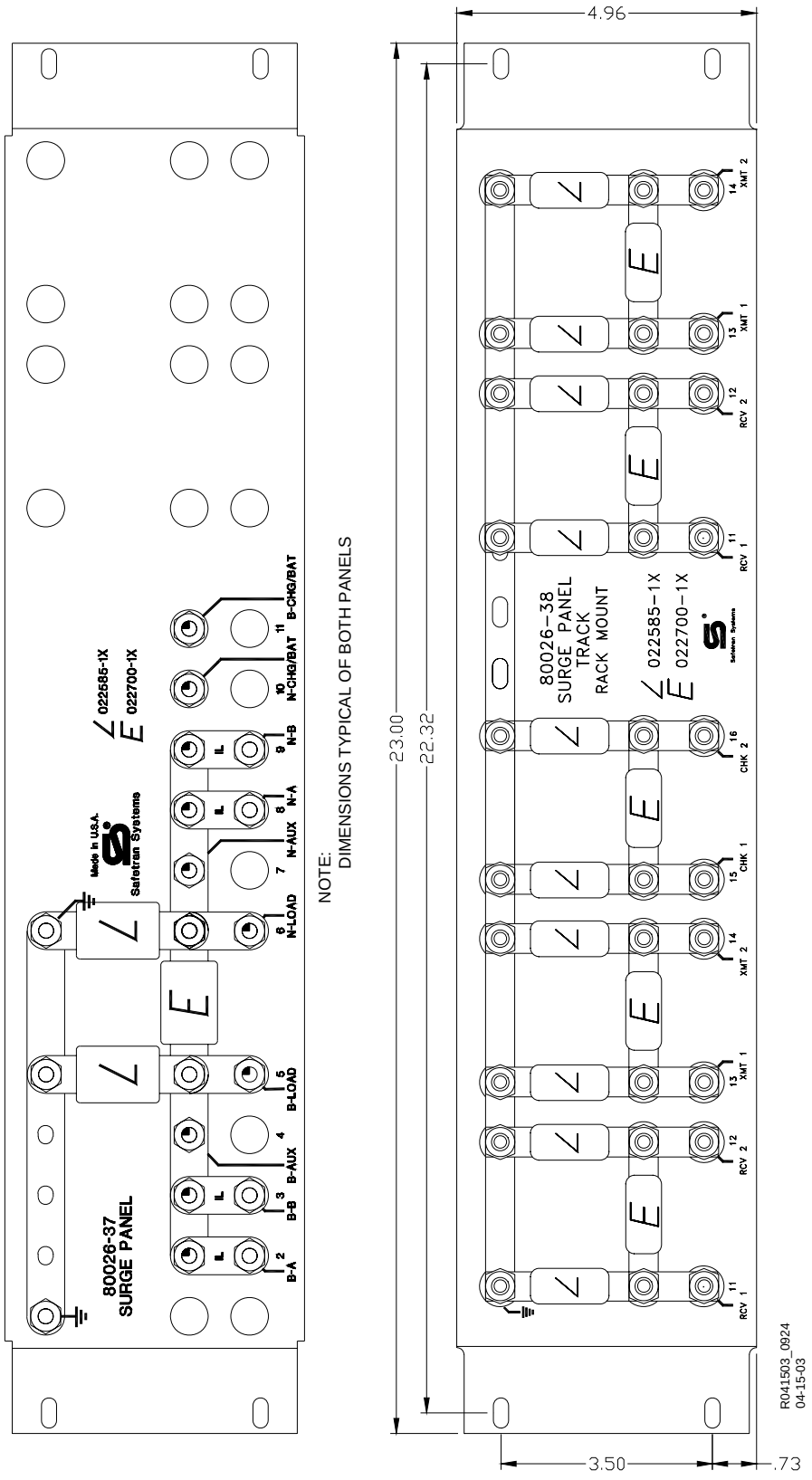


Figure 3-39. Rack Mount Surge Panels 80026-37 and 80026-38

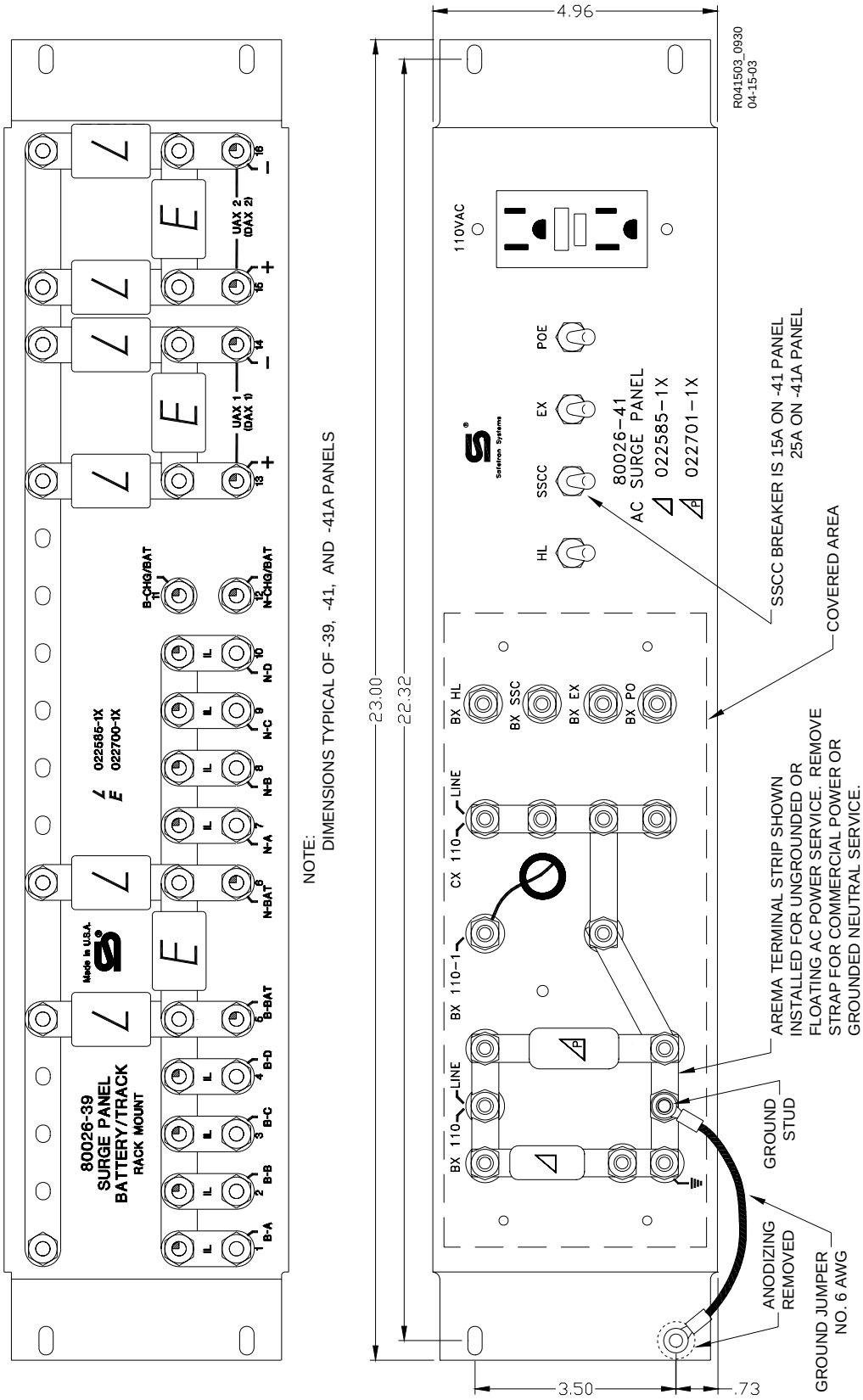


Figure 3-40. Rack Mount Surge Panels 80026-39, 80026-41, and 80026-41A

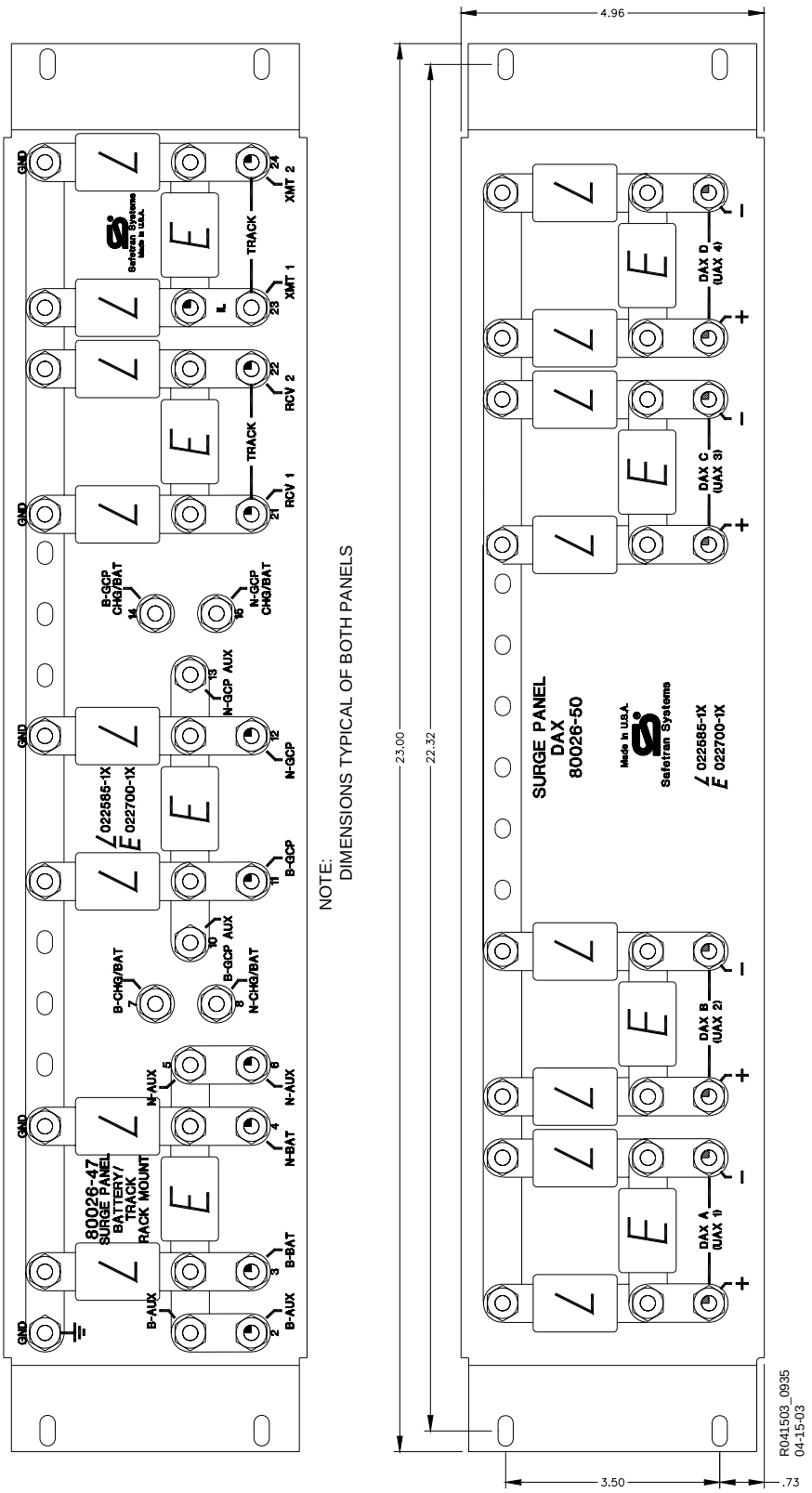


Figure 3-41. Rack Mount Surge Panels 80026-47 and 80026-50

3.24 RECTIFIER PANEL ASSEMBLY, 80033

The 80033 Rectifier Panel Assembly is equipped with equalizers and arresters to provide surge protection on the B(+) and N(-) connections to the battery and the GCP.

- Mounting holes are provided for a battery charger, as required.

3.24.1 Rectifier Panel Assembly Nomenclature and Mounting Dimensions

Rectifier Panel Assembly nomenclature and mounting dimensions are provided on figure 3-42.

3.24.2 Rectifier Panel Assembly Specifications:

Dimensions: 10.46 inches (26.57 centimeters) high
23.00 inches (58.42 centimeters) wide
2.75 inches (6.99 centimeters) deep

Weight: 7 pounds (3.18 kilograms) (approximate)

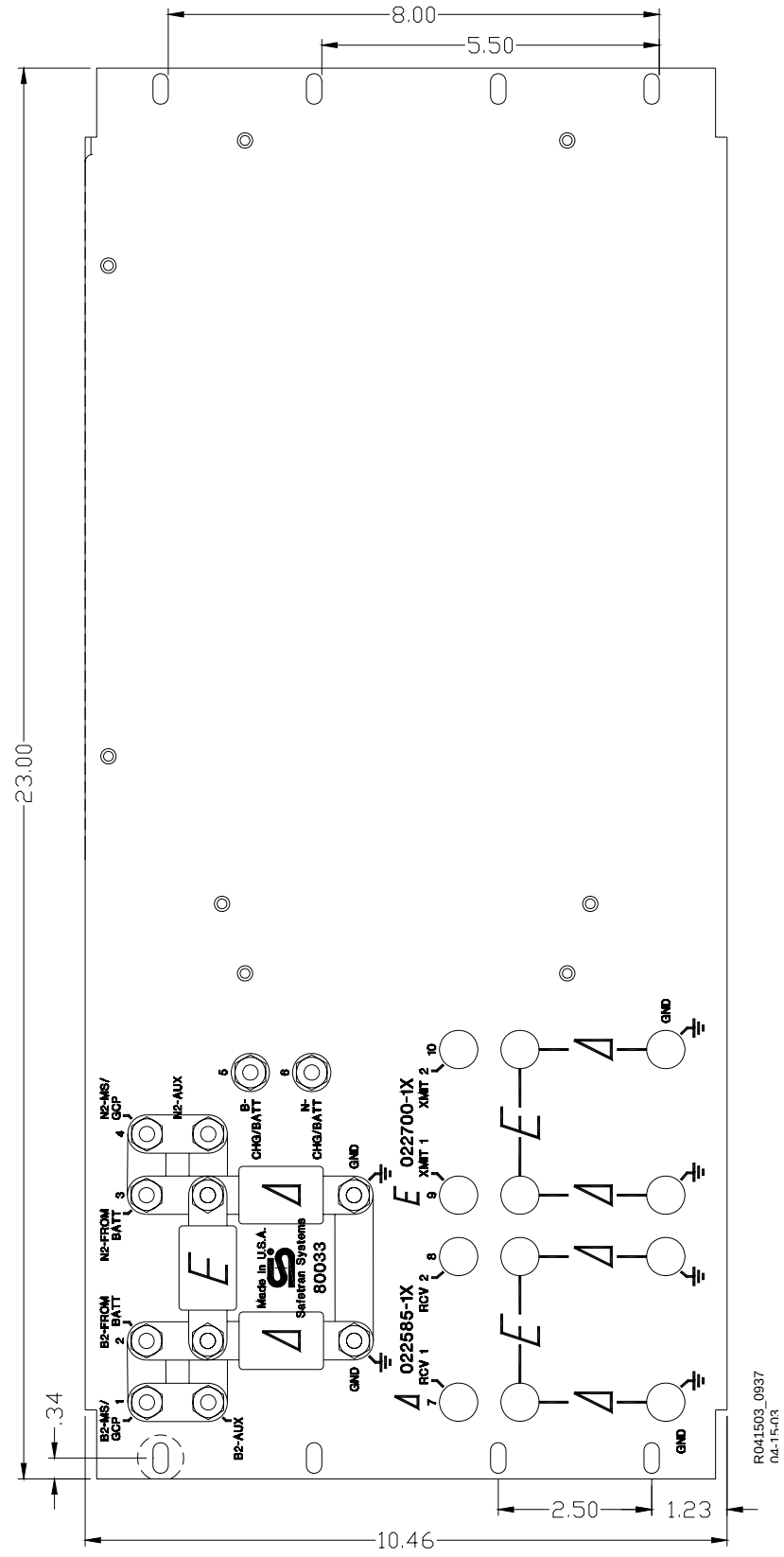


Figure 3-42. Rectifier Panel Assembly, 80033

3.25 CABLE TERMINATION PANEL ASSEMBLY, 91042

The 91042 Cable Termination Panel Assembly is a universal-mounting panel that can be ordered with from 1 to 19 pairs of strapped AREMA binding posts.

3.25.1 Cable Termination Panel Assembly Mounting Dimensions

91042 Cable Termination Panel Assembly mounting dimensions are provided on figure 3-43.

3.25.2 Cable Termination Panel Assembly Specifications:

Dimensions:	3.96 inches (10.06 centimeters) high 23.00 inches (58.42 centimeters) wide 2.25 inches (centimeters) deep
Weight:	7 pounds (17.78 kilograms) (approximate)

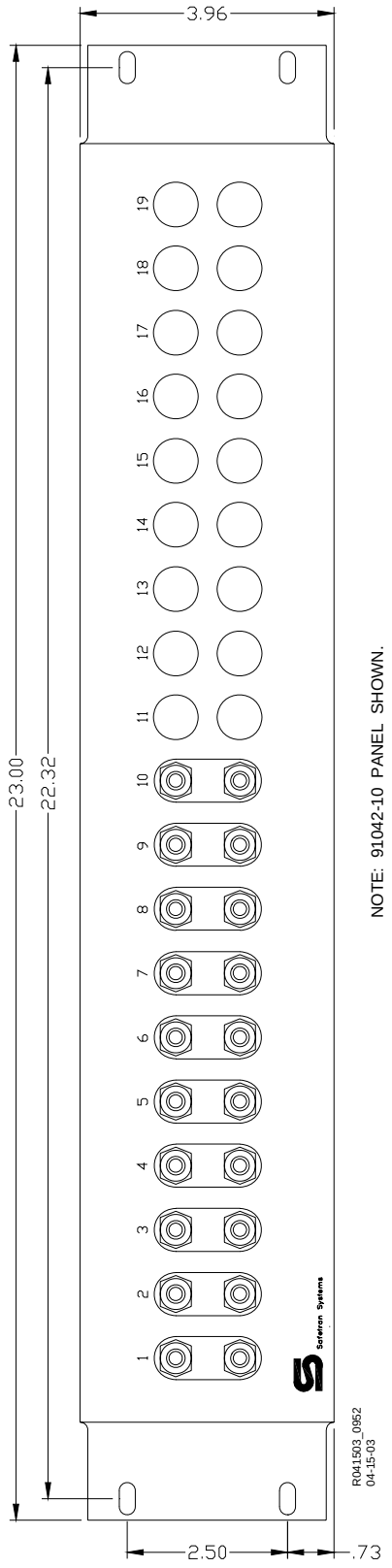


Figure 3-43. Cable Termination Panel Assembly, 91042

3.26 SSCC III LIGHTING SURGE PANELS, 91170-1 AND 91181-1

The SSCC III Lighting Surge Panels provide external I/O primary surge protection for:

- 80405 Solid State Crossing Controller IIIi (SSCC IIIi) module
- grade crossing gate controller circuitry

The 91170-1, figure 3-44, provides common return gate control

The 91181-1, figure 3-45, provides isolated gate control

Both Surge Panels have built-in secondary surge protection for all external I/O

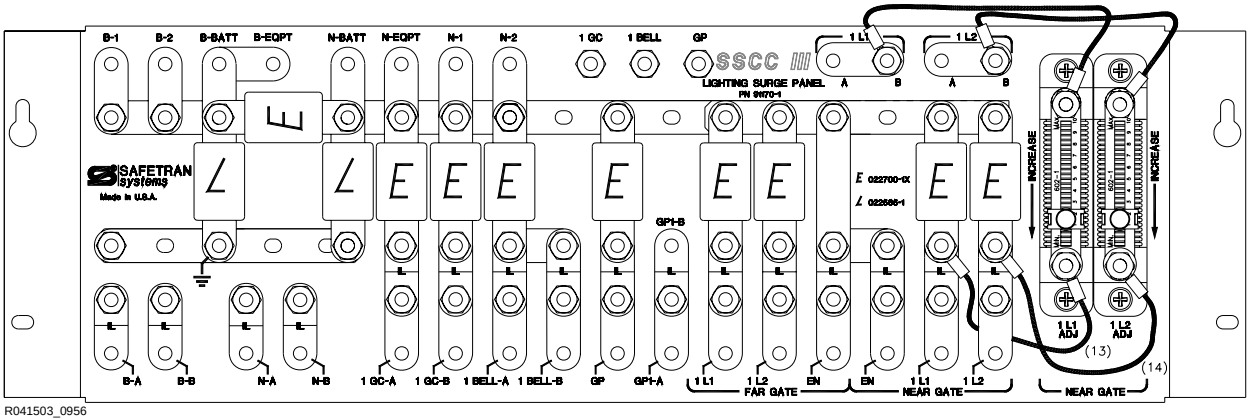
⚠ WARNING

➢ **ANY ALTERNATIVE SURGE PROTECTION DEVICE MUST BE ANALYZED TO INSURE THAT FAILURE MODES OF DEVICE DO NOT COMPROMISE SAFETY OF 4000 GCP SYSTEM. FOR EXAMPLE, BUT NOT LIMITED TO, CROSSES & GROUNDS.**

3.26.1 Lighting Surge Panel Description

The SSCC III Lighting Surge Panels provides:

- arresters and equalizers for surge protection
- standard AREMA binding posts for cable connections to the flashing lights, gates, and bells
- gate battery circuit protection
- insulated links in the underground cable connections
  - ♦ allows quick circuit isolation for testing and measurements without disarranging cable circuits
- adjustable resistors in the **NEAR GATE** Lamp 1 (**L1**) and Lamp 2 (**L2**) circuits
  - ♦ provides compensation for different wire lengths (cabling) to the crossing flashing lamps
  - ♦ compensate for unequal voltage drops between the two lamp cables
- steering diodes for the Crossing Controller Gate Control output to provide gate control circuit isolation



R041503_0956
04-15-03

Figure 3-44. SSCC III Lighting Surge Panel, 91170-1

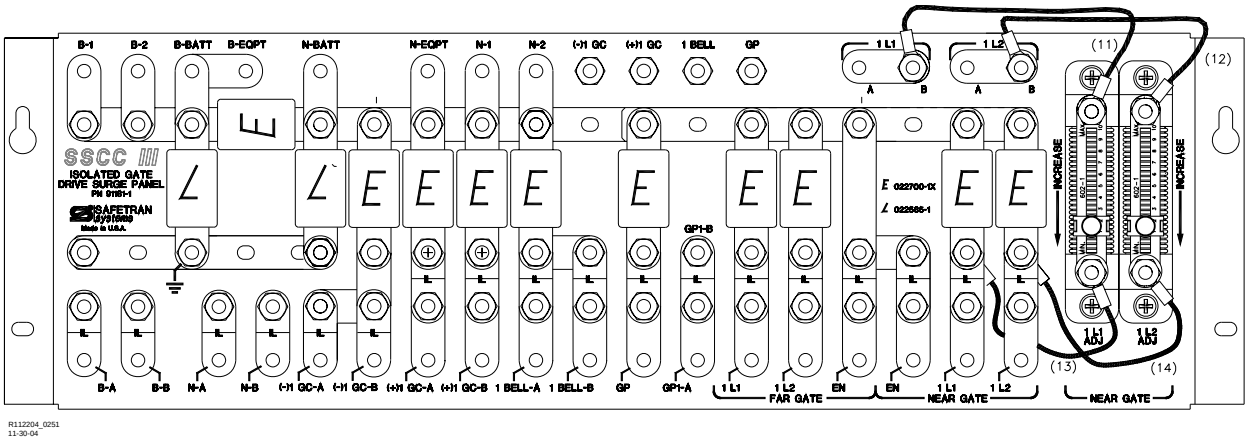


Figure 3-45. SSCC III Lighting Surge Panel, 91181-1

3.26.2 Insulated Testing Links

Insulated testing links, figure 3-46, are provided to allow crossing wires to be isolated for test purposes.

- The insulated testing link contains an integral insulating washer.
- Contact between insulated testing link and AREMA binding post is accomplished using a gold plated nut.
  - The gold plated nut is secured on the binding post using a standard jam nut.
  - The gold plated nut has a recess for the insulator.
  - Loosening the gold nut until contact between it and the test link is lost opens the link.
  - When the gold plated nut is tightened the link is closed.

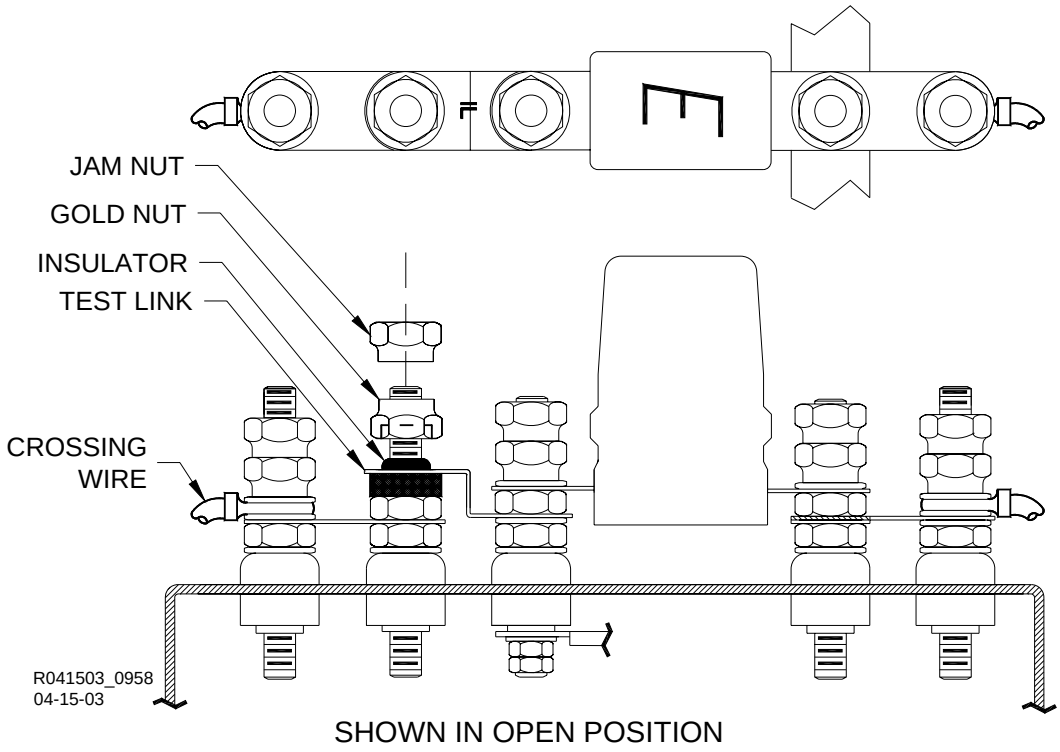


Figure 3-46. Insulated Testing Link

3.26.3 Surge Panel I/O Interface

I /O Interface Type:	Standard AREMA binding posts
Lamp Cable Compensation:	Adjustable resistors for Near Gate Lamp 1 and Lamp 2
Test/Measurement:	Special insulated links on all connections to the crossing for quick circuit isolation.
Surge Protection:	Surge protection is provided on the following gate interface terminals: • L1 (lamp 1 output for Near and Far Gates) • L2 (lamp 2 output for Near and Far Gates) • En (lamp common for Near and Far Gates) • GP (gate position input) • 1 BELL (bell outputs for Near and Far Gates) • 1 GC (gate controls for Near and Far Gates) • B (battery + input) • N (battery return)

3.26.4 Surge Panel Specifications

Dimensions:	6.97 in (17.70 cm) high 23.0 in (58.42 cm) wide (including mounting tabs) 3.56 in (9.04 cm) deep (including AREMA binding posts)
Weight:	10.0 lb (4.5 kg) (approx.)

3.26.5 Mounting Dimensions

The 91170-1 SSCC III Lighting Surge Panel is housed in a Black powder-coat metal panel designed for wall, backboard, or rack mount.

- The unit mounting dimensions are provided in figure 3-47

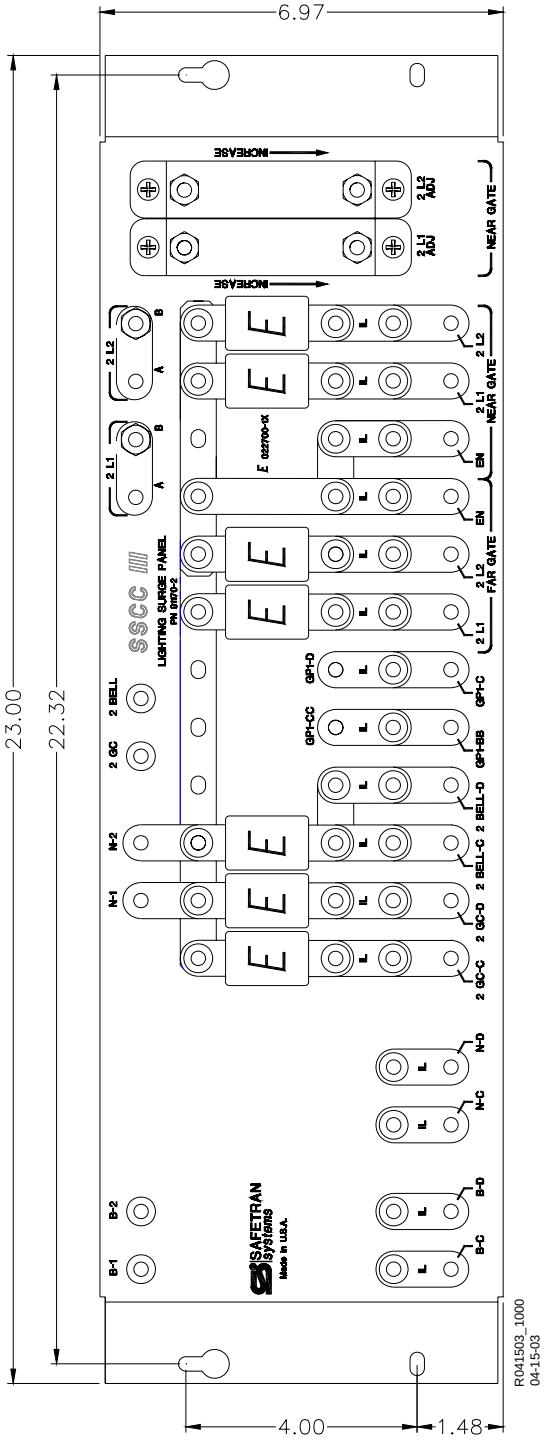


Figure 3-47. SSCC III Lighting Surge Panel Mounting Dimensions

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SECTION 4 - DIAGNOSTIC TERMINAL

4.1 DIAGNOSTIC TERMINAL

The Diagnostic Terminal (DT) is a Safetran developed Windows® based software.

- Available on CD from Safetran Customer Service.

The Diagnostic Terminal (DT) provides the user interface that allows:

- 4000 GCP configuration
  - ♦ Upload a configuration package (Pac) file to the CP from the Display Module's USB drive or a PC,
  - ♦ Download the configuration package (Pac) file from the CP and save it on The Display Module's USB drive or a PC.
- Save the Status and/or Summary logs from all cards
- Save the Maintainers Log, Train History and Diagnostic logs
- Save SEAR Reports, histories, and incidents
- Upload MEFs from the Display Module's USB drive or a PC
- Upload an MCF from the Display Module's USB drive or a PC,
- Set MCF CRC,
- Clear CIC and ECD.
- track calibration
- approach distance computation
- approach linearization
- island calibration
- application programming
- track status display
- diagnostics and troubleshooting
- Safetran Event Analyzer Recorder (SEAR II) configuration

4.1.1 DT Programs

Two separate DT programs can implement 4000 GCP configuration and display functions.

- DT for Personal Computers (PCs)
  - ♦ Desktop
  - ♦ Laptop
- DT for A80407 Display Module
- The displays for each DT program are identical in most respects except for screen height to width ratio.
  - ♦ In this section, Display Module DT displays are shown for each program function.
  - ♦ PC based program displays are shown only where the corresponding displays of each DT program differ.

4.1.2 PC Installed DT To GCP Communication

The PC-installed DT communicates with the 4000 GCP using the:

- 9-pin RS-232 **DIAG** connector on the chassis.

Communication is through a straight 9-pin female to 9-pin male cable as shown in Figure 4-1.

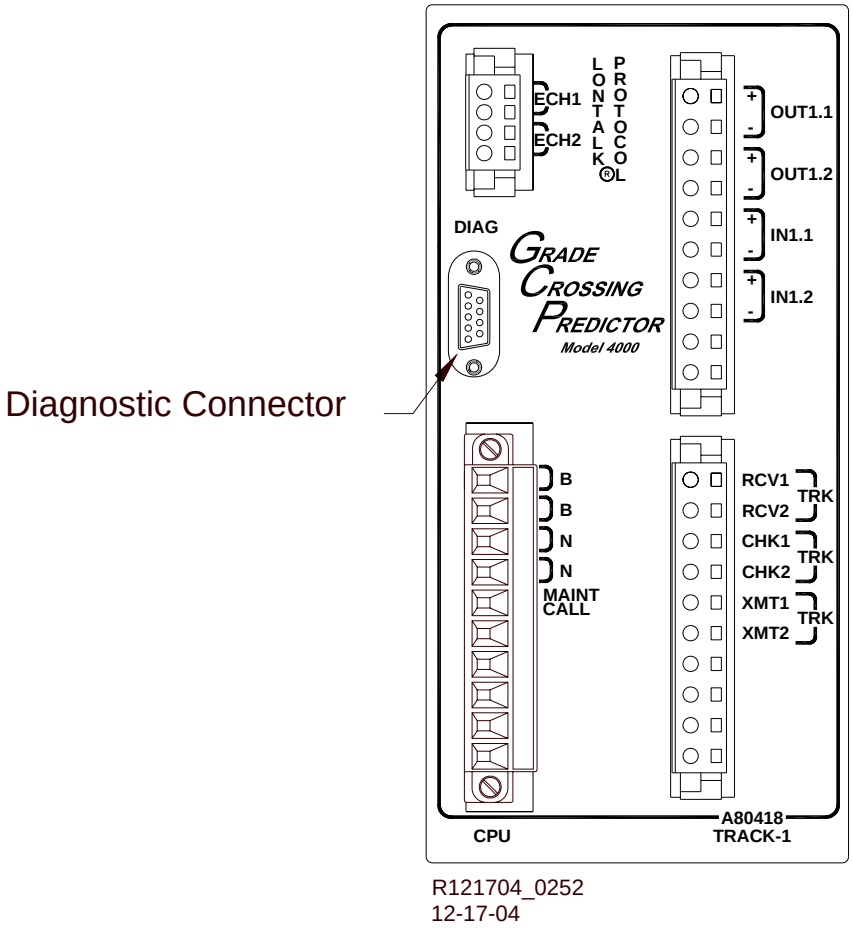


Figure 4-1. PC to CPU Module Diagnostic Connector

4.1.3 DT Program Initiation

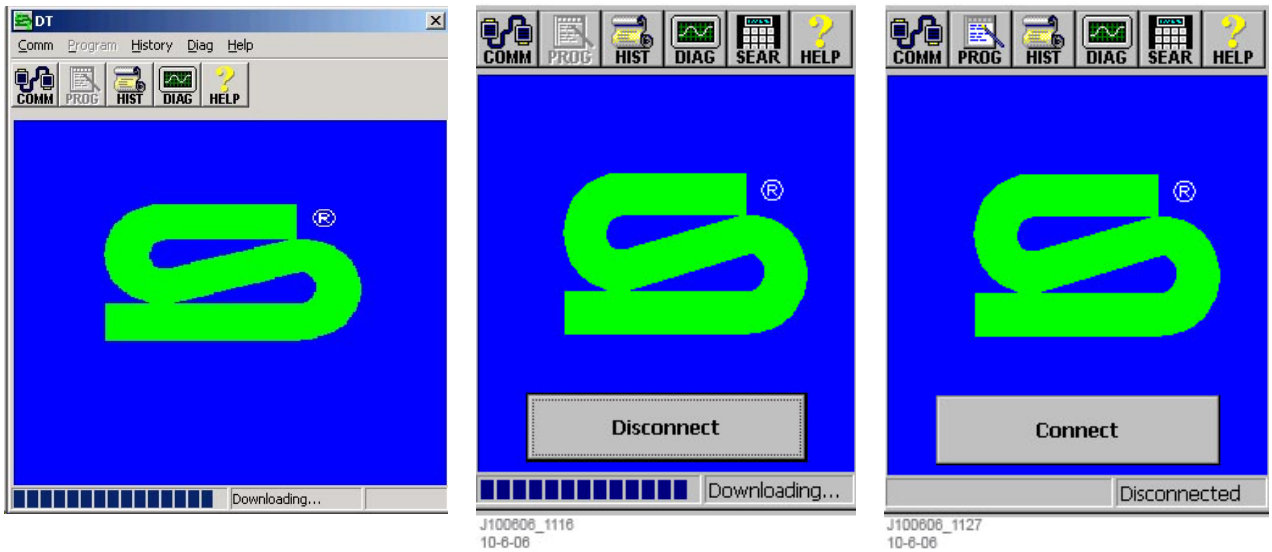
DT startup is different for the PC based DT and the Display based DT:

- The PC based DT resident program is manually started
  - The RS-232 communications cable must be in place before the program starts.
  - The 4000 GCP must complete the bootup sequence before the program starts.
- The Display based DT program is started each time power is applied to the 4000 GCP.

4.1.4 DT Startup sequence

While either DT program is opening the display appears as shown in Figure 4-2 A and B.

- A progress bar appears at the bottom of the screen.
- Status messages appear in the message box at the bottom right of the screen.
- A Connect / Disconnect button has been added to the Display based DT as shown in Figures 4-2 B and C.
  - When the Display is connecting or connected to the Communication Processor (CP) on the CPU, the Disconnect button is displayed.
  - When the Display is not communicating with the CP, the Connect button is displayed.
  - When the CP is communicating with the PC based DT, the Display is disconnected from the CP.



A

PC Based DT Screen

B - Connecting

C - Disconnected

Display Based DT Screens

Figure 4-2. DT Start-Up Screens

4.1.5 Status Screen

When 4000 DT has completed the bootup and internal test sequence, the **Main Status Screen** displays (Figure 4-3).

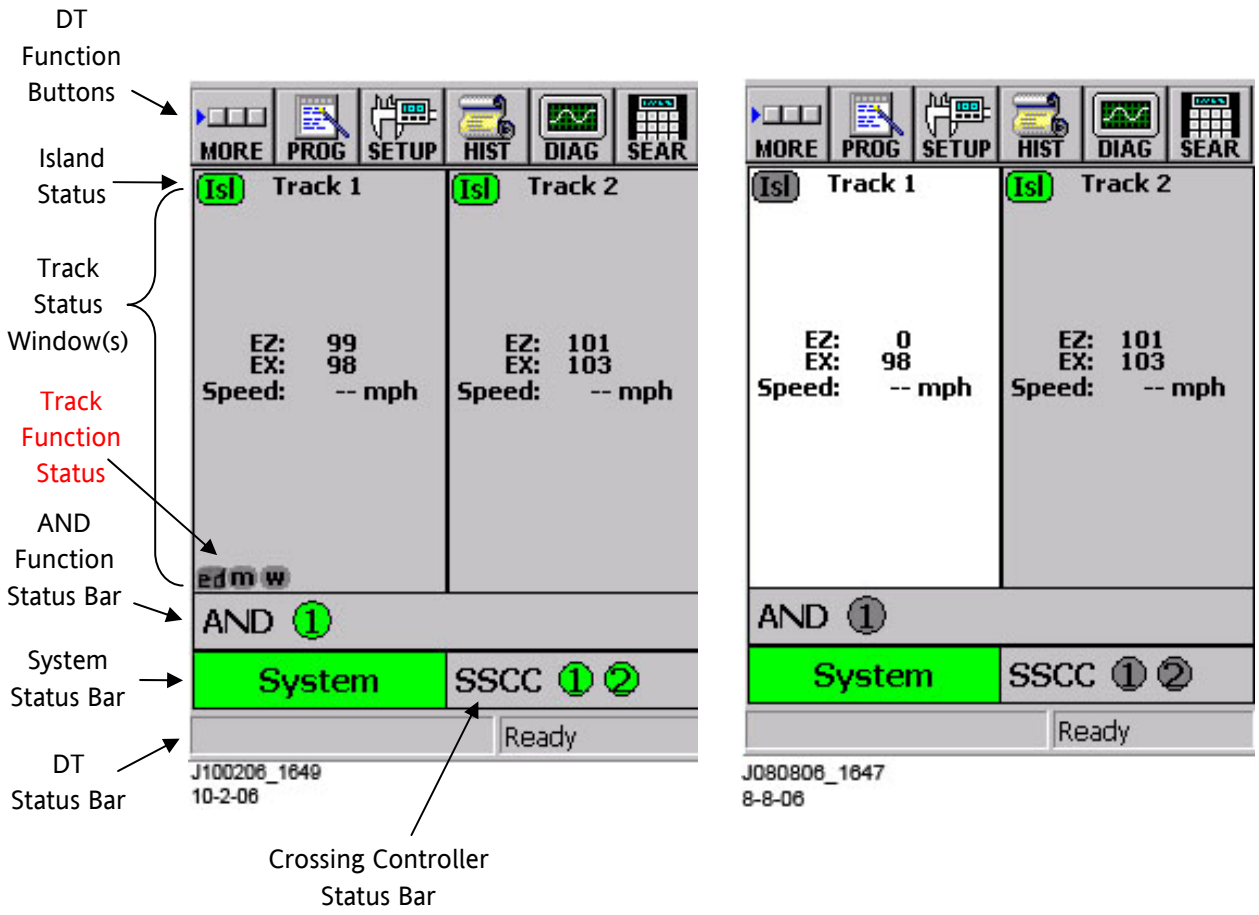


Figure 4-3. Main Status Screen on Display Module

- Eight functional display areas display:
  - DT Buttons
  - Island Status
  - AND Function Status including AND Wrap Status
  - Track Status window(s)
    - Number of track windows shown corresponds to the number of tracks that are programmed as used
  - Wrap Status
  - System Status bar
  - SSCC Status Bar
  - DT Status bar

4.1.5.1 Track Status Windows

Each Track Status window shows the:

- track number
- relative train position (**EZ**)
- track ballast condition (**EX**)
- train approach **Speed**
- calibration status notation (appears only while track is uncalibrated)
- island status (if the island is used on this Track Module)
- Wrap status (if a WRAP is used in the program ADVANCED: track wrap screen)

4.1.5.1.1 Island Status

The Island Status displays if an Island is selected on the Track Module.

- Symbol color indicates island status:
  - Gray: island occupied (Figure 4-3B)
  - Green: island unoccupied or, if used, Wrap input is energized regardless of state of occupancy (Figure 4-3A)
  - No symbol: island not used on this Track Module (i.e., unidirectional track module not connected to island)
- Symbols only appear for islands programmed as Internal or External.

4.1.5.1.2 Track Function Status

The status of various optional track functions are displayed in the lower portion of each track status window (or track information window (Figures 4-3A and 4-4).

- Wrap Circuit Status
  - ♦ "W" indicates Wrap input energized.
  - ♦ "W" is displayed only when Wrap input is energized and when "Track # Wrap Used " is set to YES.
- Enhanced Detection
  - ♦ "ed" indicates enhanced detection has been activated for the current train movement.
  - ♦ "ed" is only displayed when "Enhanced Detection Used" is set to YES and inbound poor shunting is detected.
- Motion Sensor Restart
  - ♦ "m" indicates that the predictor switched to a motion sensor after a train stopped in the approach circuit.
  - ♦ "m" is displayed only when "MS/GCP Restart Used" is set to YES and current train has stopped in the approach circuit.

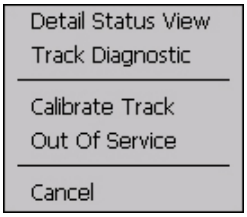
4.1.5.1.3 Track Status Window Color Scheme

The background color of each status window indicates track status:

- Red background indicates:
  - ♦ The Track Module is not installed, or
  - ♦ The Track Module is unhealthy
- Gray background indicates that:
  - ♦ The Track Module is healthy, and
  - ♦ No train is in the approach
- White background indicates that:
  - ♦ The Track Module is healthy, and
  - ♦ Train is in the approach
- Flashing blue background indicates that:
  - ♦ The GCP or the island on the Track Module is out of service

4.1.5.1.4 Track Status Window Popup Menu

The following popup menu appears when a track status window is selected:



NOTE

1. The menu applies only to the Track Module associated with the selected status window.
2. Right-click in the status window to select a Track Status Screen popup menu for the PC version DT.

4.1.5.1.4.1 Detail Status View Entry

Selecting this menu entry opens the Track Detail View screen, Figure 4-4.

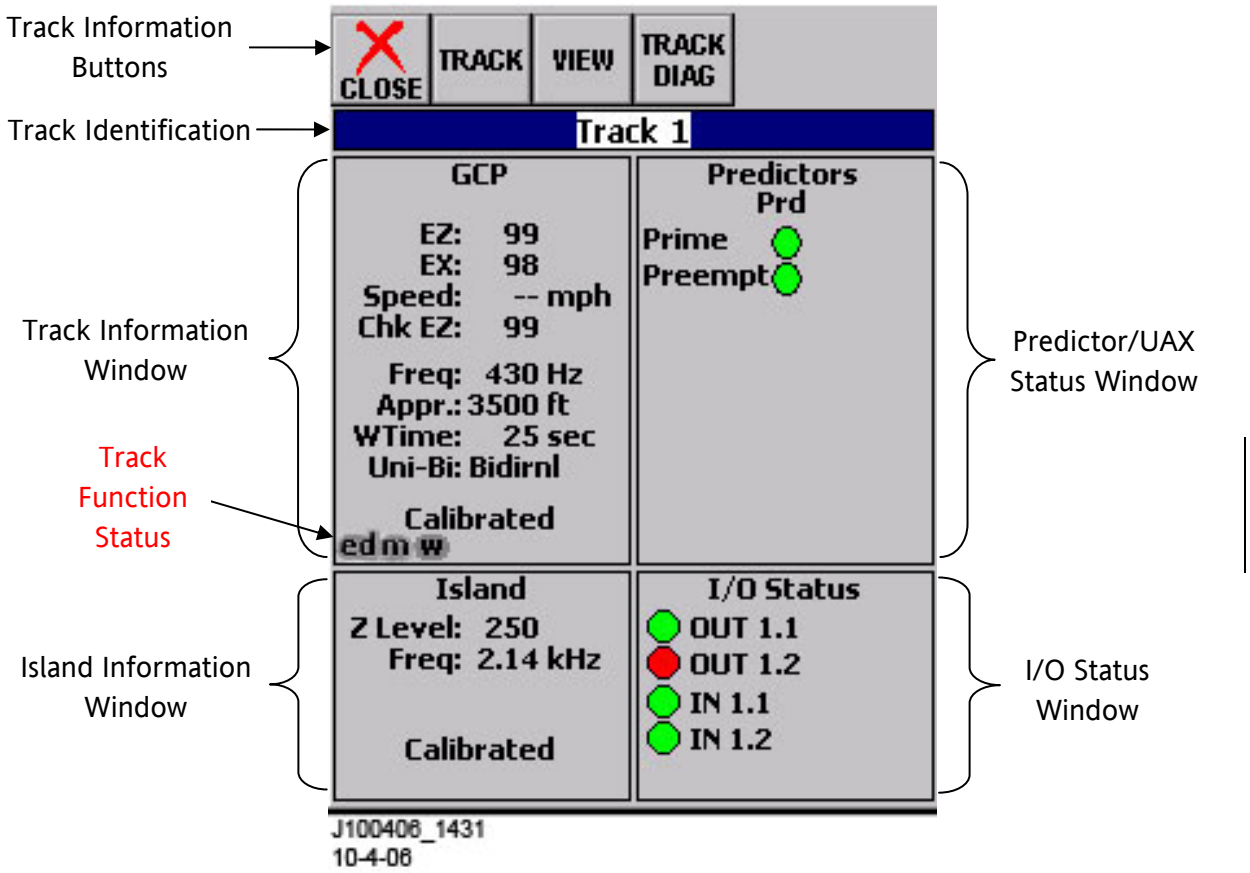


Figure 4-4. Track Detail View Screen, Initial View

- The screen consists of 6 functional areas:
  - Track number Identification Box
  - The Track Information window shows the status information for the selected Track Module:
    - Relative train position on the approach (**EZ**)
    - Track ballast condition (**EX**)
    - Train **Speed** within approach
    - Check receiver EZ level (**Chk EZ**)
    - GCP operational frequency (**Freq**)
    - Approach Distance (**Appr**)
    - Prime predictor's warning time (**WTime**)
    - Uni/Bi setting for this track (**Uni/Bi/Sim-Bi**)
    - Calibration status
    - Wrap status
  - The Island Information window shows the status information on the selected Track Module:
    - Island receiver level (**Z**)
    - Island frequency (**Freq**)
    - Island calibration status
    - loss-of-shunt indication (**LOS**)
      - appears below Island calibration status indication when loss-of shunt is detected in the island
  - The Predictor/UAX Status window:
    - shows the number and status of:
      - programmed track predictors (**Pred**)
      - programmed UAX and Enable functions
    - provides operating state indicator symbols:
      - Red circles indicate the predictor or UAX is de-energized.
      - Green circles indicate the predictor or UAX is energized or wrapped.
      - Circles change to hourglass while the predictor or UAX delay timer is running.
  - The I/O Status window shows the status of the inputs and outputs on the selected Track Module.
    - Red circle indicates that the input or output is de-energized or not used.
    - Green circle indicates that the input or output is energized.
  - Track Information Buttons are used in the diagnosis of track problems.

- Selecting the **CLOSE** button closes the Track Detail View window and returns the display to the Status Screen.
- Selecting the **TRACK** button open a drop-down menu containing an entry for each active track.
  - Selecting menu item changes the Track Detailed view to that of the selected track.
- Selecting the **VIEW** button while the Track Information Window is displayed opens a drop-down menu containing two entries (see left):
  - Selecting the **HEZ LEX** entry changes the Track Information window to the **EZ EX Limits** window as shown in Figure 4-5.
    - This window displays the Track Modules **Highest EZ** and **Lowest EX** values that have occurred and the time and date they occurred.
    - Selecting the **Reset** button resets the EZ/EX limits to the Track Module's current values and updates the display with these values.

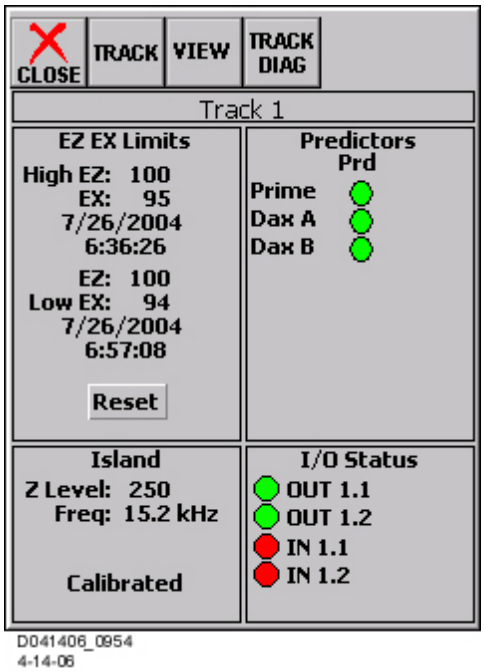


Figure 4-5. Track Detail View Screen with EX EZ Limits Window Shown

TRACK DIAG

- Selecting the **Compute Approach** entry changes the Track Information window as shown in Figure 4-6.
  - ✧ The computed approach value (**Cmp Ap**) replaces the programmed approach value
  - ✧ The Number of Linearization Steps (**Lin Step**) displays below the **Cmp Ap** value.

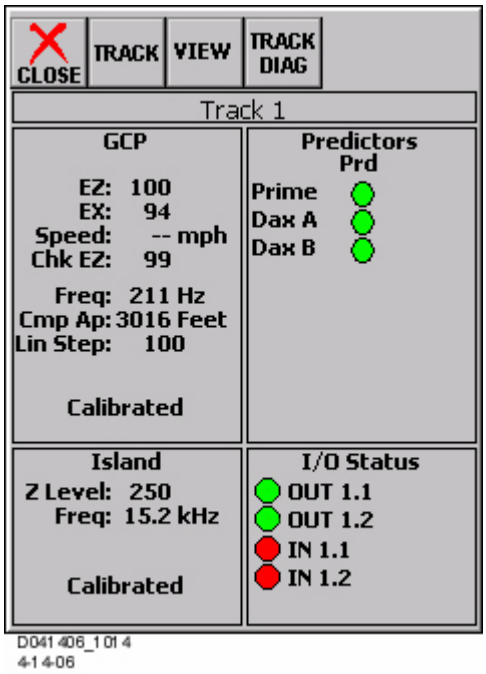


Figure 4-6. Track Detail View Screen with Computed Approach Values

HEZ LEX
Detail Status

- Selecting the **VIEW** button while the **Cmp Ap** value displays opens the drop-down menu shown to the left.
  - Selecting the **HEZ LEX** entry open the **EZ EX Limits** window, Figure 4-5.
  - Selecting the **Detailed Status** entry returns the display to the Track Detailed View window, Figure 4-4.
- Selecting the **TRACK DIAG** button opens the Track Diagnostic window, Figure 4-7
  - This window lists all track related diagnostic messages that are presently occurring for this Track Module.

Figure 4-7. Track Diagnostic Window

- Highlighting a message from the Track Diagnostic window display and selecting the **MORE INFO** button opens a detailed description of the possible causes of the message (see Figure 4-8).

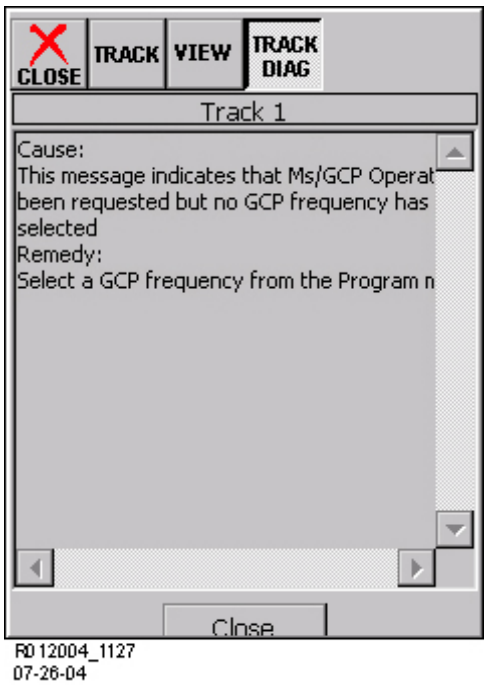


Figure 4-8. Message Description Window

Close

- Selecting the **CLOSE** button at the bottom of the Message description window returns the display to the Track Diagnostic window.

4.1.5.1.4.2 Track Diagnostic Entry

Selecting this popup menu entry opens the **Track Diagnostic window** (see Figure 4-7).

4.1.5.1.4.3 Calibrate Track Entry

Selecting this popup menu entry opens the **Calibration Select** window, Figure 4-23.

- Refer to paragraph 4.1.5.5.2.1 for a discussion of GCP calibration.

4.1.5.1.4.4 Out Of Service Entry

Select **Out Of Service** from the pop-up menu that appears when a track status window is selected, Figure 4-9.

⚠ WARNING

THE RAILROAD PROCEDURES GOVERNING HOW TO TAKE A TRACK CIRCUIT OUT OF SERVICE SHALL BE FOLLOWED. THE INSTRUCTIONS IN THIS SECTION MAY BE FOLLOWED ONLY IF ALLOWED BY THE RAILROAD.

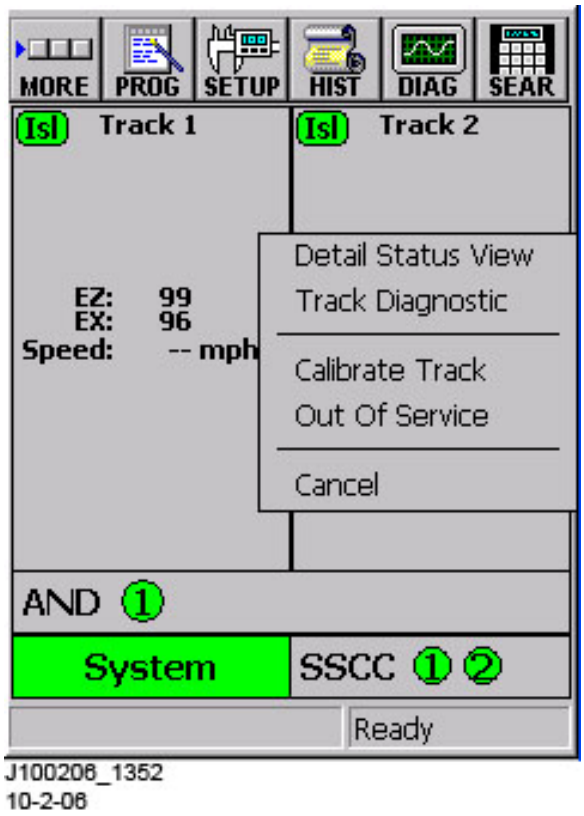


Figure 4-9. Pop-up Menu on Track Status Window

Selecting this menu entry opens the Out Of Service window. The details included in the Out Of Service window depend on the **OOS Control** program parameter settings as follows:

- If **OOS Control** is set to **Display** or **Display + OOS IPs**, the OOS Control window appears as in Figure 4-10.

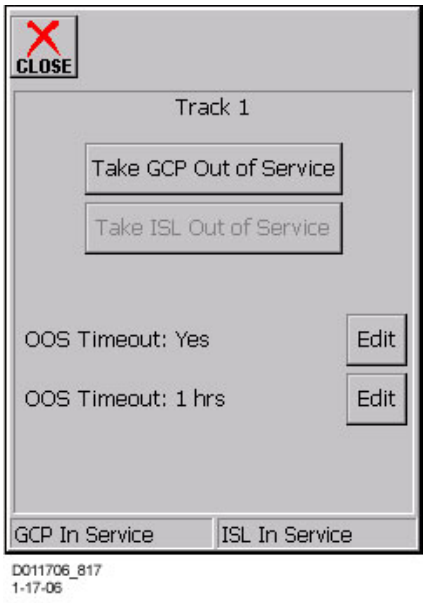


Figure 4-10. Out Of Service Window - OOS Control Set to "Display" or "Display+OOS IPs"

- If **OOS Control** is set to **OOS IPs**, the Out Of Service window is not used and is grayed out as in Figure 4-11A.
- If **OOS Control** is set to **4000 Case OOS IP**, the Out Of Service window is not used and is grayed out as in Figure 4-11B.

A

(OOS IPs)

B

(4000 Case OOS IP)

Figure 4-11. Out Of Service Window - OOS Control Set to "OOS IPs" or "4000 Case OOS IP"

- In either of the modes shown in Figure 4-11, the Display is not used to take the GCP and Island out of service so the buttons are grayed out (disabled).

4.1.5.1.4.4.1 Taking a Track or Island Out Of Service

- If **OOS Control** is set to **Display** or **Display+OOS IPs**, the Out Of Service window shown in Figure 4-10 allows the MS/GCP operation or the MS/GCP operation and the Island operation for a selected track to be taken out of service for:
  - ♦ an indefinite period (**OOS Timeout:** set to **No**)
  - ♦ a time interval between 1 and 23 hours
    - ▪ When time interval expires, GCP Track is returned to service:
      - If GCP Track prime or island outputs are off, crossing devices will be activated
      - If GCP Track prime and island outputs are on, activation of warning devices is dependent on the state of AND 1XR

NOTE The Island cannot be taken out of service until the GCP is taken out of service.

- The two buttons in the center of the Out Of Service window (Figure 4-10) are used to take the GCP and/or Island out of service.
- When the button is selected to take either function out of service, a corresponding confirmation box appears (Figure 4-12A and Figure 4-12B).
  - ♦ Selecting **Yes** on the confirmation box takes the indicated function (GCP or Island) out of service.
- The status bar at the bottom of the window shows whether the GCP and the Island are currently in or out of service.

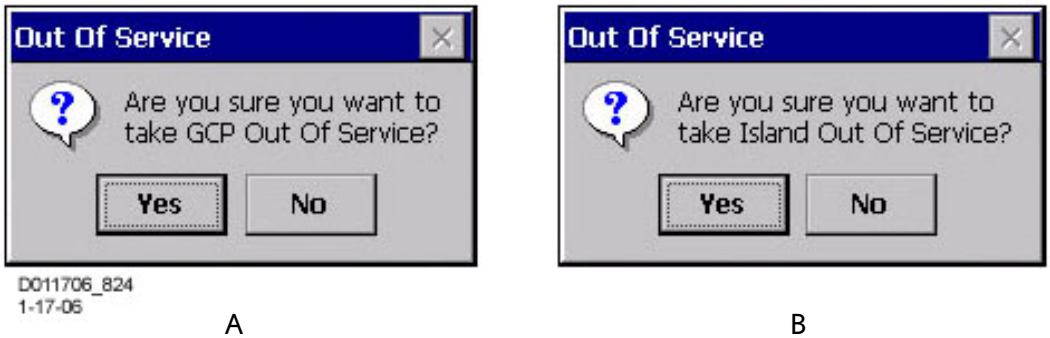


Figure 4-12. Out Of Service Confirmation Boxes

- When the GCP is taken out of service, the Out Of Service window changes as shown in Figure 4-13A.
- When both the GCP and the Island are taken out of service, the Out Of Service window changes as shown in Figure 4-13B.

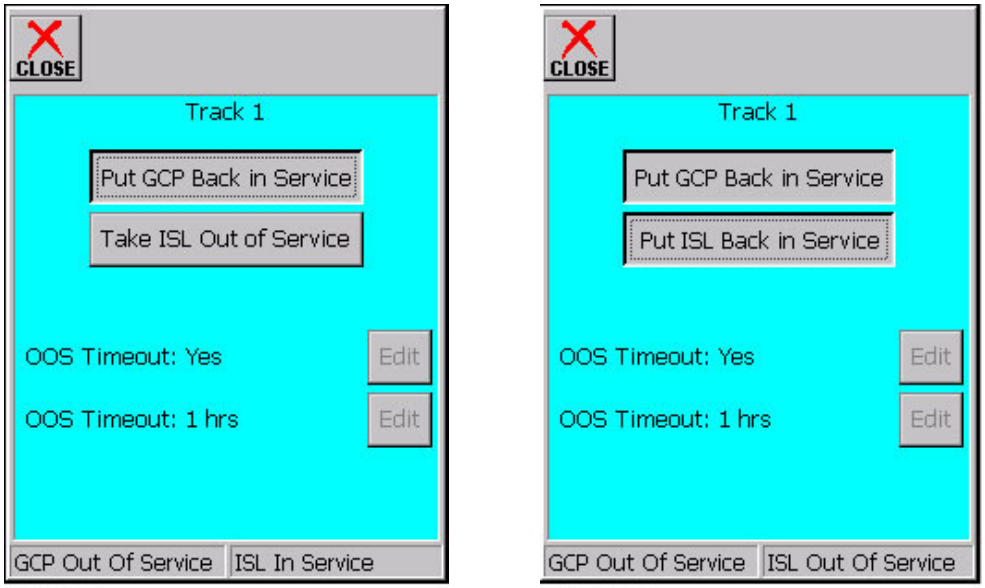


Figure 4-13. Out Of Service Window – GCP or GCP and Island Out Of Service

- When a GCP is put out of service, the main track status window shows the **GCP Out Of Service** and the window background flashes between blue and dark gray as shown in Figure 4-14.

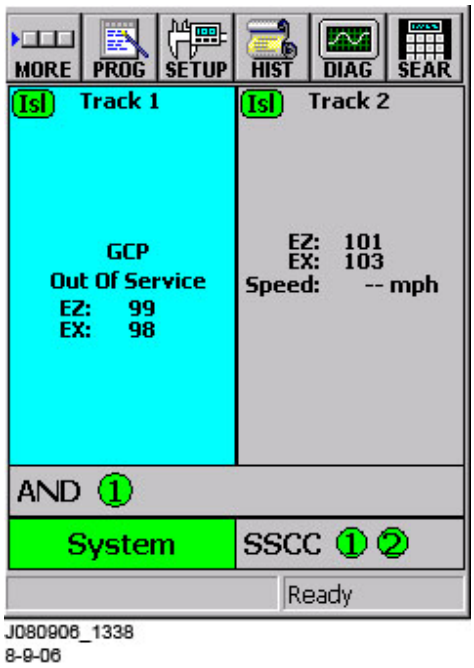


Figure 4-14. Track Status Window Indicating GCP Out Of Service

- When a GCP and Island are both put out of service, the main track status window shows the GCP and Island (**GCP – ISL**) **Out Of Service** and the window background flashes between blue and dark gray as shown in Figure 4-15.

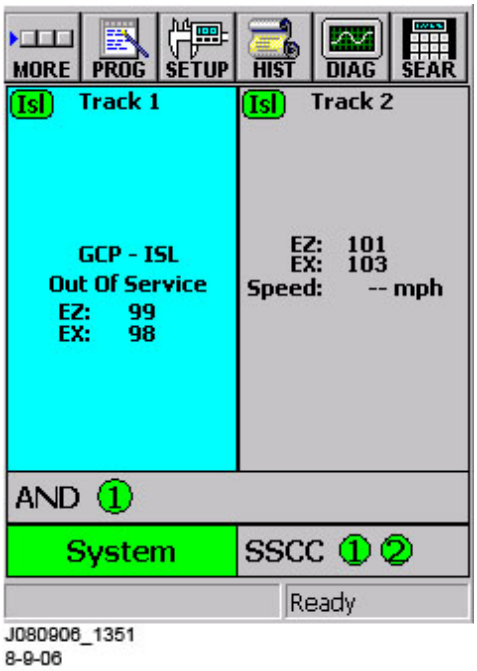


Figure 4-15. Track Status Window Indicating GCP and Island Out Of Service

NOTE

When the GCP or GCP and Island are out of service, the Maint Call output will be deenergized.

4.1.5.1.4.4.2 OOS Timer Operation

- If the **OOS Timout** is used (set to **Yes**), the OOS Timer starts when the first Track module is taken out of service.
- When the time programmed for the OOS Timer has elapsed, all GCPs and Islands that are currently out of service will be put back in service.
- Once a track has been put out of service and the OOS Timer has started, the timer value cannot be edited while it is still running. If it becomes necessary to change the value of the OOS Timout while the timer is running, all GCPs and Islands must first be put back in service.

4.1.5.1.4.4.3 Returning a GCP and/or Island to Service

- To put a GCP or Island back in service, press the appropriate button on the Out Of Service window (Figure 4-16):
  - **Put GCP Back In Service** or
  - **Put ISL Back In Service**.

⚠ WARNING

- **REQUIRED OPERATIONAL TESTS SHALL BE PERFORMED IN ACCORDANCE WITH RAILROAD PROCEDURES WHEN RESTORING TRACKS TO SERVICE**
- **WHEN RESTORING TRACK CIRCUITS TO SERVICE, VERIFY THAT THE EZ AND EX ARE IN THE EXPECTED RANGE OF VALUES.**

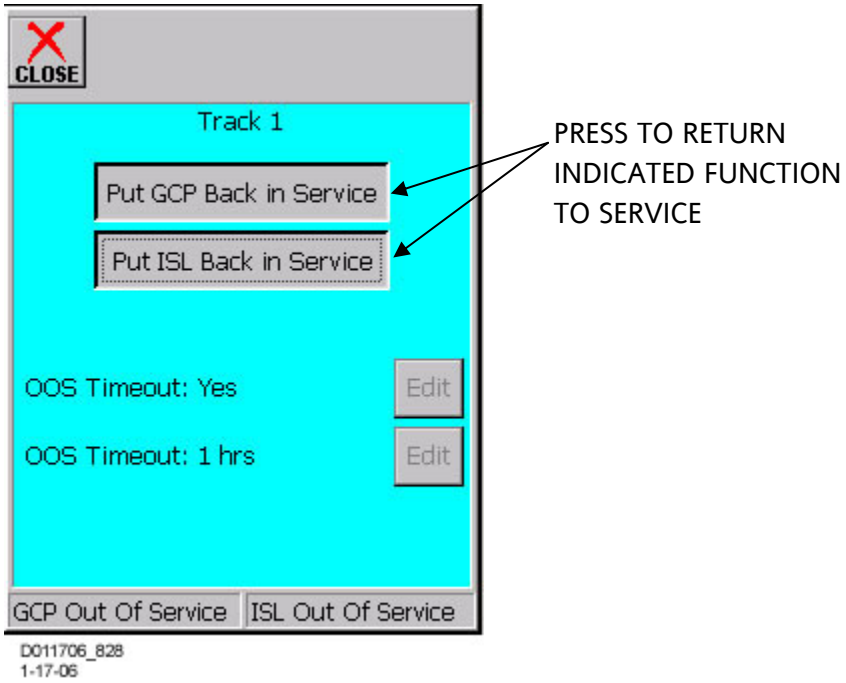
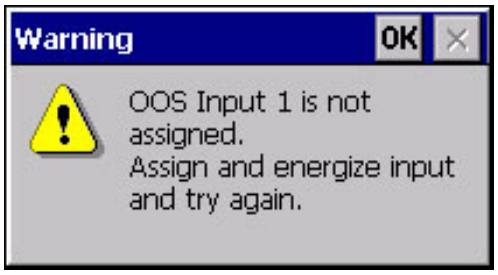


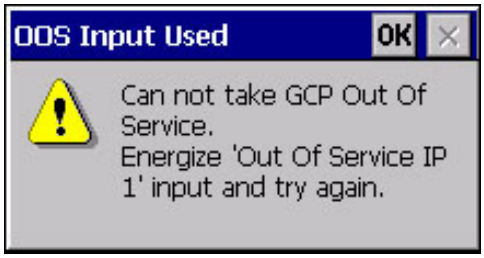
Figure 4-16. Out Of Service Window – Put GCP or Island Back In Service Buttons

4.1.5.1.4.4.4 Special Out Of Service Considerations

- If **OOS Control** is set to **Display+OOS IPs**, then in order to take the GCP or GCP and Island out of service, the programmed out of service input must be energized when the GCP or Island is commanded out of service using the Out Of Service window as previously described.
- If the out of service input has not been assigned to an input and an attempt is made to open the GCP Out Of Service window, the following warning message is displayed:



- If the out of service input has been assigned to an input but is deenergized and the "Take GCP Out of Service" button is pressed, the following warning message is displayed:



NOTE

When an **out of service input** is energized, the Maint Call output will be deenergized indicating that the system is not normal. The GCP or Island may still be in service.

- If **OOS Control** is set to **OOS IPs**, then the programmed GCP and Islands will be taken out of service if an out of service input is energized.
- If **OOS Control** is set to **4000 Case OOS IP**, then all 4000 GCP outputs will be taken out of service. The main track status window shows the AND status bar flashing between blue and gray (Figure 4-17).

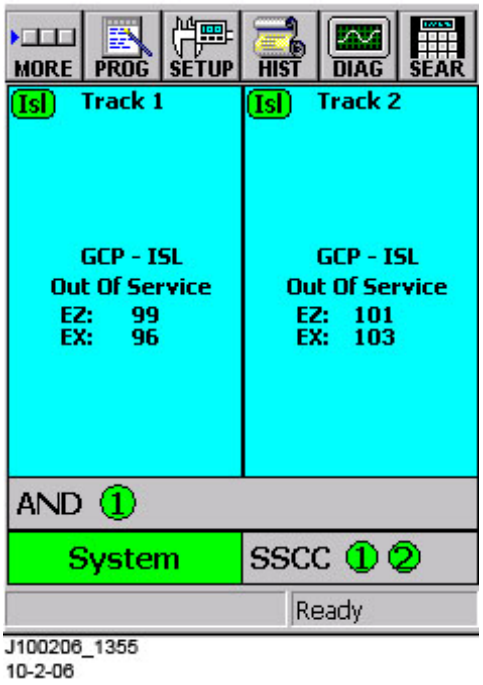


Figure 4-17. Track Status Window Indicating All GCP Inputs Out Of Service

4.1.5.1.4.4.5 Main to Standby Transfer While GCP and/or Island is Out Of Service

- If **OOS Control** is set to **Display** or **Display+OOS IPs** and the 4000 GCP transfers from main to standby or back, or the CPU is rebooted, any out of service GCP or islands will be returned to service.
- If **OOS Control** is set to **OOS IPs** or **4000 Case OOS IP** and the 4000 GCP transfers from main to standby or back, or the CPU is rebooted, any out of service GCP or islands will return to their out of service status after the system has booted up.

4.1.5.1.4.4.6 GCP and Island Activity While Out Of Service

- When the GCP function is out of service, it continues to monitor its track conditions and:
  - ♦ is still able to show the current EZ. EX,
  - ♦ can have GCP Calibration, Approach or Linearization Calibration performed,
  - ♦ can show diagnostic errors.
- When the Island function is out of service, it continues to monitor its island conditions and:
  - ♦ is still able to show the current Island Z Level,
  - ♦ can have Island Calibration performed,
  - ♦ can show diagnostic errors.

NOTE

If an Emergency Activation input is programmed and the Emergency Activation input is deenergized, any out of service tracks will be placed back in service.

4.1.5.2 AND Function Status Bar

The AND Function Status Bar (see Figure 4-3) shows which AND functions are programmed and their status.

- Gray circles indicate the AND function is de-energized and not Wrapped (if used).
- Green circles indicate the AND function is energized and not Wrapped (if used).
- Yellow circles indicate the AND function is Wrapped regardless of state of AND function logic.

4.1.5.3 System Status Bar

The System Status Bar (See Figure 4-3) shows the 4000 GCP operational status.

- Green when:
  - All tracks are calibrated and track conditions are within normal operating parameters
  - System is fully functional
- Red when unhealthy system or track condition exists.
  - Displays system status as shown in Figure 4-18.
  - Status window for affected track also displays red.
- Status Menu displays when Status Bar is selected.
- A flashing blue background indicates that the AND functions are out of service.

View System Diagnostics
View System IO

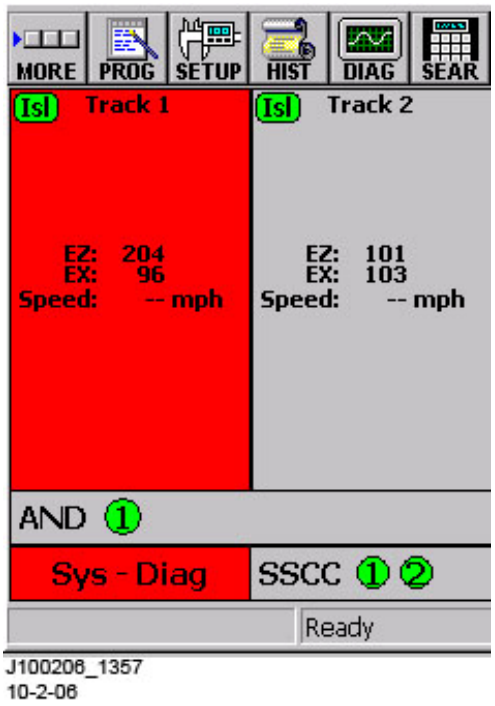


Figure 4-18. Status Screen with Unhealthy Track 1 Condition Detected

4.1.5.3.1 System Status Popup Menu

The system status popup menu displays two entries:

- Selecting the **View System Diagnostics** entry changes the display to the System Diagnostics Window, Figure 4-19.
  - Operation of this window is covered in paragraph 4.1.5.5.4.1.

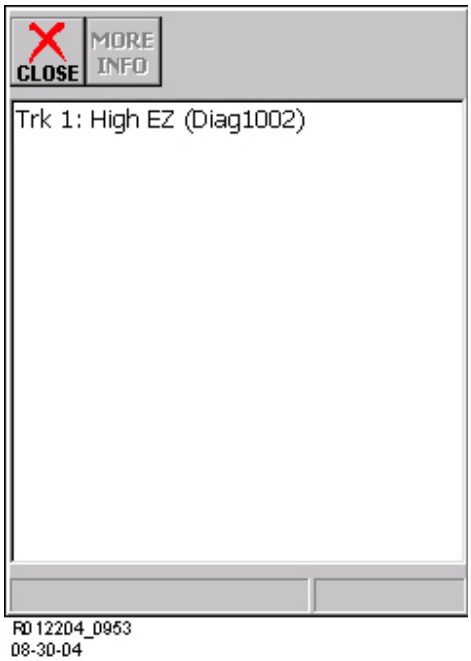
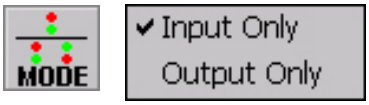
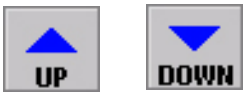


Figure 4-19. System Diagnostics Window

- Selecting the **View System IO** entry changes the display to the **IN** window, Figure 4-20A.
  - Displays the assigned inputs for each active track.
  - Selecting the **MODE** button opens the IO selection menu.
    - Selecting the **Output Only** entry changes the display to the **OUT** window, Figure 4-20B.
      - Displays the assigned outputs for each active track.
  - When input or output entries extend beyond the display parameters of the window, the **UP** and **DOWN** buttons may be selected to move the off-screen entries onto the window.
  - The **CLOSE** button returns the display to the Status Screen.





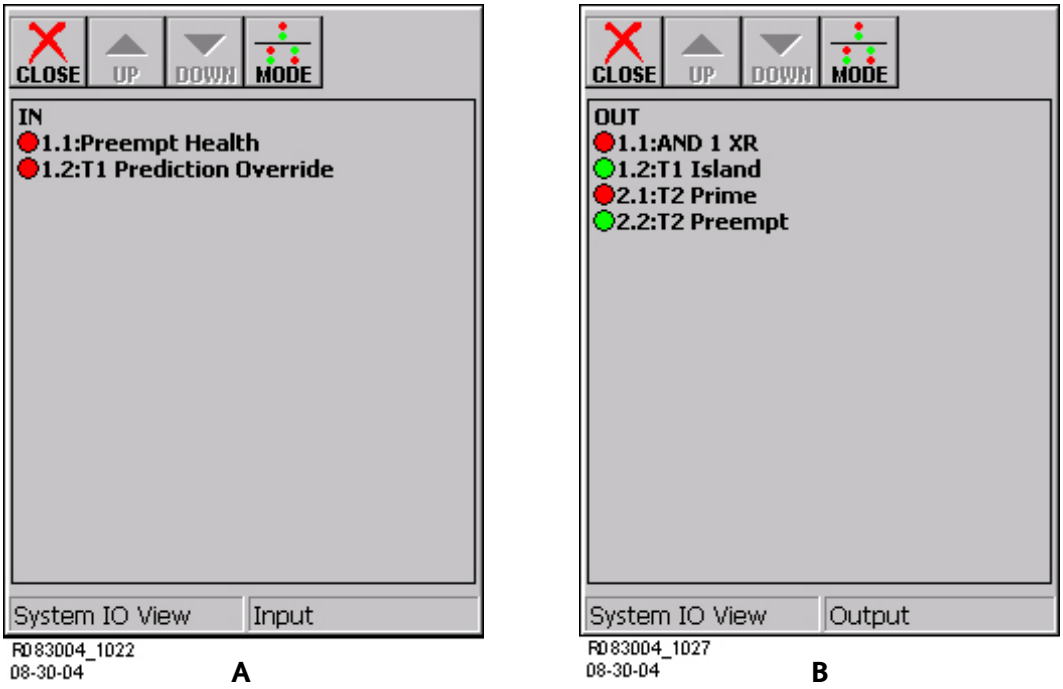


Figure 4-20. IO Display Windows

4.1.5.4 SSCC Status Bar

The DT SSCC Bar displays the SSCC IIIi operational status (refer to Figure 4-3).

- The SSCC status bar:
  - Indicates which SSCC IIIi are used as shown by circled number.
  - Color of circled number Indicates status of each used SSCC IIIi:
    - Green when not activated (lamps not flashing)
    - Grey when signals are activated (lamps flashing)

4.1.5.5 DT Status Bar

The DT Status Bar displays the DT operational status.

- Examples of status messages include:
  - Ready
  - USB Drive (connected to Display)
  - Downloading (information from CP)
  - Checking Files

4.1.5.6 DT Function Buttons

The DT Function Buttons (see Figure 4-3) control the operational displays of the Diagnostic Terminal.

- The DT button hierarchy is shown in Figure 4-21.

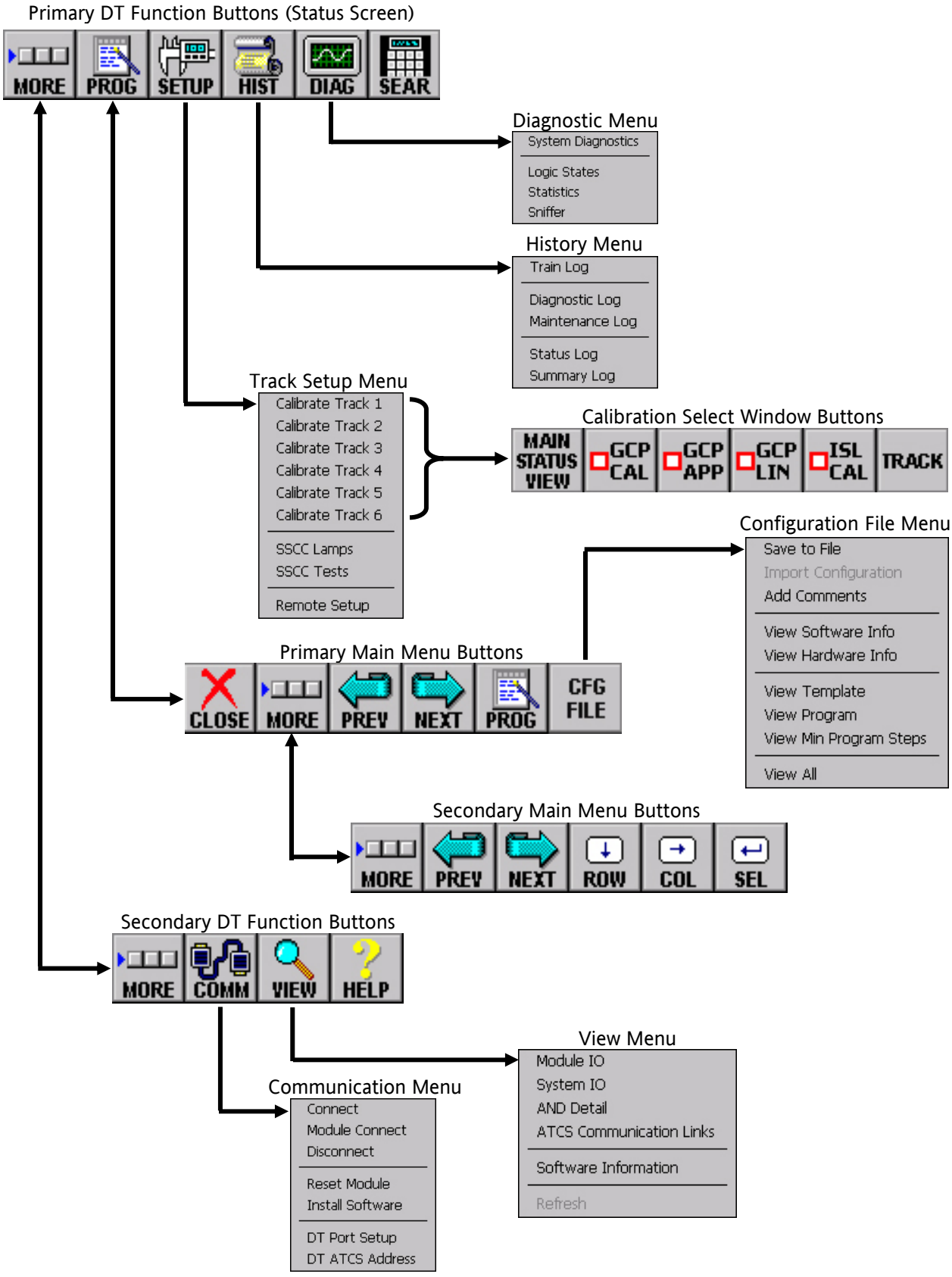


Figure 4-21. DT Function Button and Menu Hierarchy

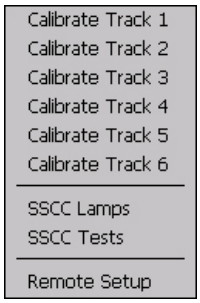
4.1.5.6.1 Program Button

Selecting the **PROG** button opens the **MAIN PROGRAM menu**, Figure 4-22.

- This menu allows the programming of:
  - MS/GCP operation
  - Island operation
  - SSCC
  - Input and output assignments
  - SEAR
- The **Main** Menu is described in Section 5.

Figure 4-22. Main Program Menu Window

4.1.5.6.2 Setup Button



Selecting the **Setup** button opens the **Track Setup** menu. This menu provides access to the:

- Calibration Select window for each used Track Module
- SSCC Lamp Setup window
- SSCC Lamp Test Setup window
- Remote Setup Dialog window

4.1.5.6.2.1 Calibration Select Window

Selecting any of the active **Calibrate Track** entries of the Track Setup Menu opens the Calibration Select window, Figure 4-23.

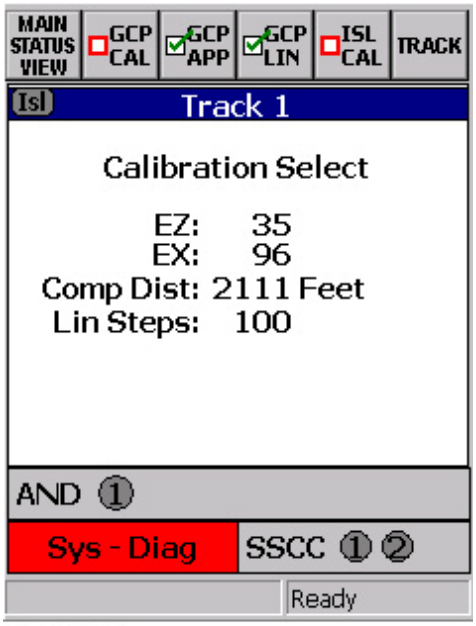


Figure 4-23. Calibration Select Window

NOTE

System calibration can be performed only after system programming is completed.

➢ See Section 6 for specific calibration procedures.

4.1.5.6.2.1.1 Main Status View Button

Selecting this button returns the display to the Status Screen, Figure 4-3.

4.1.5.6.2.1.2 GCP CAL Button

Selecting the **GCP CAL** button opens the GCP Calibration Screen, **Figure 4-24**.

- The current **EZ** and **EX** values appear.
- **Calibration Req.** appears at the bottom of the window, if calibration is required.

To start calibration, select the **START** button.

- The **START** button deactivates (grays out).
- At the successful completion of the GCP calibration:
  - ♦ The display returns to the **Calibration Select** window, Figure 4-24B.
  - ♦ The calibrated EZ and EX values appear.
  - ♦ the **GCP CAL** button check box shows a green check mark.
  - ♦ The current computed approach distance (**Comp Dist)** appears.

- The current number of linearization steps (**Lin Steps**) appears.
- If calibration is not successful, **Calibration Req.** is replaced by **Failed**.

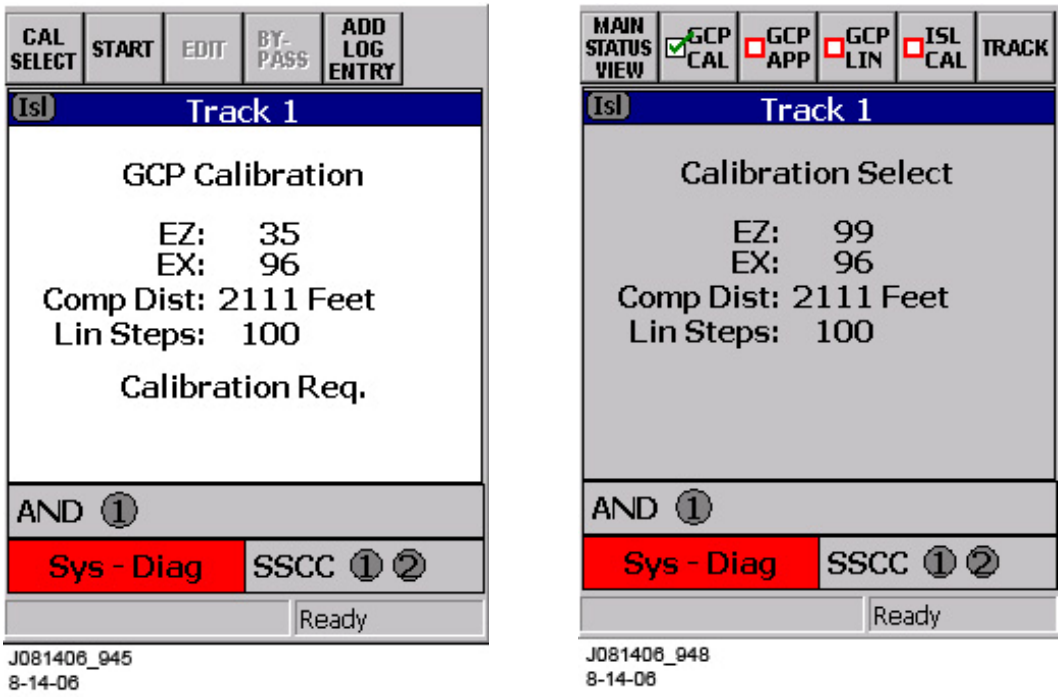


Figure 4-24. GCP Calibration Window

A record of what was done and why may be added to the Maintenance log.

- Select the **ADD LOG ENTRY** button to open the **Log Entry** dialog window, Figure 4-25.
- Make entries by using the keypad at the bottom of the window.
- When the entry is completed, selecting the **OK** button saves the entry to the Maintenance Log.
- Selecting the **Cancel** button closes the **Log Entry** window without saving the new entry and returns the display to the **Calibration** window.

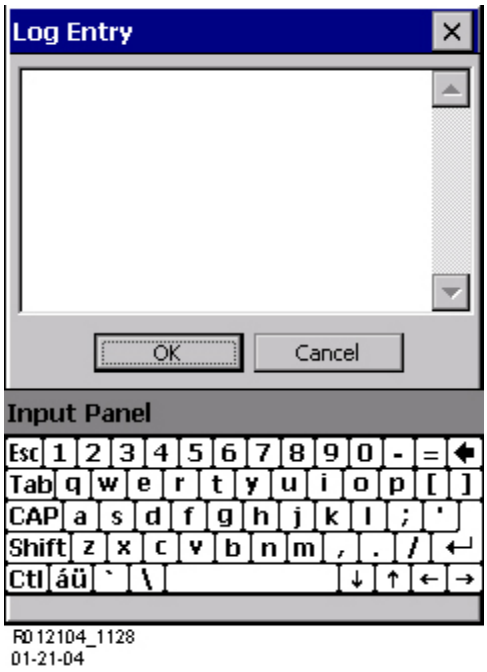


Figure 4-25. Calibration Log Entry Window

4.1.5.6.2.1.3 GCP APP Button

Selecting the **GCP APP** button opens the GCP Approach window, Figure 4-26A. The display shows:

- The current values for **EZ** and **EX**.
- The current computed approach distance (**Comp Dist**).
- **Calibration Req.** appears at the bottom of the window, if calibration is required.
- After the hardwire shunt has been placed across the approach termination shunt, select the **START** button to start the calibration.

NOTE

If the computed approach distance is known from a previous calibration, this value may be entered rather than placing shunts.

- ♦ The **START** button deactivates (grays out).

- At completion of the approach calibration:
  - ♦ If calibration is successful:
    - The display returns to the **Calibration Select** window, Figure 4-26B.
    - The computed approach distance (**Comp Dist**) appears.
    - The **GCP APP** button check box shows a green check mark.
  - ♦ If calibration is not successful, **Failed** appears on the screen.

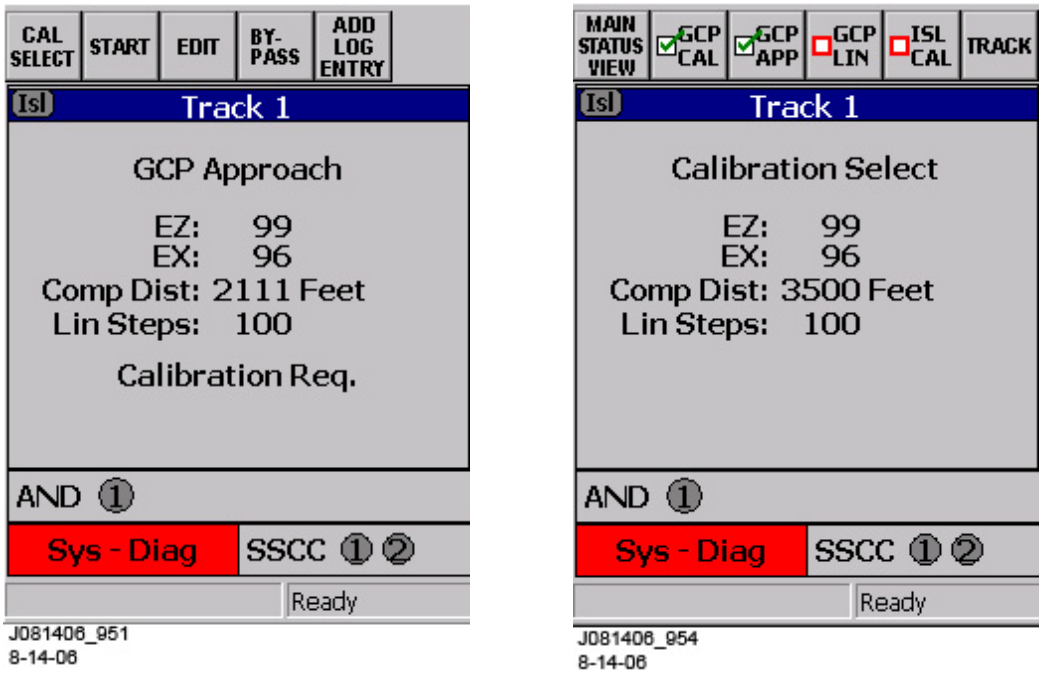


Figure 4-26. GCP Approach Window

Selecting the **Edit** button opens the **Computed Approach Distance** dialog box.

- This **Set Parameter** dialog box allows the computed approach distance to be modified.
  - ♦ Default value: **9999**
  - ♦ Valid range: **0** to **9999** feet

NOTE

If the currently shown value of the computed approach distance is correct, the calibration step may be bypassed.

Selecting the **BYPASS** button returns the display to the **Calibration Select** window.

- The **GCP APP** button check box shows a green check mark.

A record of what was done and why may be added to the Maintenance log.

- Select the **ADD LOG ENTRY** button to open the **Log Entry** dialog window, Figure 4-25.
- Make entries by using the keypad at the bottom of the window.
- When the entry is completed, selecting the **OK** button saves the entry to the Maintenance Log.
- Selecting the **Cancel** button closes the **Log Entry** window without saving the new entry and returns the display to the **GCP Approach** window.

4.1.5.6.2.1.4 GCP LIN Button

Selecting the **GCP LIN** button opens the **GCP Linearization** window, Figure 4-27A, which shows:

- The current **EZ** and **EX**.
- The computed approach distance (**Comp Dist**).
- The current number of linearization steps (**Lin Steps**).
- If calibration is required, **Calibration Req.** appears.

After shunt has been placed at the midpoint, calibration may be initiated by selecting the **START** button.

- ♦ The **START** button deactivates (grays out).

- At the completion of the calibration:
  - ♦ The display returns to the **Calibration Select** window, Figure 4-27B.
  - ♦ The **GCP LIN** button check box shows a green check mark.

♦ If calibration is not successful, **Failed** appears on the screen.

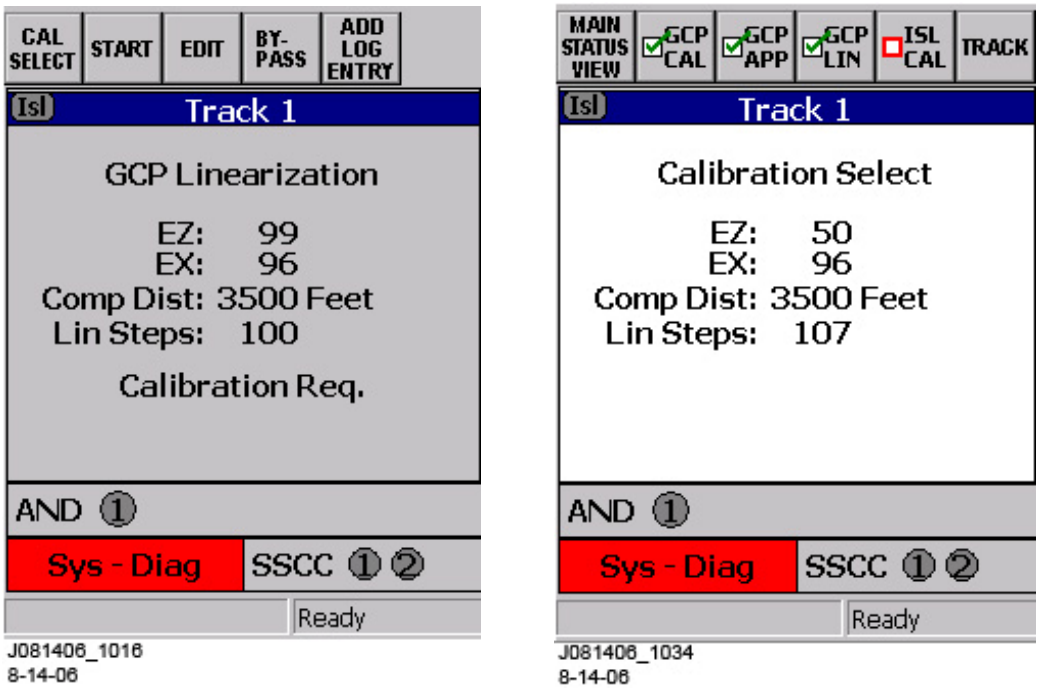


Figure 4-27. GCP Linearization Window

NOTE

If the number of linearization steps is known from a previous calibration, this value may be entered rather than placing shunts.

Selecting the **Edit** button opens the **Linearization Steps** dialog box.

- This **Set Parameter** dialog box allows the number of linearization steps to be modified.
  - Default value: **100**
  - Valid range: **68** to **132**
    - Equivalent to range of –32 to 32 for 3000 GCP
    - 2 steps correspond to approximately 1 EZ point.

If the currently displayed value of linearization steps is correct, the calibration step may be bypassed by:

- Selecting the **Bypass** button
  - returns the display to the **Calibration Select** window
  - the **GCP LIN** check box shows a green check mark

A record of what was done and why may be added to the Maintenance log.

- Select the **ADD LOG ENTRY** button to open the **Log Entry** dialog window, Figure 4-25.
- Make entries by using the keypad at the bottom of the window.
- When the entry is completed, selecting the **OK** button saves the entry to the Maintenance Log.
- Selecting the **Cancel** button closes the **Log Entry** window without saving the new entry and returns the display to the **GCP Linearization** window.

4.1.5.6.2.1.5 ISL CAL Button

Selecting the **ISL CAL** button opens the **Island Calibration** window, Figure 4-28A.

- If calibration is required, **Calibration Req.** appears.

A table of shunt placement distances displays for different shunting sensitivities.

- Find the required distance and place the hardwire shunt at the distance indicated.

After the shunt has been placed, start calibration by selecting the **START** button.

- The **START** button deactivates (grays out).
- At completion of the approach calibration:
  - The display returns to the **Calibration Select** window.
  - The **ISL CAL** button check box shows a green check mark.

- If calibration is not successful, **Failed** appears on the screen.

A record of what was done and why may be added to the Maintenance log.

- Select the **ADD LOG ENTRY** button to open the **Log Entry** dialog window, Figure 4-25.
- Make entries by using the keypad at the bottom of the window.
- When the entry is completed, selecting the **OK** button saves the entry to the Maintenance Log.
- Selecting the **Cancel** button closes the **Log Entry** window without saving the new entry and returns the display to the **Island Calibration** window

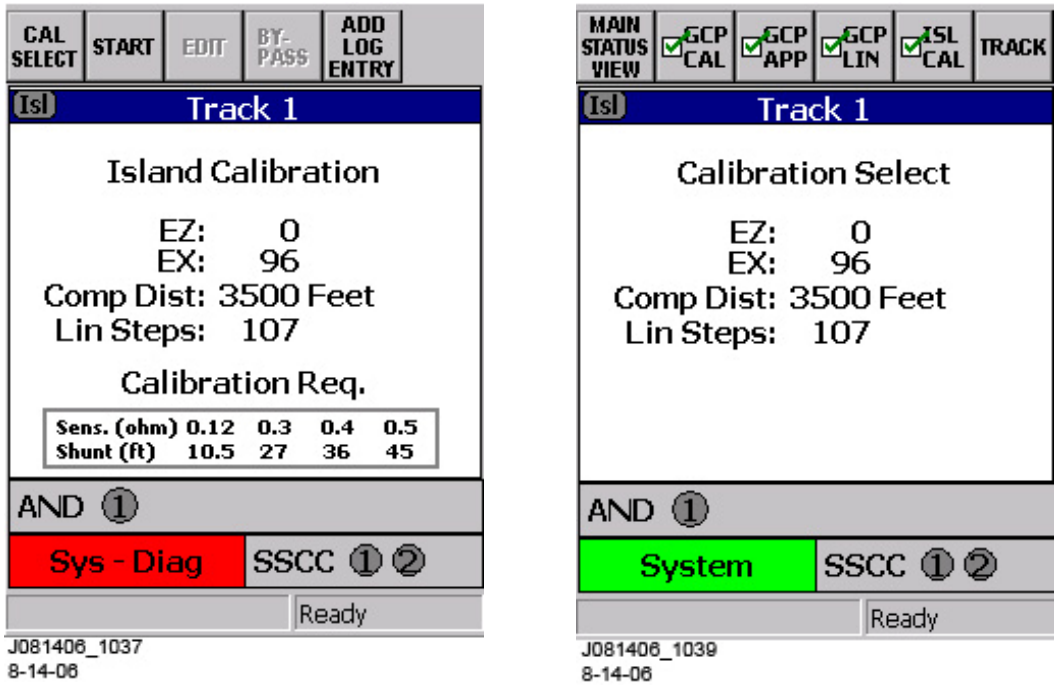
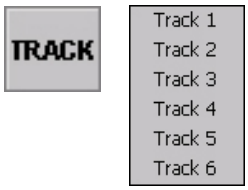


Figure 4-28. Island Calibration Window

4.1.5.6.2.1.6 Track Button



Selecting the **TRACK** button allows a different track to be selected for calibration.

- Entries correspond to the used track circuits
- Selecting an entry closes the menu and displays the **Calibration Select** window for the selected track.

4.1.5.6.2.2 Lamp Setup Window

Selecting the **SSCC Lamps** entry on the Setup Menu opens the Lamp Setup window, Figure 4-29.

- This window may be used to adjust the crossing lamp voltage output of the selected Solid State Crossing Controller (SSCC IIIi)
  - ♦ Select the Crossing Controller using tabs at the bottom of window
    - **Slot 8 SSCC3I**
    - **Slot 9 SSCC3I**
  - ♦ The Lamp output voltage is displayed in decivolts (dV).
    - 90 dV (9.0 V) to 150 dV (15.0 V) adjustment range
    - Lamp output voltage adjustment is described in Section 6.
  - ♦ There are two lamp voltage fields:
    - **Lamp 1 Voltage** shows the voltage applied to crossing lamp 1.
    - **Lamp 2 Voltage** shows the voltage applied to crossing lamp 2.
- **Fine** or **Coarse** voltage adjustments may be selected.
  - **Fine** changes the voltage in 1dV (0.1V) steps
  - **Coarse** changes the voltage in 5dV (0.5V) steps
- The display shows the SSCC IIIi module status.
  - **Off** indicates that the lamps are off.
  - **Ringing** indicates that the bell output is energized.
  - **Flashing** indicates that the lamps are flashing.
  - **Failed** indicates that a bell, lamp, or crossing gate drive failure has been detected.

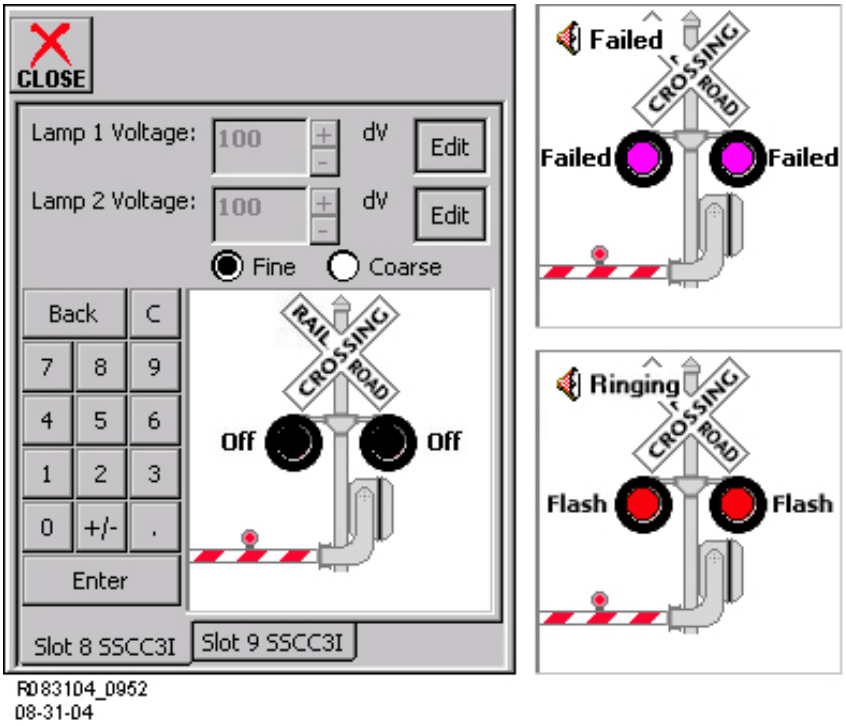


Figure 4-29. Lamp Setup Window

4.1.5.6.2.3 Lamp Test Window

The lamp test allows the crossing controller to be tested.

- The following tests may be performed:
  - **Bell**: Turn on the bell
  - **Lamp 1**: Turn on Lamp 1
  - **Lamp 2**: Turn on Lamp 2
  - **Flash the Lamps**:
    - Tests the lamps on both controllers
  - **Test the crossing**:
    - Flashes the lights, rings the bell, runs the gate, delays then drops the gate.

After these tests have been started, they remain active until:

- the **Stop** button is selected,
- the Lamp Test cancel time expires
- the window is closed

4.1.5.6.2.3.1 Timed Test

When the Timed test is started, the GCP performs the following sequence:

- pauses for the programmed **Lamp Test Delay** time
- flashes the lamps for the programmed **Lamp Test On** time
- turns the lamps off
- stops the test.

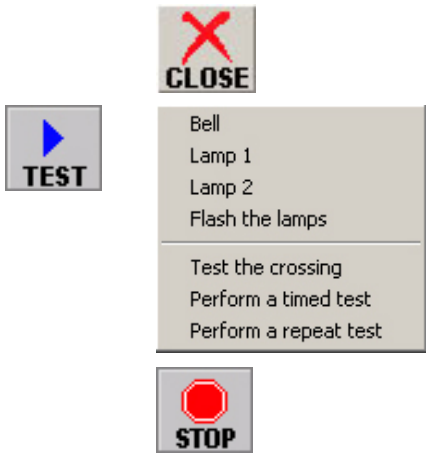
4.1.5.6.2.3.2 Repeat Test

When the Repeat Test is started, the GCP performs the following sequence:

- pauses for the programmed **Lamp Test Delay** time
- flashes the lamps for the programmed **Lamp Test On** time
- turns the lamps off for twice the programmed **Lamp Test Delay** time
- flashes the lamps for the programmed **Lamp Test On** time
- turns the lamps off
- stops the test.

Selecting the **SSCC Tests** entry of the Track Setup Menu opens the Test Setup window, Figure 4-30.

- The operation of each Solid State Crossing Controller (SSCC IIIi) can be tested.
  - ♦ Select the Crossing controller using tabs at the bottom of window
    - **Slot 8 SSCC3I**
    - **Slot 9 SSCC3I**
- Three function buttons at the top of the window controls the SSCC tests.
  - ♦ The **CLOSE** button closes the window and returns the display to the Status Screen.
  - ♦ The **TEST** button opens the Test Initiation menu
    - Selection of item from menu:
      - ♦ Starts selected item test
      - ♦ Closes menu
      - ♦ places selected item in **Test** field
  - ♦ The **STOP** button stops a selected test.
    - Button is active when the test is started.



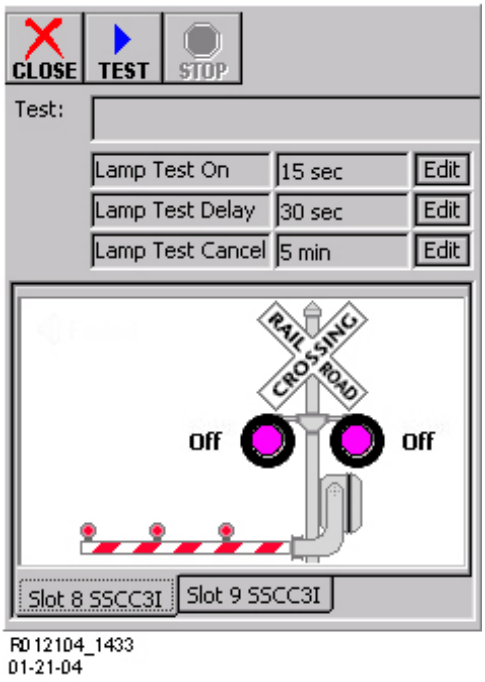


Figure 4-30. SSCC Test Setup Window

4.1.5.6.2.3.3 SSCC Test Parameters

Parameters for each SSCC test are set in the fields below the test designation field:

- The **Lamp Test On** field designates the duration of the Lamp On test
  - ♦ Selecting the **Edit** button to the right of the field opens the **Set Timer** dialog box.
    - ▪ This **Set Parameter** dialog box allows the test duration to be modified.
    - ▪ Default value: **15 sec**
    - ▪ Valid entry range: **15** to **60** seconds
    - ▪ Dialog box type: *numeric value entry*
- The **Lamp Test Delay** field designates the time between test selection and test start.
  - ♦ Selecting the **Edit** button to the right of the field opens the **Set Timer** dialog box.
    - ▪ Allows the **Lamp Test Delay** field value to be modified
    - ▪ Default value: **30 sec**
    - ▪ Valid entry range: **30** to **120** seconds
    - ▪ Dialog box type: *numeric value entry*

- The **Lamp Test Cancel** field designates the automatic test termination time following test initiation.
  - Selecting the **Edit** button to the right of the field opens the **Set Timer** dialog box.
    - Allows the **Lamp Test Cancel** field value to be modified
    - Default value: **5 min**
    - Valid entry range: **1** to **15** minutes
    - Dialog box type: *numeric value entry*

4.1.5.6.2.3.4 SSCC Test Displays

The status of the SSCC IIIi module shows in the dialog box during tests.

- Three notations appear during operational tests:
  - **Off** indicates that the SSCC IIIi module lamp drives are off.
  - **Ringing** indicates that the SSCC IIIi module bell is energized.
  - **Flashing** indicates that the SSCC IIIi module lamps are flashing.
  - **Failed** indicates that a bell, lamp, or crossing gate output failure has been detected.
- Refer to Section 8 for a complete discussion of the Solid State Crossing Controller module (SSCC IIIi) tests.

4.1.5.6.2.4 Remote Setup Entry

Selecting the **Remote Setup** entry on the Setup Menu opens the **Remote Setup** dialog window, Figure 4-31A.

- This window allows track calibration to be performed from remote locations within the approach
- Communication between the maintainer and the 4000 GCP is implemented using the A80276 VHF communicator connected to the Echelon port.
- Remote setup is initiated as described in Section 6, Calibration.

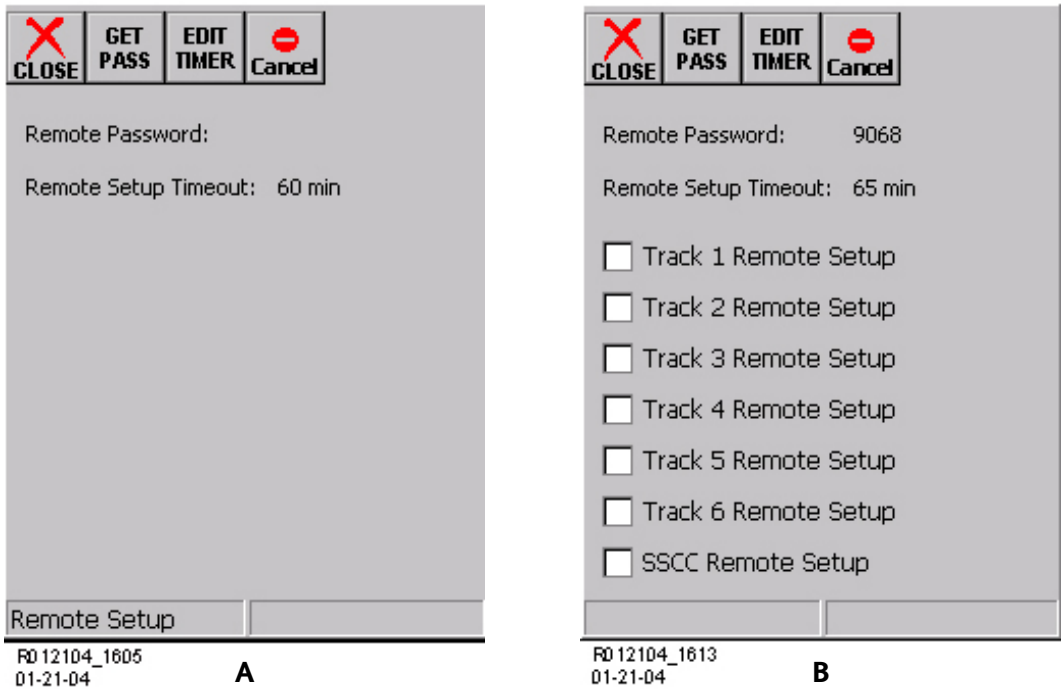


Figure 4-31. Remote Setup Dialog Windows

The Remote Setup Dialog window is controlled by the four function buttons at the top of the window:

- Selecting the **CLOSE** button closes the Time window and returns the display to the Status Screen.

- Selecting the **GET PASS** button requests a remote access password from the 4000 GCP.
  - Selecting the **SEL** button on the front panel of the CPU Module changes the window display as shown in Figure 4-31.
- Selecting the **EDIT TIME** Button opens the **Set Timer** dialog box.
- This **Set Parameter** dialog box allows the **Remote Setup Timeout** value to be modified.
  - Default value: **60 min**
  - Valid timeout range: **1** to **120** minutes

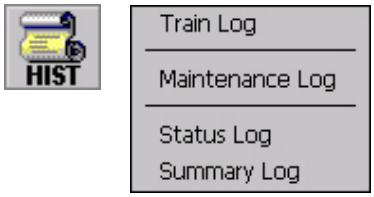
- Selecting the **CANCEL** Button clears the **Remote Setup** display and resets the current remote password.

⚠ WARNING

AFTER PERFORMING REMOTE GCP CALIBRATION VIA THE VHF COMMUNICATOR, RETURN TO THE 4000 GCP AND VERIFY THAT EACH CALIBRATION IS PROPERLY IMPLEMENTED.

4.1.5.6.3 History Button

Selecting the **HIST** button opens the History Menu.



4.1.5.6.3.1 Train Move History Log

Selecting the **TRAIN LOG** entry from the History Menu opens the **Train Move History Log**, Figure 4-32.

- Separate log for Main and Standby:
  - Train log stored in CPU Module
    - Main log on main CPU
    - Standby log on standby CPU
- The log shows details for recent crossing activations:
  - Date and time of move
  - Crossing warning time (**WT**) in seconds
  - Average (**Avg**) detection speed
  - Detection (**Det**) speed
  - Island (**Isl**) speed

The train log contains up to 40 entries.

- Typically, a train move and a crossing move entry is logged for each crossing activation.
  - A crossing move is marked in the log with an **X**.
    - A crossing move is measured from when the crossing is first activated to when the first island goes down.
      - Crossing activation may be initiated by any track
    - While the crossing is active, no other crossing moves can be recorded.
  - A train move is marked in the log with a **T**.
    - A train move is measured from when a particular Track Module or UAX associated with a particular Track Module de-energizes to when the island on that track is occupied.
      - Crossing activation may be initiated by any track
    - Multiple train moves can be recorded while the crossing is active due to simultaneous train moves.
  - Six buttons appear at the top of the log:

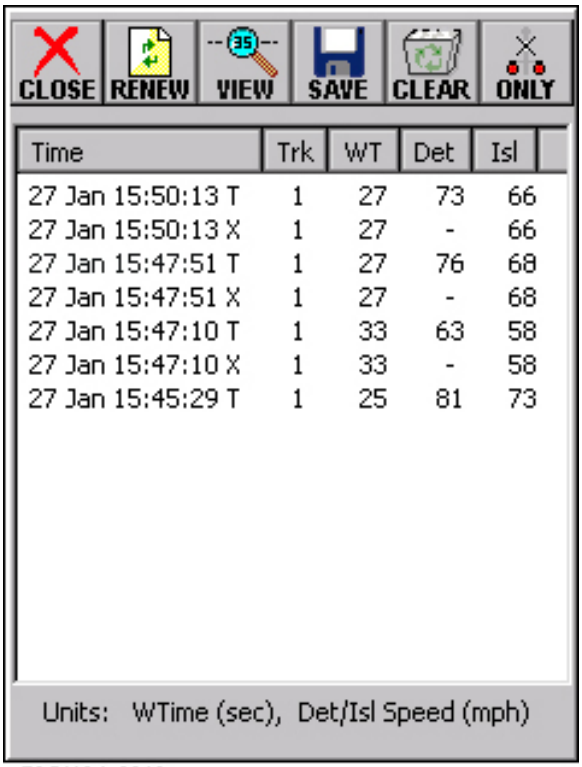


Figure 4-32. Train Move History Log Window

- Selecting the **CLOSE** button returns the display to the Main Status Screen.

- Selecting the **RENEW** button refreshes and updates the train move list.

- Selecting the **VIEW** button opens the **Train Move History Detail** window, Figure 4-33. This view:
  - Details item highlighted within the train move list.
    - Includes Average Speed of the train move
    - Includes route of train move, which is useful when multiple track circuits are used.
  - Selecting the **CLOSE** button closes **Train Move History** dialog box and returns the display to the Main Status Screen.

- The **SAVE** button is active only for the PC installed Diagnostic Terminal and when a USB drive is plugged into the display.
  - Selecting the **SAVE** button saves the Train Move History Detail Event Log in **.txt** format to the PC or USB Drive.
  - File name is "TrainLogAll-*DOT#-Date*"

- The **ONLY** button shifts the view between showing just crossing moves and showing crossing and train moves.

In the crossing moves mode:

- In the crossing mode, the **Train Move History Detail** window only includes island information in the route
- The **SAVE** button is active only for the PC installed Diagnostic Terminal and when a USB drive is plugged into the display.
  - Selecting the **SAVE** button saves the Train Move History Detail Event Log in **.txt** format to the PC or USB Drive.
    - File name is "TrainLogXing-*DOT#-Date*"

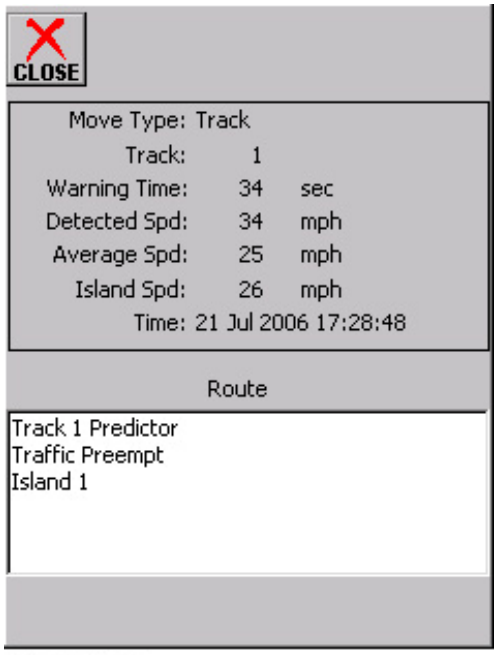
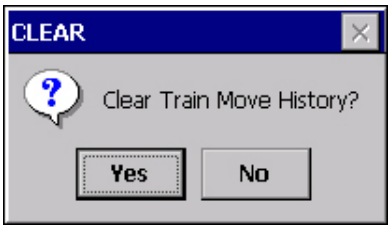


Figure 4-33. Train Move History Detail Window

- Selecting the **CLEAR** button opens the **CLEAR** prompt.



  - Selecting **Yes** clears all events from the **Train Move History** dialog box.
  - Selecting **No** closes the prompt without clearing the events.
- Selecting the **ONLY** button opens a **Train Move History** Log that shows only those events relating to crossing activation.

4.1.5.6.3.2 Maintenance Log Entry

Selecting the **Maintenance Log** entry on the History Menu opens the Maintenance Log window, Figure 4-34.

- Combines entries for both Main and Standby
  - ♦ Maintenance log stored on Display Module
  - ♦ Information for Main and Standby CPUs stored in same log
- This window shows the following operations that have been performed on the display:
  - ♦ date and time of each:
    - ▪ programming parameter change
    - ▪ calibration operation
    - ▪ maintainer notation
  - ♦ track parameter changes
  - ♦ EZ and EX values at the time of track calibration
  - ♦ operation annotations
    - ▪ maintainer initiated
  - ♦ current track values
    - ▪ maintainer initiated
- Similar log resides on PC DT for operations performed on PC

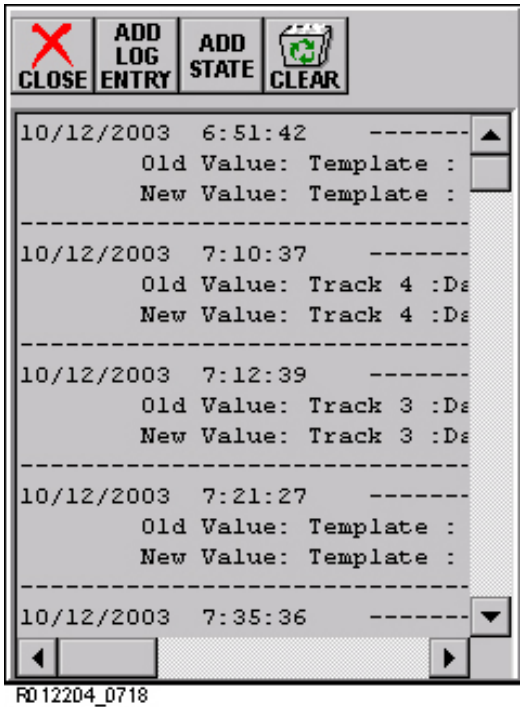
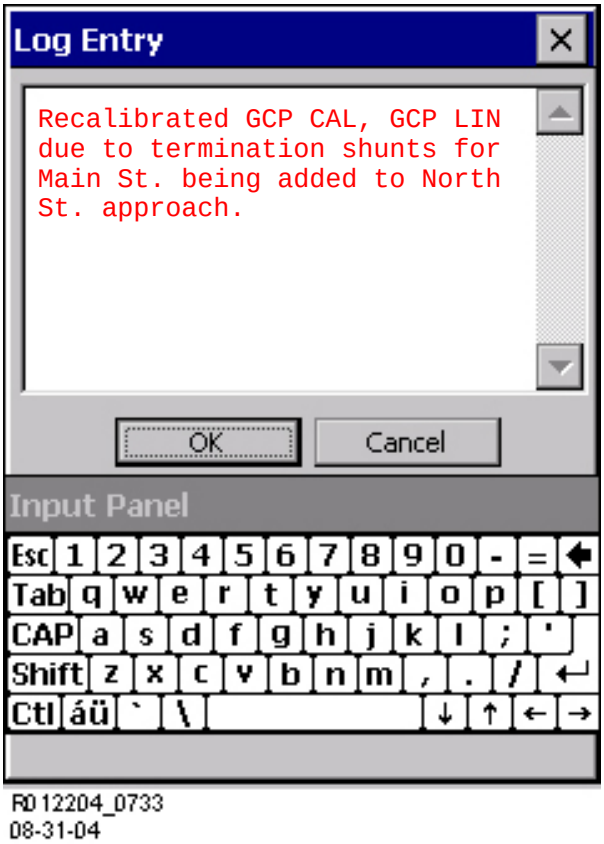


Figure 4-34. Maintenance Log

- Four buttons appear at the top of the window:
  - Selecting the **CLOSE** button returns the display to the Main Status Screen.
  - Selecting the **ADD LOG ENTRY** button opens the **Log Entry** window, Figure 4-35.
    - Text entered into this window using the keyboard or keypad is saved to the Maintenance Log when the **OK** button is selected.
    - Notation identified as **User Entry** within the log.



R0 12204_0733
08-31-04

Figure 4-35. Log Entry Window

- Selecting the **ADD STATE** button places the current track circuit parameters at the end of the Maintenance Log.
- Selecting the **CLEAR** button clears all events from the **Train Move History** dialog box.
- The **SAVE** button is active only for the PC installed Diagnostic Terminal and when a USB drive is plugged into the display.
  - Selecting the **SAVE** button saves the Train Move History Detail Event Log in **.txt** format to the PC or USB Drive.
    - File name is "MaintLog- *DOT#-Date*"

4.1.5.6.3.3 Status Log Entry

Selecting the **STATUS LOG** (log of train moves) entry opens the Status Log window, Figure 4-36.

- Contains all system events
- Separate log for Main and Standby:
  - Train log stored in CPU Module
    - Main log on main CPU
    - Standby log on standby CPU
- DT displays five events per page
- Three sets of successive buttons appear at the top of the Status Log window.
  - Successive selection of the **MORE** button opens:
    - Set of six primary buttons
    - Set of six secondary buttons
    - Set of five tertiary buttons
  - Appears at the beginning of each set of buttons.

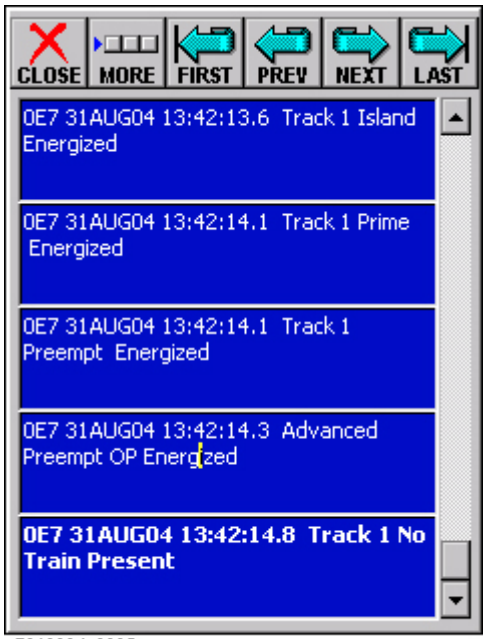
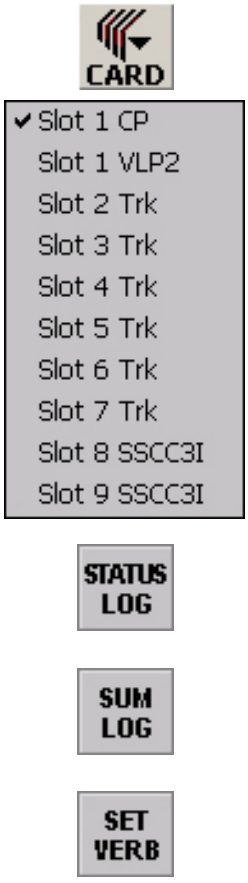


Figure 4-36. Status Log Window

- Primary buttons:
  - **CLOSE** button
    - Selecting this button closes the **STATUS LOG** window and returns the display to the Status Screen
  - **MORE** button
    - See above
  - **FIRST** button
    - Selecting this button moves the display to the top of the Error log.
    - First entry is displayed in bold characters.
  - **PREV** button
    - Selecting this button moves the Error Log entries up one page.
  - **NEXT** button
    - Selecting this button moves the Error Log entries down one page.
  - **LAST** button
    - Selecting this button moves the display to the Bottom of the Error Log entries.
    - Last entry is displayed in bold characters.



- Secondary buttons
  - **CLOSE** button
    - See Above
  - **MORE** button
    - See above
  - **CARD** button
    - Selecting this button opens a pop-up menu of each module slot.
    - **Slot 1 CP** (communications processor) is the default setting
    - Slot designations indicate relative module positions from left to right.
    - When a slot designation is selected from the pop-up menu, the menu closes and the Status log for the selected module appears in the Log window.
  - **STATUS LOG** button
    - Selecting this button opens the Status Log for the selected module slot.
  - **SUM LOG** button
    - Selecting this button opens the Summary Log for the selected module slot.
  - **SET VERB** (Set Verbosity) button
    - Selecting this button opens the Verbosity Level Selector dialog box, Figure 4-37.
    - On the CP, 2 event recording levels can be set:
      - **Min** (Level 1) is the most general
      - **Max** (Level 2) is the most detailed
    - On the VLP2 and I/O modules, 1 of 5 event recording levels may be selected:
      - **Min** (Level 1) is the most general
      - **Max** (Level 5) is the most detailed
    - Select a level by moving the slider.
      - When the desired level is set, select **CLOSE**.

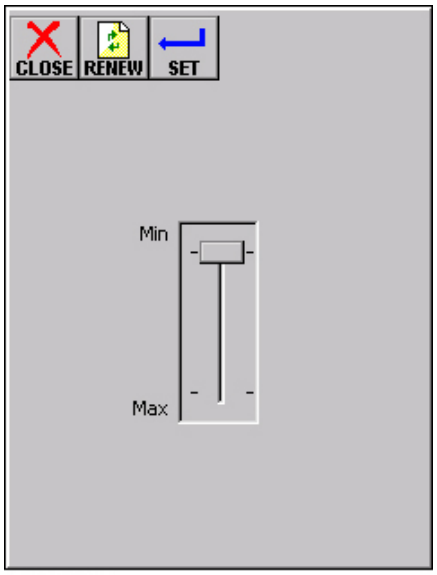


Figure 4-37. Event History Verbosity Level Selector Dialog Box

- Selecting the **CLOSE** button to returns the display to the Error Log window
- Selecting the **RENEW** button refreshes the display
- Selecting the **SET** button set the log to the selected verbosity level

- Tertiary buttons
  - **CLOSE** button
    - See Above
  - **MORE** button
    - See above
  - The **DOWN LOAD** button is active only on PC based Diagnostic Terminals.
    - Selecting this button opens the Download Menu.
    - Selecting either item (**Text** or **Binary**) opens the Download Log dialog window, Figure 4-38A.
  - The **SAVE** button is active only for the Diagnostic Terminal when a USB drive is plugged into the display.
    - Selecting the **SAVE** button saves the Status Log in **.txt** format to the PC or USB Drive.
      - File name is "StatLogSL1CP-DOT-date.txt"

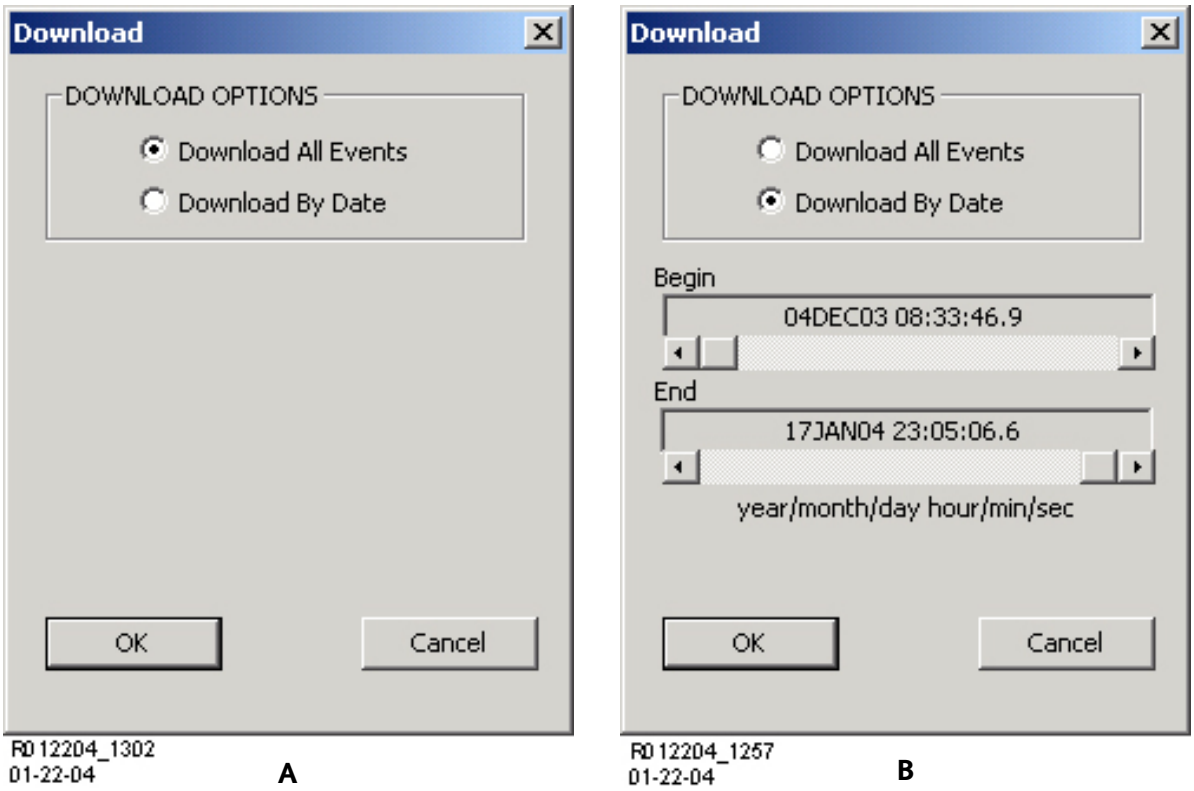


Figure 4-38. Download Log Dialog Window

- Two radio button options appear on the dialog window.
- If all events of the current log are to be downloaded, the **Download All Events** radio button is selected (default setting).
- If only the events within specific dates are to be downloaded, the **Download By Date** radio button is selected.
  - The Download Log dialog box changes as shown in Figure 4-38B.
  - The event start date and time is set by means of the scroll bar below the **Begin** window.
  - The event end date and time is set by means of the scroll bar below the **End** button.
- Selecting the **OK** button begins the download operation.
  - At the completion of the download, the requested files are displayed within the log window.

- Selecting the **Cancel** button before selecting the **OK** button closes the dialog box without downloading the selected events.

- The **SAVE** button is enabled only on PC based Diagnostic Terminals.
  - Selecting this button allows the current event log to be downloaded to a file.

The **OPEN** button becomes active *only* when a Configuration Package File (Pac file) is created and after the DT is disconnected from the CPU.

- The DT can be disconnected from the CPU by selecting **Disconnect** from the Communication Menu.

Selecting the **OPEN** button allows an existing Pac file to be selected.

- Following file selection, a message sequence appears at the bottom of the Status screen.
- When the messages are done, a **Config. package open** message appears and the **VIEW** button is activated.
  - Selecting the **VIEW** button shows the View popup menu as described above.

4.1.5.6.3.4 Summary Log Entry

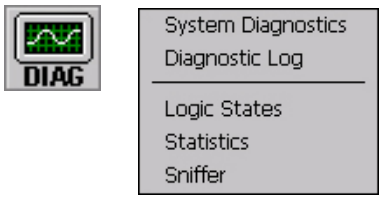
Selecting the **Summary Log** entry opens the Error Log window, Figure 4-39.

- The **Summary Log** buttons are identical to those of the **Status Log** with the following exceptions:
  - The **SET VERB** button and function are not present in the secondary button set.
  - The **CLEAR** button appears following the **SAVE** button of the tertiary buttons.
    - Selecting the **CLEAR** button resets the **Summary Log**.

Figure 4-39. Summary Log

4.1.5.6.4 Diagnostics Button

Selecting the **DIAG** button opens the Diagnostics Menu.



4.1.5.6.4.1 System Diagnostics Item

Selecting the **System Diagnostic** item opens the System Diagnostic Window, Figure 4-40A

- The diagnostics description and code (**DiagXXXX)** are shown to the right of each entry.
  - ♦ Selecting an error description and then the **MORE INFO** button opens the Diagnostic Description window, Figure 4-40B.
    - The cause and the remedy of the diagnostic message appears at the top of the window.

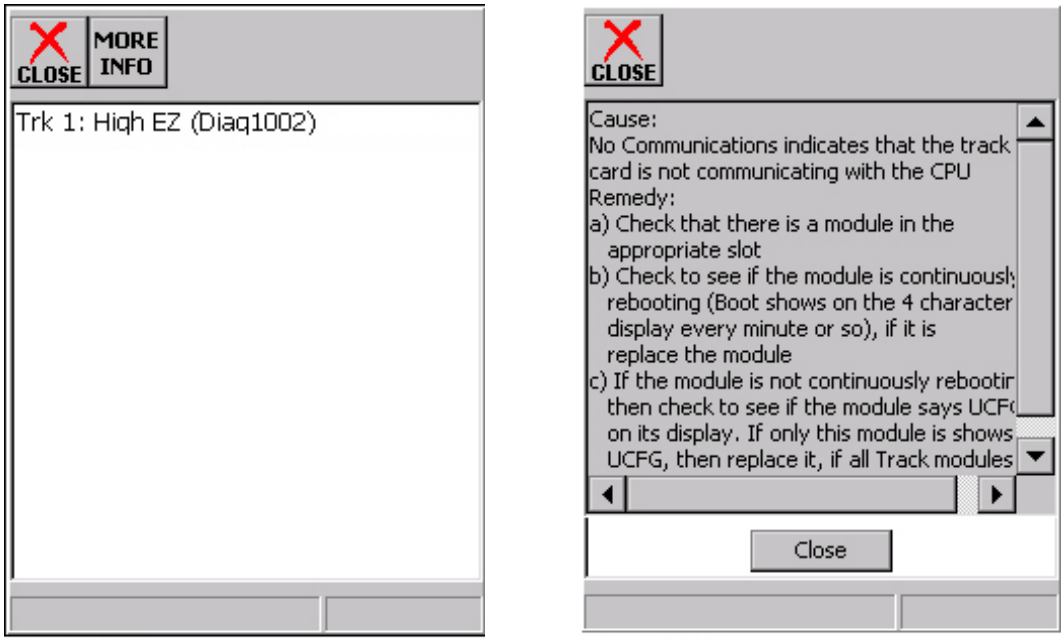


Figure 4-40. System Diagnostic Windows

4.1.5.6.4.2 Diagnostic Log Entry

Selecting the **Diagnostic Log** entry from the Diagnostic Menu opens the **Diagnostic Log,** Figure 4-41.

- Shows all diagnostic events for the 4000 GCP.
- Is stored in the display module.
- Captures events only while the DT Display is connected to the GCP.

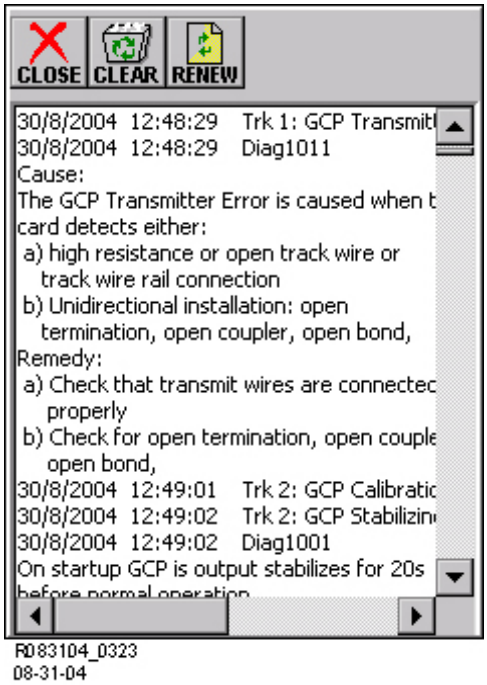


Figure 4-41. Diagnostic Log

- Three buttons appear at the top of the log:
  - Selecting the **CLOSE** button returns the display to the Main Status Screen.
    - Selecting the **CLEAR** button clears all events of the Diagnostic Log.
  - Selecting the **RENEW** button refreshes and updates the Diagnostic Log entries.
- Selecting any of the listed diagnostic entries opens a detailed report of that event as shown in Figure 4-42.

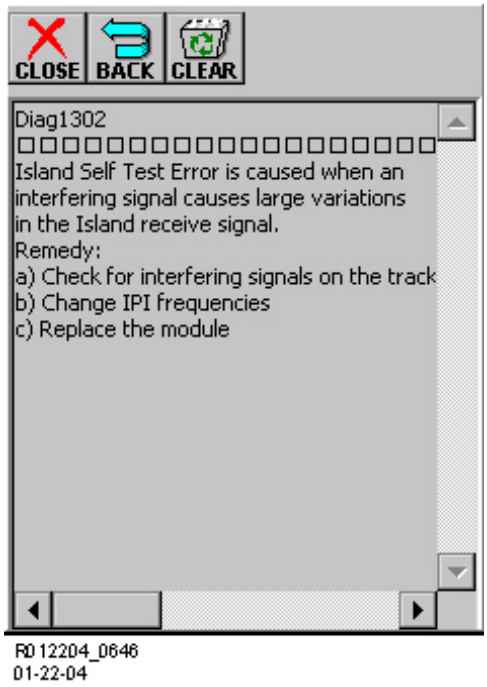


Figure 4-42. Diagnostic Log Detailed Report Window

- Three button appear at top of window:
  - Selecting the **CLOSE** button returns the display to the Main Status Screen.
  - Selecting the **BACK** button returns the display to the Diagnostic Log Screen.
  - Selecting the **CLEAR** button clears all events of the Diagnostic Log.

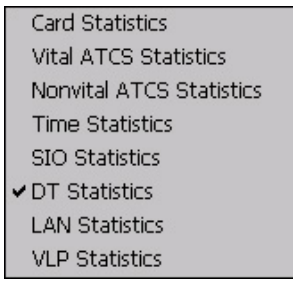
4.1.5.6.4.3 Logic States Item

The Logic State function is a diagnostic tool primarily for use by Safetran Engineering personnel.

4.1.5.6.4.4 Statistics Item

Selecting the **Statistics** item from the Diagnostics Menu opens the **DT Statistics** display window, Figure 4-43.

- Selecting the **Type** button opens the following pop-up menu:



  - ♦ This menu shows a list of available statistics.
  - ♦ Selecting an item from the list opens a display window for the selected statistics.

- Selecting the **RENEW** button updates the statistical value fields currently on the display.

- Selecting the **CLEAR** button clears the displayed statistics **Value** entries.

- Selecting the **CLOSE** button closes the currently displayed statistics window and returns the display to the Status Screen.

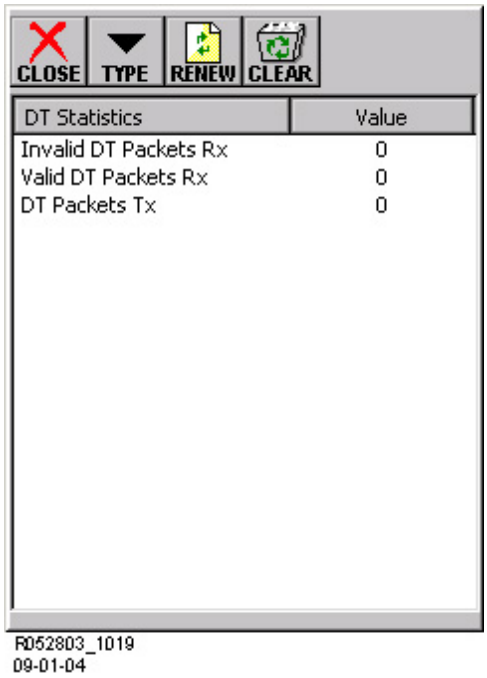


Figure 4-43. DT Statistics Display Window

4.1.5.6.4.5 Sniffer Item

The Sniffer function is a diagnostic tool for use by Safetran Engineering personnel.

4.1.5.6.5 SEAR Button

Selecting the **SEAR** button opens the 25-key, touch-screen keypad, Figure 4-44.

- Touch-screen keypad provides user interface for the A80410 Safetran Internal Event Recorder (SEAR IIi).

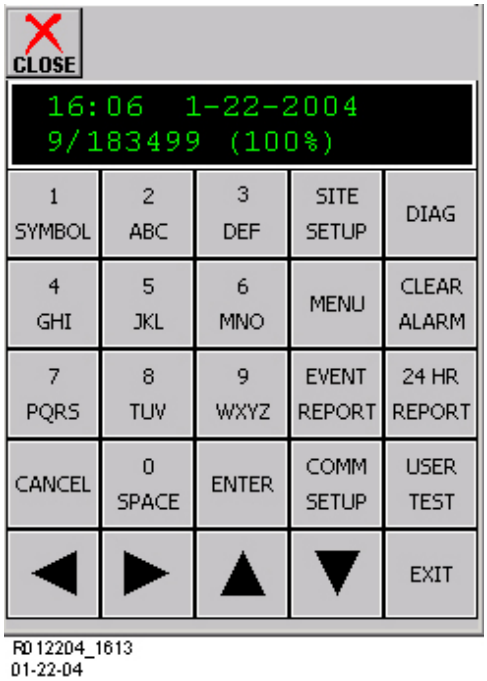


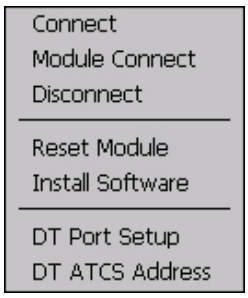
Figure 4-44. SEAR IIi Touch–Screen Keypad

4.1.5.6.6 More Button

Selecting the **MORE** button opens the Secondary DT Function buttons.

- Selecting the **MORE** button of the Secondary DT Function buttons returns the display to the primary DT Function buttons.

4.1.5.6.7 COMM Button



Selecting the **COMM** button opens the Communications Menu.

4.1.5.6.7.1 Connect Entry

Selecting the **Connect** entry connects the DT to the CPU module.

4.1.5.6.7.2 Module Connect Entry

Selecting the **Module Connect** entry connects the DT to a target module (VLP, track, or SSCC3I).

- Entry is active only on the PC-based DT while the DT is disconnected from the CPU module
- Requires connecting an RS-232 communications cable between the **Com** port of the PC and the **DIAG** terminal of the target module.

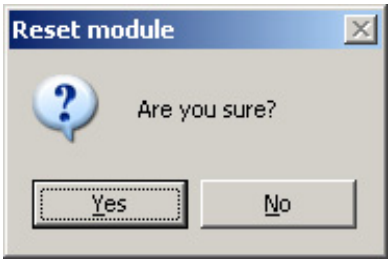
4.1.5.6.7.3 Disconnect Entry

Selecting this entry disconnects the DT from the CPU module.

4.1.5.6.7.4 Reset Module Entry

This entry is used by the PC-based DT to reset the target module.

- Selecting the **Reset Module** entry opens the **Reset module** prompt.



  - ♦ Selecting **Yes** opens the Reset Module **Text Terminal**, Figure 4-45.
    - ▪ Used to reconfigure a targeted module.
  - ♦ Selecting **No** closes the prompt without initiating a module reset.

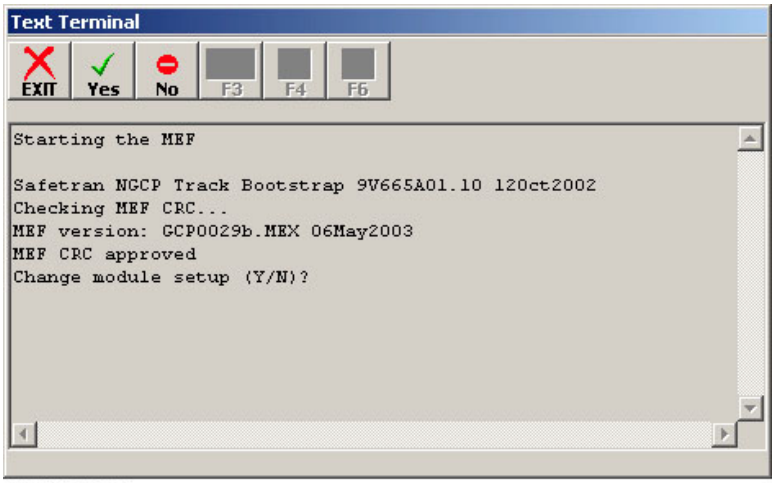


Figure 4-45. Reset Module Text Terminal

4.1.5.6.7.5 Install Software Entry

This entry enables new software to be uploaded to a target module.

4.1.5.6.7.6 DT Port Setup Entry

Selecting this entry opens the Serial Port Settings dialog box, Figure 4-46.

- This function is active only for PC-based Diagnostic Terminals.

This dialog box allows the communications port and baud rate of the PC to be set to the appropriate values.

- Selecting the corresponding radio button sets the Serial Port Selection value.
- Selecting the corresponding radio button sets the Max Baud rate value.
- Selecting the **OK** button changes the PC port configuration for the DT and closes the dialog box.
- Selecting the **Cancel** button closes the dialog box without changing the DT COM port configuration.

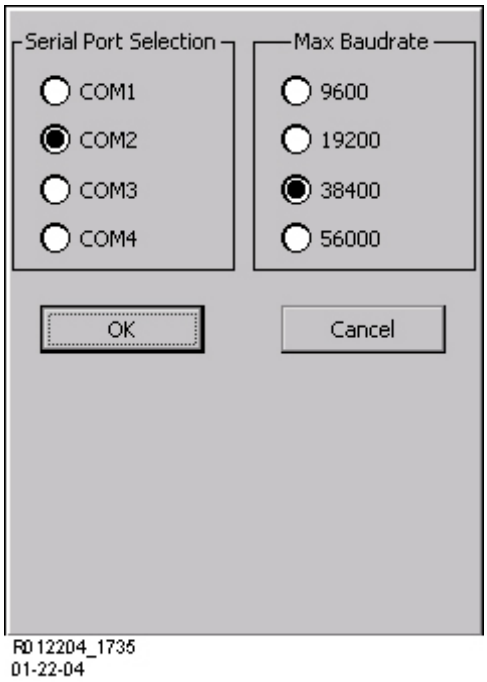


Figure 4-46. Serial Port Settings Dialog Box

4.1.5.6.7.7 DT ATCS Address Entry

Selecting the **DT ATCS Address** entry opens the **ATCS Destination Address** window, Figure 4-47A. This window:

- Establishes a link between the local 4000 GCP DT and a remote 4000 GCP.
- Enables the program settings, operational parameters, and event logs of a remote 4000 GCP to be accessed, displayed, and modified from the local 4000 GCP.
  - The remote GCP can be linked to the local DT as described in procedure 4-1.
  - The local DT is returned to exclusive operation with the local 4000 GCP as described in procedure 4-2.
- In the remote mode the following menus are disabled:
  - Out of Service Menu
  - Calibration Menu
  - SSCC Lamp Menu
  - SSCC Test Menu
- In the remote mode,
  - All programming parameters of the remote GCP can be viewed from the local GCP DT.
  - Programming parameters of the remote GCP can be changed only if the CPU push button is pressed on the remote GCP.
    - Remote programming ability times out after 15 minutes of inactivity.

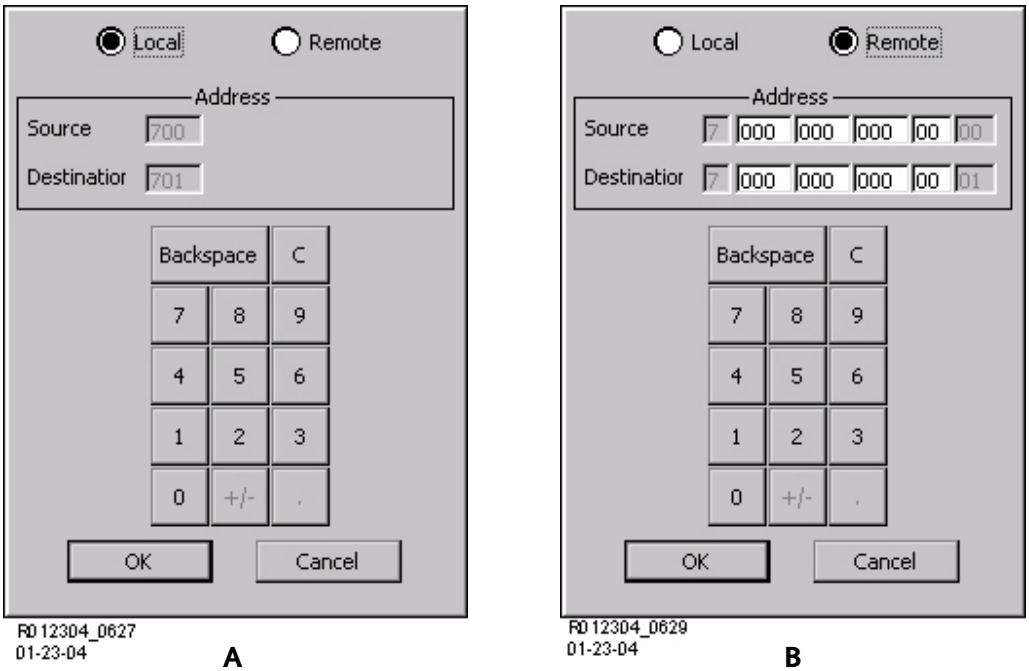


Figure 4-47. ATCS Destination Address Windows

Procedure 4-1. Transfer Of Local DT To Display A Remote GCP

Step 1 Select the **COMM** button from the secondary DT Function buttons.
- The Communications Menu appears.

Step 2 Select the **DT ATCS address** entry from the Communications Menu.
- The **ATCS Destination Address** dialog window, Figure 4-47A, displays

Step 3 Highlight the leftmost segment of the number shown in the **Source** text box fields.
- On the PC-based DT, press the **Tab** key several times to highlight successive segments of the ATCS number.

Step 4 Enter the local 4000 GCP ATCS address segment in the **Source** field using the keypad.

Step 5 Repeat steps 3 and 4 for each remaining segment of the ATCS address.

Step 6 Highlight the leftmost segment of the number shown in the **Destination** text box fields.
- On the PC-based DT, press the **Tab** key several times to highlight successive segments of the ATCS number.

Step 7 Enter the ATCS address of the remote 4000 GCP in the **Destination** field using the keypad.

Step 8 Repeat steps 6 and 7 for each remaining segment of the ATCS address.

Step 9 Select the **OK** button below the keypad.
- The Time dialog box closes and is replaced by the Status Screen.
- A communications link is established between the local 4000 GCP (**Source**) and the remote (**Destination**) 4000 GCP
  - ♦ Communication is though LAN and an external communications device such as modem or SSR.
- The functions of the remote 4000 GCP are transferred to the local DT.
  - ♦ The program settings, operational parameters, and event logs of the remote 4000 GCP are exclusively shown.

Procedure 4-2. Return Of DT Display To Local GCP Operating Parameters

Step 1 Select the **COMM** button from the secondary DT Function buttons.
- The Communications Menu displays.

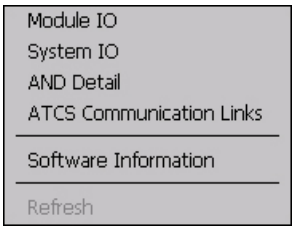
Step 2 Select the **DT ATCS address** entry from the Communications Menu.
- The **ATCS Destination Address** dialog window, Figure 4-47B, displays.

Step 3 Select the **Local** radio button at the top of the dialog window.
- The **ATCS Destination Address** dialog window returns to the configuration shown in Figure 4-47A.

Step 4 Select the **OK** button below the keypad.
- The Time dialog box closes and is replaced by the Status Screen.
- The communications link between the local 4000 GCP (**Source**) and the remote (**Destination**) 4000 GCP is terminated
- The functions of the local 4000 GCP are transferred to the local DT.
  - The program settings, operational parameters, and event logs of the local 4000 GCP are again exclusively shown.

4.1.5.6.8 View Button

Selecting the **VIEW** button brings up the View Menu.

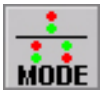


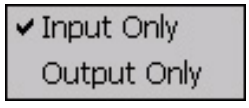
4.1.5.6.8.1 Module IO Entry

Selecting the **Module IO** entry opens the Module Slot Information Windows, Figure 4-48.
- Provides functional information for each module slot.
- Slots are selected and displayed by means of the numbered tabs at the right of the window.

4.1.5.6.8.2 System IO Entry

Selecting the **System IO** entry opens the **IN** Window, Figure 4-49.
- The assigned inputs and outputs for each module are displayed by:
  - Selecting the **MODE** button at the top of the window
  - selecting appropriate entry from the displayed popup menu





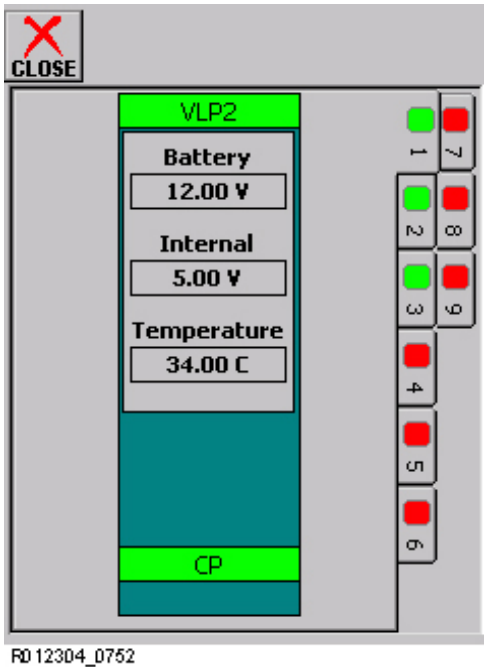


Figure 4-48. Slot Information Windows

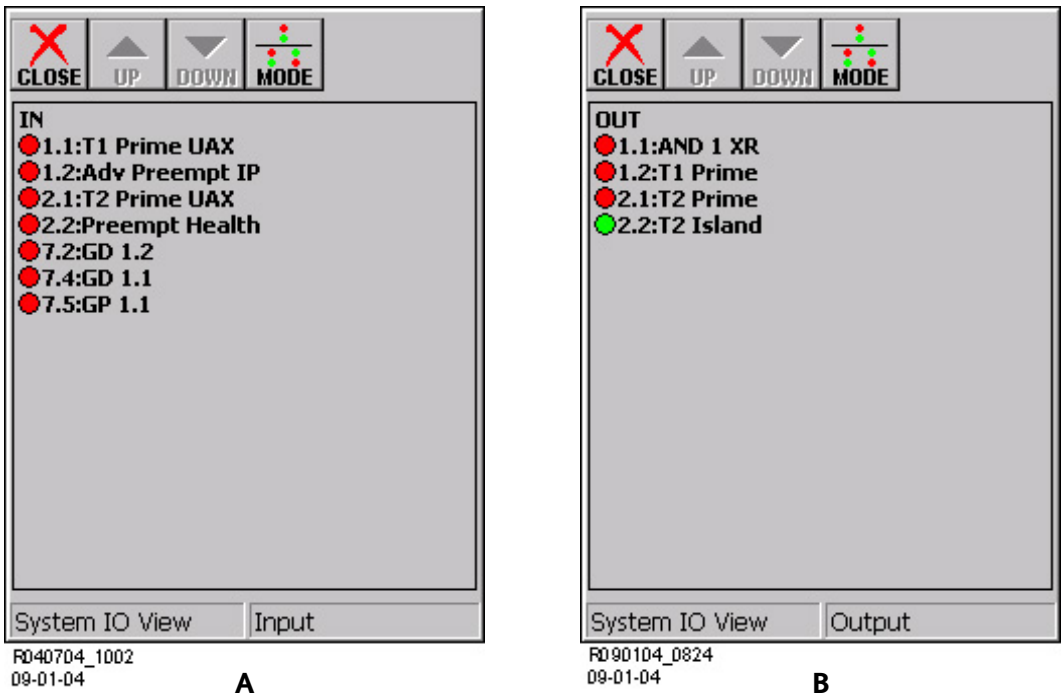


Figure 4-49. Input/Output Display Window

4.1.5.6.8.3 AND Detail View

The AND Detail View can be opened by touching the AND Function Status Bar and selecting AND Detail View. This screen has two functional areas:

- The AND Status window indicates the status of each AND function and its enable function (if used)
  - AND function
    - Red circles indicate the AND function is de-energized and not wrapped (if used).
    - Green circles indicate the AND function is energized and not wrapped (if used)
    - Yellow circles indicate the AND function is wrapped regardless of state of AND function logic.
    - Grey circles indicate the AND function is not used
  - AND Enable function (if used)
    - Red circles indicate the AND Enable is de-energized.
    - Green circles indicate the AND Enable function is energized.
    - Grey circles indicate the AND Enable function is not used.
- Maintenance Call & Preemption Input status.
  - The lower portion of the AND Detail View displays the status of:
    - Maint Call
    - Advance Preempt Input
    - Advance preempt Output
    - Advance Preempt AND 1
    - Traffic Health Input
    - Preempt Health Input
  - The status is indicated by:
    - Red circles indicate the input is de-energized.
    - Green circles indicate the input is energized.
    - Grey circles indicate the input is not used.

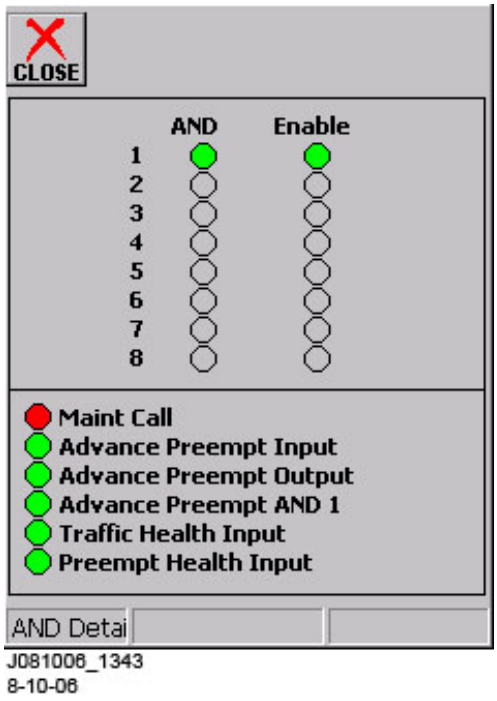


Figure 4-50. AND Function Display Window

4.1.5.6.8.4 ATCS Communications Links Entry

Selecting the **ATCS Communications Links** entry brings up the ATCS Communications Information Window, Figure 4-51.

- Provides a display of the Radio Link A and Radio Link B ATCS data bit activity.
  - ♦ Bit displays provided for each track:
    - ▪ Predictors 1 through 9
    - ▪ EZ
    - ▪ EX
    - ▪ train speed
    - ▪ motion detection
  - ♦ Active data bits display green
  - ♦ Inactive data bits display red
- Provides a numerical display of:
  - ♦ EZ value
  - ♦ EX value
  - ♦ Train speed
  - ♦ Data bits

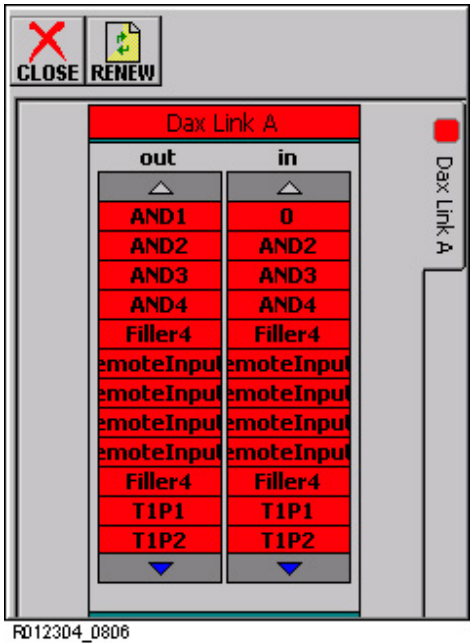


Figure 4-51. ATCS Communications Information Window

- Numerical displays appear when corresponding field is selected
- ATCS activity bit display may be incrementally moved up or down by selecting the arrows at the top or bottom of each column.
- On the GCP DT display only, the Radio Link display is selected by activating the corresponding tab at the right of the display.

4.1.5.6.8.5 Software Information Entry

Selecting the **CARD INFO** button brings up the Software information Window, Figure 4-52.

- This window designates:
  - **Module Type**
    - number 10 designates CPU II module
  - **MEF Version**
    - the current 4000 GCP module executable file (MEF) designation
  - **MEF/MCF CI**
    - the MEF to Module Configuration File (MCF) compatibility index (CI)
    - Intended for factory use only
  - **MEF/HW CI**
    - the MEF to hardware (HW) compatibility index (CI)
    - Intended for factory use only.

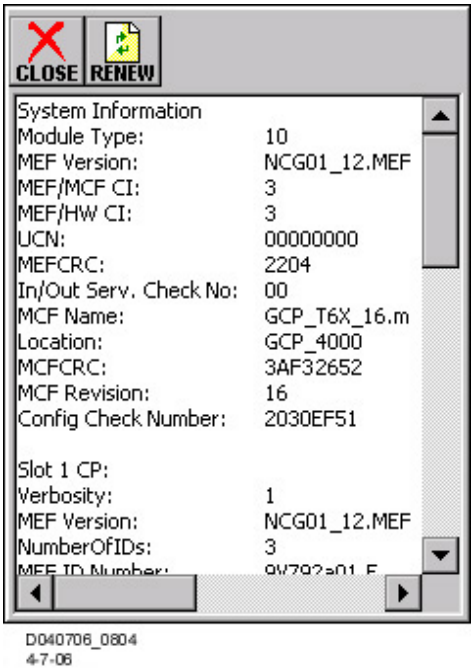


Figure 4-52. Software Information Window

- ♦ UCN – the current unique configuration number (UCN)
- ♦ MEFCRC – The current MEF cycle redundancy check (CRC) number
- ♦ In/Out Service Check Number – the service status number generated by the 4000 GCP
- ♦ MCF Name – the file name of the current MCF
- ♦ Location – the group location of the current MCF

- Selecting the **Renew** button updates the information fields of the window.
- Selecting the **Close** button returns the display to the Main Status Screen.

4.1.5.6.9 Refresh Entry

The Refresh entry is not used.

- The refresh function may be accessed only from the PC based DT by:
  - ♦ Accessing the Module IO **View** menu
  - ♦ Selecting the **Refresh** item from the **View** menu

4.1.5.6.10 Help Button

About DT

Selecting the **HELP** button brings up the **About DT** Menu,

- Selecting the single menu item brings up the 4000 GCP Information Window, Figure 4-53. This window identifies:
  - GCP 4000 DT software version
  - Software part number
- Selecting the **OK** button closes the **About GCP 4000 DT** Window and returns the display to the Status Screen.

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11-28-06

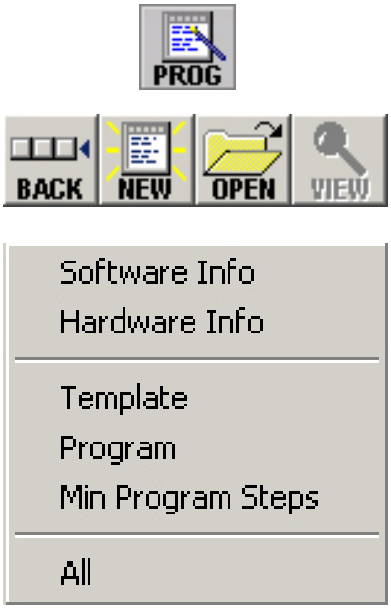
Figure 4-53. About GCP 4000 DT Window

4.2 OFFICE CONFIGURATION EDITOR

The Office Configuration Editor is solely a function of the PC based Diagnostic Terminal (DT) and is not supported by the A80407 Display Module.

- This function extends the operation of the DT by enabling:
  - configuration parameters and their current values to be captured from an MCF while disconnected from the 4000 GCP and then saved as a configuration package file
  - configuration parameters of existing configuration package files to be reviewed and edited
- These features allow the circuit designers to create a configuration package file (Pac file) for a specific GCP unit.
  - The Pac file can be uploaded to the GCP 4000 using a USB drive connected to the display. Loading the Pac file:
    - Is an efficient method of programming office design into a field 4000 GCP unit
    - Minimizes the field programming steps
    - Eliminates field errors in transferring programming from plans to unit
  - This file may be used to print a report that shows the:
    - minimum number of configuration parameters that are different from template programming.
    - field configuration parameters that must be determined and set in the field
      - A fixed text entry is provided with each field designated parameter.
      - Provides instructions on handling the specified parameter.
- Utilization of the Office Configuration Editor features dramatically reduces the number of parameters that must be entered in the field.
  - This allows office designer to designate most configuration parameters
  - Only site specific parameters must be determined and entered in the field

4.2.1 Office Configuration Editor Operation



The functions of the Office Configuration Editor are accessed by means of the **PROG** button of the Startup Screen.

- When the **PROG** button is selected the DT buttons are replaced by a group of four buttons (see left).
  - ♦ The **BACK** button returns the display to the initial DT buttons
  - ♦ The **NEW** button opens a window that allows MCFs (*.mcf) to be located and selected.
  - ♦ The **OPEN** button opens a window that allows an existing configuration package file (*.pac) to be located and selected.
  - ♦ The **View** button opens the Report View drop-down menu (see left).
    - ▪ This button becomes active after the **CLOSE** button is selected from an open configuration package file.
    - ▪ The menu provides the configuration file reports described in paragraph 4.2.2 to be opened and viewed.
- When a configuration pack file is selected the **MAIN PROGRAM** menu window, Figure 4-54, is opened for that file.

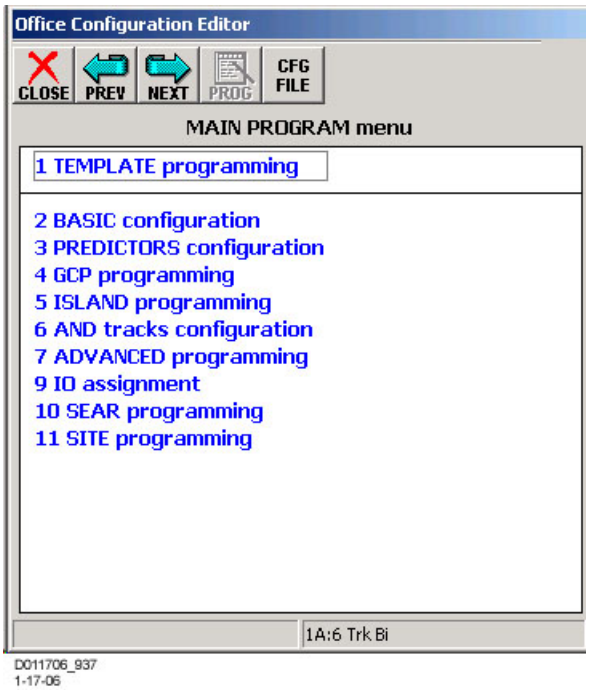
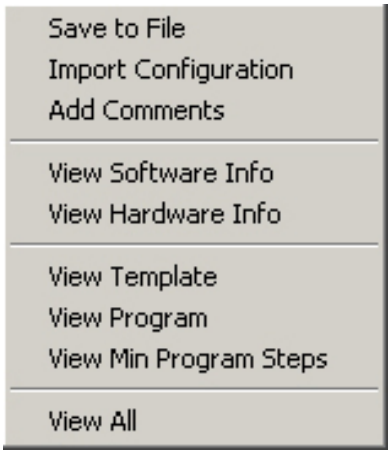


Figure 4-54. MAIN PROGRAM Menu Window with DT Disconnected from 4000 GCP

- This window provides access to the:
  - template selection and programming functions described in Section 5
  - **CFG FILE** button
    - Selecting this button opens the Configuration File drop-down menu described in paragraph 4.2.2.

4.2.2 Configuration Drop-Down Menu



The Configuration File drop-down menu allows:

- a configuration package file to be saved
- configuration file parameters to be imported into the configuration file to be saved
- general comments to be added to the Minimum Program Steps Report of a configuration file
  - saved in configuration package file.
- configuration reports to be displayed
  - Software Information Report
  - Hardware Information Report
  - Template Report
  - Program Report
  - Minimum Program Steps Report
  - System Configuration Report (View All)

4.2.2.1 Capturing Files

When the DT is disconnected from the 4000 GCP and the **CFG FILE** button is selected, the active menu display items depend on the capture function used. For example:

- when the **NEW** button is used to select and open a *.mcf file only the first three item are active
  - ♦ configuration parameters and their current values may be captured and saved to a *.pac file by selecting the **Save to File** menu item
  - ♦ configuration parameters from another *.pac file may be incorporated into the new configuration file by selecting the **Import Configuration** item
  - ♦ comments may be added to the Minimum Program Steps Report of the configuration file by selecting the **Add Comments** menu item
    - ▪ saved in configuration package file
- when the **OPEN** button is used to select and open an existing *.pac file all items except **View Hardware Info** are active

4.2.2.1.1 Configuration Package File Reports

All reports generated by a configuration package may be viewed by selecting the corresponding configuration Menu entry.

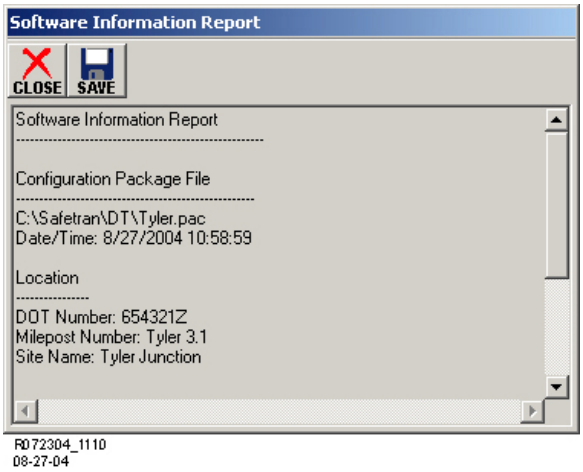
- The displays and the complete printout for each report menu item are shown in Figure 4-55 through Figure 4-60.

To save an individual report file, select the **SAVE** button at the top of the report.

All report files are automatically saved when the **Save to File** menu item is selected while the DT is disconnected from the 4000 GCP.

To obtain a printout of a report:

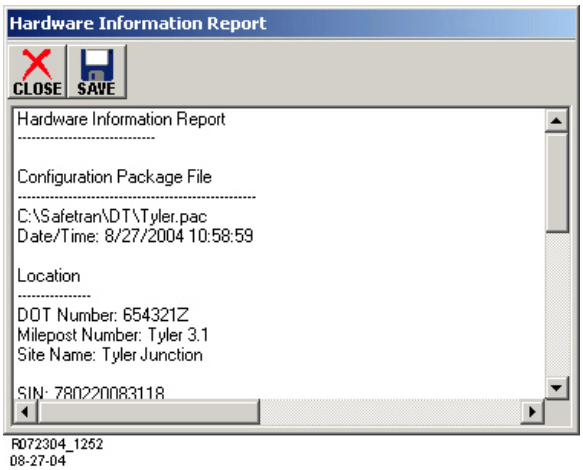
- open the report file using a text editor such as the Notepad
- navigate to the configuration pac file storage directory and select the desired file.
  - ♦ The text file for each report is identified by the configuration file name followed by the report designation:
    - ▪ e.g., the software report for ConfigFileTyler.pac is identified as ConfigFileTyler_SWInfo.
- select **Print** from the **File** drop-down menu



DT Display

```
Software Information Report
---------------------------

Location and SIN
----------------
DOT Number: 654321Z
Milepost Number: Tyler 3.1
Site Name: Tyler Junction

SIN: 762010010016

MCF Version
-----------
MCF Name: GCP-T6X-01-a
MCF Revision: 1aa
MCFCRC: 3E35AC6D
Config Check Number: CAC61B6B

Software Information
--------------------
Slot 1 CP:
SWVersion: NCG02_34.MEF
SWIdNumber: 9V792a01.K1
MEFCRC: 83D0

Slot 1 VLP2:
MEF Version: VPH02_15.MEF
MEF ID Number: 9V689a01.R2
MEF CRC: AF09
BOOTCODE ID Number: 9V455A01.C
BOOTCODE CRC: D04E

Slot 2 Trk:
MEF Version: GCP0235b.MEF
MEF ID Number: 9V788a01.T1
MEF CRC: 9BAA
XILINX ID Number: 80418 A01.7
XILINX CRC: 6E2F
Bootcode ID Number: 9V795A01.A
Bootcode CRC: 2341

Slot 3 Trk:
MEF Version: GCP0235b.MEF
MEF ID Number: 9V788a01.T1
MEF CRC: 9BAA
XILINX ID Number: 80418 A01.7
XILINX CRC: 6E2F
Bootcode ID Number: 9V795A01.A
Bootcode CRC: 2341

Slot 8 SSCC3I:
MEF Version: XNG02_00.MEF
MEF ID Number: 9V686a01.K
MEF CRC: 534F
Bootcode ID Number: 9V681A01.A
Bootcode CRC: E092
Slave1 ID Number: 9V816A01.B
Slave1 CRC: 554E
Slave1 Boot ID Number: 9V817-A01.A
Slave1 Boot CRC: FC9A
Slave2 ID Number: 9V816A01.B
Slave2 CRC: 554E
Slave2 Boot ID Number: 9V817-A01.A
Slave2 Boot CRC: FC9A

Slot 9 SSCC3I:
MEF Version: XNG02_00.MEF
MEF ID Number: 9V686a01.K
MEF CRC: 534F
Bootcode ID Number: 9V681A01.A
Bootcode CRC: E092
Slave1 ID Number: 9V816A01.B
Slave1 CRC: 554E
Slave1 Boot ID Number: 9V817-A01.A
Slave1 Boot CRC: FC9A
Slave2 ID Number: 9V816A01.B
Slave2 CRC: 554E
Slave2 Boot ID Number: 9V817-A01.A
Slave2 Boot CRC: FC9A

Configuration Package File
--------------------------
Filename: tyler.pac
Path: C:\Safetran\DT\
Date/Time: 1/16/2006 15:43:25
```

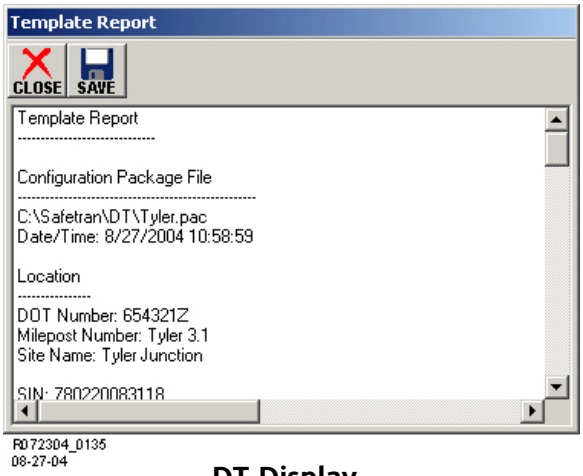
Figure 4-55. Typical Software Information Report



DT Display

```
Hardware Information Report
---------------------------

Location and SIN
----------------
DOT Number: 654321Z
Milepost Number: Tyler 3.1
Site Name: Tyler Junction

SIN: 762010010016

Hardware Information
--------------------
Slot 1 CP:
Manufacturing:
    Part Number: 8000-80403-0001
    HW Rev. Shipped: C9
    Serial Number: 1675
    Build Date: 06/16/2005
    SW ID Shipped: 9V689-A01R
    SW ID2 Shipped: 9V792-A01K
Latest HW Revision: C9
Customer 1:
    Sales Order Number: 2ER000060
    Customer: R&amp;D
    Safety Level:
    Warranty Date: JUN/2007

Slot 2 Trk:
Manufacturing:
    Part Number: 8000-80418-0001
    HW Rev. Shipped: D4
    Serial Number: 2922
    Build Date: 06/08/2005
    SW ID Shipped: 9V788-A01T
    SW ID2 Shipped: 9V0000000000
Latest HW Revision: D4
Customer 1:
    Sales Order Number: 2ER000060
    Customer: R&amp;D
    Safety Level:
    Warranty Date: JUN/2007

Slot 3 Trk:
Manufacturing:
    Part Number: 8000-80418-0001
    HW Rev. Shipped: D4
    Serial Number: 2923
    Build Date: 06/08/2005
    SW ID Shipped: 9V788-A01T
    SW ID2 Shipped: 9V0000000000
Latest HW Revision: D4
Customer 1:
    Sales Order Number: 2ER000060
    Customer: R&amp;D
    Safety Level:
    Warranty Date: JUN/2007

Slot 8 SSCC3I:
Manufacturing:
    Part Number: 8000-80405-0001
    HW Rev. Shipped: D7
    Serial Number: 1031
    Build Date: 06/08/2005
    SW ID Shipped: 9V686-A01K
    SW ID2 Shipped: 9V0000000000
Latest HW Revision: D7
Customer 1:
    Sales Order Number: 2ER000060
    Customer: R&amp;D
    Safety Level:
    Warranty Date: JUN/2010

Slot 9 SSCC3I:
Manufacturing:
    Part Number: 8000-80405-0001
    HW Rev. Shipped: D7
    Serial Number: 1045
    Build Date: 06/08/2005
    SW ID Shipped: 9V686-A01K
    SW ID2 Shipped: 9V0000000000
Latest HW Revision: D7
Customer 1:
    Sales Order Number: 2ER000060
    Customer: R&amp;D
    Safety Level:
    Warranty Date: JUN/2007

Configuration Package File
--------------------------
Filename: tyler.pac
Path: C:\Safetran\DT\
Date/Time: 1/16/2006 15:43:25
```

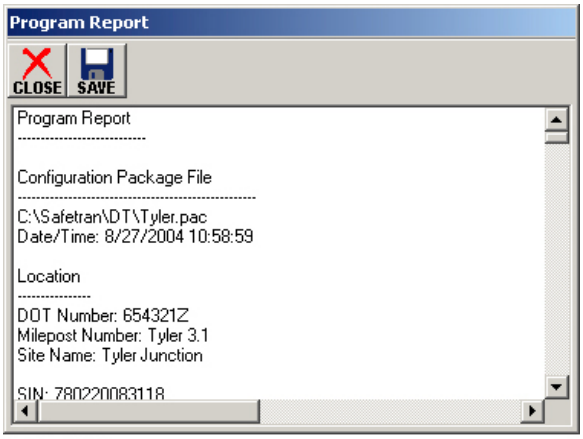
Figure 4-56. Typical Hardware Information Report



DT Display

```
Template Report
---------------

Location and SIN
----------------
DOT Number: 654321Z
Milepost Number: Tyler 3.1
Site Name: Tyler Junction

SIN: 762010010016

MCF Version
-----------
MCF Name: GCP-T6X-01-a
MCF Revision: 1aa
MCFCRC: 3E35AC6D

Template
--------
TEMPLATE:  selection
Template = 1A:6 Trk Bi

TEMPLATE:  module configuration
Track 1 Slot = Track
Track 2/RIO 1 Slot = Track
Track 3 Slot = Not Used
Track 4 Slot = Not Used
Track 5/RIO 2 Slot = Not Used
Track 6/RIO 3 Slot = Not Used
SSCC 1 Slot = SSCC3i
SSCC 2 Slot = SSCC3i
SEAR Used = Yes

TEMPLATE:  preemption
Preempt Logic = No

TEMPLATE:  track 1-Bi, Island
Track 1 : GCP Frequency = 211 Hz
Track 1 : Approach Distance = 3000 ft
Track 1 : Prime Warning Time = 35 sec
Track 1 : Prime UAX = Not Used
Track 1 : GCP Transmit Level = Medium
Track 1 : Isl Frequency = 15.2 kHz

TEMPLATE:  track 2-Bi, Island
Track 2 : GCP Frequency = 348 Hz
Track 2 : Approach Distance = 3000 ft
Track 2 : Prime Warning Time = 35 sec
Track 2 : Prime UAX = Not Used
Track 2 : GCP Transmit Level = Medium
Track 2 : Isl Frequency = 15.2 kHz

TEMPLATE: AND 1 XR
AND 1 XR Track 1 = Prime
AND 1 XR Track 2 = Prime
AND 1 Enable Used = No

TEMPLATE:  SSCC
Gates Used = Yes

SSCC1+2 GPs Coupled = Yes
SSCC-1 Number of GPs = 1
SSCC-1 Number of GDs = 2
SSCC-2 Number of GPs = 0
SSCC-2 Number of GDs = 0

TEMPLATE:  OP assignment 1
OUT 1.1 = Not Used
OUT 1.2 = Not Used
OUT 2.1 = Not Used
OUT 2.2 = Not Used

TEMPLATE:  IP assignment 1
IN 1.1 = Not Used
IN 1.2 = Not Used
IN 2.1 = Not Used
IN 2.2 = Not Used

TEMPLATE:  IP assignment SSCC
IN 7.1 = Not Used
IN 7.2 = GD 1.2
IN 7.3 = Not Used
IN 7.4 = GD 1.1
IN 7.5 = GP 1.1
IN 8.1 = Not Used
IN 8.2 = Not Used
IN 8.3 = Not Used
IN 8.4 = Not Used
IN 8.5 = Not Used

TEMPLATE:  SEAR
SP 2.1 = POK 1
SP 3.1 = Door 1
SP 4.1 = Not Used
SP 5.1 = Not Used
SP 6.1 = Not Used

Configuration Package File
--------------------------
Filename: Config.pac
Path: C:\Safetran\DT\
Date/Time: 1/16/2006 15:47:53
```

Figure 4-57. Typical Template Information Report



DT Display

```
 Program Report
--------------

Location and SIN
----------------
DOT Number: 654321Z
Milepost Number: Tyler 3.1
Site Name: Tyler Junction

SIN: 762010010016

MCF and Template Selection
--------------------------
MCF Name: GCP-T6X-01-a
MCF Revision: 1aa
MCFCRC: 3E35AC6D

Template = 1A:6 Trk Bi

Program
-------
BASIC:  module configuration
Track 1 Slot = Track
Track 2/RIO 1 Slot = Track
Track 3 Slot = Not Used
Track 4 Slot = Not Used
Track 5/RIO 2 Slot = Not Used
Track 6/RIO 3 Slot = Not Used
SSCC-1 Slot = SSCC3i
SSCC-2 Slot = SSCC3i
SEAR Used = Yes

BASIC:  MS/GCP operation
Track 1 : MS/GCP Operation = Yes
Track 2 : MS/GCP Operation = Yes

BASIC:  island operation
Track 1 : Island Used = Internal
Track 2 : Island Used = Internal

BASIC:  preemption
Preempt Logic = No

BASIC:  radio Dax links
Radio DAX link A Used = No
Radio DAX link B Used = No

BASIC:  Vital Comms links
Vital Comms link 1 Used = No
Vital Comms link 2 Used = No

PREDICTORS:  track 1
Track 1 : Prime Used = Yes
Track 1 : Dax A Used = No
Track 1 : Dax B Used = No
Track 1 : Dax C Used = No
Track 1 : Dax D Used = No
Track 1 : Dax E Used = No
Track 1 : Dax F Used = No
Track 1 : Dax G Used = No

PREDICTORS:  track 2
Track 2 : Prime Used = Yes
Track 2 : Dax A Used = No
Track 2 : Dax B Used = No
Track 2 : Dax C Used = No
Track 2 : Dax D Used = No
Track 2 : Dax E Used = No
Track 2 : Dax F Used = No
Track 2 : Dax G Used = No

GCP:  track 1
Track 1 : GCP Freq Category = Standard
Track 1 : GCP Frequency = 211 Hz
Track 1 : Approach Distance = 3000 ft
Track 1 : Uni/Bi/Sim-Bidirnl = Bidirnl
Track 1 : GCP Transmit Level = Medium
Track 1 : Island Connection = Isl 1
Track 1 : Island Distance = 199 ft
Track 1 : Computed Distance = 9999 ft
Track 1 : Linearization Steps = 100

GCP:  track 1 prime
Track 1 : Prime Warning Time = 35 sec
Track 1 : Prime Offset Distance = 0 ft
Track 1 : Switch MS EZ Level = 10
Track 1 : Prime MS/GCP Mode = Pred
Track 1 : Prime Pickup Delay = 15 sec
Track 1 : Prime UAX = Not Used

GCP:  track 1 low EZ detect
Track 1 : Low EZ Detection Used = No
Track 1 : Positive Start = Off
Track 1 : Enhanced Detectn Used = No
Track 1 : Trailing Switch Logic = Off
```

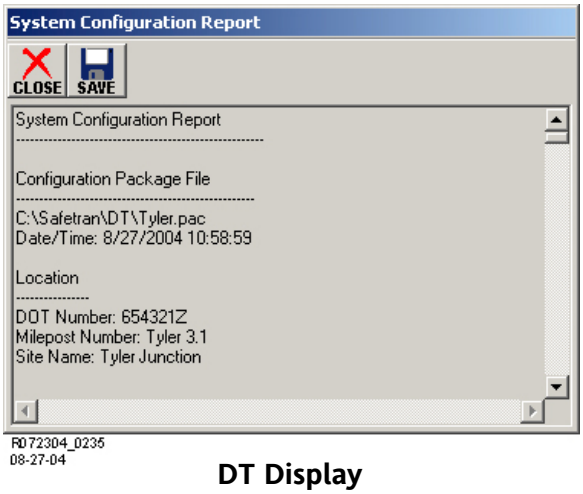
Figure 4-58. Typical Program Information Report, Sheet 1 of 3

```
GCP:  track 1 MS Control
Track 1 : MS/GCP Ctrl IP Used = No
Track 1 : MS Sensitivity Level = 0
Track 1 : Compensation Level = 1300
Track 1 : Low EX Adjustment = 39
Track 1 : Bidirn Dax Passthru = No

GCP:  track 2
Track 2 : GCP Freq Category = Standard
Track 2 : GCP Frequency = 348 Hz
Track 2 : Approach Distance = 3000 ft
Track 2 : Uni/Bi/Sim-Bidirnl = Bidirnl
Track 2 : GCP Transmit Level = Medium
Track 2 : Island Connection = Isl 2
Track 2 : Island Distance = 199 ft
Track 2 : Computed Distance = 9999 ft
Track 2 : Linearization Steps = 100

GCP:  track 2 prime
Track 2 : Prime Warning Time = 35 sec
Track 2 : Prime Offset Distance = 0 ft
Track 2 : Switch MS EZ Level = 10
Track 2 : Prime MS/GCP Mode = Pred
Track 2 : Prime Pickup Delay = 15 sec
Track 2 : Prime UAX = Not Used

GCP:  track 2 low EZ detect
Track 2 : Low EZ Detection Used = No
Track 2 : Positive Start = Off
Track 2 : Enhanced Detectn Used = No
Track 2 : Trailing Switch Logic = Off

GCP:  track 2 MS Control
Track 2 : MS/GCP Ctrl IP Used = No
Track 2 : MS Sensitivity Level = 0
Track 2 : Compensation Level = 1300
Track 2 : Low EX Adjustment = 39
Track 2 : Bidirn Dax Passthru = No

ISLAND:  track 1
Track 1 : Isl Frequency = 15.2 kHz
Track 1 : Pickup Delay (2s +) = 0 sec

ISLAND:  track 2
Track 2 : Isl Frequency = 15.2 kHz
Track 2 : Pickup Delay (2s +) = 0 sec

AND:  track Anding
AND 1 XR Used = Yes
AND 2 Used = No
AND 3 Used = No
AND 4 Used = No
AND 5 Used = No
AND 6 Used = No
AND 7 Used = No
AND 8 Used = No

AND:  AND 1 XR
AND 1 XR Track 1 = Prime
AND 1 XR Track 2 = Prime
AND 1 Enable Used = No
AND 1 Wrap Used = No

ADVANCED:  MS restart
MS/GCP Restart Used = No

ADVANCED:  out of service
OOS Control = Display
OOS Timeout = Yes
OOS Timeout = 1 min

ADVANCED:  track wrap circuits
Wrap LOS Timer = 5 sec
Track 1 Wrap Used = No
Track 2 Wrap Used = No

ADVANCED:  trk 1 overrides
Track 1 : All Predictors Override Used
= No

ADVANCED:  trk 2 overrides
Track 2 : All Predictors Override Used
= No

ADVANCED:  OR logic
OR 1 Used = No
OR 2 Used = No
OR 3 Used = No
OR 4 Used = No

ADVANCED:  internal I/O 1
Pass Thrus = No
Int.1 Sets = Not Used
Int.1 Set by = Not Used
Int.2 Sets = Not Used
Int.2 Set by = Not Used
Int.3 Sets = Not Used
Int.3 Set by = Not Used
Int.4 Sets = Not Used
Int.4 Set by = Not Used

ADVANCED:  internal I/O 2
Int.5 Sets = Not Used
Int.5 Set by = Not Used
Int.6 Sets = Not Used
Int.6 Set by = Not Used
Int.7 Sets = Not Used
Int.7 Set by = Not Used
Int.8 Sets = Not Used
Int.8 Set by = Not Used
```

Figure 4-58. Typical Program Information Report, Sheet 2 of 3

```
ADVANCED:  site options
Daylight Savings = Off
Units = Standard
Ext Maint Call Input = No
Emergency Activate IP = No
EZ/EX Logging = Change
EZ/EX Point Change = 3

SSCC
Gates Used = Yes
SSCC1+2 GPs Coupled = Yes
Min Activation = 0 sec
Rmt Activation Cancel = 2 min
Bell On Gate Rising = No
Mute Bell On Gate Down = No
SSCCIV Controller Used = No

SSCC:  1
SSCC-1 Activation = AND 1 XR
SSCC-1 Gate Delay = 4 sec
SSCC-1 Number of GPs = 1
SSCC-1 Number of GDs = 2
SSCC 1 : Flash Rate = 50
SSCC 1 : Low Battery Detection = No
SSCC 1 : Flash Sync = master
SSCC 1 : Invert Gate Output = No
SSCC 1 : Lamp Neutral Test = On
Aux-1 Xng Ctrl Used = No

SSCC:  2
SSCC-2 Activation = AND 1 XR
SSCC-2 Gate Delay = 4 sec
SSCC-2 Number of GPs = 0
SSCC-2 Number of GDs = 0
SSCC 2 : Flash Rate = 50
SSCC 2 : Low Battery Detection = No
SSCC 2 : Flash Sync = slave
SSCC 2 : Invert Gate Output = No
SSCC 2 : Lamp Neutral Test = On
Aux-2 Xng Ctrl Used = No

OUTPUT:  assignment page 1
OUT 1.1 = Not Used
OUT 1.2 = Not Used
OUT 2.1 = Not Used
OUT 2.2 = Not Used

INPUT:  assignment page 1
IN 1.1 = Not Used
IN 1.2 = Not Used
IN 2.1 = Not Used
IN 2.2 = Not Used

IO:  assignment SSCC
OUT GC 1 = Gate Output 1
OUT GC 2 = Gate Output 2
IN 7.1 = Not Used
IN 7.2 = GD 1.2
IN 7.3 = Not Used
IN 7.4 = GD 1.1
IN 7.5 = GP 1.1
IN 8.1 = Not Used
IN 8.2 = Not Used
IN 8.3 = Not Used
IN 8.4 = Not Used
IN 8.5 = Not Used

SEAR
SEAR Subnode = 99
DI 1 = Not Used
DI 2 = Not Used
Rly 1 = Not Used
Rly 2 = Not Used

SEAR:  inputs
SP 2.1 = POK 1
SP 3.1 = Door 1
SP 4.1 = Not Used
SP 5.1 = Not Used
SP 6.1 = Not Used

SEAR:  slot 1-4 inputs
IN 1.1 = Not Used
IN 1.2 = Not Used
IN 2.1 = Not Used
IN 2.2 = Not Used
IN 3.1 = Not Used
IN 3.2 = Not Used
IN 4.1 = Not Used
IN 4.2 = Not Used

SEAR:  inputs slot 5
IN 5.1 = Not Used
IN 5.2 = Not Used

SEAR:  inputs slot 6
IN 6.1 = Not Used
IN 6.2 = Not Used

SEAR:  slot 7-8 inputs
IN 7.1 = Not Used
IN 7.3 = Not Used
IN 8.1 = Not Used
IN 8.2 = Not Used
IN 8.3 = Not Used
IN 8.4 = Not Used
IN 8.5 = Not Used

SITE:  programming
Radio Subnode = 1
Password Access = Off
Low Battery Enabled = Off

Configuration Package File
--------------------------
Filename: Config.pac
Path: C:\Safetran\DT\
Date/Time: 1/16/2006 15:47:53
```

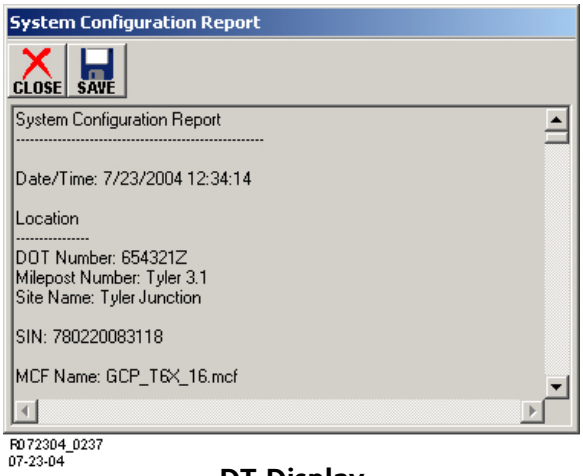
Figure 4-58. Typical Program Information Report, Sheet 3 of 3



DT Display

```
Minimum Program Steps Report
----------------------------

Location and SIN
----------------
DOT Number: 654321Z
Milepost Number: Tyler 3.1
Site Name: Tyler Junction

SIN: 762010010016 *

* Parameter is part of office check
number calculation.

MCF and Template Selection
--------------------------
MCF Name: GCP-T6X-01-a
MCF Revision: 1aa
MCFCRC: 3E35AC6D

Template = 1A:6 Trk Bi *

* Parameter is part of office check
number calculation.

Minimum Program Steps
---------------------
TEMPLATE:  module configuration
Track 2/RIO 1 Slot = Track *

TEMPLATE:  track 1-Bi, Island
Track 1 : GCP Frequency = 211 Hz
Track 1 : Approach Distance = 3000 ft
See Plans
Track 1 : GCP Transmit Level = Medium
Set in Field
Track 1 : Isl Frequency = 15.2 kHz

TEMPLATE:  track 2-Bi, Island
Track 2 : GCP Frequency = 348 Hz
Track 2 : Approach Distance = 3000 ft
See Plans
Track 2 : GCP Transmit Level = Medium
Set in Field
Track 2 : Isl Frequency = 15.2 kHz

* Parameter is part of office check
number calculation.

Office Configuration Check Number
---------------------------------
Check Number: 2E2A819E
(Based on MCF Revision 1aa)

Parameters not part of office check
number calculation:

Track 1 : GCP Frequency = 211 Hz
Track 1 : Approach Distance = 3000 ft
See Plans
Track 1 : GCP Transmit Level = Medium
Set in Field
Track 1 : Isl Frequency = 15.2 kHz
Track 2 : GCP Frequency = 348 Hz
Track 2 : Approach Distance = 3000 ft
See Plans
Track 2 : GCP Transmit Level = Medium
Set in Field
Track 2 : Isl Frequency = 15.2 kHz

Comments
--------
<none>

Configuration Package File
--------------------------
Filename: Config.pac
Path: C:\Safetran\DT\
Date/Time: 1/16/2006 15:47:53
```

Figure 4-59. Typical Minimum Program Steps Information Report



DT Display

```
 System Configuration Report
----------------------------

Location and SIN
----------------
DOT Number: 654321Z
Milepost Number: Tyler 3.1
Site Name: Tyler Junction

SIN: 762010010016

MCF Version
-----------
MCF Name: GCP-T6X-01-a
MCF Revision: 1aa
MCFCRC: 3E35AC6D

Minimum Program Steps
---------------------
TEMPLATE:  module configuration
Track 2/RIO 1 Slot = Track *

TEMPLATE:  track 1-Bi, Island
Track 1 : GCP Frequency = 211 Hz
Track 1 : Approach Distance = 3000 ft
See Plans
Track 1 : GCP Transmit Level = Medium
Set in Field
Track 1 : Isl Frequency = 15.2 kHz

TEMPLATE:  track 2-Bi, Island
Track 2 : GCP Frequency = 348 Hz
Track 2 : Approach Distance = 3000 ft
See Plans
Track 2 : GCP Transmit Level = Medium
Set in Field
Track 2 : Isl Frequency = 15.2 kHz

* Parameter is part of office check
number calculation.
```

```
 Office Configuration Check Number
---------------------------------
Check Number: 2E2A819E
(Based on MCF Revision 1aa)

Parameters not part of office check
number calculation:

Track 1 : GCP Frequency = 211 Hz
Track 1 : Approach Distance = 3000 ft
See Plans
Track 1 : GCP Transmit Level = Medium
Set in Field
Track 1 : Isl Frequency = 15.2 kHz
Track 2 : GCP Frequency = 348 Hz
Track 2 : Approach Distance = 3000 ft
See Plans
Track 2 : GCP Transmit Level = Medium
Set in Field
Track 2 : Isl Frequency = 15.2 kHz

Template
--------
TEMPLATE:  selection
Template = 1A:6 Trk Bi

TEMPLATE:  module configuration
Track 1 Slot = Track
Track 2/RIO 1 Slot = Track
Track 3 Slot = Not Used
Track 4 Slot = Not Used
Track 5/RIO 2 Slot = Not Used
Track 6/RIO 3 Slot = Not Used
SSCC 1 Slot = SSCC3i
SSCC 2 Slot = SSCC3i
SEAR Used = Yes

TEMPLATE:  preemption
Preempt Logic = No

TEMPLATE:  track 1-Bi, Island
Track 1 : GCP Frequency = 211 Hz
Track 1 : Approach Distance = 3000 ft
Track 1 : Prime Warning Time = 35 sec
Track 1 : Prime UAX = Not Used
Track 1 : GCP Transmit Level = Medium
Track 1 : Isl Frequency = 15.2 kHz

TEMPLATE:  track 2-Bi, Island
Track 2 : GCP Frequency = 348 Hz
Track 2 : Approach Distance = 3000 ft
Track 2 : Prime Warning Time = 35 sec
Track 2 : Prime UAX = Not Used
Track 2 : GCP Transmit Level = Medium
Track 2 : Isl Frequency = 15.2 kHz
```

Figure 4-60. Typical System Configuration Report, Sheet 1 of 6

```
TEMPLATE: AND 1 XR
AND 1 XR Track 1 = Prime
AND 1 XR Track 2 = Prime
AND 1 Enable Used = No

TEMPLATE:  SSCC
Gates Used = Yes
SSCC1+2 GPs Coupled = Yes
SSCC-1 Number of GPs = 1
SSCC-1 Number of GDs = 2
SSCC-2 Number of GPs = 0
SSCC-2 Number of GDs = 0

TEMPLATE:  OP assignment 1
OUT 1.1 = Not Used
OUT 1.2 = Not Used
OUT 2.1 = Not Used
OUT 2.2 = Not Used

TEMPLATE:  IP assignment 1
IN 1.1 = Not Used
IN 1.2 = Not Used
IN 2.1 = Not Used
IN 2.2 = Not Used

TEMPLATE:  IP assignment SSCC
IN 7.1 = Not Used
IN 7.2 = GD 1.2
IN 7.3 = Not Used
IN 7.4 = GD 1.1
IN 7.5 = GP 1.1
IN 8.1 = Not Used
IN 8.2 = Not Used
IN 8.3 = Not Used
IN 8.4 = Not Used
IN 8.5 = Not Used

TEMPLATE:  SEAR
SP 2.1 = POK 1
SP 3.1 = Door 1
SP 4.1 = Not Used
SP 5.1 = Not Used
SP 6.1 = Not Used

Program
-------
BASIC:  module configuration
Track 1 Slot = Track
Track 2/RIO 1 Slot = Track
Track 3 Slot = Not Used
Track 4 Slot = Not Used
Track 5/RIO 2 Slot = Not Used
Track 6/RIO 3 Slot = Not Used
SSCC-1 Slot = SSCC3i
SSCC-2 Slot = SSCC3i
SEAR Used = Yes

BASIC:  MS/GCP operation
Track 1 : MS/GCP Operation = Yes
Track 2 : MS/GCP Operation = Yes

BASIC:  island operation
Track 1 : Island Used = Internal
Track 2 : Island Used = Internal

BASIC:  preemption
Preempt Logic = No

BASIC:  radio Dax links
Radio DAX link A Used = No
Radio DAX link B Used = No

BASIC:  Vital Comms links
Vital Comms link 1 Used = No
Vital Comms link 2 Used = No

PREDICTORS:  track 1
Track 1 : Prime Used = Yes
Track 1 : Dax A Used = No
Track 1 : Dax B Used = No
Track 1 : Dax C Used = No
Track 1 : Dax D Used = No
Track 1 : Dax E Used = No
Track 1 : Dax F Used = No
Track 1 : Dax G Used = No

PREDICTORS:  track 2
Track 2 : Prime Used = Yes
Track 2 : Dax A Used = No
Track 2 : Dax B Used = No
Track 2 : Dax C Used = No
Track 2 : Dax D Used = No
Track 2 : Dax E Used = No
Track 2 : Dax F Used = No
Track 2 : Dax G Used = No

GCP:  track 1
Track 1 : GCP Freq Category = Standard
Track 1 : GCP Frequency = 211 Hz
Track 1 : Approach Distance = 3000 ft
Track 1 : Uni/Bi/Sim-Bidirnl = Bidirnl
Track 1 : GCP Transmit Level = Medium
Track 1 : Island Connection = Isl 1
Track 1 : Island Distance = 199 ft
Track 1 : Computed Distance = 9999 ft
Track 1 : Linearization Steps = 100

GCP:  track 1 prime
Track 1 : Prime Warning Time = 35 sec
Track 1 : Prime Offset Distance = 0 ft
Track 1 : Switch MS EZ Level = 10
Track 1 : Prime MS/GCP Mode = Pred
Track 1 : Prime Pickup Delay = 15 sec
Track 1 : Prime UAX = Not Used
```

Figure 4-60. Typical System Configuration Report, Sheet 2 of 6

```
GCP:  track 1 low EZ detect
Track 1 : Low EZ Detection Used = No
Track 1 : Positive Start = Off
Track 1 : Enhanced Detectn Used = No
Track 1 : Trailing Switch Logic = Off

GCP:  track 1 MS Control
Track 1 : MS/GCP Ctrl IP Used = No
Track 1 : MS Sensitivity Level = 0
Track 1 : Compensation Level = 1300
Track 1 : Low EX Adjustment = 39
Track 1 : Bidirn Dax Passthru = No

GCP:  track 2
Track 2 : GCP Freq Category = Standard
Track 2 : GCP Frequency = 348 Hz
Track 2 : Approach Distance = 3000 ft
Track 2 : Uni/Bi/Sim-Bidirnl = Bidirnl
Track 2 : GCP Transmit Level = Medium
Track 2 : Island Connection = Isl 2
Track 2 : Island Distance = 199 ft
Track 2 : Computed Distance = 9999 ft
Track 2 : Linearization Steps = 100

GCP:  track 2 prime
Track 2 : Prime Warning Time = 35 sec
Track 2 : Prime Offset Distance = 0 ft
Track 2 : Switch MS EZ Level = 10
Track 2 : Prime MS/GCP Mode = Pred
Track 2 : Prime Pickup Delay = 15 sec
Track 2 : Prime UAX = Not Used

GCP:  track 2 low EZ detect
Track 2 : Low EZ Detection Used = No
Track 2 : Positive Start = Off
Track 2 : Enhanced Detectn Used = No
Track 2 : Trailing Switch Logic = Off

GCP:  track 2 MS Control
Track 2 : MS/GCP Ctrl IP Used = No
Track 2 : MS Sensitivity Level = 0
Track 2 : Compensation Level = 1300
Track 2 : Low EX Adjustment = 39
Track 2 : Bidirn Dax Passthru = No

ISLAND:  track 1
Track 1 : Isl Frequency = 15.2 kHz
Track 1 : Pickup Delay (2s +) = 0 sec

ISLAND:  track 2
Track 2 : Isl Frequency = 15.2 kHz
Track 2 : Pickup Delay (2s +) = 0 sec

AND:  track Anding
AND 1 XR Used = Yes
AND 2 Used = No
AND 3 Used = No
AND 4 Used = No
AND 5 Used = No
AND 6 Used = No
AND 7 Used = No
AND 8 Used = No

AND:  AND 1 XR
AND 1 XR Track 1 = Prime
AND 1 XR Track 2 = Prime
AND 1 Enable Used = No
AND 1 Wrap Used = No

ADVANCED:  MS restart
MS/GCP Restart Used = No

ADVANCED:  out of service
OOS Control = Display
OOS Timeout = Yes
OOS Timeout = 1 min

ADVANCED:  track wrap circuits
Wrap LOS Timer = 5 sec
Track 1 Wrap Used = No
Track 2 Wrap Used = No

ADVANCED:  trk 1 overrides
Track 1 : All Predictors Override Used
= No

ADVANCED:  trk 2 overrides
Track 2 : All Predictors Override Used
= No

ADVANCED:  OR logic
OR 1 Used = No
OR 2 Used = No
OR 3 Used = No
OR 4 Used = No

ADVANCED:  internal I/O 1
Pass Thrus = No
Int.1 Sets = Not Used
Int.1 Set by = Not Used
Int.2 Sets = Not Used
Int.2 Set by = Not Used
Int.3 Sets = Not Used
Int.3 Set by = Not Used
Int.4 Sets = Not Used
Int.4 Set by = Not Used

ADVANCED:  internal I/O 2
Int.5 Sets = Not Used
Int.5 Set by = Not Used
Int.6 Sets = Not Used
Int.6 Set by = Not Used
Int.7 Sets = Not Used
Int.7 Set by = Not Used
Int.8 Sets = Not Used
Int.8 Set by = Not Used
```

Figure 4-60. Typical System Configuration Report, Sheet 3 of 6

```
ADVANCED:  site options
Daylight Savings = Off
Units = Standard
Ext Maint Call Input = No
Emergency Activate IP = No
EZ/EX Logging = Change
EZ/EX Point Change = 3

SSCC
Gates Used = Yes
SSCC1+2 GPs Coupled = Yes
Min Activation = 0 sec
Rmt Activation Cancel = 2 min
Bell On Gate Rising = No
Mute Bell On Gate Down = No
SSCCIV Controller Used = No

SSCC:  1
SSCC-1 Activation = AND 1 XR
SSCC-1 Gate Delay = 4 sec
SSCC-1 Number of GPs = 1
SSCC-1 Number of GDs = 2
SSCC 1 : Flash Rate = 50
SSCC 1 : Low Battery Detection = No
SSCC 1 : Flash Sync = master
SSCC 1 : Invert Gate Output = No
SSCC 1 : Lamp Neutral Test = On
Aux-1 Xng Ctrl Used = No

SSCC:  2
SSCC-2 Activation = AND 1 XR
SSCC-2 Gate Delay = 4 sec
SSCC-2 Number of GPs = 0
SSCC-2 Number of GDs = 0
SSCC 2 : Flash Rate = 50
SSCC 2 : Low Battery Detection = No
SSCC 2 : Flash Sync = slave
SSCC 2 : Invert Gate Output = No
SSCC 2 : Lamp Neutral Test = On
Aux-2 Xng Ctrl Used = No

OUTPUT:  assignment page 1
OUT 1.1 = Not Used
OUT 1.2 = Not Used
OUT 2.1 = Not Used
OUT 2.2 = Not Used

INPUT:  assignment page 1
IN 1.1 = Not Used
IN 1.2 = Not Used
IN 2.1 = Not Used
IN 2.2 = Not Used

IO:  assignment SSCC
OUT GC 1 = Gate Output 1
OUT GC 2 = Gate Output 2
IN 7.1 = Not Used
IN 7.2 = GD 1.2
IN 7.3 = Not Used
IN 7.4 = GD 1.1
IN 7.5 = GP 1.1
IN 8.1 = Not Used
IN 8.2 = Not Used
IN 8.3 = Not Used
IN 8.4 = Not Used
IN 8.5 = Not Used

SEAR
SEAR Subnode = 99
DI 1 = Not Used
DI 2 = Not Used
Rly 1 = Not Used
Rly 2 = Not Used

SEAR:  inputs
SP 2.1 = POK 1
SP 3.1 = Door 1
SP 4.1 = Not Used
SP 5.1 = Not Used
SP 6.1 = Not Used

SEAR:  slot 1-4 inputs
IN 1.1 = Not Used
IN 1.2 = Not Used
IN 2.1 = Not Used
IN 2.2 = Not Used
IN 3.1 = Not Used
IN 3.2 = Not Used
IN 4.1 = Not Used
IN 4.2 = Not Used

SEAR:  inputs slot 5
IN 5.1 = Not Used
IN 5.2 = Not Used

SEAR:  inputs slot 6
IN 6.1 = Not Used
IN 6.2 = Not Used

SEAR:  slot 7-8 inputs
IN 7.1 = Not Used
IN 7.3 = Not Used
IN 8.1 = Not Used
IN 8.2 = Not Used
IN 8.3 = Not Used
IN 8.4 = Not Used
IN 8.5 = Not Used

SITE:  programming
Radio Subnode = 1
Password Access = Off
Low Battery Enabled = Off

Software Information
--------------------
```

Figure 4-60. **Typical System Configuration Report, Sheet 4 of 6**

```
Slot 1 CP:
SWVersion: NCG02_34.MEF
SWIdNumber: 9V792a01.K1
MEFCRC: 83D0

Slot 1 VLP2:
MEF Version: VPH02_15.MEF
MEF ID Number: 9V689a01.R2
MEF CRC: AF09
BOOTCODE ID Number: 9V455A01.C
BOOTCODE CRC: D04E

Slot 2 Trk:
MEF Version: GCP0235b.MEF
MEF ID Number: 9V788a01.T1
MEF CRC: 9BAA
XILINX ID Number: 80418 A01.7
XILINX CRC: 6E2F
Bootcode ID Number: 9V795A01.A
Bootcode CRC: 2341

Slot 3 Trk:
MEF Version: GCP0235b.MEF
MEF ID Number: 9V788a01.T1
MEF CRC: 9BAA
XILINX ID Number: 80418 A01.7
XILINX CRC: 6E2F
Bootcode ID Number: 9V795A01.A
Bootcode CRC: 2341

Slot 8 SSCC3I:
MEF Version: XNG02_00.MEF
MEF ID Number: 9V686a01.K
MEF CRC: 534F
Bootcode ID Number: 9V681A01.A
Bootcode CRC: E092
Slave1 ID Number: 9V816A01.B
Slave1 CRC: 554E
Slave1 Boot ID Number: 9V817-A01.A
Slave1 Boot CRC: FC9A
Slave2 ID Number: 9V816A01.B
Slave2 CRC: 554E
Slave2 Boot ID Number: 9V817-A01.A
Slave2 Boot CRC: FC9A

Slot 9 SSCC3I:
MEF Version: XNG02_00.MEF
MEF ID Number: 9V686a01.K
MEF CRC: 534F
Bootcode ID Number: 9V681A01.A
Bootcode CRC: E092
Slave1 ID Number: 9V816A01.B
Slave1 CRC: 554E
Slave1 Boot ID Number: 9V817-A01.A
Slave1 Boot CRC: FC9A
Slave2 ID Number: 9V816A01.B
Slave2 CRC: 554E
Slave2 Boot ID Number: 9V817-A01.A
Slave2 Boot CRC: FC9A
```

```
Hardware Information
--------------------

Slot 1 CP:
Manufacturing:
    Part Number: 8000-80403-0001
    HW Rev. Shipped: C9
    Serial Number: 1675
    Build Date: 06/16/2005
    SW ID Shipped: 9V689-A01R
    SW ID2 Shipped: 9V792-A01K
Latest HW Revision: C9
Customer 1:
    Sales Order Number: 2ER000060
    Customer: R&amp;amp;D
    Safety Level:
    Warranty Date: JUN/2007

Slot 2 Trk:
Manufacturing:
    Part Number: 8000-80418-0001
    HW Rev. Shipped: D4
    Serial Number: 2922
    Build Date: 06/08/2005
    SW ID Shipped: 9V788-A01T
    SW ID2 Shipped: 9V0000000000
Latest HW Revision: D4

customer 1:
    Sales Order Number: 2ER000060
    Customer: R&amp;amp;D
    Safety Level:
    Warranty Date: JUN/2007

Slot 3 Trk:
Manufacturing:
    Part Number: 8000-80418-0001
    HW Rev. Shipped: D4
    Serial Number: 2923
    Build Date: 06/08/2005
    SW ID Shipped: 9V788-A01T
    SW ID2 Shipped: 9V0000000000
Latest HW Revision: D4
Customer 1:
    Sales Order Number: 2ER000060
    Customer: R&amp;amp;D
    Safety Level:
    Warranty Date: JUN/2007

Slot 8 SSCC3I:
Manufacturing:
    Part Number: 8000-80405-0001
    HW Rev. Shipped: D7
    Serial Number: 1031
    Build Date: 06/08/2005
    SW ID Shipped: 9V686-A01K
    SW ID2 Shipped: 9V0000000000
Latest HW Revision: D7
```

Figure 4-60. Typical System Configuration Report, Sheet 5 of 6

```
Customer 1:
    Sales Order Number: 2ER000060
    Customer: R&amp;D
    Safety Level:
    Warranty Date: JUN/2010

Slot 9 SSCC3I:
Manufacturing:
    Part Number: 8000-80405-0001
    HW Rev. Shipped: D7
    Serial Number: 1045
    Build Date: 06/08/2005
    SW ID Shipped: 9V686-A01K
    SW ID2 Shipped: 9V0000000000
Latest HW Revision: D7
Customer 1:
    Sales Order Number: 2ER000060
    Customer: R&amp;D
    Safety Level:
    Warranty Date: JUN/2007


Configuration Package File
--------------------------
Filename: Config.pac
Path: C:\Safetran\DT\
Date/Time: 1/16/2006 15:47:53
```

Figure 4-60. Typical System Configuration Report, Sheet 6 of 6

4.2.3 Create Pac File From MCF

The steps required to create a configuration package file from an MCF are provided in procedure 4-3.

Procedure 4-3. MCF Parameter Capture

Step 1 Start the PC resident DT program.
- The DT Startup Screen displays (see Figure 4-61A).

Step 2 Select the **PROG** button at the top the DT Start-up Screen.
- The DT buttons change to the configuration shown in Figure 4-61B.

Step 3 Select the **NEW** DT button.
- The **Select MCF file** window opens (Figure 4-62A).

Step 4 Select an *.mcf from the displayed files or from another location as required.
- The **Select MCF file** window closes and the **MAIN PROGRAM menu** of the selected MCF displays (Figure 4-62B).

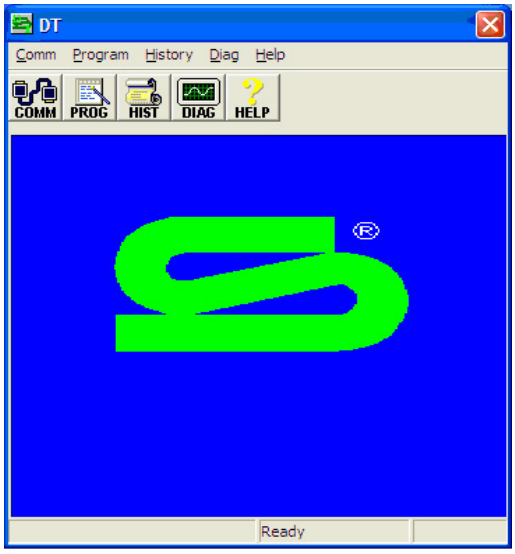
Step 5 Select the track configuration template and program the required operational parameters as described in Section 5.

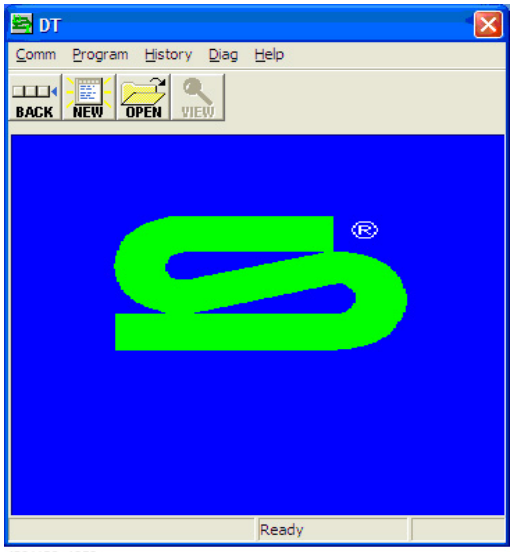
Step 6 Select the **CFG FILE** button.
- The Configuration drop-down menu displays.

Step 7 Select the **Save Configuration** menu item.
- A **Save File As** window opens.

Step 8 Enter the name in the **File name:** box.

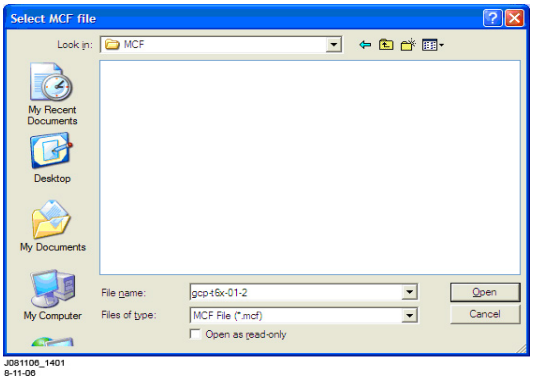
Step 9 Select the **SAVE** button.
- The **Save File As** window closes and the display returns to the active menu window.
  - The window is deactivated (grayed out) as the configuration file is created.
- When the file is saved:
  - the window returns to the active state
  - a text file for each active Configuration drop-down menu report item is created

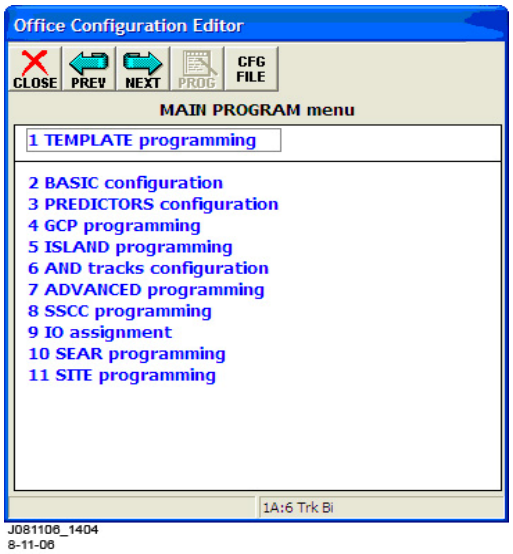




A B

Figure 4-61. PC DT Display (Office Configuration Editor)





A B

Figure 4-62. Select MCF and MAIN PROGRAM Menu

4.2.3.1 Importing Parameters Into Open Pac File

The steps required to import configuration parameters into the open configuration package file are provided in procedure 4-4.

- The import configuration allows conversion of a PAC file that was created with one version of an MCF into a new MCF.
  - ♦ Open a new PAC file with the new MCF.
  - ♦ Import the previous PAC file and resave it.

Procedure 4-4. Importing Configuration Parameters Into Open Configuration Package File

Step 1 From the **MAIN PROGRAM menu** (Figure 4-62B) select the **CFG FILE** button.
- The Configuration drop-down menu displays.

Step 2 Select the **Import Configuration** entry.
- An **Open Configuration Package File** window opens.

Step 3 Enter the name of the Pac file to import.

Step 4 Select the **OPEN** button.
- The Package Progress window, Figure 4-63, displays the card (module) parameters are imported from the selected Pac file.
- When the import process is completed, **Package Imported** displays at the bottom of the list of imported module parameters.

Step 5 Select the **CLOSE** button.
- The Package Progress window closes and the display returns to the **MAIN PROGRAM menu**.

Step 6 Select the **CFG FILE** button.
- The Configuration drop-down menu displays.

Step 7 Select the **Save Configuration** menu item.
- A **Save File As** window opens.

Step 8 Enter the name of the Pac file to save.

Step 9 Select the **SAVE** button.
- A **Save File As** dialog window opens.

Step 10 Select the **Yes** button
- The **Save File As** dialog window closes and display returns to the **MAIN PROGRAM menu**.
- A text file for each active Configuration drop-down menu report item is saved for the Pac file.

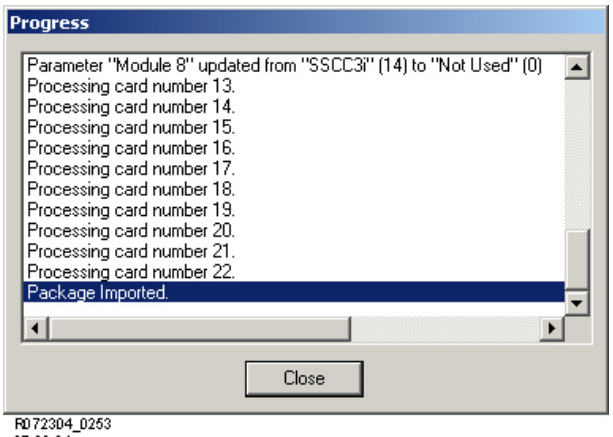


Figure 4-63. Package Progress Window

4.2.3.2 Adding Comments To Minimum Steps Report

The steps required to add comments to the Minimum Program Steps Report of an open configuration package file are provided in procedure 4-5.

Procedure 4-5. Adding Comments To Open Configuration Package File

Step 1 Select the **CFG FILE** button.
- The Configuration drop-down menu displays.

Step 2 Select **ADD COMMENTS** from the drop-down menu.
- The **Comments** text window, Figure 4-64 displays.

Step 3 Enter the comments in the text window.
- Use **Ctrl + Enter** to enter each additional line of text (pressing **Enter**, selects **OK** and closes the window).

Step 4 Select the **OK** button, or press **Enter**.
- The window closes and the display returns to the currently selected menu window, but the change has not been saved.

Step 5 Select the **CFG FILE** button.
- The Configuration drop-down menu displays.

Step 6 Select the **Save Configuration** menu item.
- A **Save File As** window opens.

Step 7 Enter the name of the Pac file to be saved.

Step 8 Select the **SAVE** button.
- A **Save File As** dialog window opens.

Step 9 Select the **Yes** button.
- The comments are saved to the Minimum Program Steps Report.
- The display returns to the **MAIN PROGRAM menu**.

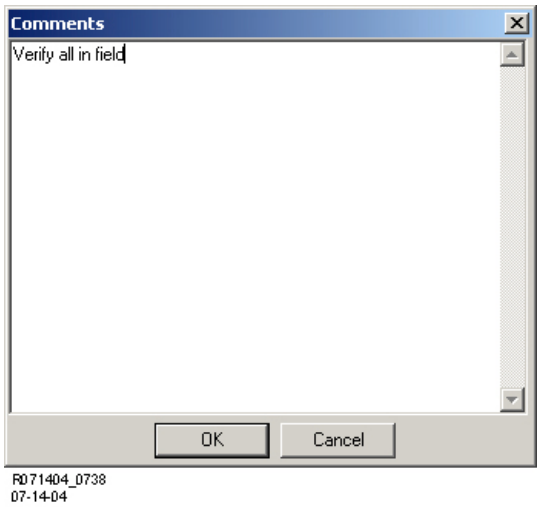


Figure 4-64. Comments Window

4.2.4 Configuration Package File Edit Procedure

The steps required to modify the operational parameters of a Configuration Package File, which reprograms a 4000 GCP, are provided in procedure 4-6.

Procedure 4-6. Editing Configuration Package Files

Step 1 Start the PC resident DT program.
- The DT Startup Screen displays (see Figure 4-61A).

Step 2 Select the **PROG** button at the top the DT Start-up Screen.
- The DT buttons change to the configuration shown in Figure 4-62B.

Step 3 Select the **OPEN** button.
- An **Open Configuration Package File** window opens (Figure 4-65A).

Step 4 Select a configuration file from the displayed files or from another location as required.
- The **Open Configuration Package File** window closes and the **MAIN PROGRAM menu** (Figure 4-65B) of the selected Pac file displays.

Step 5 Select the track configuration template, or program menus 2 through 11, and modify the required operational parameters as described in Section 5.

Step 6 Select the **CFG FILE** button.
- The Configuration drop-down menu displays.

Step 7 Select the **Save Configuration** menu item.
- A **Save File As** window opens.

Step 8 Enter the name in the **File name:** box.

Step 9 Select the **SAVE** button.
- The **Save File As** window closes and the display returns to the active menu window.
  - The window is deactivated (grayed out) as the configuration file is saved.
- When the file is saved:
  - the window returns to the active state
  - **Package Open** appears at the bottom of the window
  - a text file for each active Configuration drop-down menu report item is created

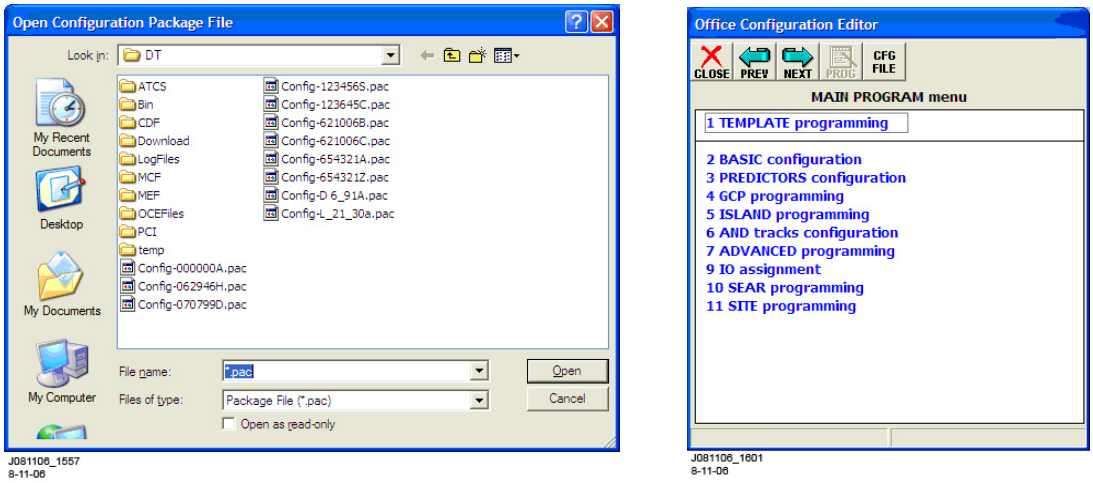
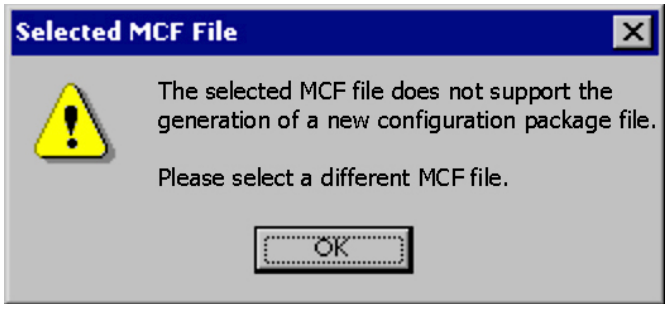


Figure 4-65. Opening a Pac File on the OCE

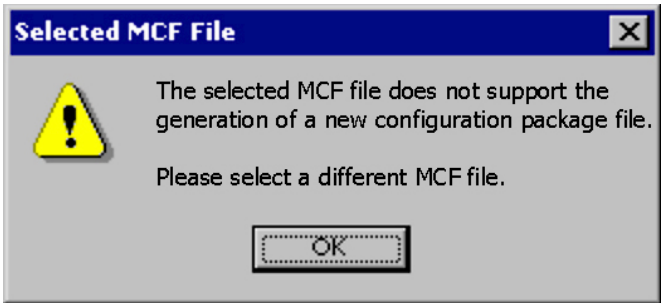
4.2.5 Configuration Capture Message Windows

During configuration capture operations several message windows may be displayed.

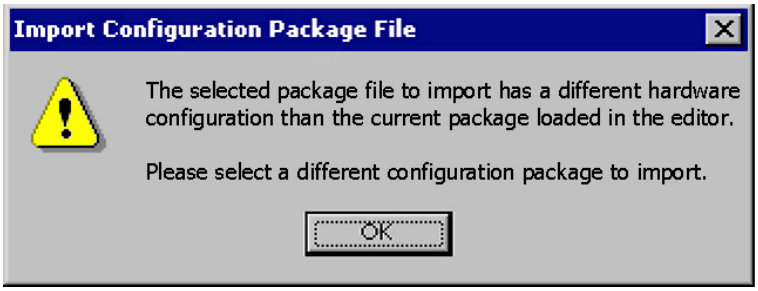
4.2.5.1 Selected MCF Can Not Generate New Configuration Package File



4.2.5.2 Selected Configuration Package File Is Corrupted



4.2.5.3 Configuration Package File Hardware Configurations Do Not Match



4.3 DISPLAY DT USB WIZARD

The USB Wizard is solely a function on the Display Module, A80407-03, based Diagnostic Terminal (DT) and is not supported on the PC based DT.

- The feature provides a Windows® based wizard that allows the user to save GCP 4000 files to, or upload files from, an USB drive.
- The following GCP 4000 file types can be saved to a USB drive connected to the Display Module:
  - ♦ Configuration Package Files (pac files)
  - ♦ Train History
  - ♦ Maintenance Logs
  - ♦ Status Logs
  - ♦ Summary Logs
  - ♦ SEAR IIi
    - ▪ Reports
    - ▪ History
    - ▪ Incidents
- The following GCP 4000 file types can be uploaded from an USB drive connected to the Display Module:
  - ♦ Configuration pac files
  - ♦ Module Executable Files (MEF)
  - ♦ Module Configuration Files (MCF)
  - ♦ SEAR IIi
    - ▪ Executive Software
    - ▪ Control Descriptor Language (CDL)
    - ▪ Ladder Logic Executive file (LLW)
    - ▪ Ladder Logic Label file (LLB)

4.3.1 USB Drive Recommendation

Safetran recommends the use of a 512 MB USB drive manufactured by SimpleTech, model STI-UFD/512. This device can be ordered from Safetran under the part number: Z927-00270-0000.

4.3.2 Display DT USB Wizard Menu

When a USB drive device is inserted into the Display Module, A80407-3, the WIZ button is made active and the WIZARD menu is automatically opened.

- In Figure 4-66A the WIZ button is on the top line of the main status screen.
- The WIZARD menu is shown in Figure 4-66B

To select a function, touch the function on the screen and then press NEXT

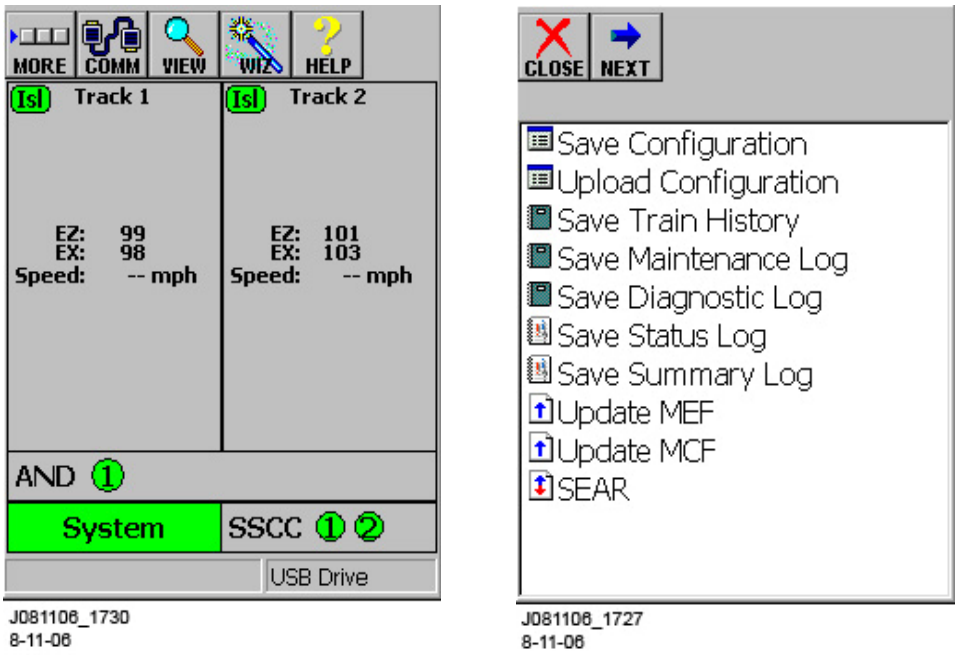


Figure 4-66. Wizard WIZ Button and USB WIZARD Menu

4.3.3 File Transfers with USB Drive

To save, upload, or update a file to an USB drive, insert the USB drive in the port on the Display Module. Refer to Figure 4-67 for the location of the USB port.

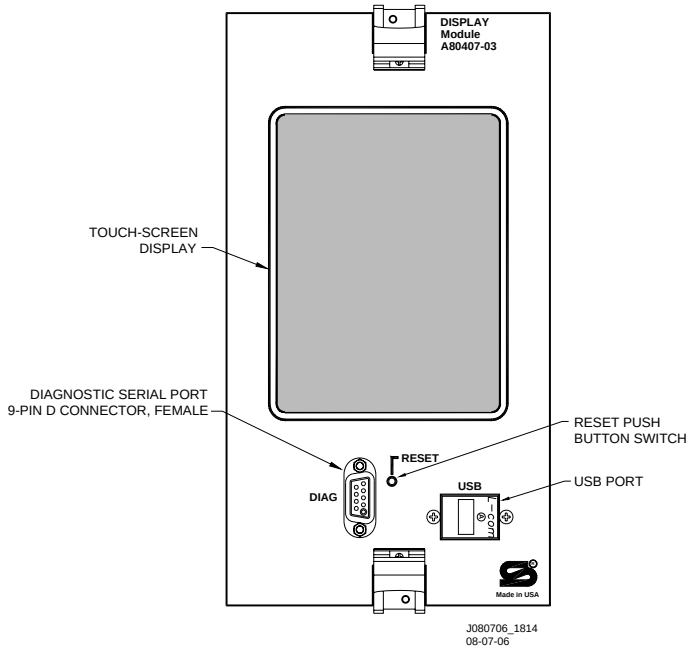


Figure 4-67. Display Module A80407-3 with USB Port

4.3.3 Saving Files to USB Drive

To select a file type to save, highlight the function name by touching the name on the screen and then press NEXT.

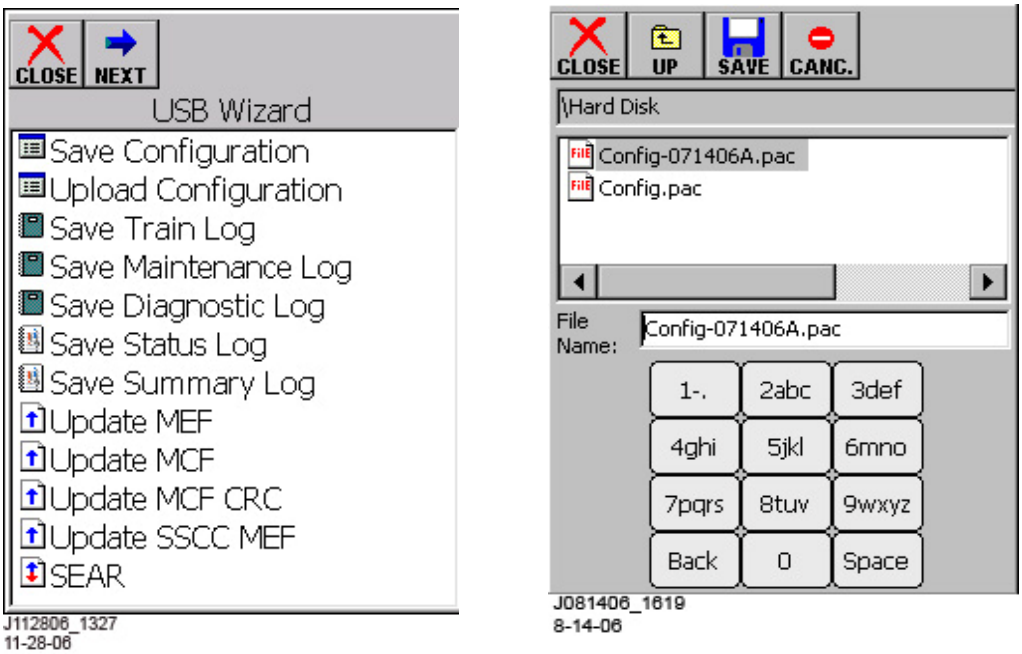
THE DEFAULT DESTINATION DRIVE ON THE DT (REFER TO FIGURE 4-68) WHEN SAVING FILES TO THE USB DRIVE IS "\HARD DISK". DO NOT SAVE A FILE TO ANOTHER FOLDER BECAUSE IT MAY DISRUPT DISPLAY OPERATION

NOTE

- Each SAVE function will default to a File Name to be saved. The "save as" file name may be edited
- To edit the name of the file:
  - ♦ Use the stylus to pick the location of added text (refer to Figure 4-68)
  - ♦ Use the keyboard to backspace, add spaces or enter letters and numbers (This process is similar to editing names on a cell phone)

4.3.3.1 Save Configuration

- In the PROGRAM menu, select CFG FILE, and Save Configuration
- In the USB Wizard menu (USB Device inserted in Display), highlight SAVE CONFIGURATION and press NEXT. Refer to Figure 4-68.
  - ♦ Touching the desired PAC File name in the upper window will enter it in the File Name box
  - ♦ Press SAVE button



A **B**

Figure 4-68. Save Configuration Screens

4.3.3.2 Save Train Log

- Highlight SAVE TRAIN LOG and press NEXT. Refer to Figure 4-69.
  - The Train Log file name default is:
    - TrainLogAll-DOT No.-DayMoYr.Txt
  - Edit file name, if desired
  - Press SAVE button

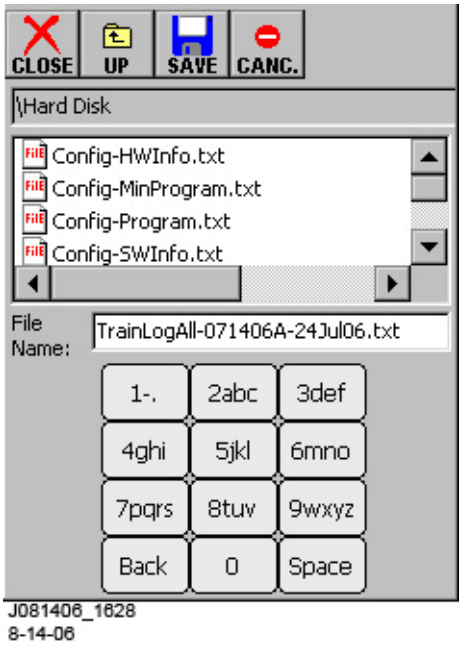


Figure 4-69. Save Train Log Screen

4.3.3.3 Save Maintenance Log

- Highlight SAVE MAINTENANCE LOG and press NEXT. Refer to Figure 4-70
  - The Maintenance Log file name default is:
    - MaintLog-DOT No.-DayMoYr.txt
  - Edit file name, if desired
  - Press SAVE button

Figure 4-70. Save Maintenance Log Screen

4.3.3.4 Save Diagnostic Log

- Highlight SAVE DIAGNOSTIC LOG and press NEXT. Refer to Figure 4-71.
  - The Diagnostic Log file name default is:
    - DiagLog-DOT No.-DayMoYr.txt
  - Edit file name, if desired
  - Press SAVE button

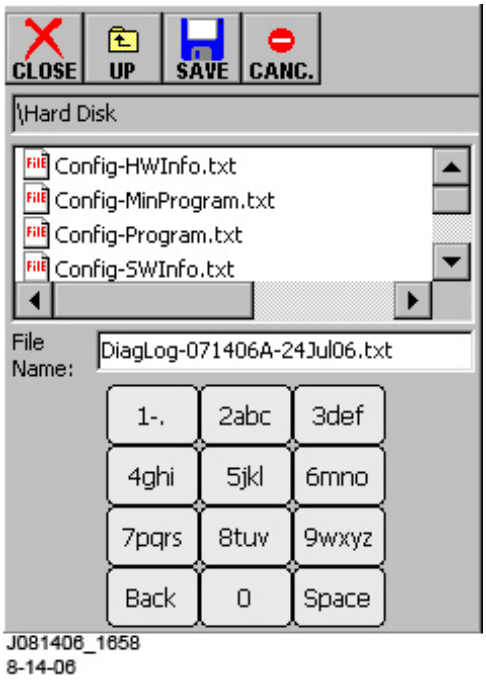
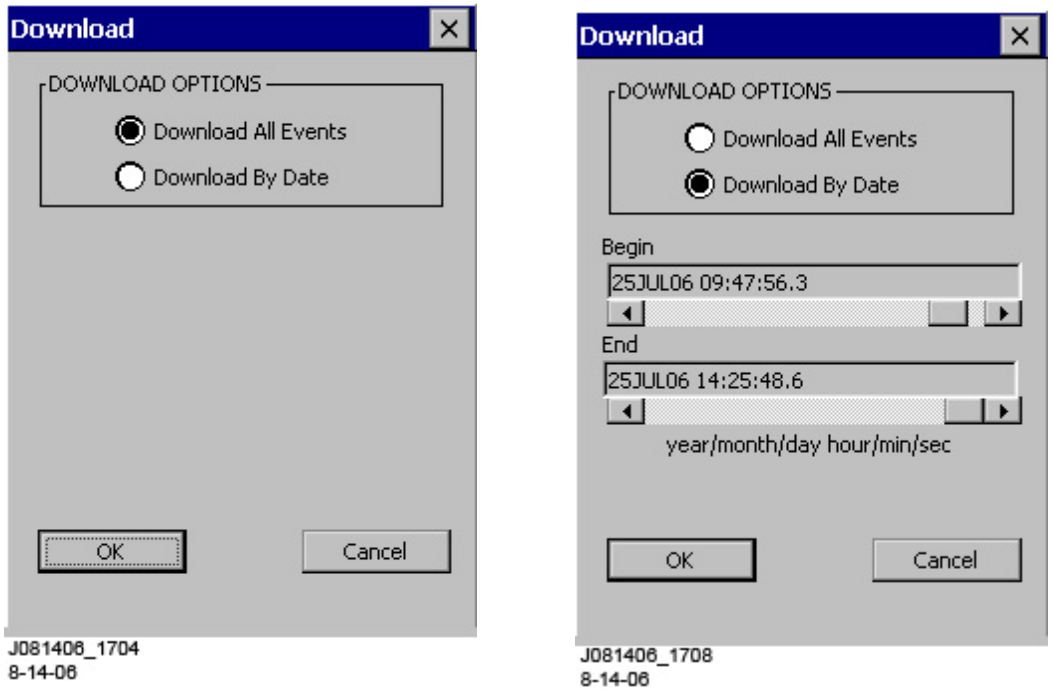


Figure 4-71. Save Diagnostic Log Screen

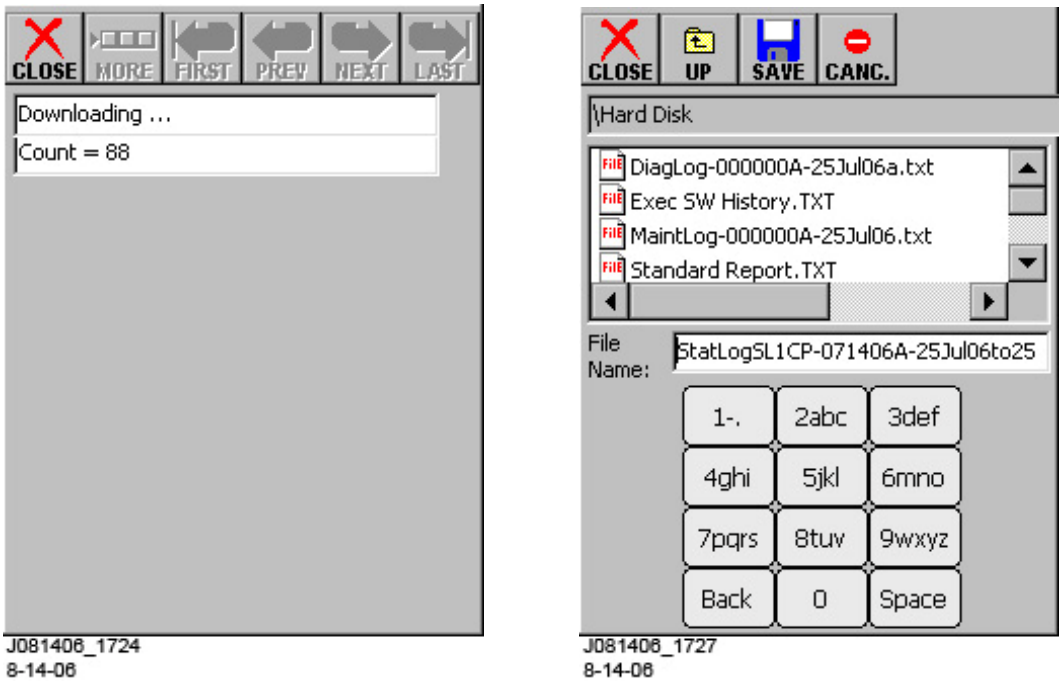
4.3.3.5 Save Status Log

- Highlight SAVE STATUS LOG and press NEXT.
  - Select Download Option. Refer to Figure 4-72
    - Edit dates, if desired, by sliding the button.
  - While downloading the screen in Figure 4-73A is displayed
  - The Status Log file name default is:
    - StatLogSL1CP-DOT No.-DayMoYrtoDayMoYr
  - Edit file name, if desired. Refer to Figure 4-73B
  - Press SAVE button



A B

Figure 4-72. Status Log Download Options

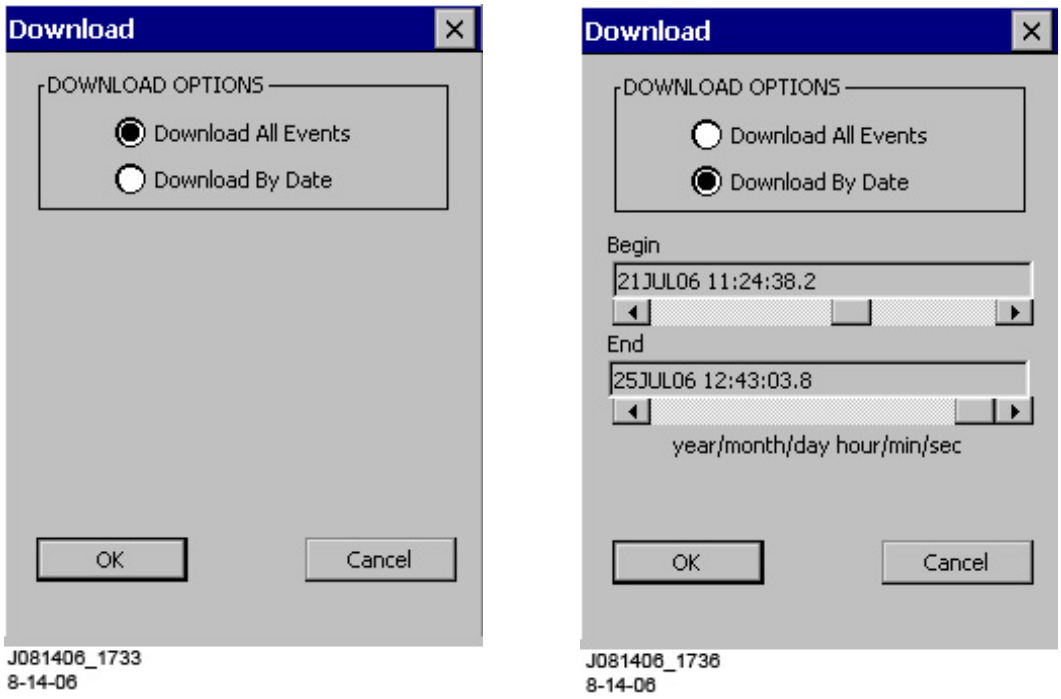


A B

Figure 4-73. Status Log Downloading and File Name

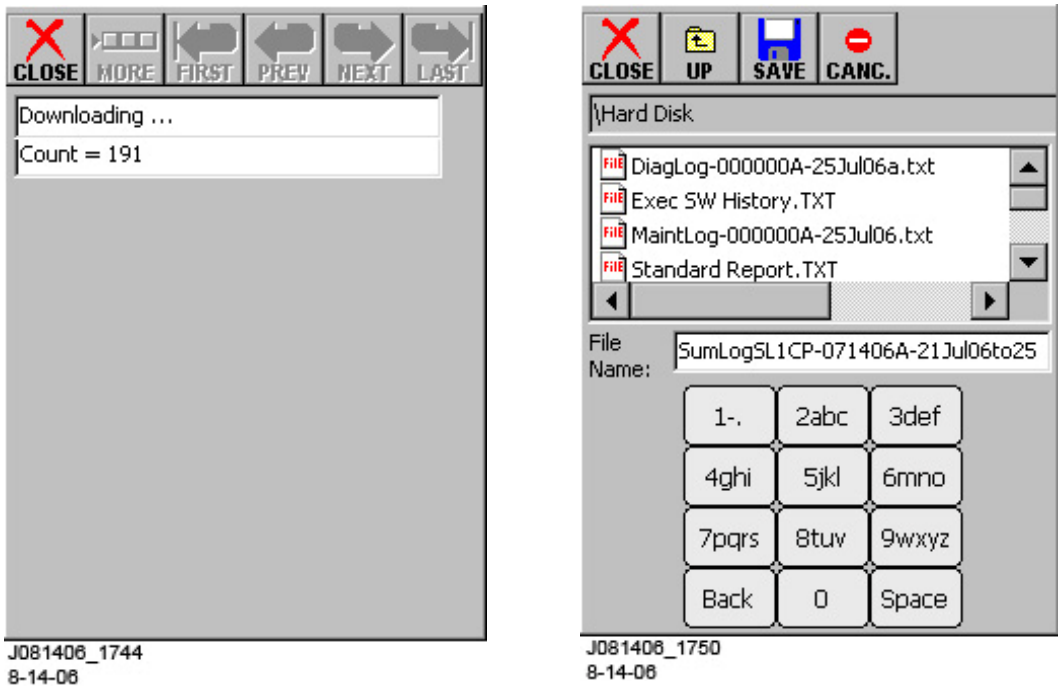
4.3.3.6 Save Summary Log

- Highlight SAVE SUMMARY LOG and press NEXT.
  - Select Download Option. Refer to Figure 4-74
    - Edit dates, if desired, by sliding the button.
  - While downloading the screen in Figure 4-75A is displayed
  - The Status Log file name default is:
    - SumLogSL1CP-DOT No.-DayMoYrtoDayMoYr
  - Edit file name, if desired. Refer to Figure 4-75B
  - Press SAVE button



A B

Figure 4-74. Summary Log Download Options



A B

Figure 4-75. Summary Log Downloading and File Name

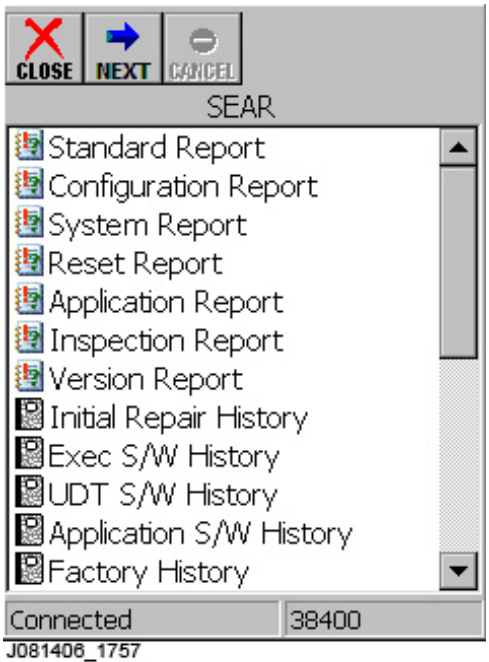
4.3.3.8 SEAR IIi Reports and Files

- Highlight SEAR and press NEXT.
- The SEAR report screen, shown in Figure 4-76, lists all of the reports, histories, incidents, and files that can be saved or uploaded.

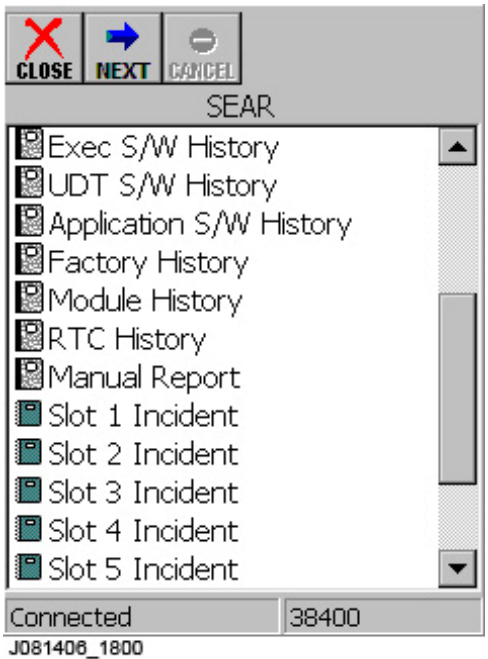
NOTE

The communications between the Display and the SEAR occurs in two ways:

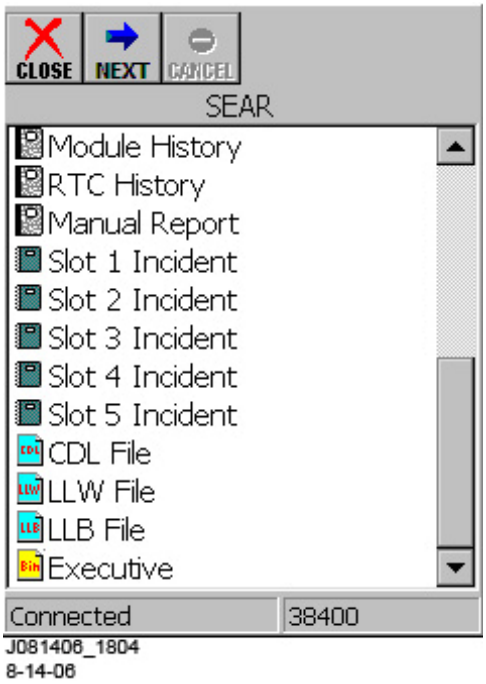
- INTERNAL SERIAL BUSS between Display and SEAR IIi
  - File downloads for reports, histories, incidents
  - File uploads for Control Descriptor Language (CDL) file, Ladder Logic Executive (LLW), and Ladder Logic Label (LLB) files
  - The baud rate of this buss is automatically set at the maximum rate of 38400 baud.
  - The file transfer time for the Display is approximately 50% longer than when transferring files using a PC set at 57600 baud
- EXTERNAL SERIAL CABLE connecting the Display DIAG port and the SEAR IIi USER port.
  - File uploading for the SEAR executive software
  - The SEAR IIi USER port setting must be set 38400 baud. Refer to section 9.6.2 for instruction on setting the setting the baud rate.



A



B



C

Figure 4-76. SEAR Report and File Screens

4.3.3.8.1 Standard Report

- Highlight STANDARD REPORT and press NEXT. Refer to Figure 4-77A.
  - The Download Date screen appears.
    - Edit dates, if desired, by selecting the browse button located to the right of the date.
    - Edit times, if desired, by selecting the up and down arrows located to the right of the time
  - The Standard Report file name default is:
    - Standard Report.TXT
  - Edit file name, if desired. Refer to Figure 4-78.
  - Press SAVE button

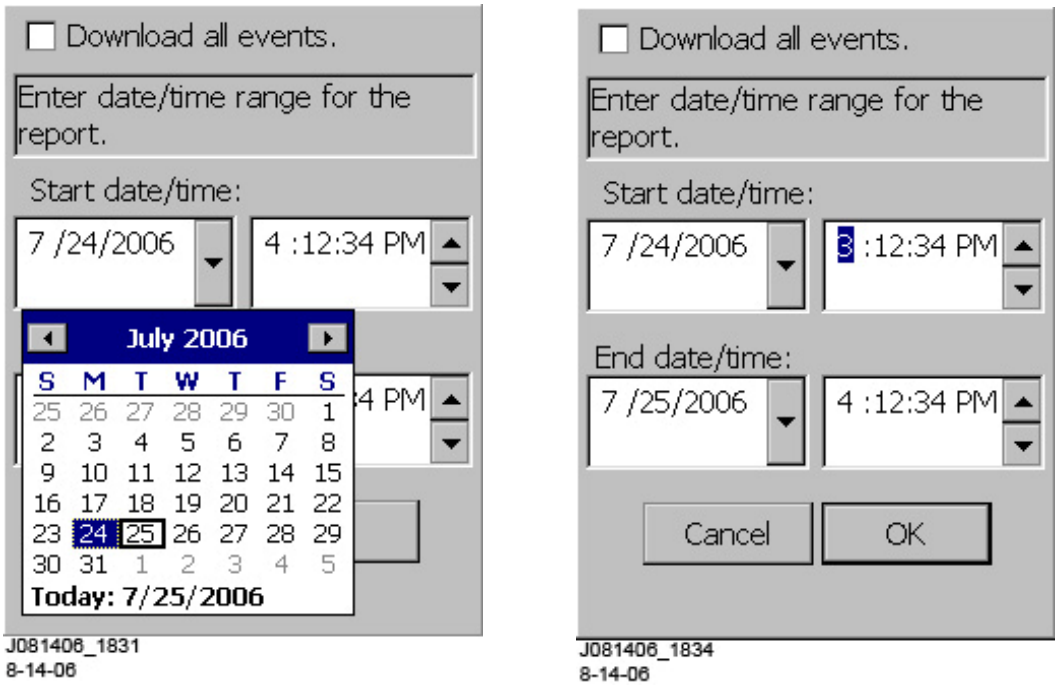


Figure 4-77. Standard Report Date and Time Editing

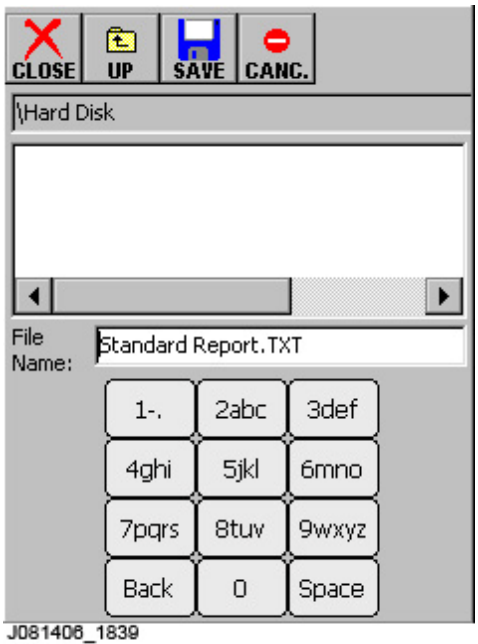


Figure 4-78. Standard Report File Name

4.3.3.8.2 Configuration Report

- Highlight CONFIGURATION REPORT and press NEXT. Refer to Figure 4-79.
  - The Configuration Report file name default is:
    - Configuration Report.TXT
  - Edit file name, if desired.
  - Press SAVE button

Figure 4-79. Configuration Report File Name

4.3.3.8.3 System Report

- Highlight SYSTEM REPORT and press NEXT. Refer to Figure 4-80.
  - The System Report file name default is:
    - System Report.TXT
  - Edit file name, if desired.
  - Press SAVE button

Figure 4-80. System Report File Name

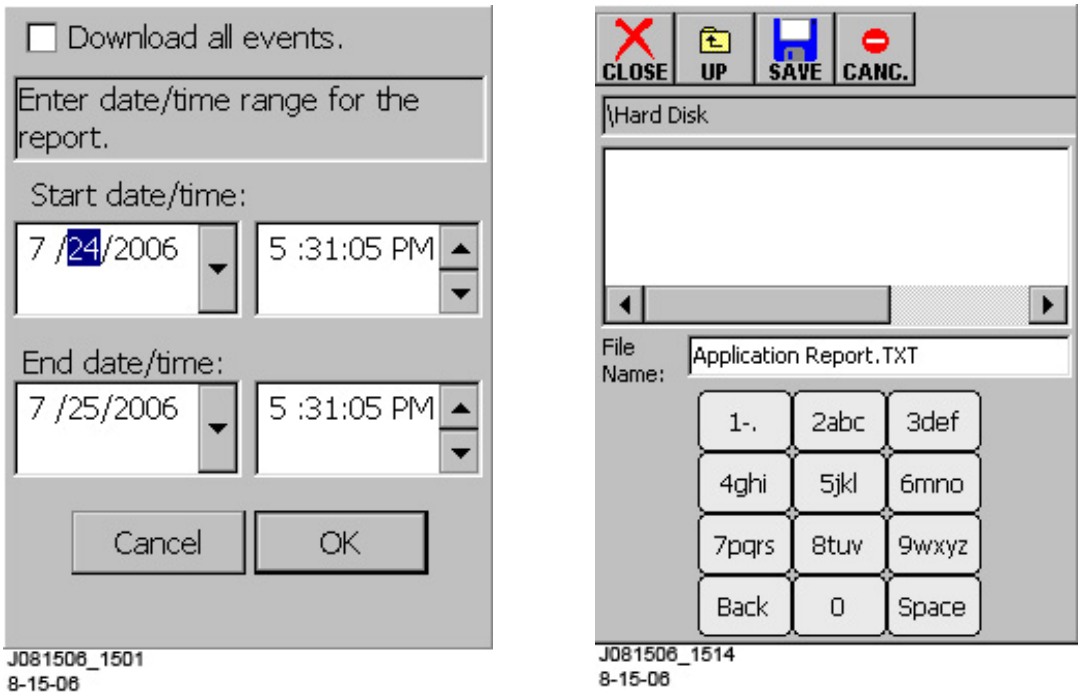
4.3.3.8.4 Reset Report

- Highlight REST REPORT and press NEXT. Refer to Figure 4-81.
  - The System Report file name default is:
    - Reset Report.TXT
  - Edit file name, if desired.
  - Press SAVE button.

Figure 4-81. Reset Report File Name

4.3.3.8.5 Application Report

- Highlight APPLICATION REPORT and press NEXT. Refer to Figure 4-82A.
  - The Download Date screen appears.
    - Edit dates, if desired, by selecting the browse button located to the right of the date.
    - Edit times, if desired, by selecting the up and down arrows located to the right of the time.
  - The Application Report file name default is:
    - Application Report.TXT (Figure 4-82B).
  - Edit file name, if desired.
  - Press SAVE button.



A B

Figure 4-82. Application Report Date / Time and File Name

4.3.3.8.6 Inspection Report

- Highlight INSPECTION REPORT and press NEXT. Refer to Figure 4-83.
  - The System Report file name default is:
    - Inspection Report.TXT
  - Edit file name, if desired.
  - Press SAVE button.

Figure 4-83. Inspection Report File Name

4.3.3.8.7 Version Report

- Highlight VERSION REPORT and press NEXT. Refer to Figure 4-84.
  - The System Report file name default is:
    - Version Report.TXT
  - Edit file name, if desired.
  - Press SAVE button.

Figure 4-84. Version Report File Name

4.3.3.8.8 Initial Repair History

- Highlight INITIAL REPAIR HISTORY and press NEXT. Refer to Figure 4-85.
  - The Initial Repair History file name default is:
    - Initial Repair History.TXT
  - Edit file name, if desired.
  - Press SAVE button.

Figure 4-85. Initial Repair History File Name

4.3.3.8.9 Exec S/W History

- Highlight EXEC SW HISTORY and press NEXT. Refer to Figure 4-86.
  - The Initial Repair History file name default is:
    - Exec SW History.TXT
  - Edit file name, if desired.
  - Press SAVE button.

Figure 4-86. Executive Software File Name

4.3.3.8.10 UDT S/W History

- Highlight APPLICATION SW HISTORY and press NEXT. Refer to Figure 4-87.
  - The Application Software History file name default is:
    - Application SW History.TXT
  - Edit file name, if desired.
  - Press SAVE button.

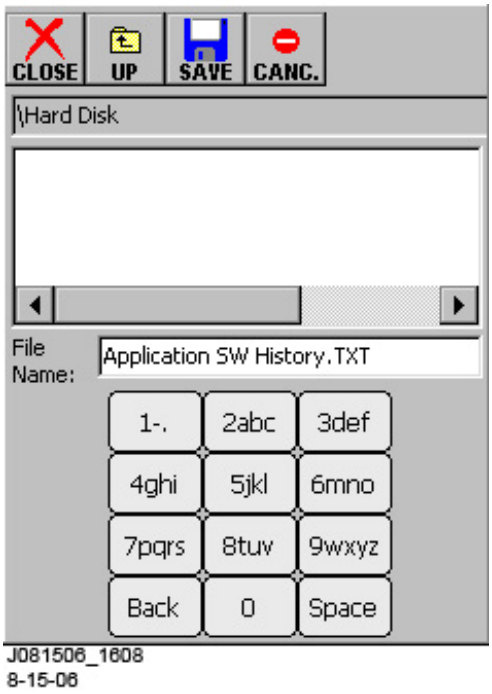


Figure 4-87. Application Software File Name

4.3.3.8.11 Factory History

- Highlight FACTORY SW HISTORY and press NEXT. Refer to Figure 4-88.
  - The Factory History file name default is:
    - Factory History.TXT
  - Edit file name, if desired.
  - Press SAVE button.

Figure 4-88. Factory History File Name

4.3.3.8.12 Module History

- Highlight MODULE HISTORY and press NEXT. Refer to Figure 4-89.
  - The Module History file name default is:
    - Module History.TXT
  - Edit file name, if desired.
  - Press SAVE button.

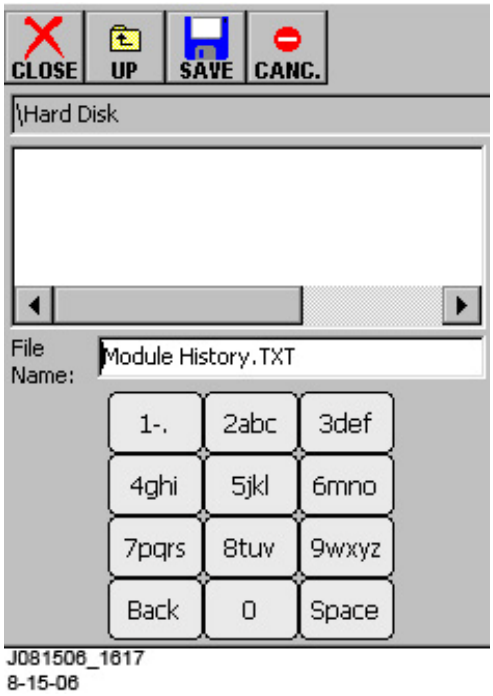


Figure 4-89. Module History File Name

4.3.3.8.13 RTC History (Real Time Clock)

- Highlight RTC HISTORY and press NEXT. Refer to Figure 4-90.
  - The RTC History file name default is:
    - RTC History.TXT
  - Edit file name, if desired.
  - Press SAVE button.

Figure 4-90. rtc History File Name

4.3.3.8.14 Manual (Repair History) Report

- Highlight MANUAL REPORT and press NEXT. Refer to Figure 4-91.
  - The Manual (Repair History) Report file name default is:
    - Manual Report.TXT
  - Edit file name, if desired.
  - Press SAVE button.

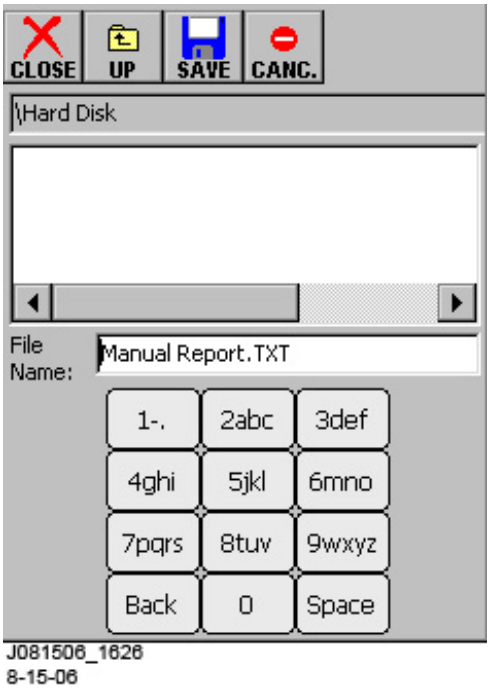


Figure 4-91.Manual (Repair History) Report File Name

4.3.3.8.15 SLOT 1 thru SLOT 5 Incident

- SLOT 1 thru Slot 5 Incidents are saved in the same manner. (#= slot number)
- Highlight SLOT # INCIDENT and press NEXT. Refer to Figure 4-92.
  - The Slot # Incident file name default is:
    - Slot # Incident.TXT
  - Edit file name, if desired.
  - Press SAVE button.

Figure 4-92. Slot # Incident File name

4.3.3.8.16 Upload CDL

- The CDL file is copied from the USB device on the display to the SEAR IIi via internal wiring
- Highlight CDL FILE and press NEXT. Refer to Figure 4-93.
  - ♦ Select the CDL that is to be copied by touching the name on the display. The name will transfer to the 'file name' box.
  - ♦ Press the OPEN button to download the file.

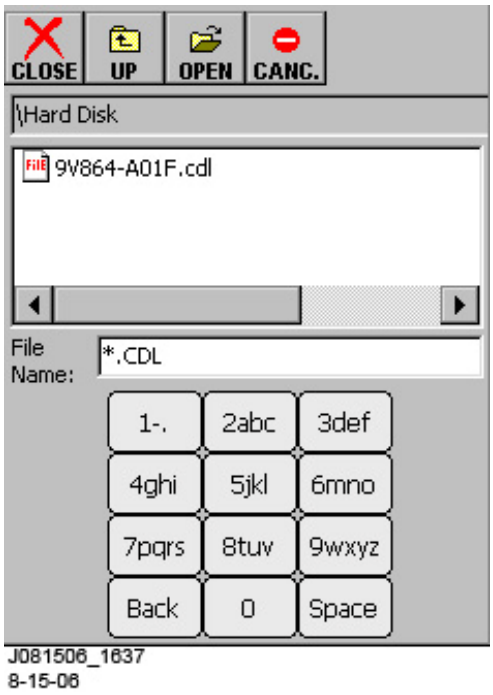


Figure 4-93. CDL File Name

4.3.3.8.17 Upload Ladder Logic Executive (LLW) software

- The LLW FILE is copied from the USB device on the display to the SEAR IIi via internal wiring
- Highlight LLW FILE and press NEXT. Refer to Figure 4-94.
  - ♦ Select the LLW file that is to be copied by touching the name on the display. The name will transfer to the 'file name' box.
  - ♦ Press the OPEN button to download the file.

Figure 4-94. Ladder Logic Executive File Name

4.3.3.8.18 Upload Ladder Logic Label (LLB) software from USB Drive

- The LLB FILE is copied from the USB device on the display to the SEAR IIi via internal wiring.
- Highlight LLW FILE and press NEXT. Refer to Figure 4-95.
  - ♦ Select the LLB that is to be copied by touching the name on the display. The name will transfer to the 'file name' box.
  - ♦ Press the OPEN button to download the file.

Figure 4-95. Ladder Logic Label File Name

4.3.3.8.19 Upload SEAR Executive Software from USB Drive

- The EXECUTIVE is copied from the USB device by connecting a serial cable with Null Modem Adapter between the Display DIAG PORT and SEAR IIi USER PORT. A male-male gender changer with Null Modem adapter is provided on the Display module.
- Highlight EXECUTIVE and press NEXT. Refer to Figure 4-96.
  - ♦ Select the Executive software that is to be copied by touching the name on the display. The name will transfer to the 'file name' box.
  - ♦ Press the OPEN button to download the file.

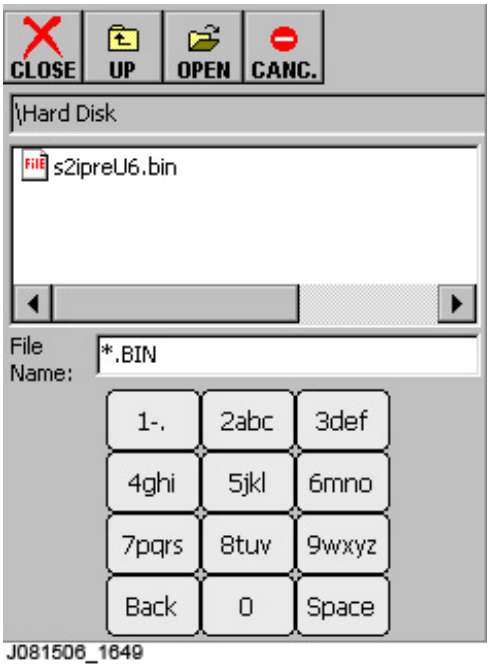


Figure 4-96. SEAR Executive File Name

4.3.4 Uploading and Updating Files from USB Drive

To select a file type to upload, highlight the function name by touching the name on the screen and then press NEXT.

⚠ WARNING

- **UPLOADING A CONFIGURATION, MEF, OR MCF WILL PLACE THE GCP IN A RESTRICTIVE STATE AND ACTIVATE THE CROSSING WARNING SYSTEM.**
  - **GATES WILL BEGIN TO LOWER IMMEDIATELY (WITHOUT GATE DELAY)**
- **BEFORE UPLOADING BEGINS, TAKE ADEQUATE PRECAUTIONS TO WARN ANY PEDESTRIANS, PERSONNEL, TRAINS, AND VEHICLE IN THE AREA UNTIL PROPER SYSTEM OPERATION IS VERIFIED.**
- **TESTS MUST BE PREFORMED TO VERIFY PROPER OPERATION OF GCP PRIOR TO PLACING THE SYSTEM BACK IN SERVICE**

NOTE

The communication speed for the display-based DT to module interface is 38,400 Baud/Sec. The communication speed for the PC-based DT to module interface is 56,000 Baud/Sec. Therefore, uploading files via the Display DT will take approximately 50% longer that uploading from a PC.

4.3.4.1 Upload Configuration (PAC File)

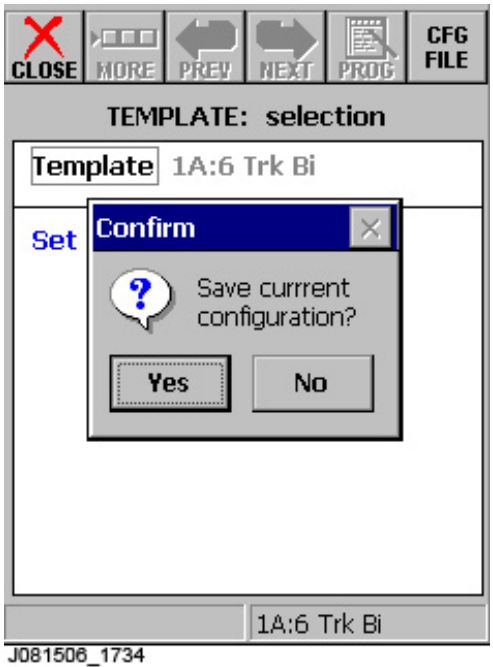
- The PAC FILE is copied from the USB device on the display to the CPU module via internal wiring.
- Highlight UPLOAD CONFIGURATION and press NEXT. Refer to Figure 4-97.

⚠ WARNING

- **UPLOADING A NEW CONFIGURATION WILL PLACE THE GCP IN A RESTRICTIVE STATE AND ACTIVATE THE CROSSING WARNING SYSTEM.**
- **BEFORE UPLOADING BEGINS, TAKE ADEQUATE PRECAUTIONS TO WARN ANY PEDESTRIANS, PERSONNEL, TRAINS, AND VEHICLE IN THE AREA UNTIL PROPER SYSTEM OPERATION IS VERIFIED.**
- **TESTS MUST BE PREFORMED TO VERIFY PROPER OPERATION OF GCP PRIOR TO PLACING THE SYSTEM BACK IN SERVICE**

- Press YES to continue
- Next a prompt to save the current configuration is displayed, as shown in Figure 4-98.
  - Select YES to save the current configuration.
  - Select NO to continue without saving the current configuration.
- Refer to Figure 4-99.
  - Select the Configuration PAC File that is to be copied by touching the name on the display. The name will transfer to the 'file name' box.
- Press the OPEN button to download the file.
- Saving the new PAC file is a two step process. Refer to Figure 4-100
  - Press the SEL pushbutton on the active CPU module. This step must be completed within 5 minutes, or the process must be repeated.
  - Next, press YES to save the PAC file parameter.
- After the PAC file parameters are saved, the Main Status Screen will appear and indicate that track circuit calibration is required.

Figure 4-97. Warning Before Continuing With Upload

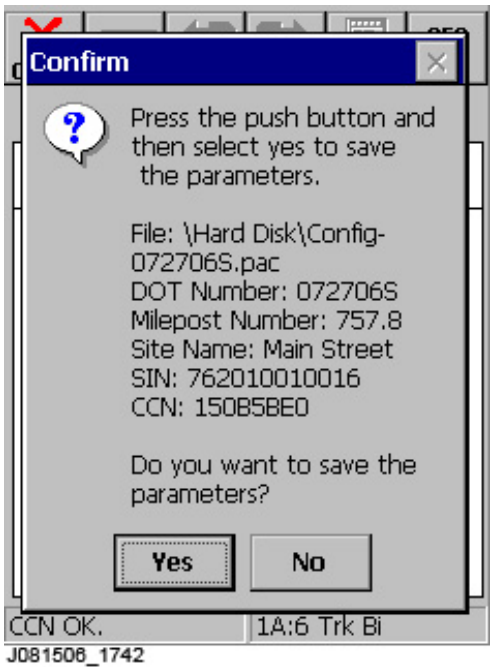


J081506_1734
8-15-06

Figure 4-98. Prompt To Save Current Configuration

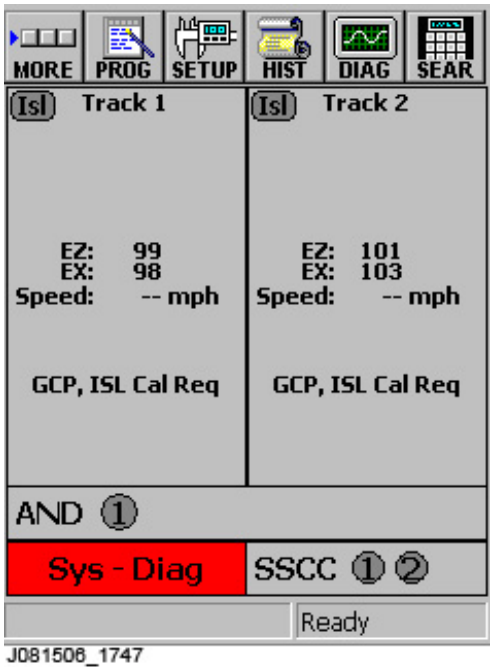
J081506_1738
8-15-06

Figure 4-99. Configuration File Name



J081506_1742
8-15-06

Figure 4-100. Confirmation Of Saving PAC File



J081506_1747
8-15-06

Figure 4-101. Calibration Required After Uploading PAC File

4.3.4.2 Update MEF

- The files are copied from the USB device by connecting a serial cable with Null Modem Adapter between the Display DIAG PORT and the DIAG PORT of the module that is being updated. Generally, a 'male-male gender changer adapter" will also be required.
- The screen in Figure 4-102 further describes the connections
  - Press Next
- Reset the module by pressing YES (Figure 4-103).
- After the display connects to the module that the MEF is being downloaded to, and deletes the previous MEF, the File Name screen shown in Figure 4-104 appears.
  - ♦ Select the MEF File that is to be copied by touching the name on the display. The name will transfer to the 'file name' box.
- Press the OPEN button to download the file.
  - ♦ The file download may take several minutes and the blue progress bar indicates the status.
- Press EXIT when prompted (Figure 4-105).
- If prompted, press the CONNECT button to reconnect the display with the system.

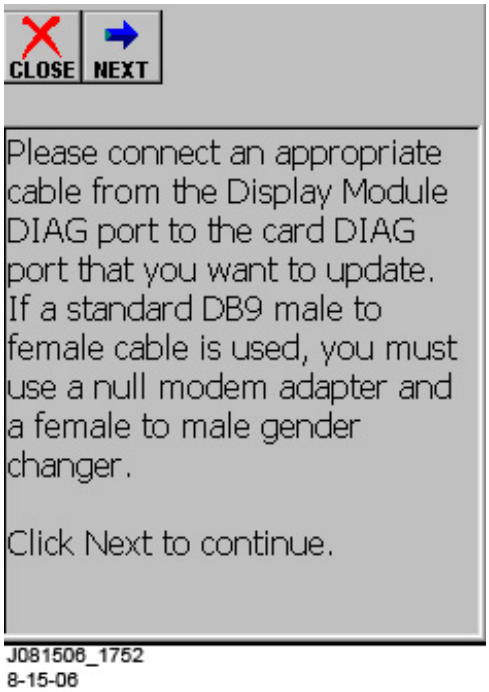


Figure 4-102. Serial Cable Connections

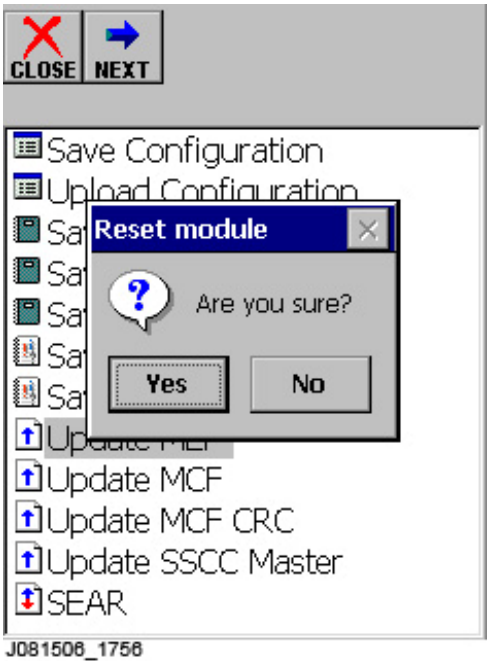


Figure 4-103. Reset Module

Figure 4-104. MEF File Name

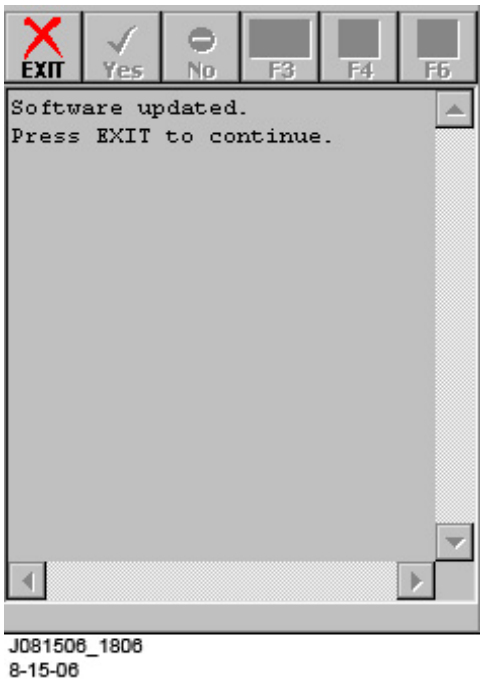


Figure 4-105. Software Update Complete

4.3.4.3 Update MCF

- The files are copied from the USB device by connecting a serial cable with Null Modem Adapter between the Display DIAG PORT and the DIAG PORT of the CPU module that is being updated. Generally, a 'male-male gender changer adapter" will also be required.
- The screen in Figure 4-102 further describes the connections
  - Press Next
- Reset the module by pressing YES (Figure 4-106).
- After the display connects to the module that the MCF is being downloaded to, the File Name screen shown in Figure 4-107 appears.
  - ♦ Select the MEF File that is to be copied by touching the name on the display. The name will transfer to the 'file name' box.
- Press the OPEN button to download the file.
  - ♦ The file download may take several minutes and the blue progress bar indicates the status.
- Next, the MCF's CRC number must be entered, as shown in Figure 4-108.
- Verify CRC entry and then press OK
- Press EXIT when prompted.
- If prompted, press the CONNECT button to reconnect the display with the system.

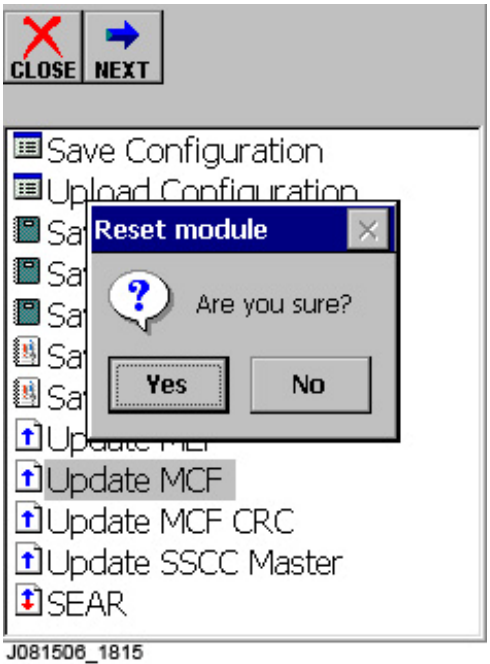


Figure 4-106. Reset Module

Figure 4-107. MCF File Name

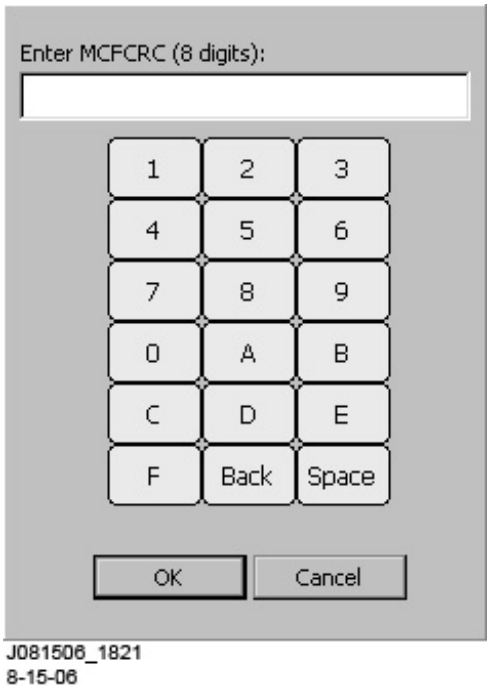


Figure 4-108. Enter MCF CRC Number

4.3.4.4 Update MCF CRC

- In the event that the External Configuration Device, ECD, is replaced on the chassis, or a wrong CRC is entered in the previous step, the following procedure may be used to update the MCF CRC.
- The files are copied from the USB device by connecting a serial cable with Null Modem Adapter between the Display DIAG PORT and the DIAG PORT of the CPU module that is being updated. Generally, a 'male-male gender changer adapter" will also be required.
- The screen in Figure 4-102 further describes the connections
  - Press Next
- Reset the module by pressing YES (Figure 4-106).
- Next, the MCF's CRC number must be entered, as shown in Figure 4-108.
- Verify the MCF entry and then press OK
- Press EXIT when prompted.
- If prompted, press the CONNECT button to reconnect the display with the system.

4.3.4.5 Update SSCC Master MEF

- The files are copied from the USB device by connecting a serial cable with Null Modem Adapter between the Display DIAG PORT and the DIAG PORT of the SSCC module that is being updated. Generally, a 'male-male gender changer adapter" will also be required.
- The screen in Figure 4-102 further describes the connections
  - Press Next
- Reset the module by pressing YES (Figure 4-103).
- After the display connects to the SSCC module that the MEF is being downloaded to, and deletes the previous MEF, the File Name screen shown in Figure 4-109 appears.
  - ♦ Select the MEF File that is to be copied by touching the name on the display. The name will transfer to the 'file name' box.
- Press the OPEN button to download the file.
  - ♦ The file download may take several minutes and the blue progress bar indicates the status.
- Press EXIT when prompted.
- If prompted, press the CONNECT button to reconnect the display with the system.

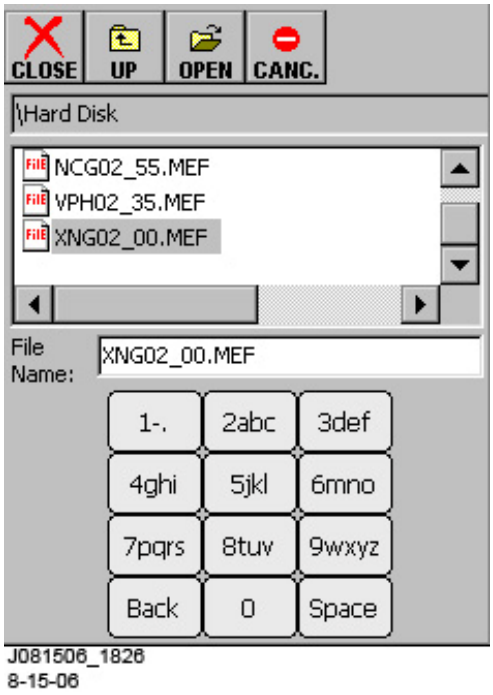


Figure 4-109. SSCC MEF File Name

4.4 DIAGNOSTIC TERMINAL – INSTALLING SOFTWARE ON GCP 4000

The DT is also used to install new software issued by Safetran for the GCP 4000

NOTE

Follow railroad specific procedures for installing software in vital signal equipment. Companies may restrict who may install software and what additional documentation and operational checks are required.

⚠ WARNING

DURING MODULE CHANGEOUT, SOFTWARE REVISION, REBOOT AND CALIBRATION PROCEDURES, WARNING DEVICES MAY NOT OPERATE AS INTENDED. TAKE ALTERNATE MEANS TO WARN VEHICULAR TRAFFIC, PEDESTRIANS, AND EMPLOYEES.

Future software revisions will be issued with instructions that describe which module and data port (connector) the software is to be loaded into. These software instructions may supersede portions of this manual.

4.4.1 Installing Software on CPU Module

NOTE

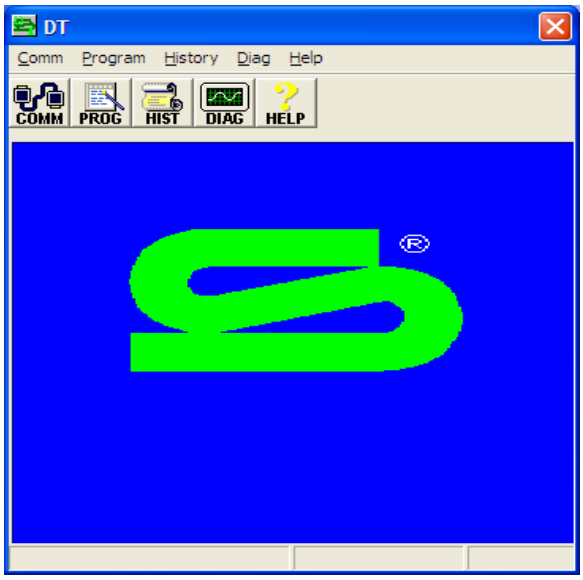
The examples in this section are used to explain how to install software and indicate screens that may be seen. The software and version names may not be the same as seen in an actual GCP. The example will also assume the GCP is a Dual unit and the main modules are loaded first. The procedure is repeated for the standby modules.

In this example the following files will be loaded into the indicated modules and data port:

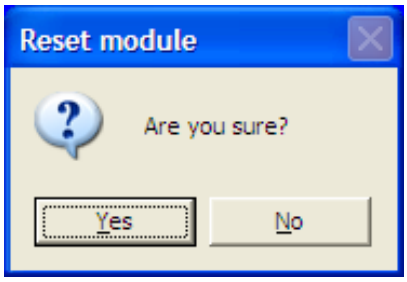
- CPU Module
  - VLP Port – File: VPH02_12.MEF
  - DIAG (CP) Port – File: NCG02_32.MEF
  - DIAG (CP) Port – File: gcp_t6x_01_01L.mcf, CRC=74A5474F
- Track Module
  - DIAG Port – File: GCP02_32.MEF

The files should be copied to a folder in the C:\Safetran\DT folder or another convenient folder on the PC that will be used to install the software.

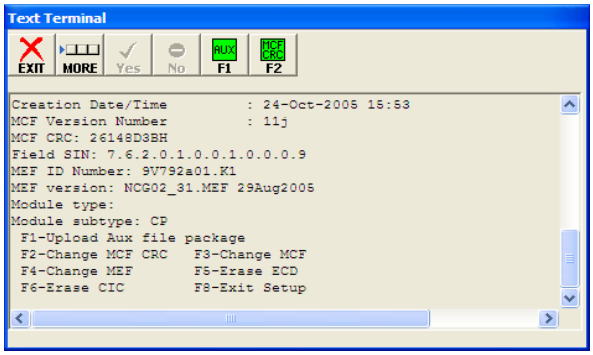
Connect the serial cable between the PC and the DIAG (CP) port of the CPU module. Open the DT software.



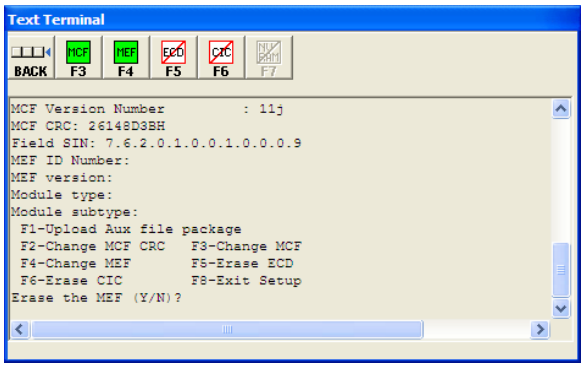
Select **COMM**, then select **Install Software**. A prompt window will ask if you want to REST MODULE. Select YES.



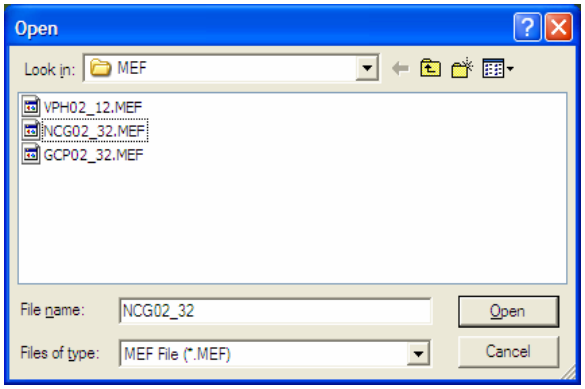
The following Text Terminal screen will appear.



Press F4, or select MORE then the MEF/F4 button.

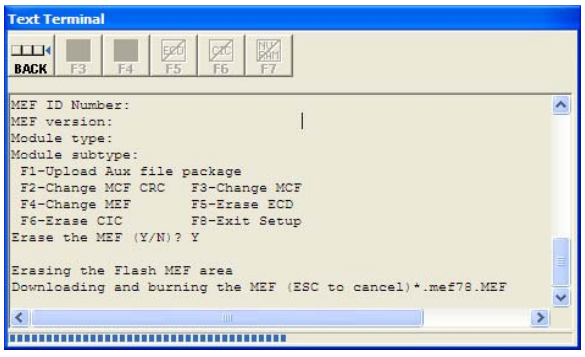


If the Erase the MEF (Y/N)? prompt is displayed, select **Y**. After erasing the previous MEF, the following window will appear.

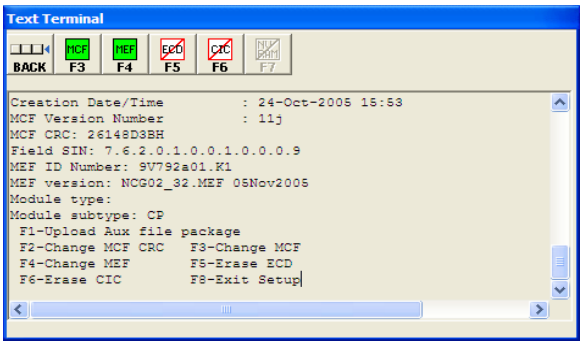


Select the file to be installed, in this example NCG02_32.MEF. This may take a few minutes.

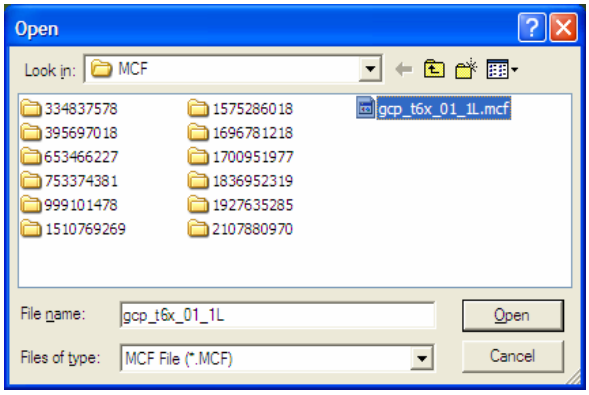
While the file is downloading, progress will be indicated on the bottom line of the window.



When complete, the DT returns to the following screen.



Select **MCF/F3** to proceed with installing the mcf file. When prompted to erase the MCF area, select **Y**. Then select the gcp_t6x_01_01L.mcf file.

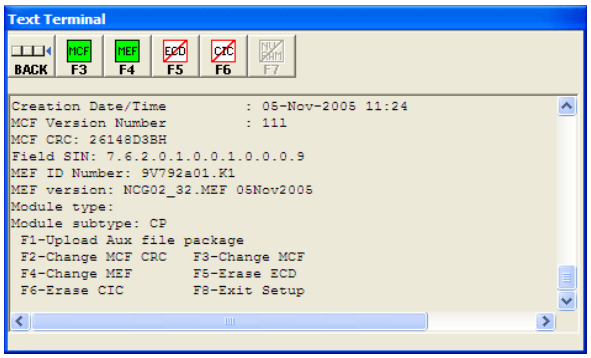


Again, this step may take a few minutes. While it is downloading, progress will be indicated on the bottom line of the window.

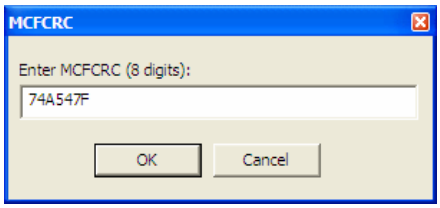
NOTE

After the blue progress bar stops, the CPU loads a copy of the file to the ECD on the chassis. This will be indicated on the DT screen and on the 4 character display on the CPU as LOADING TO ECD. Wait until this process completes before proceeding.

The next step is to change the CRC of the MCF. Select **F2**, or press **BACK** and then select **MCF CRC/F2**.



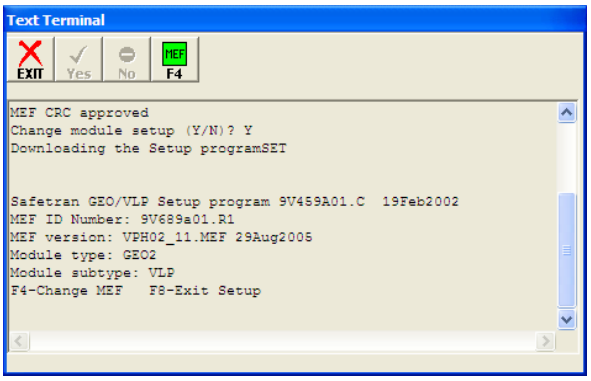
The following dialog box will be displayed. Enter the CRC issued with the software revision instructions. The CRC will always be 8 characters consisting of 0 through 9 and A through F.



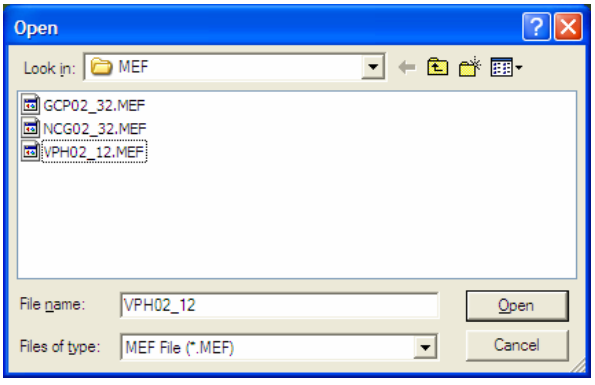
This completes the software installation on the DIAG (CP) port. Next, the software will be installed on the VLP port.

Remove the cable from the DIAG port and connect it to the VLP port. **EXIT** the screen. Select **COMM** and **Install Software**. Select **YES** when prompted to Reset Module.

The following screen appears.



Select **F4** and select **Y** when asked to erase the MEF.



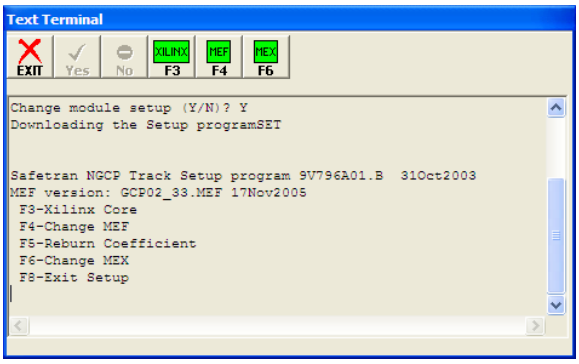
This step may take a few minutes. While it is downloading, progress is indicated at the bottom of the window. When complete select **EXIT** and return to the DT screen.

4.4.2 Installing Software on Track Module

Per the instructions issued with the software revision, the next step is to install the GCP02_32.MEF files on the Track Modules.

- From the **COMM** menu, select **Install Softwar**e
- Repeat the above steps when prompted.
- Repeat the procedure for the remaining Track Modules in the MAIN section of the GCP.
- Repeat the procedure for installing all files on the STANDBY modules.

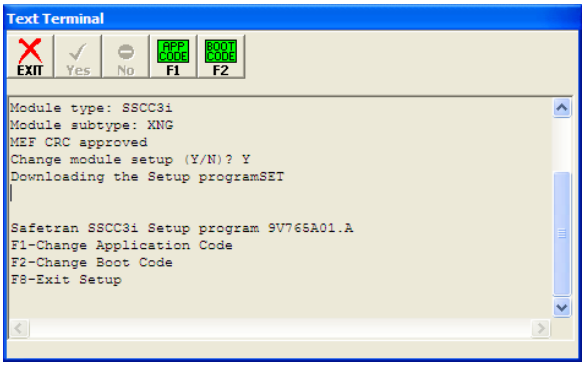
The track software upgrade screen is shown below.



4.4.3 Installing Software on SSCC IIIi Module

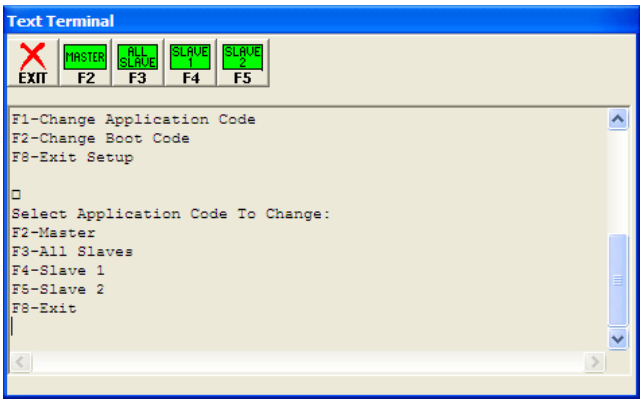
If the instructions issued with the software revision, call for upgrading the software in the SSCC IIIi Module, the next step is to install the specified MEF file on the SSCC modules. The SSCC Modules have a master processor that controls slave processors, which control the independent lamp outputs. Therefore, there are separate MEFs for the master and slave processors.

From the **COMM** menu, select **Install Software**.



Selecting F1 will change Application Code, which on the SSCC are MEF files.

- Based on the issued instructions, load the new software.
- Repeat the procedure for the remaining SSCC IIIi Module.



Loading software into the display module is discussed in the following section.

4.4.4 Changing Display Module Software

The installation of software on the Display Module is a two-part process.

1. The DT Display Module software must be copied to a CompactFlash® card.
2. The DT software must be installed in the Display Module using the CompactFlash® Card and CompactFlash® to PCMCIA adapter (CompactFlash® PC Card Adapter).

Installation of DT to CompactFlash® Card

- Tools Needed:
  - CD containing DT Display software
  - CompactFlash® Card (minimum 32 MB)
  - CompactFlash® PC Card Adapter (if needed)
  - Computer equipped with one of the following:
    - CompactFlash® Card slot
    - Peripheral device with a CompactFlash® Card slot (CompactFlash® Reader)
    - A PC Card slot (use CompactFlash® Card Adapter)

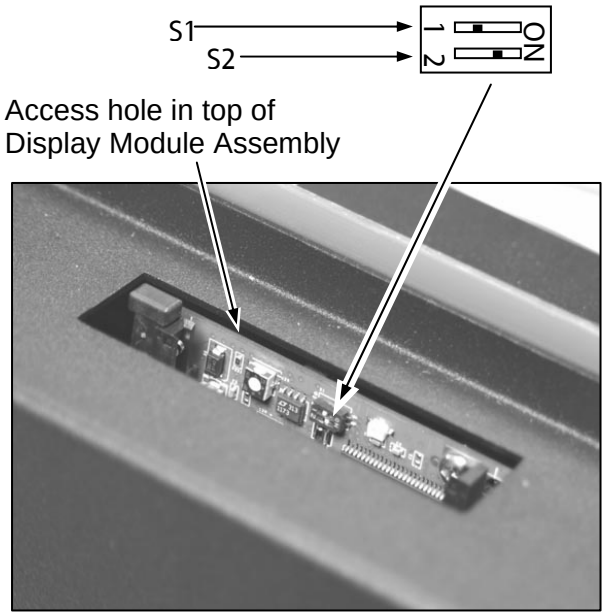
NOTE

CompactFlash® Cards up to 2 GB may be used for this application. However, any CompactFlash® Card used must be formatted for FAT (FAT 16) file format. In Windows® XP, go to **My Computer** and select the CompactFlash® Card. From the **File** menu select **Format>FAT**.

- Insert CompactFlash® Card into computer/adapter and confirm using Windows Explorer that the CompactFlash® Card is available.
- Insert CD into CDROM drive. If auto run does not start the installation program, use Windows Explorer and navigate to the Setup.exe located on the installation CD. Start the Setup.exe application.
- Select the drive identified as the CompactFlash® Card as the destination folder when prompted. Select Finish when done.
- Using Windows Explorer, navigate to the drive identified as the CompactFlash® Card. Using the Mouse, select the CompactFlash® Card with a right click and select “Eject” in the popup menu. Confirm that no error messages are produced.
- Remove CompactFlash® Card from the computer. if a CompactFlash® PC Card Adapter was used, remove adapter and CompactFlash® Card together.

Installation of DT from CompactFlash® Card to A80407 Display Module

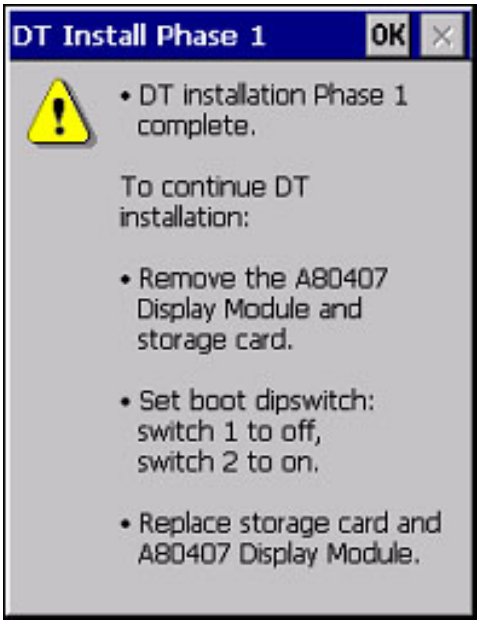
- Tools Needed for A80407 Display Module:
  - CompactFlash® Card with DT files
  - CompactFlash® PC Card Adapter
- Remove the A80407 Display Module from the GCP chassis.
- Locate boot DIP switch and turn off number 2 switch on A80407 Display Module (number 1 switch should already be off). See figure below.



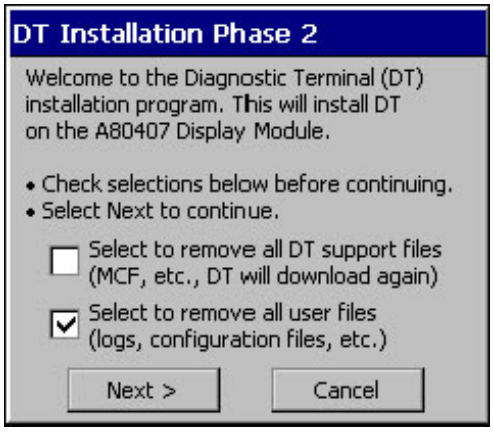
- Insert adapter with CompactFlash® Card into PCMCIA slot. See figure below.

- Insert A80407 Display Module into appropriate slot in GCP chassis.

- After the Display Module boots up, a stylus calibration screen will display (white screen with a target in the middle). Tap the target firmly and accurately at each location on the screen. The target will continue to move until the screen is aligned. When the screen displays "Time limit: …", tap anywhere to store the settings.
- After stylus calibration screen closes, the following dialog should display:



- Follow the instructions on the dialog. **Note that the adapter with CompactFlash® Memory card (Storage card) must be returned to the PCMCIA slot.**
- After the A80407 Display Module boots up again, the following dialog should display:



- It is recommended that all files be removed (select both options). Select “Next >” when ready. Select “Yes” for confirm dialog (this will start installation).

- After several minutes, a dialog should display that indicates installation is complete. Select Finish when ready. Remove CompactFlash® Card and adapter from A80407 Display Module. Replace the Display Module to start DT.

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SECTION 5 - MAIN PROGRAM MENU DESCRIPTION

5.1 OVERVIEW

5.1.1 Menu Selection

The **MAIN PROGRAM Menu** window, figure 5-1:

- displays when **PROG** button at top of Main Status Screen or **PROG** button at top of menu window is selected
- menu items provide access to:
  - ♦ Template selection and programming windows
  - ♦ Case and predictor configuration windows
  - ♦ GCP and island application programming windows
  - ♦ Advanced application programming windows
  - ♦ Crossing Controller programming windows
  - ♦ Input/output assignments
  - ♦ Safetran Internal Event Recorder (SEAR) programming windows
  - ♦ Site programming windows
- navigation is by means of buttons at the top of the window (see figure 5-2)
  - ♦ functions are indicated by icons

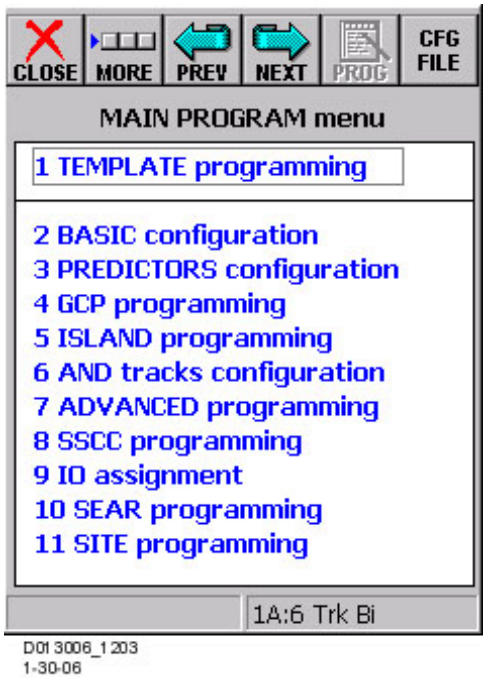


Figure 5-1. Main Program Menu Window

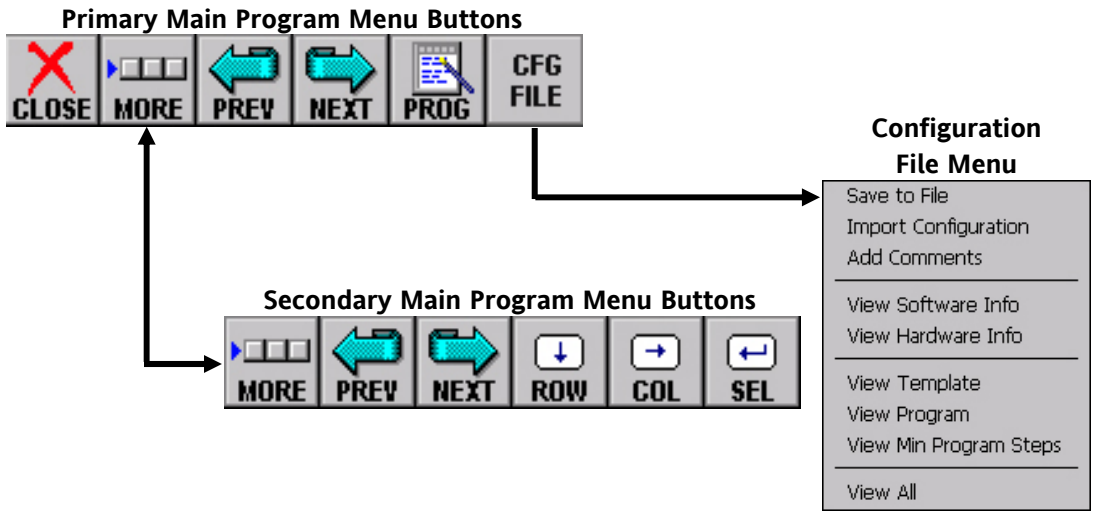


Figure 5-2. Main Menu Navigation Buttons

5.1.1.1 Navigating Between Menus

Two additional buttons appear on certain track menus (see figure 5-3):

- These buttons allow navigation between functionally equivalent track menus
- Selecting the Forward Arrow button changes the display to the next track menu.
- Selecting the Back Arrow button changes the display to the previous track menu.

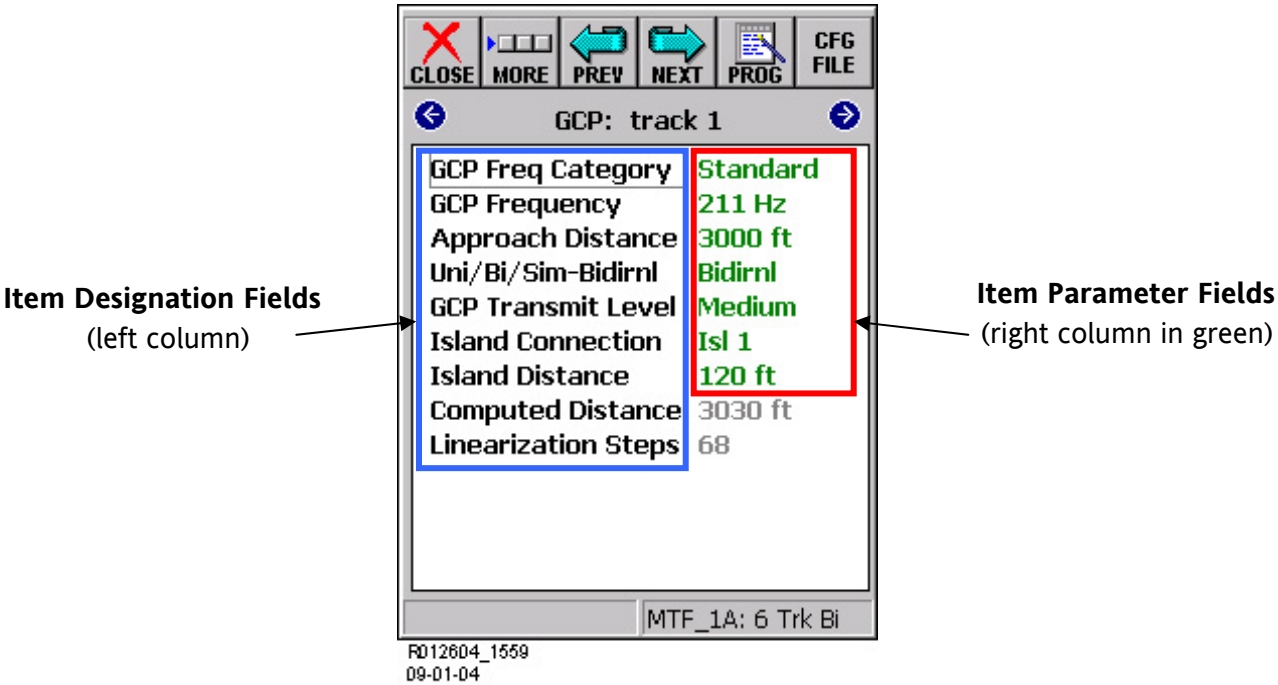


Figure 5-3. Typical Menu Window

5.1.2 Programming Options

Once a template has been selected, there are two options for programming the 4000 GCP; Template programming (simplified short form) and Total programming (complete program).

- Begin Template programming by selecting **1 TEMPLATE programming** from the **MAIN PROGRAM menu.** Then use the **NEXT** button at the top of the screen to navigate to each of the simplified template programming windows. Refer to Figure 5-1.
- Begin Total programming by selecting **2 BASIC programming** from the **MAIN PROGRAM menu.** Then use the **NEXT** button at the top of the screen to navigate to each window of all remaining menu items (3 through 11) on the **MAIN PROGRAM menu**. Refer to Figure 5-1
  - ♦ When performing total programming, any **MAIN PROGRAM menu** item (2 through 11) may be selected to jump directly to the selected area for programming or verification of program values.

5.1.3 Menu Item Selection

Selecting an item from the **MAIN PROGRAM menu** brings up a corresponding menu window (see figure 5-3).

- Each menu window provides one or more menu item sets, with each set consisting of:
  - ♦ Item designation field:
    - ▪ blue indicates link to other menu window
    - ▪ gray identifies inactive field
    - ▪ asterisk (*) indicates that addition fields will display below the current field position when the corresponding item parameter field is changed from its default value
  - ♦ Item parameter field:
    - ▪ green color
    - ▪ provides link to corresponding **Set Parameter** dialog box.

5.1.4 Changing Menu Item Values

Selecting a menu window item parameter field brings up the corresponding **Set Parameter** dialog box.

- Three dialog box types:
  - *decision* dialog box (see figure 5-4)
    - provides a choice between two status parameters:
  - *parameter select* dialog box (see figure 5-5)
    - provides a list of status parameters
  - *numeric parameter* dialog box (see figure 5-6)
    - Provides a keypad for numeric parameters entry

5.1.4.1 Decision Dialog Box

When a *decision* dialog box is opened:

- the current status parameter appears in the **Current Value** field of the dialog box as shown in figure 5-4.
- the new status automatically appears in the **New Value** field

Selecting the **Update** button closes the dialog box and returns the display to the **Menu** window

- The new value appears in the status parameter field

Selecting the **Cancel** button closes the dialog box without changing the status parameter.

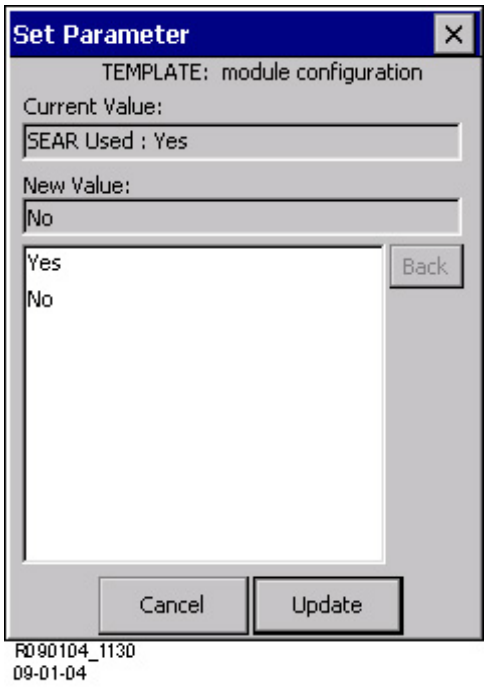


Figure 5-4. Typical Decision Dialog Box

5.1.4.2 Parameter Select Dialog Box

When a *parameter select* dialog box is opened:

- the current option parameter appears in the **Current Value** field of the dialog box as shown in figure 5-5.
- the **New Value** field is blank.

Selecting:

- a parameter from the option list places the parameter in the **New Value** field.
- the **Update** button closes the dialog box and returns the display to the **Menu** window
  - ♦ The new value appears in the option parameter field
  - ♦ When a value has not been selected the following prompt displays:

- the **Cancel** button closes the dialog box without changing the option parameter.

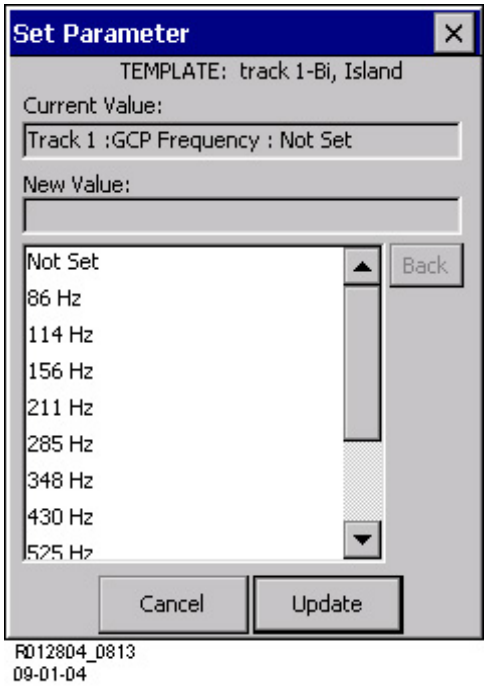


Figure 5-5. Typical Parameter Select Dialog Box

5.1.4.3 Numeric Value Entry Dialog Box

When a *numeric value entry* dialog box is opened:

- the current numeric parameter appears in the **Current Value** field of the dialog box as shown if figure 5-6.
- The **New Value** field is blank.

A new parameter entered on the keypad is appears in the **New Value** field.

Selecting:

- the **Update** button closes the dialog box and returns the display to the **Menu** window
  - ♦ the new value appears in the option parameter field
- the **Cancel** button closes the dialog box without changing the option parameter.

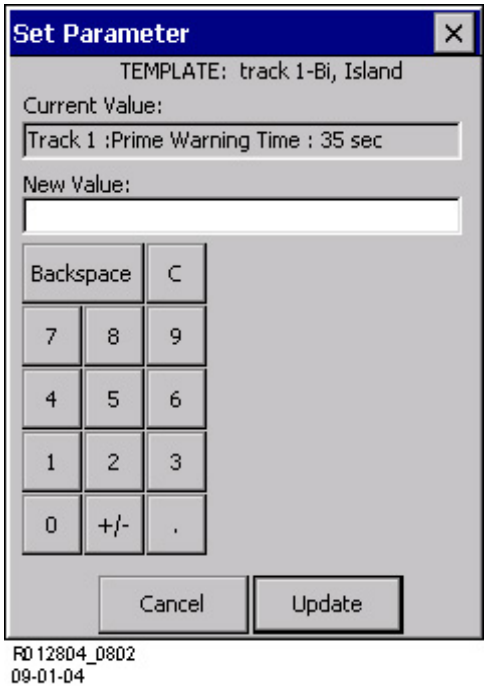
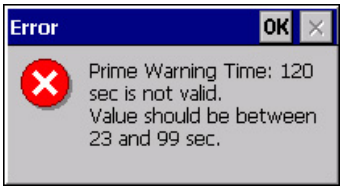


Figure 5-6. Typical Numeric Parameter Dialog Box

5.1.4.4 Out Of Range New Value Field Entry

When a **NEW Value** field entry exceeds an allowable parameter range the following prompt displays:



- Selecting the **OK** button:
  - ♦ closes the prompt
  - ♦ clears the invalid entry from the **New Value** field

5.2 TEMPLATE PROGRAMMING MENU ITEMS

Diagnostic Terminal (DT) templates configure the 4000 GCP for compatibility with basic track applications. Each template sets:

- all programming menu items to a selected default value for each of up to six tracks
- the configuration of each track
- the location of each GCP track and island circuit relative to the crossing

5.2.1 Template Selection Item

Activating the **TEMPLATE selection** item brings up the **TEMPLATE selection** menu window, figure 5-7A.

- Displays the current operational template.

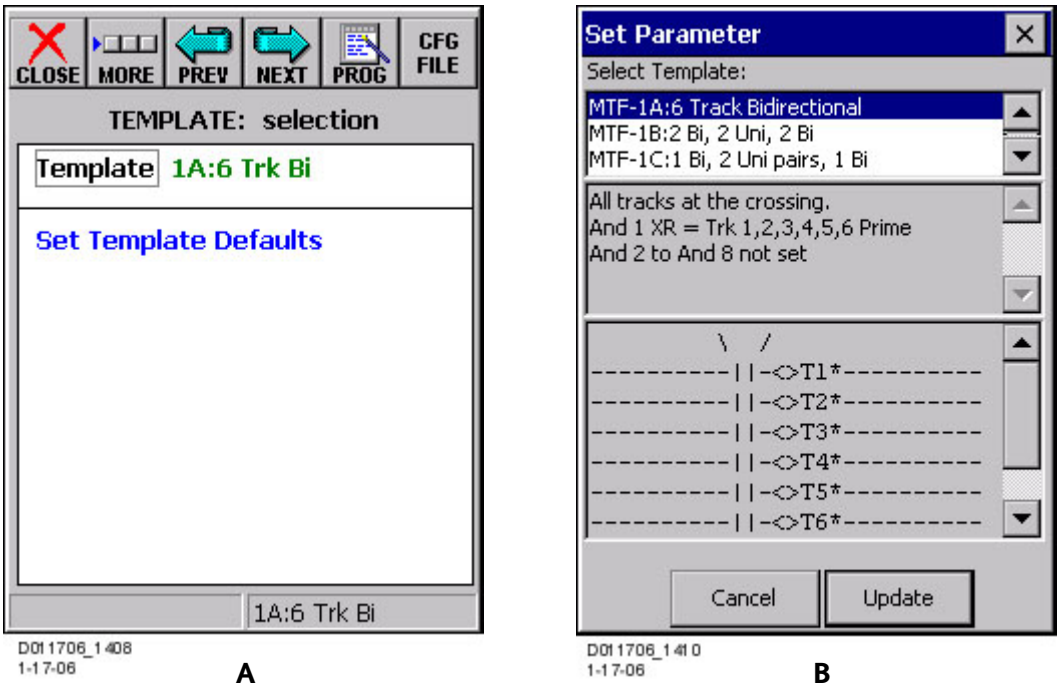


Figure 5-7. TEMPLATE Menu Selection Windows

The current operational template may be changed by:

- activating the displayed template designation field
  - ♦ The **Select Template Set Parameter** window, figure 5-7B, displays
- selecting a template from the **Select Template** menu list
- confirming the new entry by selecting the **UPDATE** button
  - ♦ The **Set Parameter** window closes, returning the display to the **TEMPLATE selection** menu window.
    - The new entry appears in the menu window

- After approximately 10 seconds the 4000 GCP resets.
  - After approximately 1 minute the new template is applied to the system and all perimeters are set to default
  - At this time all site specific parameters must be reprogrammed.

5.2.1.1 Template Menu Structure

The Template menu structure varies according to the active template.

- Menus and menu items for all active functions are displayed.

A typical template menu structure is shown in figure 5-8.

- Template menus are navigated by use of **NEXT** button
- Menus and menu items for unused or redundant functions are not displayed.
- Examples:
  - when Track-1 and Track-2 modules are used as a unidirectional pair, the **Isl** (island) **Frequency** and **Island Distance** items for the common island appear on the **track 1** menu window but not on the **track 2** menu window.
  - when Track-1 and Track-2 modules are used as a remote unidirectional pair, the corresponding **TEMPLATE: advance preempt** menus are omitted from the menu structure.

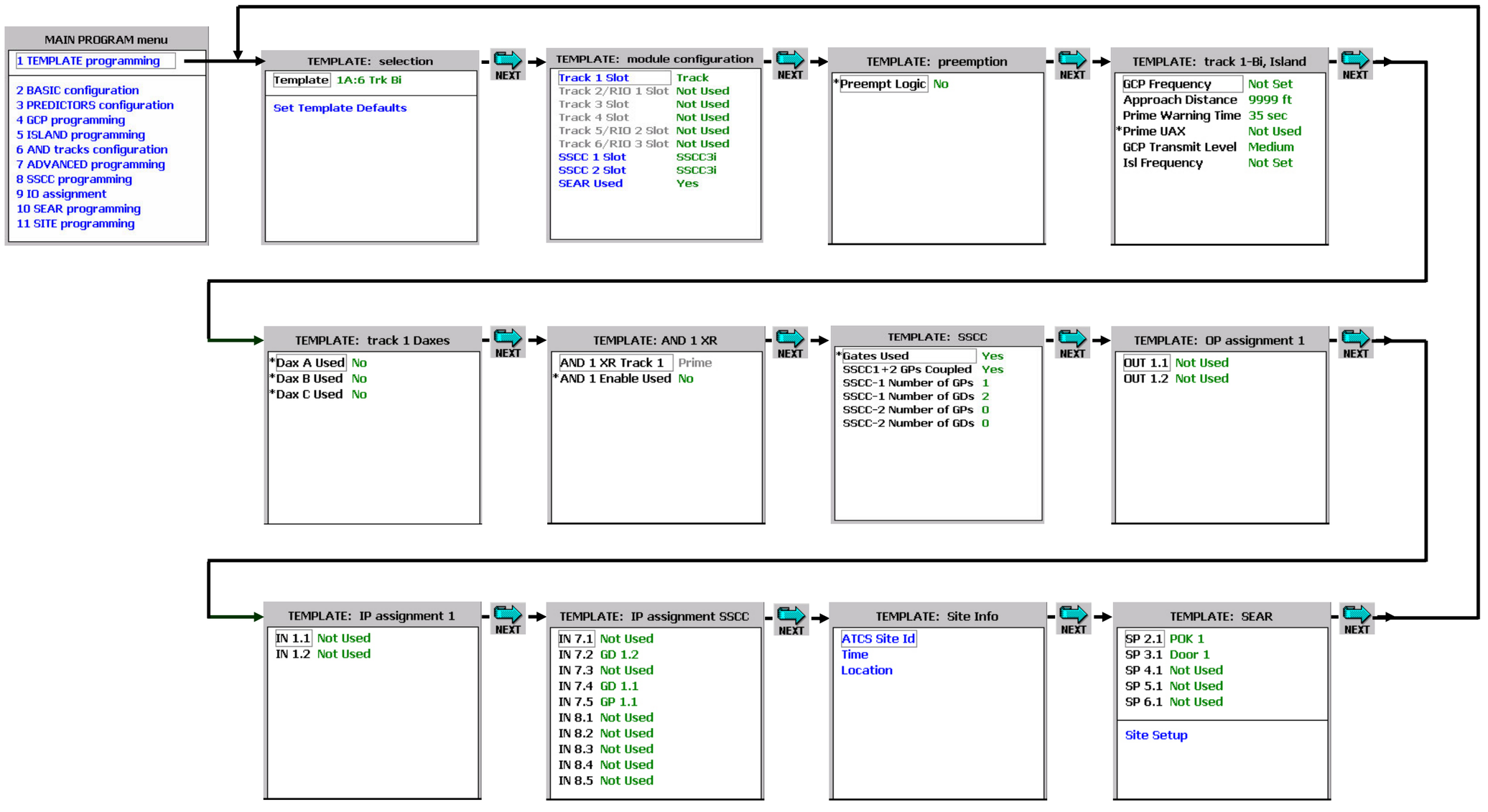
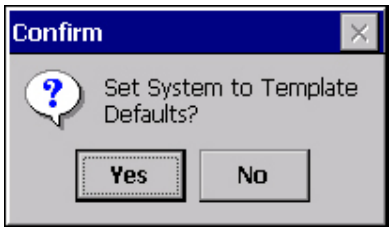


Figure 5-8. TEMPLATE Menu Structure

5.2.2 TEMPLATE Set Default Item

Activating the **TEMPLATE set default** item brings up the following prompt:



- Selecting **Yes** from the prompt
  - ♦ temporarily deactivates (grays out) the **TEMPLATE: Selection** Menu Window
  - ♦ After approximately 60 seconds:
    - ▪ the Diagnostic Terminal is re-initialized
    - ▪ all program options are reset to the template default values

5.2.3 TEMPLATE Programming Item

Selecting the Next button from **TEMPLATE selection** window brings up the **TEMPLATE: module configuration** window, figure 5-9.

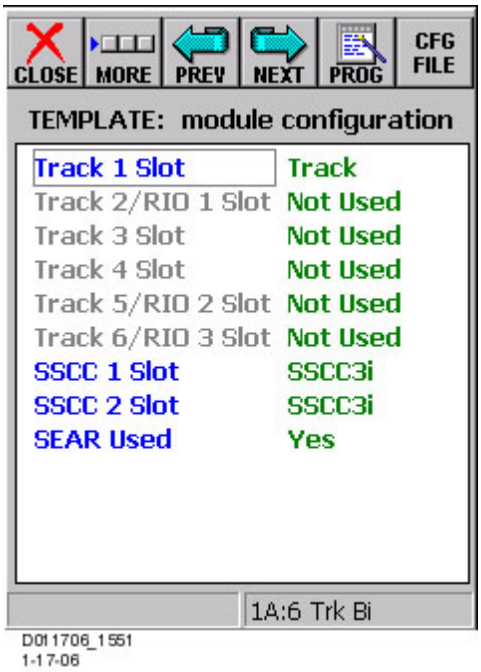


Figure 5-9. TEMPLATE: Module Configuration Menu Window

This window:

- designates the specific module assignment for each module position.
  - ♦ Unoccupied positions are set to **Not Used**.
- designates the activity status of the SEAR module
  - ♦ SEAR is operational when set to **Yes.**

The menu status fields:

- interact with corresponding **BASIC: Module Configuration** fields.
- provide links to other windows within the menu:
  - ♦ blue **Module** fields of active Track modules are linked to the corresponding **Template Track** menu window
  - ♦ blue **Module** fields for active SSCC modules are linked to the corresponding **SSCC programming** menu window.

Dialog box Type:

- **Module** fields: *parameter select*
- **SEAR Used** field: *decision*

5.2.3.1 TEMPLATE: Preemption Menu Window

The **TEMPLATE: preemption** window, figure 5-10, is accessed from the **TEMPLATE: module configuration** window (see figure 5-8).

- Window is not available in remote unidirectional applications (templates 4A and 5A).
- Default parameter: **No**
- Available Parameters:
  - ♦ **No**
  - ♦ **Advnce**
  - ♦ **Simult**
- Traffic signal preemption is enabled when **Preempt Logic** status field is set to either **Advnce** (advance) or **Simult** (simultaneous).
  - ♦ The advance preemption function allows a time interval between traffic signal preemption and crossing activation to be set.
  - ♦ The simultaneous function allows traffic signal preemption and crossing activation to occur at the same time.
    - ▪ Places **Adv Preempt** or **Sim Preempt** option in Output Assignment menus
  - ♦ Selecting either preempt option places **Preempt Health** in Input Assignment menus
- Dialog box type: *decision*

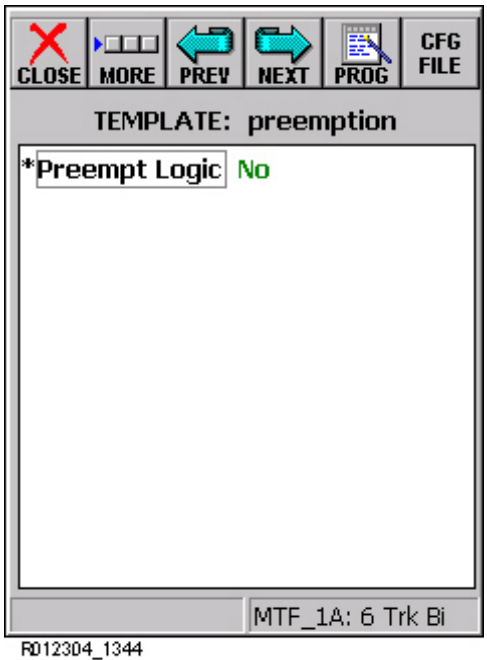
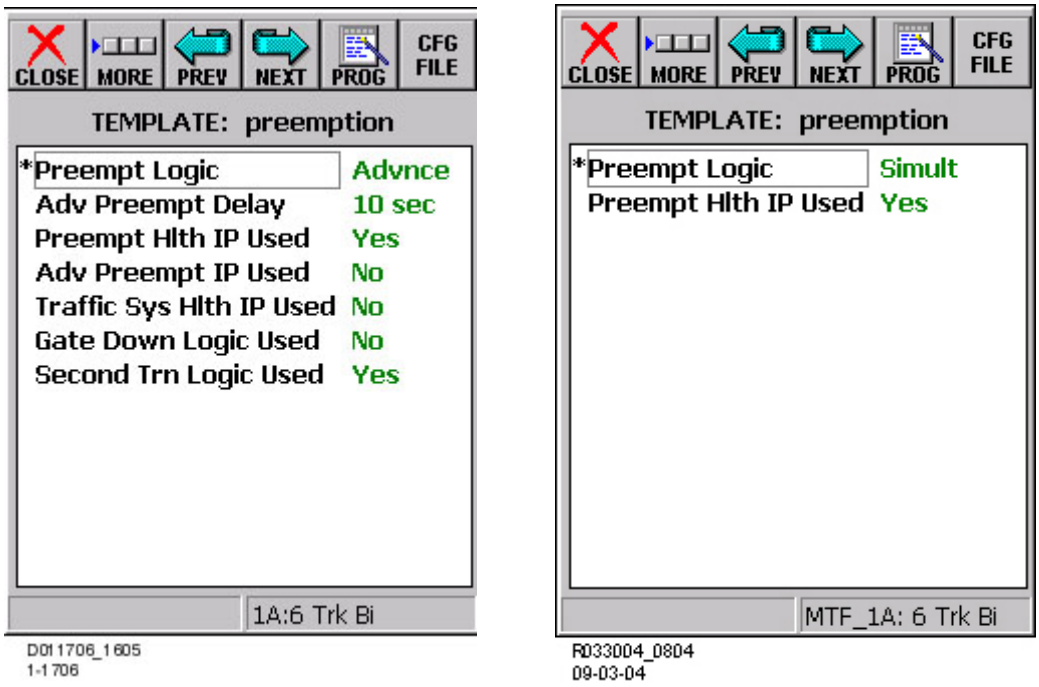


Figure 5-10. TEMPLATE: Advance Preempt Menu Window

5.2.3.1.1 Advance Preemption

When the **Preempt Logic** field is set to **Advnce** six new fields appear in the window as shown in figure 5-11A.

- **Adv Preempt Delay**
  - This value is the interval between traffic signal preemption and crossing activation.
  - Default parameter: **10 sec**
  - Valid delay value range: **0** to **500** seconds
    - When **Adv Preempt Delay** is set to **0 sec,** all Advance Preemption features are available but the system is effectively set for Simultaneous Preemption.
  - Dialog box type: *numeric value entry*
- **Preempt Hlth IP Used**
  - A GCP vital Input (**IN 1.1**, **IN 1.2**, etc.) must be assigned to monitor the **Preempt Health** signal
  - The assigned vital input functional status corresponds to the **Preempt Hlth IP Used** field status.
    - Input is activated when set to **Yes**.
    - Input checks that the preemption relay is energized when the Advance Preemption output is energized.
    - If the GCP detects that the **Preempt Health** input is low (de-energized) when the **Adv Preempt** output is high (energized), the GCP activates the crossing.
  - Default value: **Yes**
  - Dialog box type: *decision*



A B

Figure 5-11. TEMPLATE: Advance Preempt Window Advance Preempt Field On

- **Adv Preempt IP Used**
  - ♦ Enables the preempt output from a remote unit to be received. When deenergized it starts the local Adv preempt delay.
  - ♦ Default parameter: **No**
  - ♦ Dialog box type: decision
- **Traffic Sys Hlth IP Used**
    - ▪ A GCP vital Input (**IN 1.1**, **IN 1.2**, etc.) must be assigned to monitor the traffic system health.
  - ♦ The assigned vital input functional status corresponds to the **Traffic System Hlth** (health) **IP Used** field status
  - ♦ Input is enabled when set to **Yes**.
    - ▪ When the traffic signal status input indicates normal traffic signal operation, crossing activation occurs at a programmed time following traffic signal preemption.
    - ▪ When traffic signal status input indicates traffic signal failure, crossing activation occurs simultaneously with traffic signal preemption.
  - ♦ Traffic signal status input does not otherwise affect GCP operation.
  - ♦ Default parameter: **No**
  - ♦ Dialog box type: *decision*

⚠ WARNING

DO NOT USE THE "GATE DWN INDICATION" FOR TRAFFIC SIGNAL PREEMPTION WHEN GD INPUTS ARE ENABLED FOR GATES USED FOR OTHER DIRECTIONS OF TRAFFIC. CONTACT SAFETRAN TECHNICAL SUPPORT FOR PROGRAMMING INSTRUCTIONS IF "GATE DWN LOGIC" IS NEEDED WHEN "MUTE BELL ON GATE DOWN" OR FOUR-QUADRANT GATES ARE USED.

- **Gate Down Logic Used**
  - Some traffic signal controllers are capable of holding the track clearance green phase until an indication is received that the appropriate gates are lowered and obstructing traffic headed towards the preempted intersection.
    - This allows vehicles to continue to clear off the tracks until the gates are fully descended.
  - The **Gate Dwn Indication** output is available on a Track Module or RIO output when the output is active and the entry is set to **Yes**.
    - Output is high when:
      - advance preemption function is active and all **GD** (gate down) SSCC input(s) are high
      - any of the enabled islands of the crossing are deenergized (train occupies the island)
  - Default parameter: **No**
  - Dialog box type: decision
- **Second Trn Logic Used**
  - The second train logic function controls the way the crossing responds to the presence of multiple train on multiple tracks
    - When the entry is set to **No** the crossing responds to each individual train.
      - The crossing deactivates as a train moves out of the island and reactivates as the advance preempt function is activated by a subsequent train
    - When this entry is set to **Yes** the crossing will not recover when the first train clears the crossing if the preemption timer has started for the second or subsequent train.
  - Default parameter: **No**
  - Dialog box type: *decision*

5.2.3.1.2 Simultaneous Preemption

When the **Preempt Logic** field is set to **Simult** a single new field appears in the window as shown in figure 5-11B.

- **Preempt Hlth IP Used**
  - ♦ A GCP vital Input (**IN 1.1**, **IN 1.2**, etc.) may be assigned to monitor the **Preempt Health** signal
    - ▪ state of traffic signal preemption relay
  - ♦ The assigned vital input functional status corresponds to the **Preempt Hlth IP Used** field status.
    - ▪ Input is enabled when set to **Yes**.
    - ▪ Input checks that the preemption relay is energized when the **Sim Preempt** output is energized.
    - ▪ If the GCP detects that the **Preempt Health** input is low (de-energized) when the **Sim Preempt** output is high (energized), the GCP activates the crossing.
  - ♦ Default value: **Yes**
  - ♦ Dialog box type: *decision*

5.2.3.2 Template Track Menu Windows

Up to six **TEMPLATE: Track** menu windows may be directly accessed from the **TEMPLATE: module configuration** window by selecting the corresponding blue link fields.

- Window display is determined by the track status settings of the **TEMPLATE: module configuration** window, figure 5-9.
- The **TEMPLATE: Track 1** menu window, figure 5-12, is typical of the template programming windows.

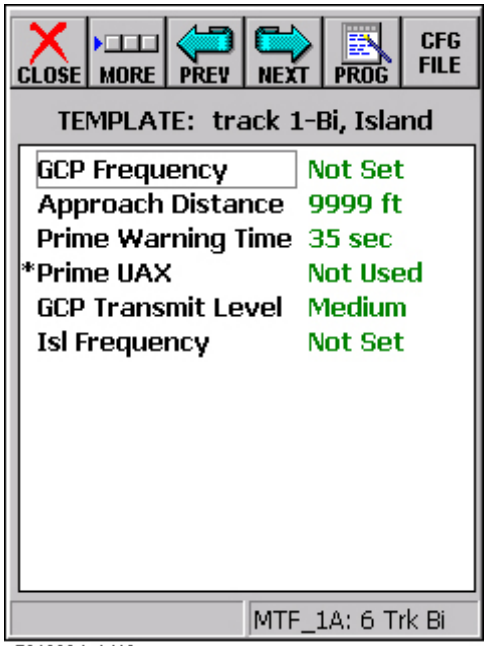


Figure 5-12. TEMPLATE: Track 1 Menu Window

Each **TEMPLATE: Track** menu window provides a display of the corresponding track parameters.

- **GCP Frequency**
  - A frequency must be set for each track.
  - Default parameter: **Not Set**
  - Valid frequency range: **45** to **999** Hz
  - Dialog box type: *parameter select entry*
- **Approach Distance**
  - Approach distance must be set for each track.
  - Default parameter: **9999 ft**
  - Valid approach distance range: **0** to **9999** feet
  - Dialog box type: *numeric value entry*
- **Prime Warning Time**
  - A warning time must be set for each track prime predictor
  - Must equal grade crossing warning time
  - Default parameter: **35 sec**
  - Valid time interval range: 23 to 99 seconds
  - Dialog box type: *numeric value entry*

- **Prime UAX**
  - A GCP vital Input (**IN1.1**, **IN1.2**, etc.) may be assigned to receive remote prediction input from an upstream GCP.
  - The vial input assignment status corresponds to the track **Prime UAX** field parameter
  - Default parameter: **Not Used**
  - Available Parameters:
    - **IP** (physical input)
    - **IP + RDAX** (physical input & radio DAX)
    - **Not Used**
    - **RDAX** (radio DAX input)
  - Dialog box type: *parameter select*
- **GCP Transmit Level**
  - The GCP Transmit Level may be set for each track:
  - Default parameter: **Medium**
  - Available Parameters: **High**, **Medium**
  - Dialog box type: *decision*
- **Uni/Bi/Sim-Bidirnl**
  - Item appears only in unidirectional applications
  - Default parameter: **Unidirnl**
  - Available Parameters:
    - **Bidirnl** (bi-directional)
    - **Sim. Bidirnl** (simulated bi-directional)
    - **Unidirn**l (unidirectional)
  - Dialog box type: *parameter select*
- **Isl Frequency**
  - Separate island frequencies must be set for each adjacent track.
  - Default parameter: **Not Set**
  - Selectable Parameters:

    - **10.0 kHz**
    - **11.5 kHz**
    - **13.2 kHz**
    - **15.2 kHz**
    - **17.5 kHz**
    - **2.14 kHz**
    - **2.56 kHz**
    - **20.2 kHz**
    - **3.24 kHz**
    - **4.0 kHz**
    - **4.9 kHz**
    - **5.9 kHz**
    - **7.1 kHz**
    - **8.3 kHz**
    - **Not Set**
  - Dialog box: parameter select

- **Island distance** (not shown)
  - ♦ displays only for unidirectional GCPs with island circuits
  - ♦ default parameter: **120 ft**
  - ♦ valid range: **0** to **999** feet
  - ♦ dialog box type: *numeric value entry*

5.2.3.3 TEMPLATE: Track Daxes Menu Window

The **TEMPLATE: Track Daxes** menu windows:

- display only for unidirectional and simulated bi-directional configurations
- are accessed from the **TEMPLATE: Track** windows (see figure 5-8)

Three remote prediction output functions are available for each active track:

- DAX A thru DAX C
- Up to six Template Track windows may be accessed.

The **TEMPLATE: Track 1 Daxes** menu window, figure 5-13, is a typical **DAX** programming window.

- The windows displayed correspond to the track status settings of the **TEMPLATE: module configuration** window, figure 5-9.
  - ♦ Default value: **No**
  - ♦ Dialog box type: *decision*

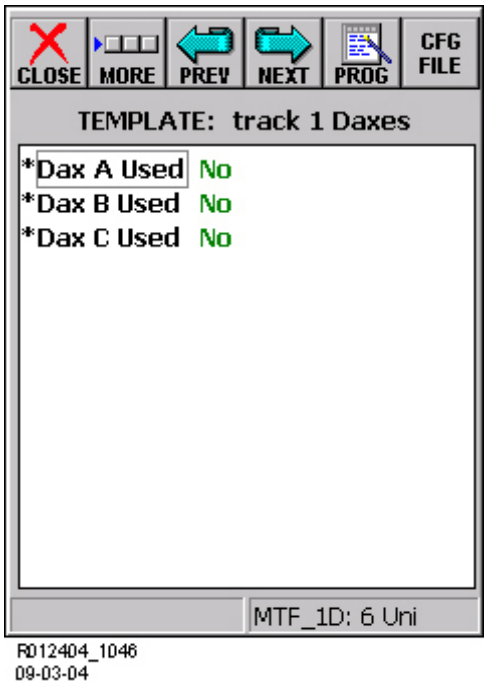


Figure 5-13. TEMPLATE: Track 1 Daxes Menu Window

When **DAX Used** is set to **Yes** three new menu items appear below it as shown in figure 5-14.

- **DAX Warning Time**
  - default: **35 sec**
  - valid range: **23** to **99** seconds
  - dialog box type: *numeric value entry*
- **DAX Offset Distance**
  - default: **99 ft**
  - valid offset range: **0** to **9999** feet
  - dialog box type: *numeric value entry*
- **DAX Enable**
  - default: **Not Used**

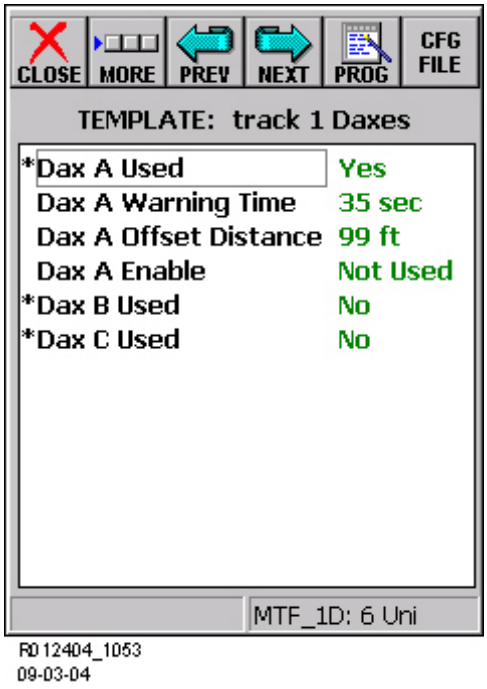


Figure 5-14. TEMPLATE: Track 1 Daxes Menu Window with DAX On

5.2.3.4 TEMPLATE: AND 1 XR Menu Window

The **TEMPLATE: AND 1 XR** menu window:

- Displays the tracks and predictors used in the AND 1 XR function
  - ♦ An entry appears for each active Track.
- Used to enable and configure the **AND 1 XR Enable Used** input

The **TEMPLATE: AND 1 XR** menu window is shown in figure 5-15.

- **AND 1 XR Track 1** through **Track 6**
  - ♦ default: **Prime**
  - ♦ for templates 1A through 1D & 2A through 2F
- **AND 1 Enable Used**
  - ♦ default: **NO**
  - ♦ Dialog box type: *decision*

NOTE

AND 1 XR is set to read only (is grayed out) in all templates except 4A and 5A.

➢ Tracks are predefined in these templates and thus ANDed based on the geometry of the crossing.

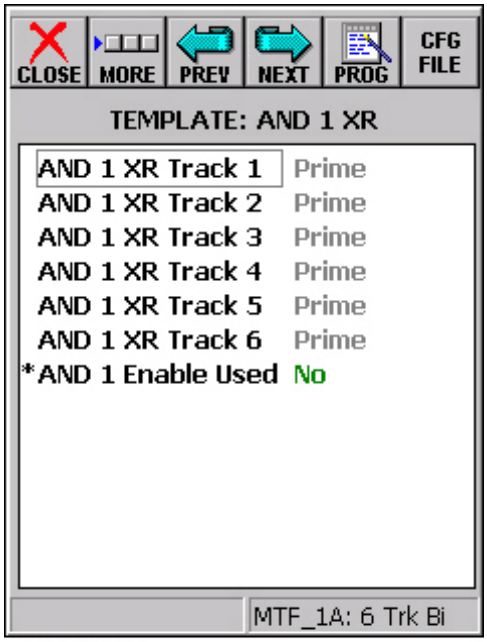


Figure 5-15. Template AND 1 XR Menu Window

5.2.3.5 TEMPLATE: SSCC Window

The **TEMPLATE: SSCC** menu window:

- Used to set SSCC circuit configuration parameters
- Displays only when one or both modules are assigned to SSCC slots
- SSCC configuration parameter fields

The **TEMPLATE: SSCC** menu window is shown in figure 5-21

- Assignment parameters:
  - **Gates Used**
    - Default: **NO**
    - Dialog box type: *decision*
  - **SSCC 1 Number of GPs**
    - Default 1
    - Range: 0 thru 2
    - Dialog box type: *parameter select*
  - **SSCC 2 Number of GPs**
    - Default 0
    - Range: 0 thru 2
    - Dialog box type: *parameter select*
  - **SSCC 1+2 GPs Coupled**
    - Default Yes
    - Dialog box type: *decision*
  - **SSCC 1 Number of GDs**
    - Default 2
    - Range: 0 thru 4
    - Dialog box type: *decision*
  - **SSCC 2 Number of GDs**
    - Default 0
    - Range: 0 thru 4
    - Dialog box type: *decision*

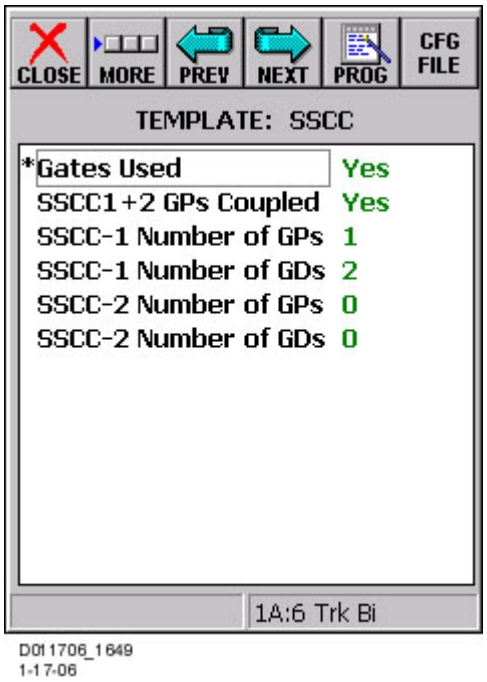


Figure 5-16. Template SSCC Window

5.2.3.6 TEMPLATE: Output Assignment Windows

The **TEMPLATE: OP assignment Menu** windows occur in the menu sequence following the **SSCC** windows.

- The window displays correspond to the track status settings of the **TEMPLATE: module configuration** window, figure 5-9.
- **TEMPLATE: OP assignment 1** window is shown in figure 5-17.
  - ♦ Two vital output assignment entries are available for active slot positions 1 thru 4:
    - ▪ **OUT 1.1** and **OUT 1.2**
    - ▪ **OUT 2.1** and **OUT 2.2**
    - ▪ **OUT 3.1** and **OUT 3.2**
    - ▪ **OUT 4.1** and **OUT 4.2**
  - ♦ Default value: **NOT USED**
  - ♦ Assignment parameters (see paragraph 5.3):
    - ▪ **Not Used**
    - ▪ **AND 1 XR**
    - ▪ **AND 2** thru **AND 8***
    - ▪ **T1** thru **T6 Island***
    - ▪ **T1** thru **T6 Prime**
    - ▪ **T1** thru **T6 Dax A***
    - ▪ **T1** thru **T6 Dax B***
    - ▪ **T1** thru **T6 Dax C***
    - ▪ **T1** thru **T6 Dax D***

- **T1** thru **T6 Dax E***
- **T1** thru **T6 Dax F***
- **T1** thru **T6 Dax G***
- **T1** thru **T6 Preempt***
- **Adv Preempt***
- **Sim Preempt***
- **T1** thru **T6 MS Ctrl OP***
- **NOT AND 1 XR**
- **NOT AND 2** thru **NOT AND 8***
- **Gate Output 1** and **Gate Output 2***
- **Bell 1** and **Bell 2***
- **Aux-1 and Aux-2 Xng Control***
- **Aux-1 Lmp Control** and **Aux-2 Lmp Control***
- **Gate Dwn Indication***
- **OR 1** thru **OR 4***
- **Remote Output 1A** thru **Remote Output 8A***
- **Remote Output 1B** thru **Remote Output 8B***
- **Vital Link 1 OP 1** thru **Vital Link 1 OP 8***
- **Vital Link 2 OP 1** thru **Vital Link 2 OP 8***
- **Rmt SSCCIV OP 1** thru **Rmt SSCCIV OP 4***
- **Passthru State 1** thru **Passthru State 4***

♦ Dialog box type: *parameter select*

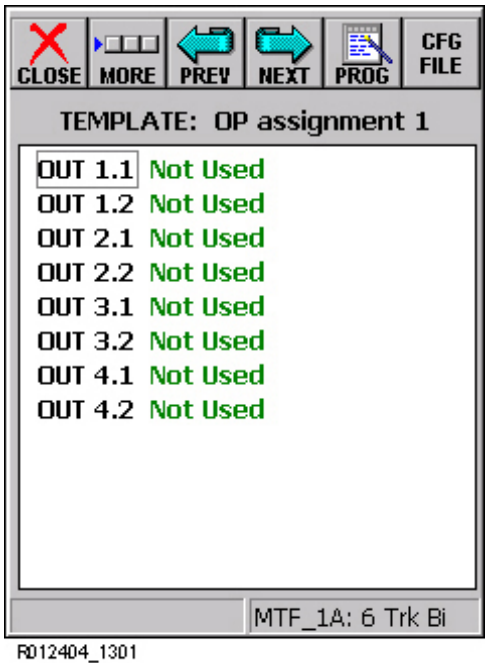


Figure 5-17. TEMPLATE: Output Assignment 1 Menu Window

NOTE

Assignment parameters with asterisk (*) appear in list only when corresponding function is enabled.

- **TEMPLATE: OP assignment 2** window is shown in figure 5-18A.
  - Window displays only when slot positions 5 and/or 6 are active.
    - Does not display when slot positions are assigned to the SEAR.
  - Two vital output assignment entries are available for active slot positions 5 and 6:
    - **OUT 5.1** and **OUT 5.2**
    - **OUT 6.1** and **OUT 6.2**
  - Default value: **NOT USED**
  - Assignment parameters: *same as* **TEMPLATE: OP assignment page 1** (see also paragraph 5.3)
  - Dialog box type: *parameter select*
- **TEMPLATE: OP assignment 2** window when RIO-2 and RIO-3 are used is shown figure 5-18B.
  - Window displays only when **RIO-2** and/or **RIO-3** are active.
  - Four vital output assignment entries are available for each active RIO:
    - **OUT 5.1** thru **OUT 5.4**
    - **OUT 6.1** thru **OUT 6.4**
  - Default value: **NOT USED**
  - Assignment parameters: same as **TEMPLATE: OP assignment page 1** (also see paragraph 5.3)
  - Dialog box type: *parameter select*

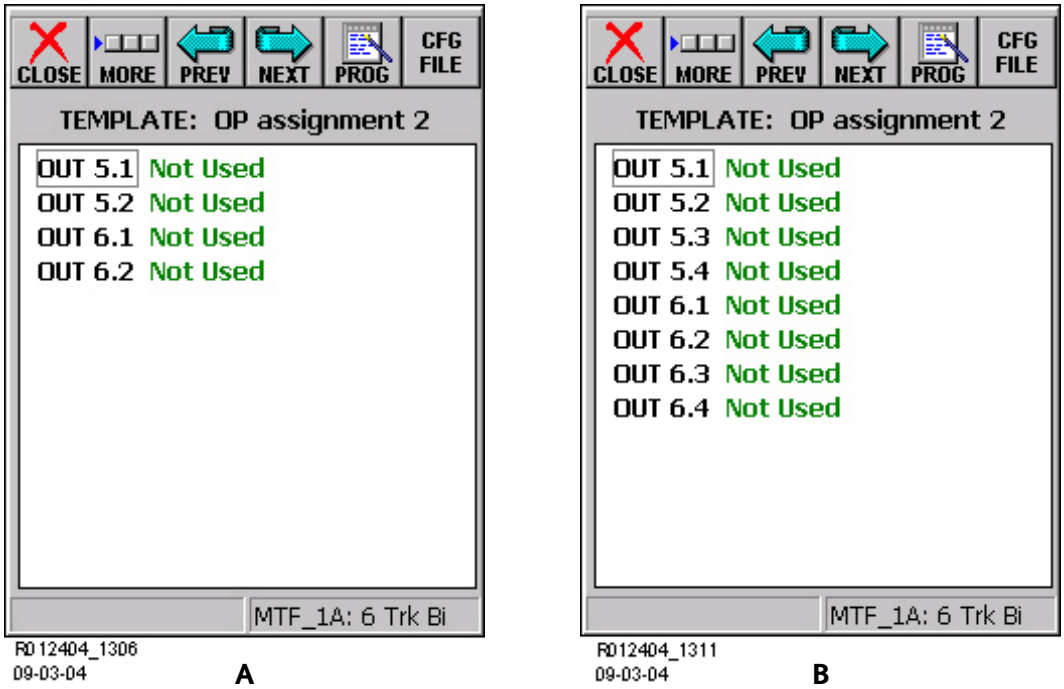


Figure 5-18. TEMPLATE: Output Assignment 2 Menu Windows

5.2.3.7 Template Input Assignment Windows

The **TEMPLATE: input assignment** menu windows occur in the menu sequence following the **TEMPLATE: OP assignment** windows.

- The window displays correspond to:
  - ♦ track status settings of the **TEMPLATE: module configuration** window, figure 5-9.
  - ♦ template selected
- **TEMPLATE: IP 1** menu window is shown in figure 5-19
  - ♦ Two vital input assignment entries are available for active tracks 1 thru 4:
    - **T1**: **IN 1.1** and **T1 IN 1.2**
    - **T2**: **IN 2.1** and **T2 IN 2.2**
    - **T3**: **IN 3.1** and **T3 IN 3.2**
    - **T4**: **IN 4.1** and **T4 IN 4.2**
  - ♦ The windows displayed correspond to the track status settings of the **TEMPLATE: module configuration** window, figure 5-9.
  - ♦ Default value: **NOT USED**

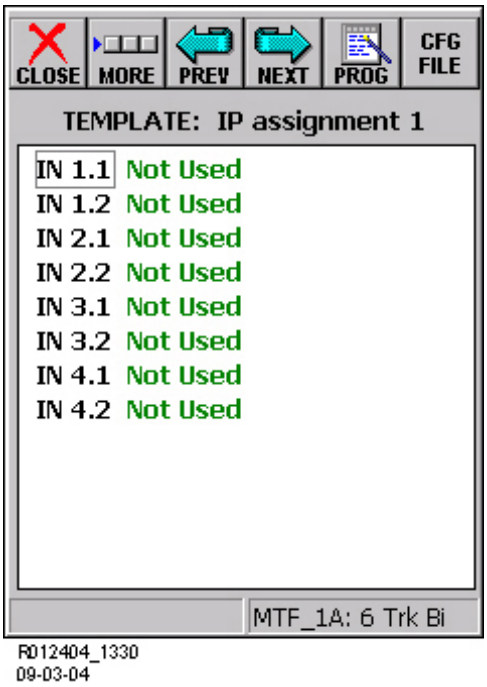


Figure 5-19. TEMPLATE: Input Assignment 1 Menu Window

- Assignment parameters (refer to paragraph 5.3 for descriptions):
  - **Not Used**
  - **Ext Island 1** thru **4**
  - **Adv Preempt IP**
  - **T1** thru **T6 Prime UAX**
  - **T1** thru **T6 Dax A Enable**
  - **T1** thru **T6 Dax B Enable**
  - **T1** thru **T6 Dax C Enable**
  - **T1** thru **T6 Dax D Enable**
  - **T1** thru **T6 Dax E Enable**
  - **T1** thru **T6 Dax F Enable**
  - **T1** thru **T6 Dax G Enable**
  - **T1** thru **T6 Preempt Enable**
  - **AND 1 XR Enable**
  - **AND 2** thru **AND 4 Enable**
  - **T1 thru T6 MS Control**
  - **Trf Control Health**
  - **T1** thru **T6 Wrap**
  - **Preempt Health**
  - **T1** thru **T6 Pred Override**
  - **T1** thru **T6 DAX A Override**
  - **T1** thru **T6 DAX B Override**

- **T1** thru **T6 DAX C Override**
- **Aux-1** and **Aux-2 Xng Ctrl Hlth**
- **Remote Input 1** thru **8**
- **AND 1 Wrap** thru **AND 8 Wrap**
- **Vital Link 1 IP 1** thru **Vital Link 1 IP 8**
- **Vital Link 2 IP 1** thru **Vital Link 2 IP 8**
- **Emergency Activate**
- **Passthru State 1** thru **Passthru State 4**
- **Maint Call Rpt IP**
- **4000 Case OOS IP**
- **Out Of Service IP 1** thru **Out Of Service IP 6**
- **3 Vehicle Detect**
- **4 Vehicle Detect**
- **Vehicle Det Hlth**

♦ Dialog box type: *parameter select*

- The **TEMPLATE: IP assignment 2** menu window when tracks 5 and 6 are used is shown in figure 5-20A
  - ♦ Two vital input assignment entries are available for active tracks 5 and 6:
    - **IN 5.1** and **IN 5.2**
    - **IN 6.1** and **IN 6.2**
  - ♦ The windows displayed correspond to the track status settings of the **TEMPLATE: module configuration** window, figure 5-9.
  - ♦ Default value: **NOT USED**
  - ♦ Assignment parameters (refer to paragraph 5.3 for descriptions);
    - Parameters correspond to **TEMPLATE: IP assignment 1** menu window parameters.
  - ♦ Dialog box type: *parameter select*

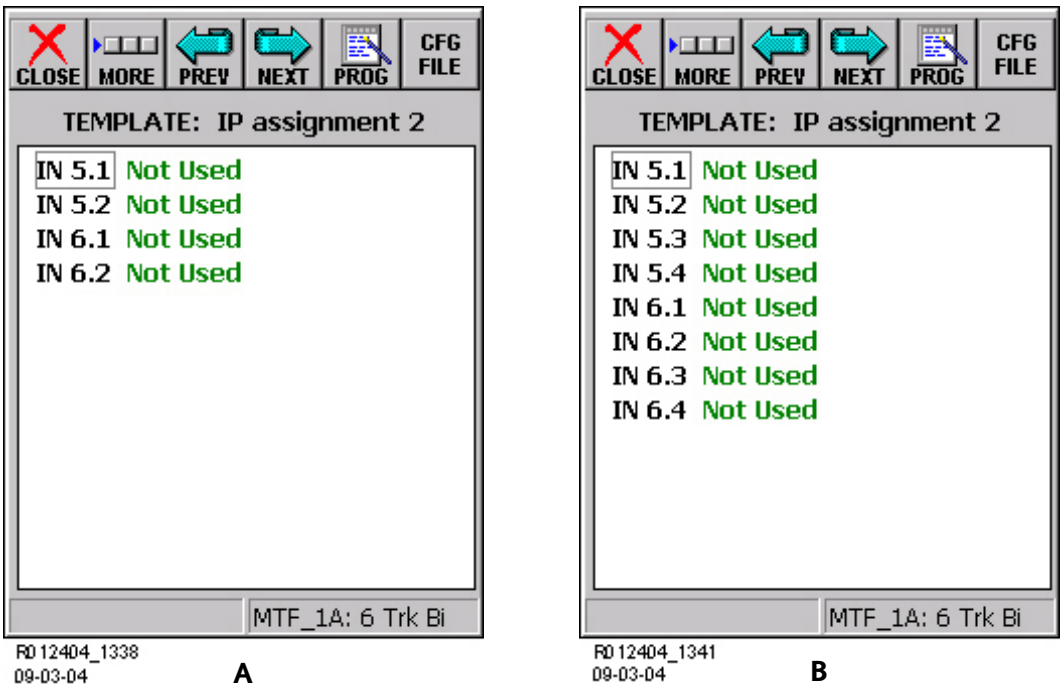


Figure 5-20. TEMPLATE: Input Assignment 2 Menu Windows

- The **TEMPLATE: Input Assignment 2** window is shown in figure 5-20B.
  - Window displays only when **RIO-2** and/or **RIO-3** are active.
  - Four vital output assignment entries are available for each active RIO module:
    - **IN 5.1** thru **IN 5.4**
    - **IN 6.1** thru **IN 6.4**
  - Default value: **NOT USED**
  - Assignment parameters (refer to paragraph 5.3 for descriptions):
    - Parameters correspond to **TEMPLATE: IP assignment 1** menu window parameters.
  - Dialog box type: *parameter select*

5.2.3.8 Template SSCC Input Assignment Windows

The **TEMPLATE: IP assignment SSCC** windows occur in the menu sequence following the **TEMPLATE: IP assignment** windows.

- The window displays correspond to:
  - SSCC status settings of the **TEMPLATE: module configuration** menu window, figure 5-9.
  - template selected
- **TEMPLATE: IP assignment SSCC** window is shown in figure 5-21
  - Five vital input assignment entries are available for each SSCC module:
    - **IN 7.1** thru **IN 7.5**
    - **IN 8.1** thru **IN 8.5**
  - Default value for **IN 7.1** thru **7.4**: **NOT USED**
  - Default value for **IN 7.5**: **GP 1.1**
  - Default value for **IN 8.1** thru **8.5**: **NOT USED**
  - Assignment parameters (refer to paragraph 5.3 for descriptions):
    - **IN 7.1** thru **IN 7.5**
      - **Not Used**
      - **Adv Preempt IP**
      - **T1** thru **T6 Wrap**
      - **AND 1 XR Enable**
      - **AND 2** thru **AND 6 Enable**
      - **Trf Control Health**
      - **Preempt Health**
      - **GP 1.1** and **GP 1.2**
      - **GD 1.1** thru **GD 1.4**
      - **Maint Call Rpt IP**
      - **Aux-1 Xng Ctrl Hlth**
      - **Remote Input 1** thru **8**
      - **AND 1 Wrap** thru **AND 8 Wrap**
      - **T1 Pred Override** thru **T6 Pred Override**
      - **T1 DAX A Override** thru **T6 DAX A Override**
      - **T1 DAX B Override** thru **T6 DAX B Override**
      - **T1 DAX C Override** thru **T6 DAX C Override**
      - **Vital Link 1 IP 1** thru **Vital Link 1 IP 8**
      - **Vital Link 2 IP 1** thru **Vital Link 2 IP 8**
      - **Emergency Activate**
      - **Passthru State 1** thru **Passthru State 4**
      - **4000 Case OOS IP**
      - **Out Of Service IP 1** thru **Out Of Service IP 6**
      - **3 Vehicle Detect**
      - **4 Vehicle Detect**

- **Vehicle Det Hlth**

- **IN 8.1** thru **IN 8.5**
  - **Not Used**
  - **Adv Preempt IP**
  - **AND 1 XR Enable**
  - **AND 2** thru **AND 6 Enable**
  - **Trf Control Health**
  - **Preempt Health**
  - **GP 2.1** and **GP 2.2**
  - **GD 2.1** thru **GD 2.4**
  - **Maint Call Rpt IP**
  - **Aux-2 Xng Ctrl Hlth**
  - **Remote Input 1** thru **8**
  - **AND 1 Wrap** thru **AND 8 Wrap**
  - **T1 Pred Override** thru **T6 Pred Override**
  - **T1 DAX A Override** thru **T6 DAX A Override**
  - **T1 DAX B Override** thru **T6 DAX B Override**
  - **T1 DAX C Override** thru **T6 DAX C Override**
  - **Vital Link 1 IP 1** thru **Vital Link 1 IP 8**
  - **Vital Link 2 IP 1** thru **Vital Link 2 IP 8**
  - **Emergency Activate**
  - **Passthru State 1** thru **Passthru State 4**
  - **4000 Case OOS IP**
  - **Out Of Service IP 1** thru **Out Of Service IP 6**
  - **3 Vehicle Detect**
  - **4 Vehicle Detect**
  - **Vehicle Det Hlth**

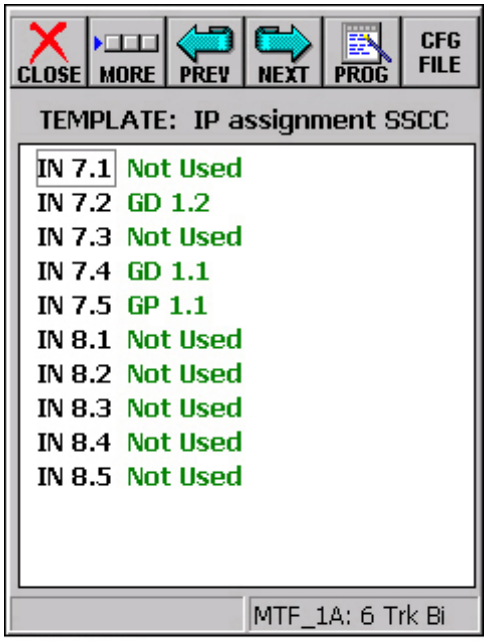


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Figure 5-21. Template IP Assignment SSCC Window

5.2.3.9 TEMPLATE: Site Info Window

The **TEMPLATE: Site Info** menu window, figure 5-22, occurs in the menu sequence following the **TEMPLATE: IP Assignment SSCC** window.

- Used to access windows to set: GCP:
  - ATCS site identification number
  - Time
  - Location Data

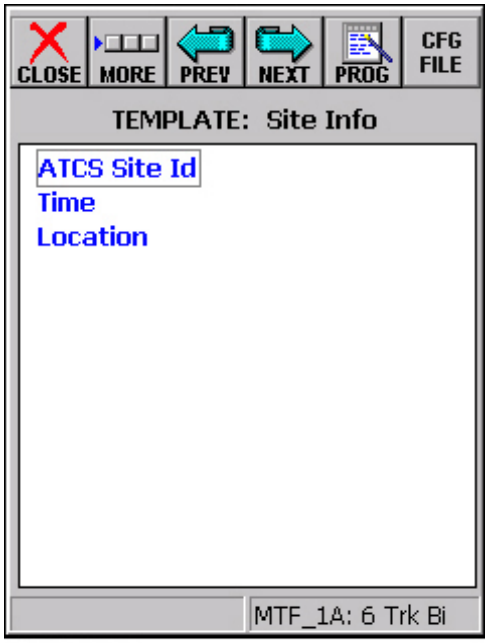

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Figure 5-22. Template Site Info Menu Window

5.2.3.10 ATCS Site Id Entry

Selecting the **ATCS Site Id** entry on the **TEMPLATE: Site Info** menu window brings up the dialog window shown in figure 5-23A. This dialog window:

- Displays the current Site Identification Number (SIN)
- Allows the current SIN to be changed
  - ♦ A SIN may be change as described in procedure 5-1
- Is controlled by six function buttons

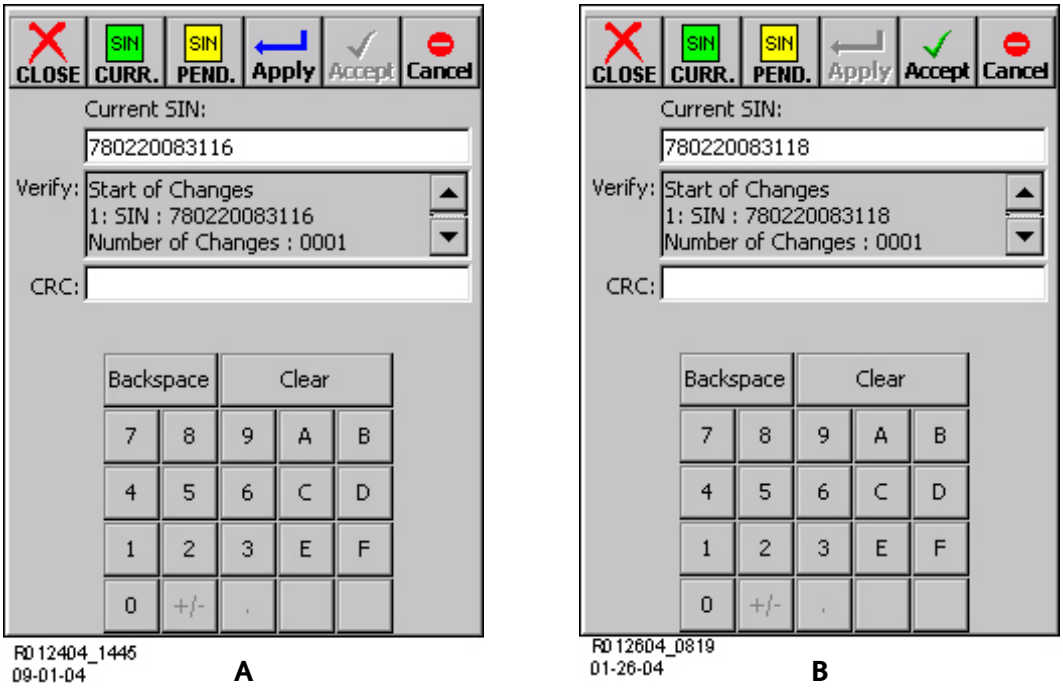


Figure 5-23. Site Identification Number Dialog Window

⚠ WARNING

CHANGING THE SITE IDENTIFICATION NUMBER REQUIRES OPERATION OF THE 4000 GCP TO BE BRIEFLY INTERRUPTED.

- ➢ **BEFORE CHANGING THE SITE IDENTIFICATION NUMBER, ENSURE THAT ADEQUATE PRECAUTIONS ARE TAKEN TO WARN PEDESTRIANS, PERSONNEL, TRAINS, AND OTHER VEHICLES IN THE AREA UNTIL PROPER SYSTEM OPERATION HAS BEEN VERIFIED.**

Selecting the:

- **CLOSE** button closes the SIN Window and returns the display to the Status Screen.
- **CURR.** button displays the current SIN in the **Current SIN** text box.
- **PEND.** Button
  - Changes the **Current SIN** text box to the **Pending SIN** text box.
  - Displays the pending SIN in the **Pending SIN** text box.
    - A SIN is pending during the time interval between acceptance of a new SIN and the initiation of CPU reboot.
    - See procedure 5-1, steps 5 through 7.

- **Apply** button sends a SIN change to the **Verify** text box and initiates a **Confirmation CRC** number.
- **Accept** button directs the DT to accept a SIN change and identify it as pending.
- **Cancel** button clears all data from the window text boxes.

Procedure 5-1. CHANGING THE SITE IDENTIFICATION NUMBER

Step 1 — Select the **ATCS Site Id** entry from the **TEMPLATE: Site Info** menu window
- The SIN dialog window, figure 5-23A, displays.

Step 2 — Highlight the number displayed in the **Current SIN** text box.
- If the site identification number (SIN) is not displayed within the **Current SIN** text box, select the **Curr.** (current) button to display the SIN.

Step 3 — Clear the current SIN entry and enter the new SIN using the keypad at the bottom of the window.
- Selecting the keypad **Backspace** button clears the right-most SIN position each time it is selected.
- Selecting the keypad **Clear** button clears the entire SIN display.

Step 4 — Select the **Apply** button at the top of the window.
- The new SIN appears in the **Verify** text box change as shown in figure 5-23B.
- The **Apply** button deactivates (grays out) and the **Accept** button becomes active.
- A confirmation cyclic redundancy check (CRC) number is placed at the bottom of the **Verify** text box

Step 5 — Use the scroll bar at the right of the **Verify** text box to display the bottom of text list.
- The **Confirmation CRC** number appears as shown in figure 5-24A.

Procedure 5-1 Continued

Step 6 Select the **CRC:** field and enter the displayed **Confirmation CRC** number using the keypad.

Step 7 Press the **SEL** button on the front of the CPUII+ module.

- The new SIN is embedded in the External Configuration Device (ECD).

Step 8 Select the **Accept** button at the top of the SIN Window.

- If the SIN window changes as shown in figure 5-24B, proceed to step 10.
  - The **Accept** button deactivates (grays out)
  - **Changes succeeded** appears below the **CRC** text box.
  - **End of Changes** appears at the bottom of the **Verify** text box.
- If **Changes Failed** appears below the CRC text box verify that the CRC number within the **CRC** text box and the **Verify** text box match.
  - If the CRCs do not match repeat the procedure starting at step 7.
  - If the CRCs match cycle power to the CPU module and repeat the procedure starting at step 1.

Step 9 Cycle power to the CPU module (remove then reinsert CPU module or remove and replace CPU power connector).

- The CPU reboots.
- The CPU module identifies the new SIN as the current site address

Step 10 Select the **Close** button.

- The SIN dialog window closes and is replaced by the Status Screen.

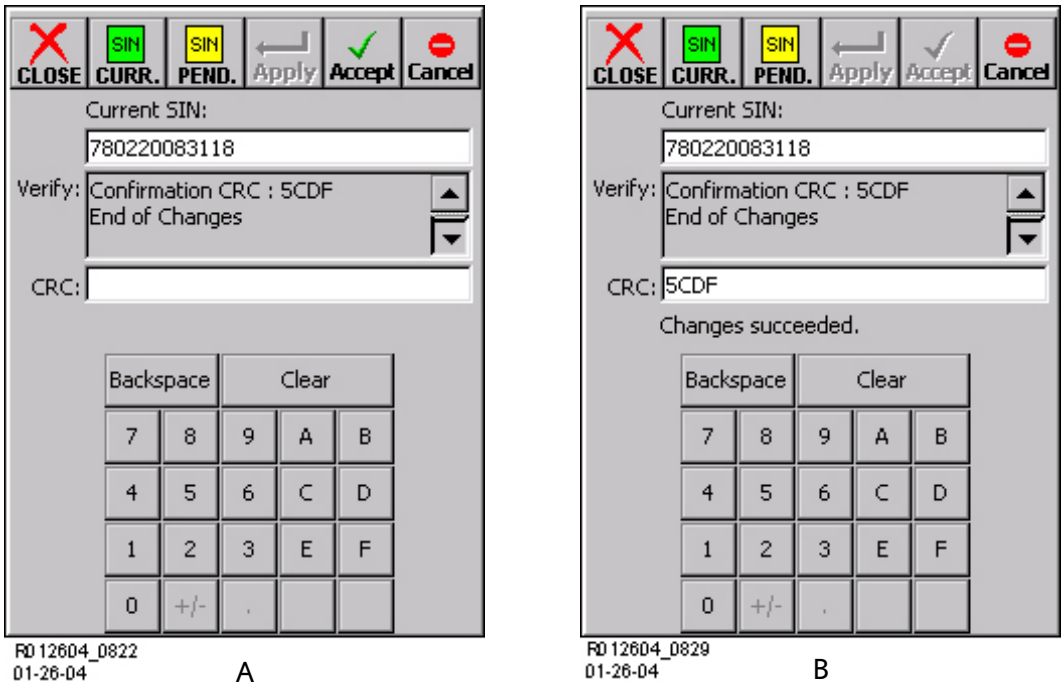


Figure 5-24. Site Identification Number Window with CRC Display

5.2.3.11 Time Entry

Selecting the **Time** entry on **TEMPLATE: Site Info** menu window brings up the dialog window shown in figure 5-25. This dialog window:

- Allows the 4000 GCP clock to be set as described in procedure 5-2.
- Dialog window is controlled by four function buttons

Selecting the:

- **CLOSE** button closes the Time Window and returns the display to the Status Screen.

- **RENEW** button displays the current CPU clock time in the **Time** text box.

- **SET** Button transfers the date and time values from the **Time** text box to the CPU clock.

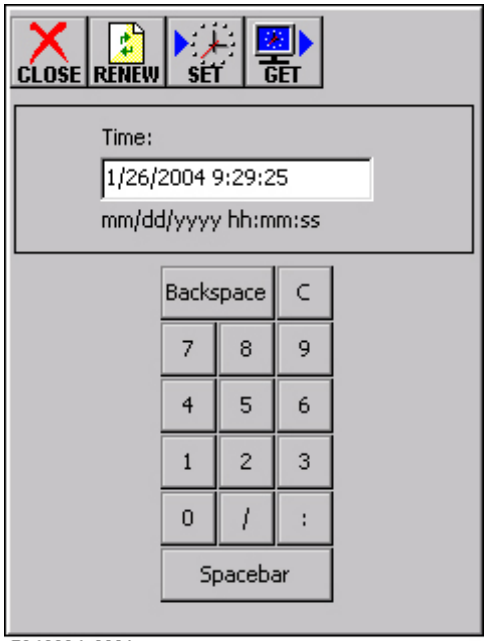


Figure 5-25. Time Dialog Window

- **GET** Button enters the current date and time in the **Time** text box.
  - ♦ The PC installed DT retrieves the date and time values of the PC CPU.
  - ♦ The 4000 GCP DT retrieves the date and time of the CPU module clock.

Procedure 5-2. SETTING THE 4000 GCP CLOCK

Step 1 Select the **Time** entry on **TEMPLATE: Site Info** menu window
- The Time dialog window, figure 5-25, displays.

Step 2 Select **Clear** from the dialog box keypad.
- The existing time and date are cleared from the **Time** window.

Step 3 Enter a new time and date using the keypad
- Enter the month/day/year (**mm/dd/yyyy)** followed by a space and then the hours:minutes:seconds (**hh:mm:ss)**
- Enter the hours using the 24 hour, military format (01, 12, 18, 21, etc.)

Step 4 Select the **Set** button from the top of the dialog box.
- The date and time values are set into the CPU II clock.

Step 5 Select the **Close** button.
- The Time dialog window closes and is replaced by the **TEMPLATE: Site Info** Menu.

5.2.3.12 Location Entry

Selecting the **Location** entry on **TEMPLATE: Site Info** menu window brings up the dialog window shown in figure 5-26. This dialog window:

- Displays the current:
  - ♦ Department of Transportation (DOT) Crossing Number (format: 6 numbers + 1 letter)
  - ♦ Milepost Number (format: 11 characters)
  - ♦ Site Name (format: 25 characters)
- Each of these fields may be changed by:
  - ♦ Selecting the field
  - ♦ Entering a new value using the keypad

Selecting the:

- **CLOSE** button closes the Time Window and returns the display to the **TEMPLATE: Site Info** Menu.

- **RENEW** button displays the current values in the each field.

- **Apply** Button transfers the new values to memory.

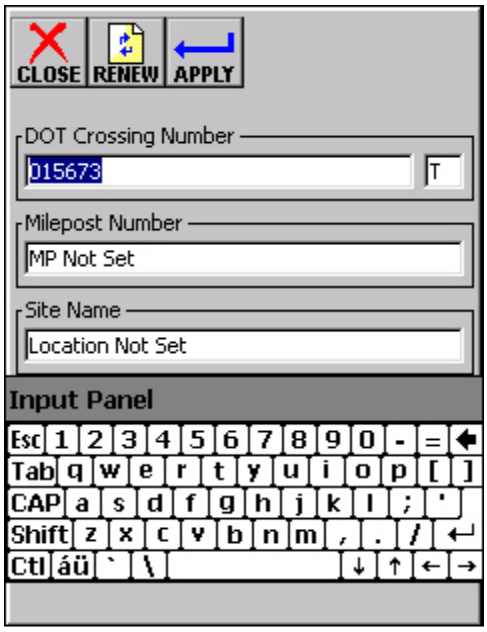


Figure 5-26. Location Dialog Window

5.2.3.13 TEMPLATE: SEAR Window

The **TEMPLATE: SEAR** window occurs in the sequence following the **TEMPLATE: Site Info** menu window.

- Used to name spare inputs that can be monitored by the SEAR
- Provides link to the SEAR interface (see Section 8)

The **TEMPLATE: SEAR** Menu window is shown in figure 5-26

- Five non-vital inputs are available
  - **SP 2.1**
    - Default: **POK 1** (power OK)
  - **SP 3.1**
    - Default: **Door 1**
  - **SP 4.1, SP 5.1, and SP 6.1**
    - Default: **Not Used**

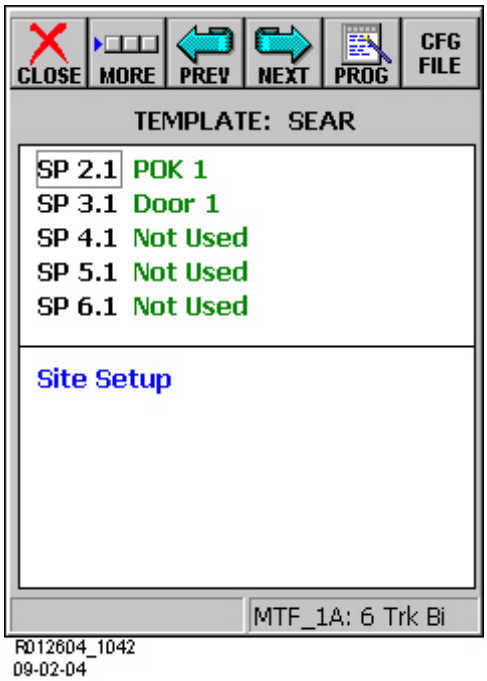


Figure 5-27. TEMPLATE: SEAR Windows

- Assignment parameters:
  - **Not Used**
  - **POK 1** and **POK 2**
  - **Door 1** and **Door 2**
  - **GP 1.1, 1.2, 2.1, 2.2**
  - **GD 1.1, 1.2, 2.1, 2.2**
  - **General 1** thru **General 4**
  - **TSS 1** thru **TSS 8**
  - **Gnd Flt Tester 1** thru **Gnd Flt Tester 3**
  - **Ext Island 1** thru **Ext Island 3**
  - **Tx**
  - **3 Vehicle Detect**
  - **4 Vehicle Detect**
  - **Vehicle Det Hlth**
- Dialog box type: *parameter select*

5.3 BASIC CONFIGURATION MENU ITEM

Diagnostic Terminal (DT) Basic Configuration menu item provides access to the configuration windows shown in figure 5-28. This is the first of ten program menu items (2 through 11) that can be used for total programming as opposed to template programming.

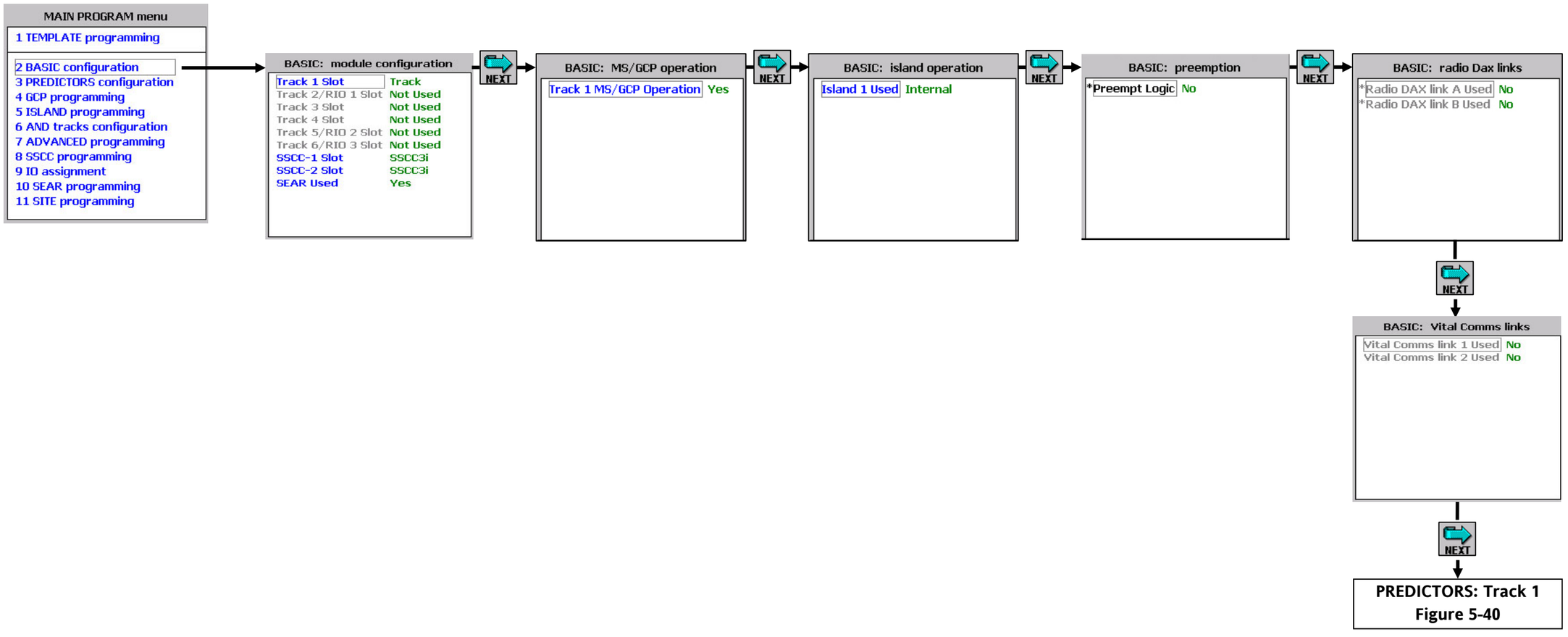


Figure 5-28. BASIC Configuration Menu Structure

5.3.1 BASIC: Configuration Item

Selecting the **BASIC Configuration** item brings up the **BASIC: module configuration** menu window, figure 5-29.

- Designates the specific module assignment for each module position.
  - ♦ Unoccupied positions are set to **Not Used**.
- designates the activity status of the SEAR module
  - ♦ SEAR is operational when set to **Yes.**
- Status fields interact with corresponding **TEMPLATE: Module Configuration** fields.
- provides links to other windows within the menu:
  - ♦ blue **Module** fields of active Track modules are linked to the corresponding **Template Track** window
  - ♦ blue **Module** fields for active SSCC modules are linked to the corresponding **SSCC programming** window.
- Dialog box Type:
  - ♦ **SEAR Used** fields: *decision*
  - ♦ **Module** fields: *parameter select*

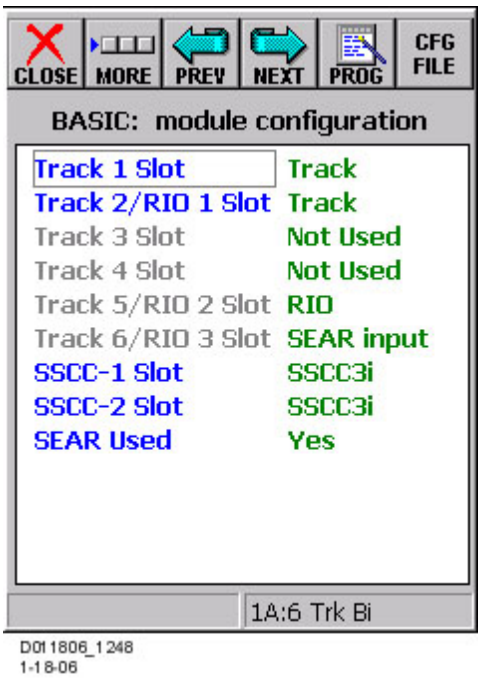


Figure 5-29. BASIC: Module Configuration Menu Window

5.3.1.1 BASIC: MS/GCP Operation Window

The **BASIC: MS/GCP operation** window, figure 5-30, displays following the **BASIC: module configuration** window.

- Indicates whether MS/GCP operation is used for each active track
- Provides links to other programming functions
  - ♦ each blue **Track MS/GCP Operation** field is linked to the corresponding **GCP: track** window
  - ♦ each operation status (**On** or **Off**) field is linked to the corresponding **BASIC: MS/GCP Operation** dialog box
- Default parameter: **On**
- Dialog box type: *decision*

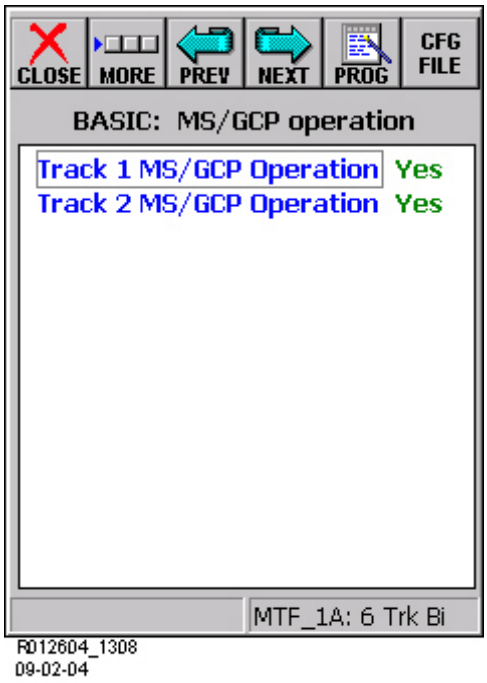


Figure 5-30. BASIC: MS/GCP Operation Window

5.3.1.2 BASIC: Island Operation

The **BASIC: island operation Menu** window, figure 5-31, displays following the **BASIC: MS/GCP operation** window.

- Indicates the type of island that is used
- Provides links to other programming functions
  - ♦ each blue **Island** field is linked to the corresponding **ISLAND: track** window
  - ♦ each operation status field is linked to the corresponding **Set Parameter** dialog box

- Default parameter
  - bi-directional: **Internal**
  - unidirectional: site dependant - see note
- Selectable parameters:
  - **Internal**
  - **External**
  - **No**
- Dialog box type: *parameter select*

NOTE

Unidirectional island default parameters are site dependant:

- The first track module of a unidirectional pair has the Island Used field set to **internal** while the second track module has the Island Used field set to **No.**
- All remote unidirectional applications are **No.**

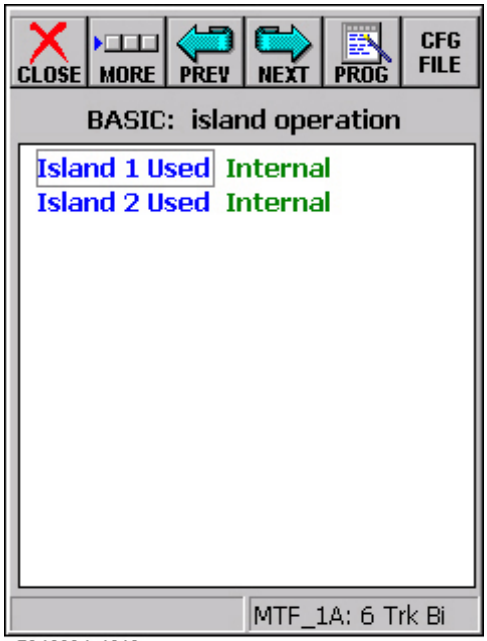


Figure 5-31. BASIC: Island Operation Window

NOTE

If you set the Island Used entry to **external**, you must program an input as an external island (see paragraph 5.8.1.1).

5.3.2 BASIC: Preemption Window

The **Basic: preemption** menu window, figure 5-32, displays following the **BASIC: island operation** window.

- The advance preemption function allows a time interval between crossing traffic signal preemption and crossing activation to be set.
- Function is activated when set to **Yes**.
- Default parameter: **No**
- Dialog box type: *decision*

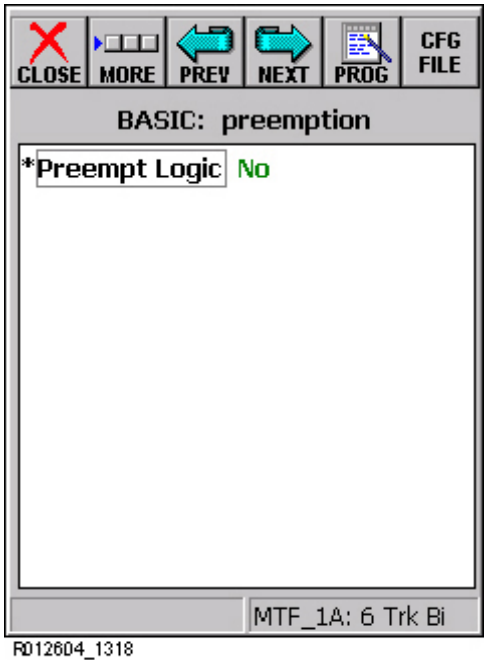


Figure 5-32. BASIC: Advance Preempt Property Browser Window

5.3.2.1 Advance Preemption

When the **Preempt Logic** field is set to **Advnce**, six new entries appear in the window as shown in figure 5-33A.

- **Adv Preempt Delay**
  - The advance preempt delay value is the interval between traffic signal preemption and crossing activation.
  - Default parameter: **10 sec**
  - Valid delay value range: **0** to **500** seconds
  - Dialog box type: *numeric value entry*

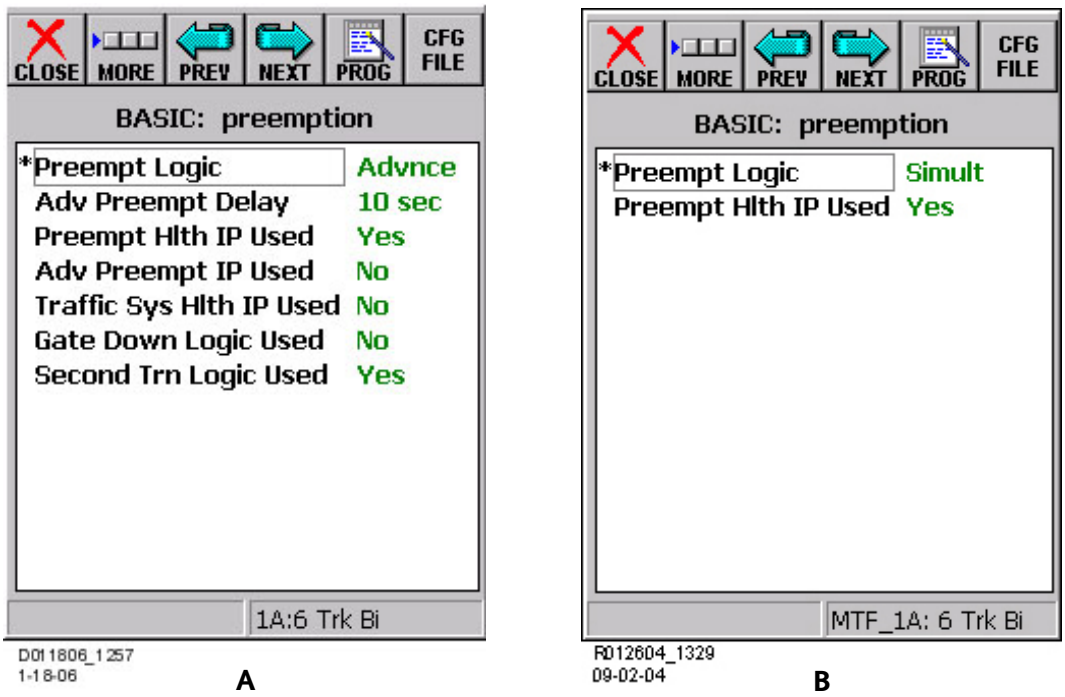


Figure 5-33. Basic Advance Preempt Field Activated

- **Preempt Hlth IP Used**
  - A GCP vital Input (**IN 1.1**, **IN 1.2**, etc.) may be assigned to monitor the **Preempt Health** signal.
    - Indicates state of traffic signal preemption relay.
  - The assigned vital input functional status corresponds to the **Preempt Hlth IP Used** field status.
    - Input is activated when set to **Yes**.
    - Input checks that the preemption relay is energized when the Advance Preemption output is energized.
    - If the GCP detects that the **Preempt Health** input is low (de-energized) when the **Adv Preempt** output is high (energized), the GCP activates the crossing.
  - Default value: **Yes**
  - Dialog box type: *decision*
- **Adv Preempt Input Used**
  - Functions as an auxiliary enable input.
  - Generally is used to receive the combined preempt output for a remote, multiple track, GCP application.
  - Default parameter: **No**
  - Dialog box type: *decision*

- **Traffic Sys Hlth IP Used**
  - A GCP vital Input (**IN 1.1**, **IN 1.2**, etc.) may be assigned to monitor traffic system health.
  - ♦ The assigned vital input functional status corresponds to the **Traffic System Hlth** (health) **IP Used** field status
  - ♦ Input is enabled when set to **Yes**.
    - When the traffic signal status input indicates normal traffic signal operation, crossing activation occurs at a programmed time following traffic signal preemption.
    - When traffic signal status input indicates traffic signal failure, crossing activation occurs simultaneously with traffic signal preemption.
  - ♦ Traffic signal status input does not otherwise affect GCP operation.
    - Default parameter: **No**
    - Dialog box type: *decision*
- **Gate Down Logic Used**
  - ♦ The **Gate Dwn Indication** output is available from each active Track Module when entry is set to **Yes**.
    - Output is high when:
      - ♦ advance preemption function is active and all **GD** (gate down) SSCC inputs are high
      - ♦ any of the enabled islands of the crossing is active (train occupies the island)
  - ♦ Default parameter: **No**
  - ♦ Dialog box type: decision
- **Second Trn Logic Used**
  - ♦ The second train logic function controls the way the crossing responds to the presence of multiple train on multiple tracks
    - When the entry is set to **No** the crossing responds to each individual train.
      - ♦ The crossing deactivates as a train moves out of the island and reactivates as the advance preempt function is activated by a subsequent train
    - When this entry is set to **Yes** the crossing will not recover when the first train clears the crossing if the preemption timer has started for the second or subsequent train.
  - ♦ Dialog box type: decision

- ♦ Default parameter: **No**
- ♦ Dialog box type: *decision*

5.3.2.2 Simultaneous Preemption

When the **Preempt Logic Used** field is set to **Simult** a single new entry appears in the window as shown in figure 5-33B.

- **Preempt Hlth IP Used**
  - ♦ A GCP vital Input (**IN 1.1**, **IN 1.2**, etc.) may be assigned to monitor the **Preempt Health** signal
    - ▪ state of traffic signal preemption relay
  - ♦ The assigned vital input functional status corresponds to the **Preempt Hlth IP Used** field status.
    - ▪ Input is enabled when set to **Yes**.
    - ▪ Input checks that the preemption relay is energized when the **Sim Preempt** output is energized.
    - ▪ If the GCP detects that the **Preempt Health** input is low (de-energized) when the **Sim Preempt** output is high (energized), the GCP activates the crossing.
  - ♦ Default value: **Yes**
  - ♦ Dialog box type: *decision*

5.3.3 BASIC: Radio Dax Links

The **BASIC: radio Dax links Property Browser** window, figure 5-34, displays following the **BASIC: preempt logic** window.

- Shows the activity status of Radio DAX links A and B
  - ♦ Links are activated when set to **Yes**.
  - ♦ Default value: **No**
- Dialog box type: *decision*

When either **Radio DAX link Used** status field is set to **Yes,** new entries appear in the window as shown in figures 5-35A and 5-35B.

- **Link A UAX Connection**
  - ♦ Displays only when **Radio DAX link A Used** is set to **Yes**.
  - ♦ This entry sets the relationship between the predictors of a remote unit and the predictor Enable functions of a local unit as shown in table 5-1.
  - ♦ Default value: **Next Prd**

- Selectable parameters:
  - **Next Prd**
  - **Same Prd**
- Dialog box type: *parameter select*

- **Link B UAX Connection**
  - Displays only when **Radio DAX link B Used** is set to **Yes**.
  - Function is same as **Link A UAX Connection** entry

Table 5-1. Predictor Enable Input Allocations

Local Unit Predictor Enable	Input Assignment	
	Next Prd Setting	**Same Prd** Setting
Prime UAX	DAX A	Prime
DAX A Enable	DAX B	DAX A
DAX B Enable	DAX C	DAX B
DAX C Enable	DAX D	DAX C
Preempt Enable	Preempt	Preempt

NOTE

1. **Next Prd** (predictor) setting is generally used when:
   - Daxing from a remote unit to a crossing
   - Daxing between crossings
2. **Same Prd** (predictor) setting is generally used when:
   - Daxing between two remote units
   - Daxing from a crossing to a remote unit

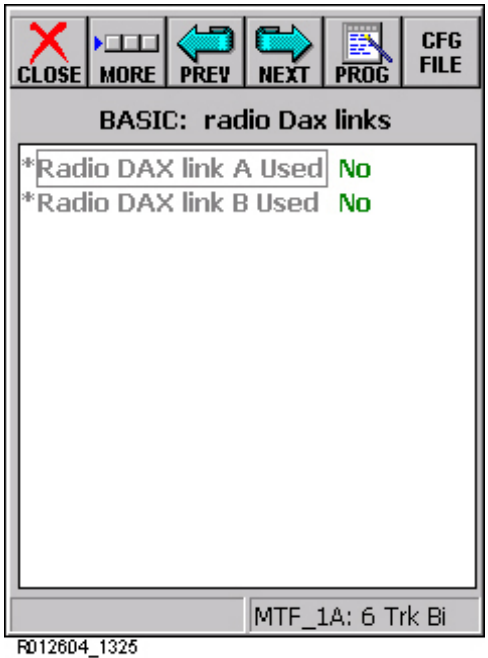


Figure 5-34. BASIC: Radio DAX Links Menu Window

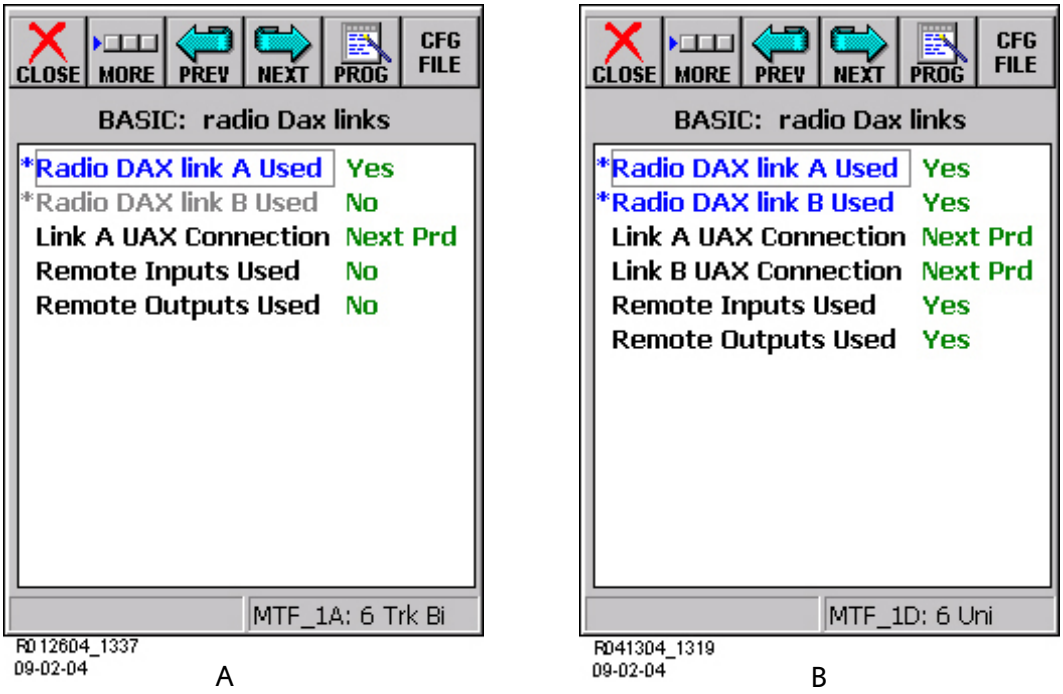


Figure 5-35. BASIC: Radio DAX Links Window Neighbor Designation

- **Remote Inputs Used**
  - ♦ Enables the state of up to eight general purpose vital inputs to be sent to a remote 4000 GCP via the radio link.
  - ♦ Enabled by setting the status field to **Yes**.
    - ▪ Activates Remote Inputs 1 thru 8
  - ♦ Default value: **No**
  - ♦ Dialog box type: *decision*
- **Remote Outputs Used**
  - ♦ Enables the state of up to eight general purpose vital inputs to be received from a remote 4000 GCP via the radio link.
  - ♦ Enabled by setting the status field to **Yes**.
    - ▪ Activates Remote Output 1A thru 8A for Radio Dax Link A
    - ▪ Activates Remote Output 1B thru 8B for Radio Dax Link B
  - ♦ Default value: **No**
  - ♦ Dialog box type: *decision*

NOTE

Remote input and output functions allow vital operations or actions to be sent between sites via the radio links.

- Vital functions at the sending site are assigned to inputs from the **INPUT: assignment window**
- Vital functions at the receiving site(s) are assigned from the **OUTPUT: assignment window**
- When the input remote function is enabled at the sending site and the output remote function is enabled at the receiving site, the vital input states at the sending site drive the assigned vital outputs at the receiving site.
- The relationship between the remote inputs, the remote outputs, and the radio Dax links are as follows:

Remote Input	Remote Output	Radio DAX Link
1	1A	A
	1B	B
2	2A	A
	2B	B
3	3A	A
	3B	B
4	4A	A
	4B	B
5	5A	A
	5B	B
6	6A	A
	6B	B
7	7A	A
	7B	B
8	8A	A
	8B	B

5.3.4 BASIC: Track Links

The **BASIC: track 1** thru **track 6 link A** and **B** windows display following the **BASIC: radio Dax Links** window.

- The **BASIC: track link A** windows display when **Radio DAX Link A Used** is set to **Yes**.
  - ♦ Windows display for activated tracks (1 thru 6)
  - ♦ The **BASIC: track 1 link A** window, figure 5-36, is typical of all **BASIC: track link A** and **B** windows.
  - ♦ Each **BASIC: track link A** window may be used to enable the associated track module to receive a DAX input via radio link A.
  - ♦ default status value is **No**
  - ♦ dialog box type: *decision*
- The **BASIC: track 1** thru **track 6 link B** windows display when **Radio DAX Link B Used** is set to **Yes**.

When the **Daxed to by Link** field (figure 5-36A) is set to **Yes**, additional entries are shown for each **BASIC: track link** window as in figure 5-36B.

- Designates the source of a radio DAX link.
  - ♦ An entry appears for each active track.
  - ♦ Default source is remote T1
- Dialog box type: *decision*

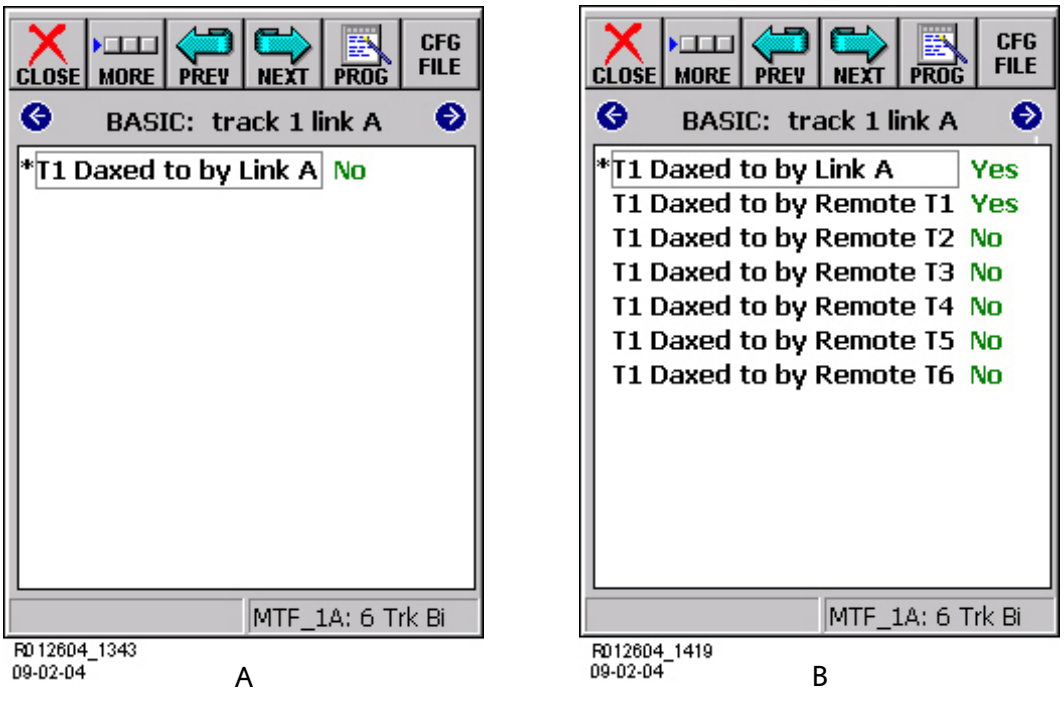


Figure 5-36. BASIC: Track 1 Link A Menu Windows

5.3.5 BASIC: Dax Links

The **BASIC: Dax link** windows display following **BASIC: track link track 1** thru **6** windows

- Functionally identical windows are provided for **Dax link A and Dax link B**.

These windows are shown in figures 5-37A and 5-37B.

- ♦ Windows appear only when corresponding DAX link is enabled.

- Each **BASIC: Dax link** window provides:
  - ♦ Dax link address offset values
  - ♦ DAX message control parameters

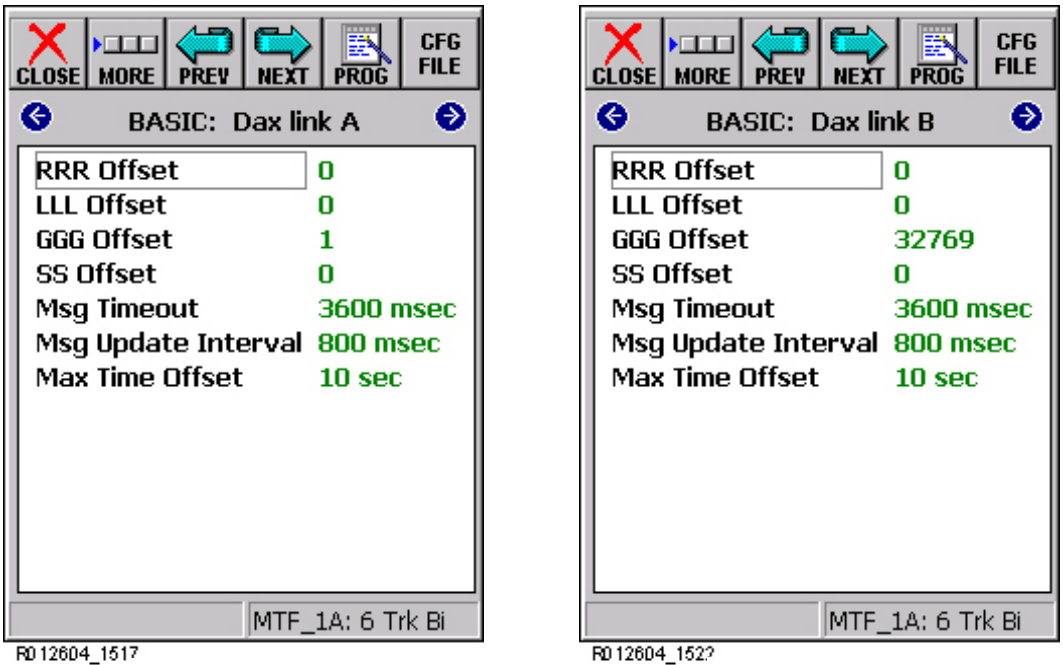


Figure 5-37. BASIC: Dax link Menu Windows

The **Dax Link** offset values represent the numeric difference between the ATCS address of the local radio site and the addresses of the DAX link A and B radio sites.

- **RRR Offset**
  - ATCS Railroad number
  - Default value: **0**
  - Valid offset value range: **999** to **–999**
    - See note.
  - Dialog box type: *numeric value entry*
- **LLL Offset**
  - ATCS Region number
  - Default value: **0**
  - Valid offset value range: **999** to **–999**
    - See note.
  - Dialog box type: *numeric value entry*
- **GGG Offset**
  - ATCS Group number
  - Default value:
    - Dax link A: **1**
    - Dax link B: **32769** (**-1**)
  - Valid offset value range: **999** to **–999**
    - See note.
  - Dialog box type: numeric value entry
- **SS Offset**
  - ATCS Site number
  - Default value: **0**
  - Valid offset value range: **99** to **–99**
    - See note.
  - Dialog box type: *numeric value entry*

NOTE

Negative numbers cannot currently be entered into these menus.

- If a negative offset is required, enter the number as 32768 plus the absolute value of the negative offset number; e.g., -5 has an absolute value of 5.
- The absolute value of the offset number is then added to 32768 to obtain the value to be entered; e.g., 5 + 32768 = 32773.

- **Msg Timeout**
  - The **Msg Timeout** entry value indicates how long the receiving unit waits for the next message from the neighbor.
    - If a message is not received within this time, the GCP is considered out of session and the UAX inputs are de-energized.
  - Default interval: **3600 msec**
  - Valid timeout interval range: 1000 to 6000 milliseconds
  - Dialog box type: numeric value entry
- **Msg Update Interval**
  - The **Msg Update Interval** entry value sets the transmit interval between ATCS DAX messages.
  - Default value: **800 msec**
  - Valid interval range: **400** to **30,000** milliseconds
  - Dialog box type: *numeric value entry*
- **Max Time Offset**
  - The **Max Time Offset** entry value sets the maximum permissible delay in transferring a message from the remote to the local site.

Messages with delays that exceed the offset parameter are identified as stale.

A stale message is one that does not represent the most recent DAX state.

- Default value: **10 sec**
- Valid interval range: **5** to **30** seconds

Dialog box type: numeric value entry

5.3.6 BASIC: Vital Comms links

The **BASIC: Vital Comms links** window (figure 5-38) displays following the **BASIC: DAX links** windows.

- Enables the 4000 GCP to interface to either an HD/Link module or another 4000 GCP via an Echelon link or a radio link. The HD/Link can be used to bring remote input states into the 4000 GCP via a radio link (e.g., to radio DAX from a 3000 GCP to a 4000 GCP). The Vital Comms link could also be used to send vital states between 4000 GCPs.
- If two 4000 GCPs are connected using Vital Comms links, Vital Comms link 1 on one GCP will connect to Vital Comms link 1 on the other GCP. When Vital Link 1 IP n is energized on one GCP it will energize Vital Link 1 OP n on the other (see paragraph 5.3.6.1).

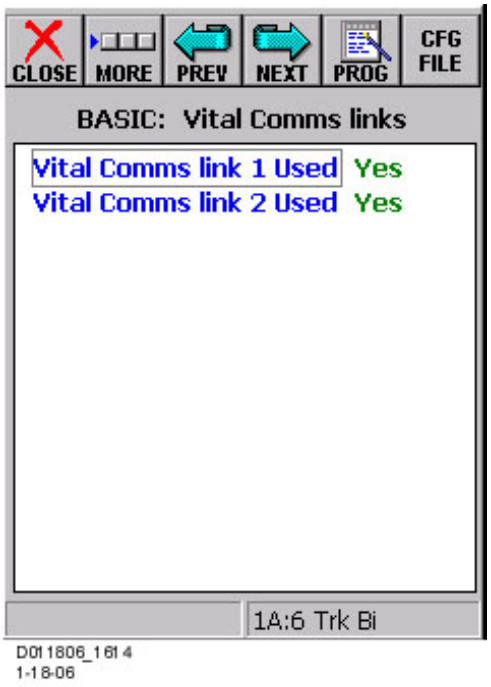


Figure 5-38. Vital Comms links Menu Window

When the **Vital Comms link 1** is enabled:

- the eight general purpose outputs **Vital Link 1 OP 1** thru **Vital Link 1 OP 8** are available to be assigned to outputs.
- the eight general purpose inputs **Vital Link 1 IP 1** thru **Vital Link 1 IP 8** are available to be assigned to inputs.
  - Enabled by setting **Vital Comms link 1 Used** to **Yes**
  - Default value: **No**
  - Dialog box type: *decision*

When the **Vital Comms link 2** is enabled:

- the eight general purpose outputs **Vital Link 2 OP 1** thru **Vital Link 2 OP 8** are available to be assigned to outputs.
- the eight general purpose inputs **Vital Link 2 IP 1** thru **Vital Link 2 IP 8** are available to be assigned to inputs.
  - Enabled by setting **Vital Comms link 2 Used** to **Yes**
  - Default value: **No**
  - Dialog box type: *decision*

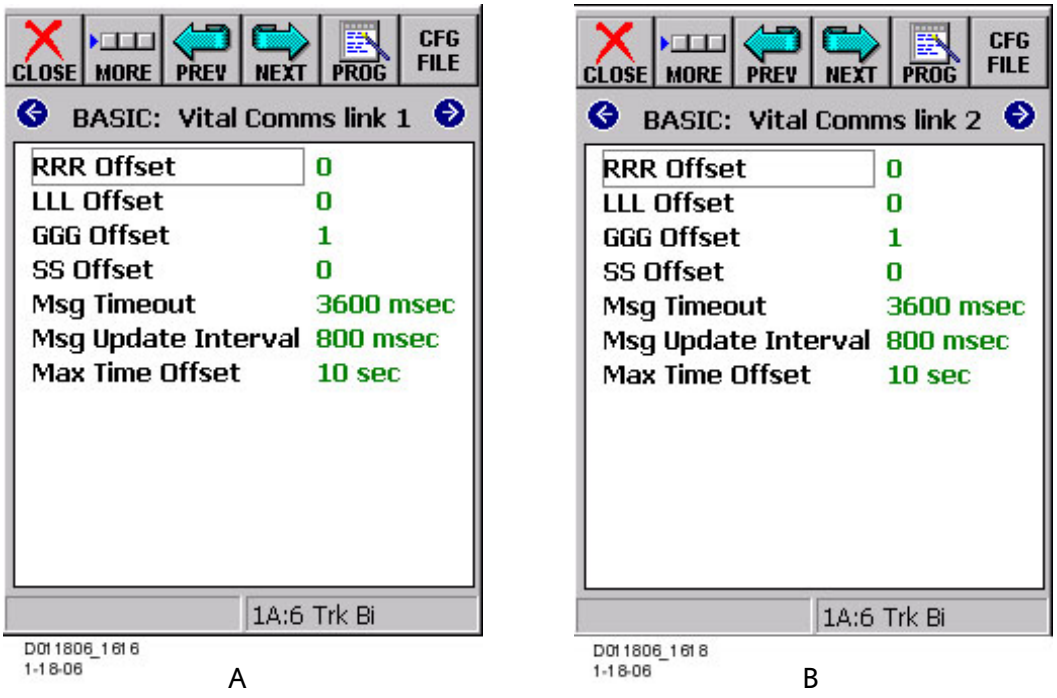


Figure 5-39. Vital Comms link 1 and 2 Menu Windows

The **BASIC: Vital Comms link** menu windows (figure 5-39) provide the ATCS session settings for Vital Comms links 1 and 2 respectively. These windows only appear when the corresponding **Vital Comms link** is enabled (see paragraph 5.3.6).

Each **BASIC: Vital Comms link** window provides:

- Vital Comms link ATCS address offset values
- ATCS Comms session timing parameters

The **Vital Comms link** offset values represent the numeric difference between the ATCS address of the local radio site and the addresses of the Vital Comms link 1 and 2 radio sites.

- **RRR Offset**
  - ATCS Railroad number
  - Default value: **0**
  - Valid offset value range: **999** to **–999**
    - See note.
  - Dialog box type: *numeric value entry*
- **LLL Offset**
  - ATCS Region number
  - Default value: **0**
  - Valid offset value range: **999** to **–999**
    - See note.
  - Dialog box type: *numeric value entry*
- **GGG Offset**
  - ATCS Group number
  - Default value:
    - Dax link A: **1**
    - Dax link B: **32769** (**-1**)
  - Valid offset value range: **999** to **–999**
    - See note.
  - Dialog box type: numeric value entry
- **SS Offset**
  - ATCS Site number
  - Default value: **0**
  - Valid offset value range: **99** to **–99**
    - See note.
  - Dialog box type: *numeric value entry*

NOTE

Negative numbers cannot currently be entered into these menus.

- If a negative offset is required, enter the number as 32768 plus the absolute value of the negative offset number; e.g., -5 has an absolute value of 5.
- The absolute value of the offset number is then added to 32768 to obtain the value to be entered; e.g., 5 + 32768 = 32773.

5.4 PREDICTORS CONFIGURATION AND GCP PROGRAMMING MENU ITEMS

Diagnostic Terminal (DT) Predictor configuration and GCP programming menu items provide access to the configuration windows shown in figure 5-40.

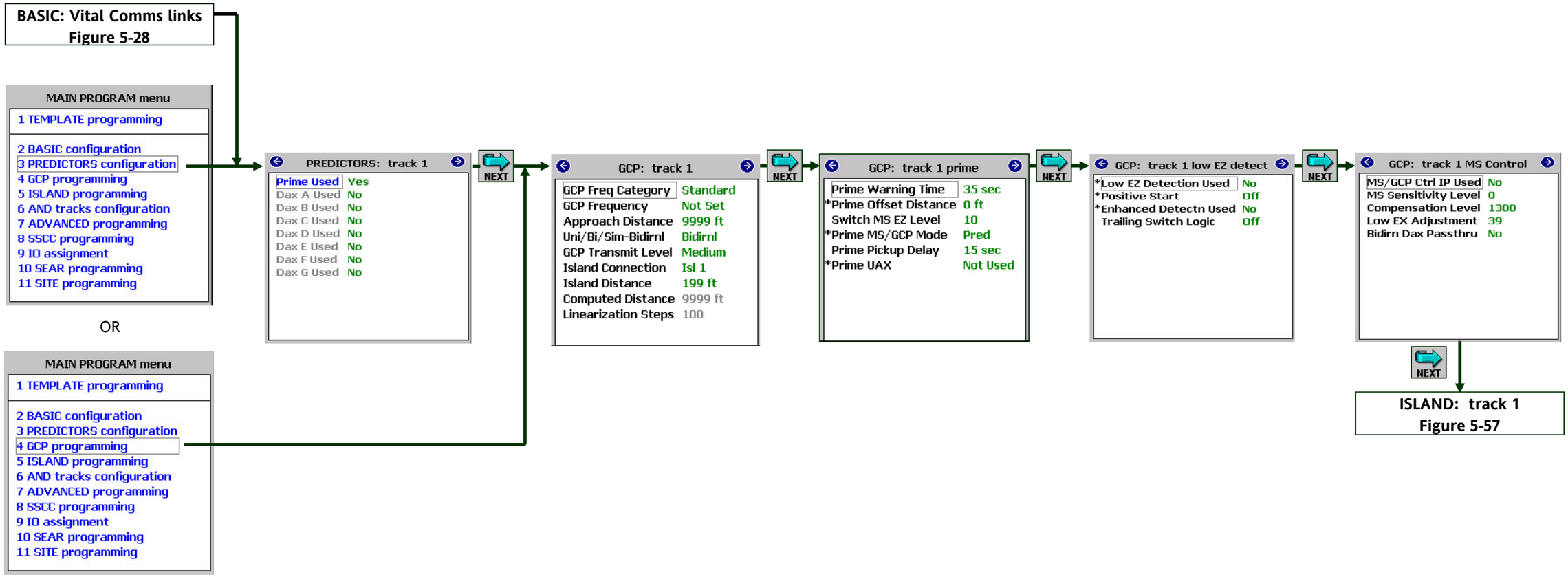


Figure 5-40. PREDICTORS and GCP Menu Structure

5.4.1 PREDICTORS: Configuration Item

Selecting the **PREDICTORS Configuration** item brings up the first enabled **PREDICTORS: track Menu** window, figure 5-41A.

- Identical window provided for all active tracks.
- A window displays nine predictors for each track.
  - A predictor is:
    - active when its selection field is set to **Yes**
    - inactive when its selection field is set to **No**
  - The default value for each predictor used field is shown In figure 5-41A (except for templates 4A and 5A).
  - Dialog box type: *decision*
- The Preempt Predictor displays only (figure 5-41B). when the Advance Preempt logic is used (see paragraph 5.3.2.1)

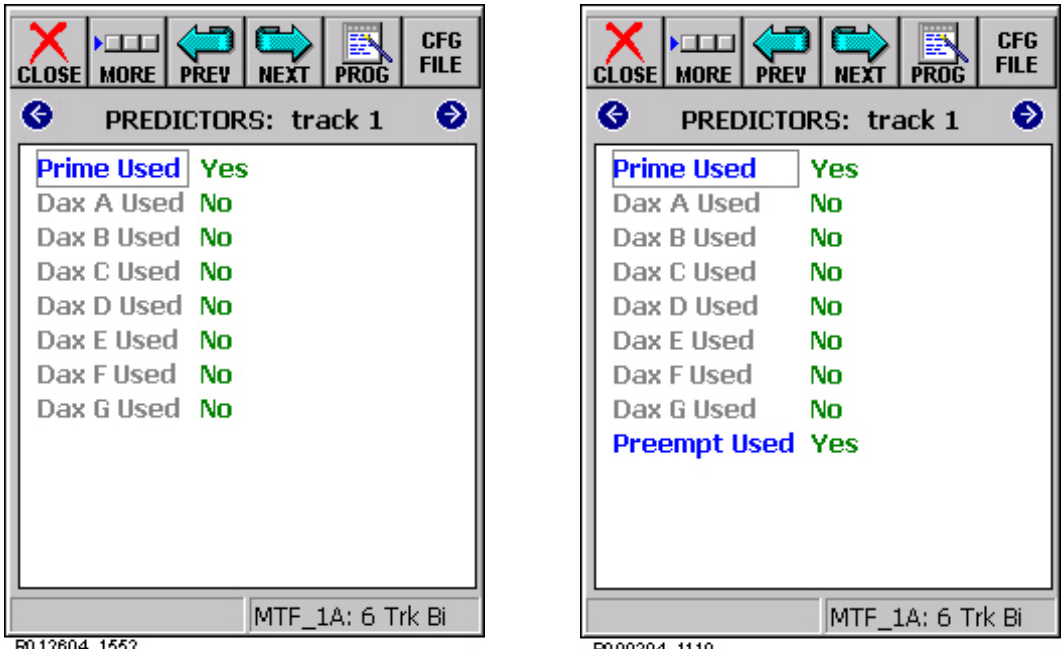


Figure 5-41. Predictors Enable Menu Windows

5.4.2 GCP Programming Menu Item

Selecting the **GCP Programming** menu item brings up the first enabled **GCP: track Menu** window.

- A window with identical parameters is provided for each active track.
  - The **GCP: track 1** window is shown in figure 5-42.

Figure 5-42. GCP: Track 1 Menu Window

Each **GCP: track** window displays track parameters for the corresponding Track module:

- **GCP Frequency Category**
  - Default value: **Standard**
  - Selectable parameters:
    - **Standard**
    - **Offset**
    - **Other**
  - Dialog box type: *parameter select*
- **GCP Frequency**
  - Selectable frequencies:
    - **Standard (Hz)**

Not Set	**156**	**348**	**645**
86	**211**	**430**	**790**
114	**285**	**525**	**970**

- **Offset (Hz)**

Not Set	**115**	**284**	**527**
85.5	**155**	**286**	**643**
86.5	**155.5**	**347**	**647**
87	**156.5**	**349**	**788**
113	**157**	**429**	**792**
113.5	**210**	**431**	**968**
114.5	**212**	**523**	**972**

- **Other**

Not Set	**250**	**522**	**816**
44	**267**	**560**	**881**
45	**326**	**630**	**979**
46	**392**	**686**	**999**
151	**452**	**753**	

- Dialog box type: *numeric value entry*

- **Approach Distance**
  - Default distance: **9999 ft**
  - Valid approach distance range: **0** to **9999** feet
  - Dialog box type: *numeric value entry*
- **Uni/Bi/Sim-Bidirnl**
  - Default value: depends on template selected
  - Selectable parameters:
  - Bidirnl (bi-directional)
  - Sim. Bidirnl (simulated bi-directional)
  - Unidirnl (unidirectional)
  - Dialog box type: *parameter select*
- **GCP Transmit Level**
  - Default level: **Medium**
  - Selectable parameters:
    - **Medium**
    - **High**
  - Dialog box type: *parameter select*
- **Island Connection**
  - Default level
    - bi-directional: Isl ‘n’ where ‘n’ is the track number
    - unidirectional at a crossing: Isl ‘m’ where ‘m’ is the lower track number of the back-to-back pair
    - unidirectional at a remote: **No Islands**
  - Selectable parameters:
  - Isl 1 (Island 1) thru Isl 6 (Island 6)
  - No Islands
  - Dialog box type: *parameter select*

- **Island Distance**
  - ♦ Island Distance is only used in DAXing applications
  - ♦ Default distance
    - ▪ bi-directional: **120 ft**
    - ▪ unidirectional at a crossing when this track has the island: **120 ft**
    - ▪ unidirectional at a crossing when this track uses the other track module's island: **0 ft**
    - ▪ unidirectional at a remote: **0 ft**
  - ♦ Valid island distance range: **120** to **350** feet
  - ♦ Dialog box type: *numeric value entry*
- **Computed Distance**
  - ♦ Information only
  - ♦ Approach distance computed during calibration procedure
- **Linearization Steps**
  - ♦ Information only
  - ♦ Computed during approach linearization procedure

5.4.2.1 GCP: Track Prime Window

A **GCP: track prime Menu** window displays following each **GCP: track** window.

- The **GCP: track 1 prime** window, figure 5-43A, is typical of all prime function windows.

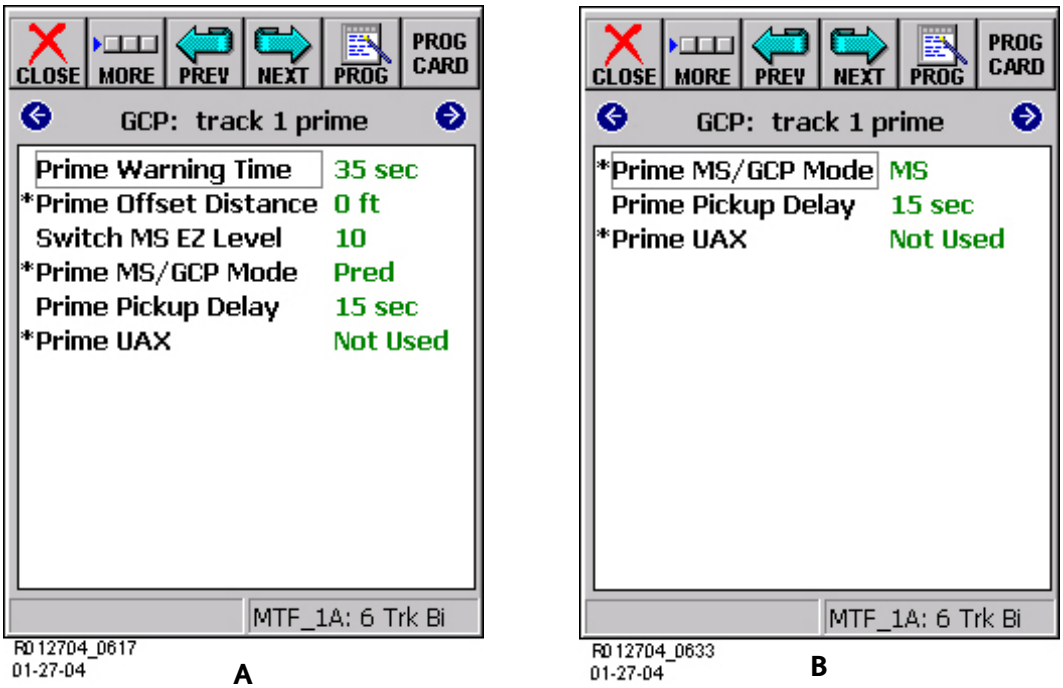


Figure 5-43. GCP: Track 1 Prime Menu Windows

Each **GCP: track prime** window displays prediction parameters for the corresponding Track module:

- **Prime Warning Time**
  - Does not display when **MS** (motion sensor operation) is selected (see figure 5-43B)
  - Default time: **35 sec**
  - Valid time range: **23** to **99** seconds
  - Dialog box type: *numeric value entry*

NOTE

Primary Warning Time should not be set below 25 seconds unless Advance Preempt is active.

- **Prime Offset Distance**
  - Does not display when **MS** is selected.
  - Default offset distance: **0 ft**
  - Valid offset distance range: **0** to **9999** feet
  - Dialog box type: *numeric value entry*
- **Switch MS EZ Level**
  - Does not display when **MS** is selected.
  - Sets the EZ level where the 4000 GCP switches from a predictor to a motion sensor.
  - Is useful where a station stop is located within the approach distance and near the crossing.
  - Displays only when **Prime Offset Distance** is set at 0.
  - Default value: **10**
  - Valid MS/EZ level range: **0** to **100**
  - Dialog box type: *numeric value entry*
- **Prime MS/GCP Mode**
  - This program option is available only when **Prime Offset Distance** is set to **0**
  - Default level: **Pred**
  - Selectable parameters:
    - **MS** (motion sensor)
    - **Pred** (predictor)
  - Dialog box type: *parameter select*
- **Pickup Delay Mode**
  - When the **Prime Offset Distance** is set to a non-zero distance value the **Pickup Delay Mode** item appears within the window as shown in figure 5-44.
  - Used to select an automatic or fixed pickup delay.
  - Default level: **Fixed**

- Selectable parameters:
  - **Auto**
  - **Fixed**
- Dialog box type: *parameter select*

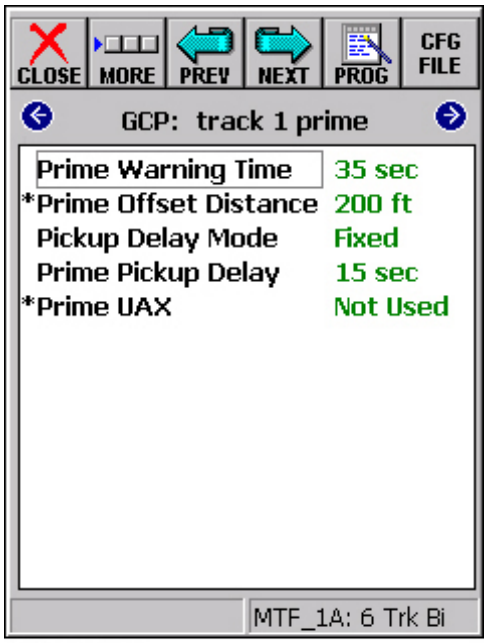


Figure 5-44. GCP: Track 1 Prime Window With Prime Offset Distance Entered

- **Prime Pickup Delay**
  - This option selects the time interval (in seconds) between prediction recovery and the return of relay drive.
  - Default value: **15 sec**
  - Valid delay range: **8** to **500** seconds
  - Dialog box type: numeric value entry
- **Prime UAX**
  - This option selects the prime UAX input source.
  - Default value: **Not Used**
  - Selectable parameters:
    - **IP** (input)
    - **IP+RDAX** (input + remote DAX)
    - **Not Used**
    - **RDAX** (remote DAX)
  - Dialog box type: *parameter select*

NOTE

If you set **IP** or **IP+RDAX**, you must program an input to Prime UAX in the INPUT: Assignment menu (paragraph 5.8.1.1).

- **Prime UAX Pickup**
  - Selects the time interval (in seconds) between UAX recovery and the return of relay drive.
  - Appears only when a **Prime UAX** input is selected (see figure 5-45)
  - Default value: **5 sec**
  - Valid delay range: **0** to **500** seconds
  - Dialog box type: *numeric value entry*

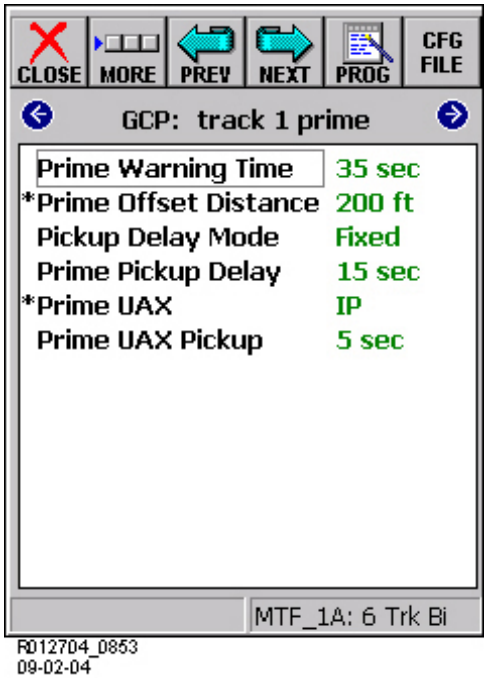


Figure 5-45. GCP: Track 1 Prime Window With Prime UAX Input Selected

5.4.2.2 Track 1 DAX Windows

A sequence of **GCP: track Dax Menu** windows displays following each **GCP: track prime** window.

- Up to seven Dax (A thru G) windows may display
- The **GCP: track 1 Dax A** window, figure 5-46, is typical of all DAX windows.
- DAX windows display only for enabled DAX functions.

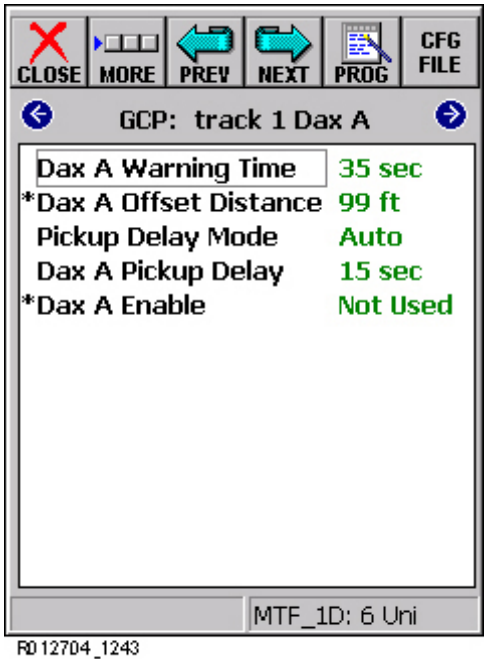


Figure 5-46. GCP: track 1 Dax A Window

Each **GCP: track Dax A Menu** window displays DAX parameters for the corresponding Track module:

- **Dax A Warning Time**
  - Default time: **35 sec**
  - Valid time range: **23** to **99** seconds
  - Dialog box type: *numeric value entry*
- **Dax A Offset Distance**
  - Default offset distance: **99 ft**
  - Valid offset distance range: **0** to **9999** feet
  - Dialog box type: *numeric value entry*
- **Pickup Delay Mode**
  - Displays only when **Dax A Offset Distance** is not set to 0.
  - Selects an automatic or fixed prediction recovery time.
  - Default level: **Auto**
  - Selectable parameters:
    - **Auto**
    - **Fixed**
  - Dialog box type: *parameter select*

- **Switch MS EZ Level**
  - ♦ Does not display when **MS** is selected or when **Offset Distance** is greater than zero
  - ♦ Sets the EZ level where the 4000 GCP switches from predictor to motion sensor status
    - ▪ Is useful where a station stop is located within the approach distance and near the crossing
  - ♦ Default value: **0**
  - ♦ Valid MS/EZ level range: **0** to **100**
  - ♦ Dialog box type: numeric value entry
- **Dax A MS/GCP Mode**
  - ♦ This program option is available only when **Dax A Offset Distance** is set to **0** (see figure 5-47).
  - ♦ Default level: **Pred**
  - ♦ Selectable parameters:
    - ▪ **MS** (motion sensor)
    - ▪ **Pred** (predictor)
  - ♦ Dialog box type: *parameter select*

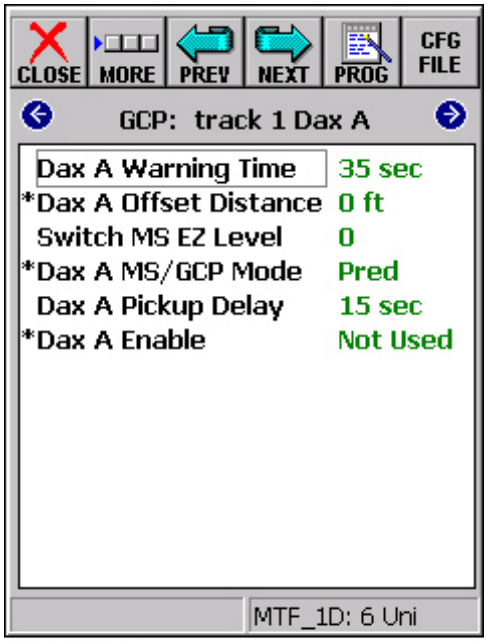


Figure 5-47. GCP: track 1 Dax A Window With Dax A Offset Distance Set To 0

- **Dax A Pickup Delay**
  - This option selects the time interval (in seconds) between prediction recovery and the return of relay drive.
    - This value is used when **Pickup Delay** mode is **Fixed**.
  - Default value: **15 sec**
  - Valid delay range: **8** to **500** seconds
  - Dialog box type: *numeric value entry*
- **Dax A Enable**
  - This option selects the prime Dax A input source.
  - Default value: **Not Used**
  - Selectable parameters:
    - **Not Used**
    - **IP** (input)
    - **RDAX** (remote DAX)
    - **IP+RDAX** (input + remote DAX)
  - Dialog box type: *parameter select*

NOTE

If **IP** or **IP+RDAX** is set, it must be programmed as an input to Prime UAX in the **IO Assignment** menu (paragraph 5.8.1.1).

- **Dax A Enable Pickup**
  - Selects the time interval (in seconds) between DAX A recovery and the return of relay drive.
    - Appears only when a **Dax A Enable** input is selected (see figure 5-48)
  - Default value: **2 sec**
  - Valid delay range: **0** to **500** seconds
  - Dialog box type: *numeric value entry*

Programmable Pickup Delay is available only for **DAX A** and **DAX B Enable**.

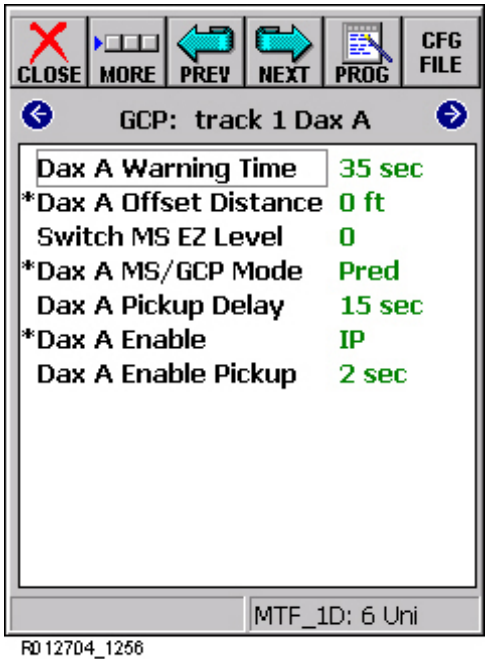


Figure 5-48. GCP: track 1 Dax A Window With Dax A Enable Input Selected

5.4.2.3 GCP: Track Preempt Windows

A preempt window displays following the final Dax window for each track.

- The **GCP: track 1 preempt Menu** window, figure 5-49A, is typical of all preempt function windows.

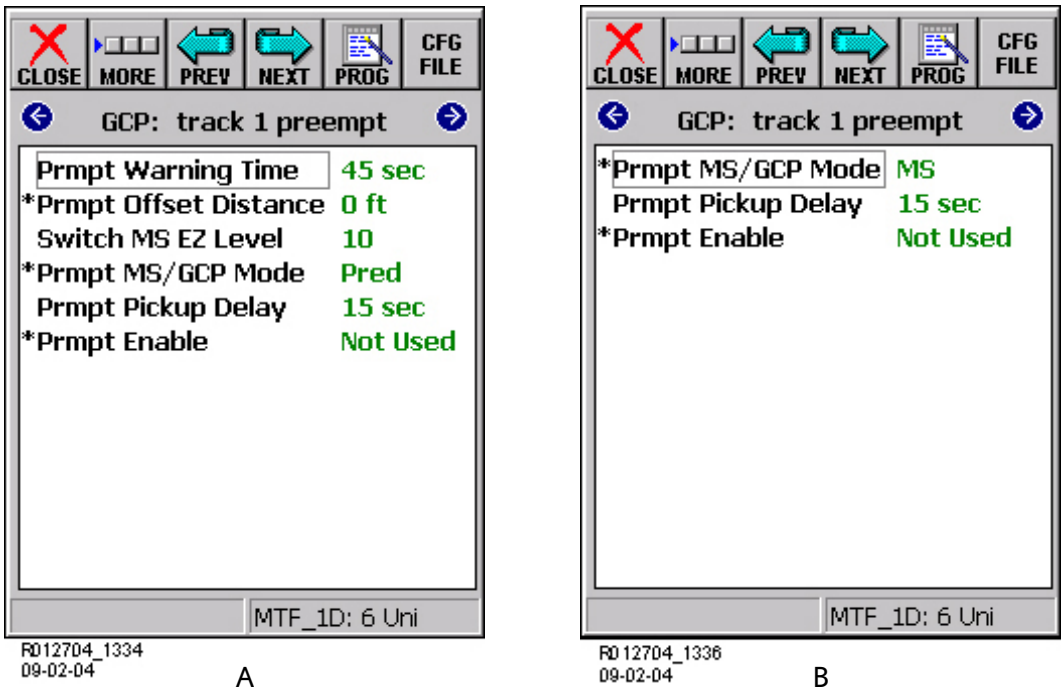


Figure 5-49. GCP: Track 1 Preempt Window

- Each **GCP: track preempt** window displays preemption parameters for the corresponding Track module:

The preempt window is only accessible when Advance Preempt is turned on.

- **Prmpt Warning Time**
  - ♦ Does not display when **MS** (motion sensor) operation is selected (see figure 5-49B)
  - ♦ Default time: **45 sec**
  - ♦ Valid time range: **23** to **99** seconds
  - ♦ Dialog box type: *numeric value entry*
- **Prmpt Offset Distance**
  - ♦ Does not display when **MS** is selected
  - ♦ Default offset distance: **0 ft**
  - ♦ Valid offset distance range: **0** to **9999** feet
  - ♦ Dialog box type: numeric value entry
- **Switch MS EZ Level**
  - ♦ Does not display when **MS** is selected or **Prmpt Offset Distance** is greater than zero
  - ♦ Sets the EZ level where the 4000 GCP switches from predictor to motion sensor status
    - ▪ Useful where a station stop is located within the approach distance and near the crossing
  - ♦ Default value: **10**
  - ♦ Valid MS/EZ level range: **0** to **250**
  - ♦ Dialog box type: *numeric value entry*
- **Prmpt MS/GCP Mode**
  - ♦ This program option displays only when **Prmpt Offset Distance** is set to **0**
  - ♦ Default level: **Pred**
  - ♦ Selectable parameters:
    - ▪ **MS** (motion sensor)
    - ▪ **Pred** (predictor)
  - ♦ Dialog box type: *parameter select*

- **Pickup Delay Mode**
  - When the **Prmpt Offset Distance** is set to a distance greater than zero, the **Pickup Delay Mode** item appears within the window as shown in figure 5-50.
  - Selects an automatic or fixed prediction recovery time.
  - Default level: **Fixed**
  - Selectable parameters:
    - **Auto**
    - **Fixed**
  - Dialog box type: *parameter select*
- **Prmpt Pickup Delay**
  - Selects the time interval (in seconds) between prediction recovery and the return of relay drive.
  - Default value: **15 sec**
  - Valid delay range: **8** to **500** seconds
  - Dialog box type: *numeric value entry*

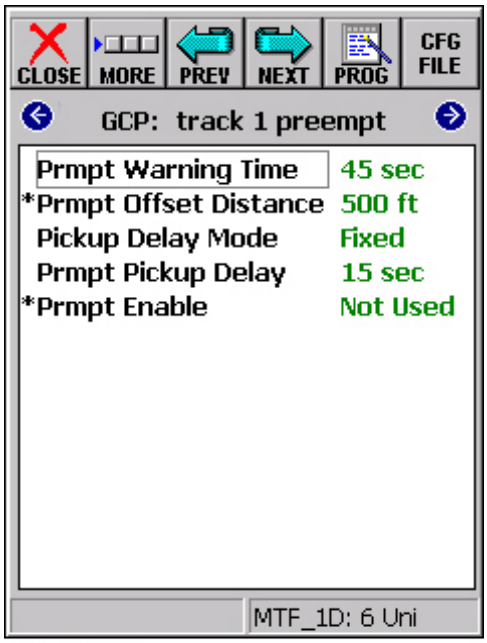


Figure 5-50. GCP: track 1 Preempt Window With Preempt Offset Distance Entered

- **Prmpt Enable**
  - Selects the preempt input source.
  - Default value: **Not Used**
  - Selectable parameters:
    - **IP (input)**
    - **IP+RDAX (input + remote DAX)**
    - **Not Used**
    - **RDAX (remote DAX)**
  - Dialog box type: *parameter select*

NOTE

If you set **IP** or **IP+RDAX**, you must program an input to Prime UAX in the INPUT: Assignment menu (paragraph 5.8.1.1).

- **Prmpt Enable Pickup**
  - Selects the time interval (in seconds) between preemption recovery and the return of relay drive.
    - Appears only when a **Prmpt Enable** input is selected (see figure 5-51)
  - Default value: **5 sec**
  - Valid delay range: **0** to **500** seconds
  - Dialog box type: *numeric value entry*

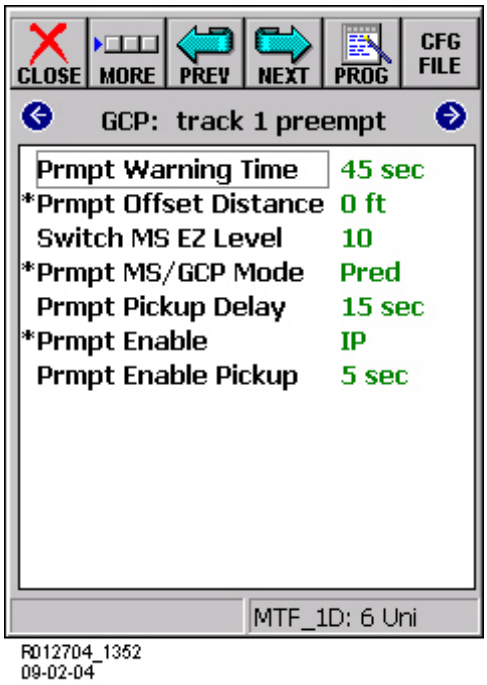


Figure 5-51. GCP: track 1 Preempt Window With Preempt Enable Input Selected

5.4.2.4 GCP: Track Low EZ Detect

A **GCP: track low EZ detect** window displays following each **GCP: track prime** window.

The **GCP: track 1 low EZ detect** window, figure 5-52, is typical of all low EZ detect function windows

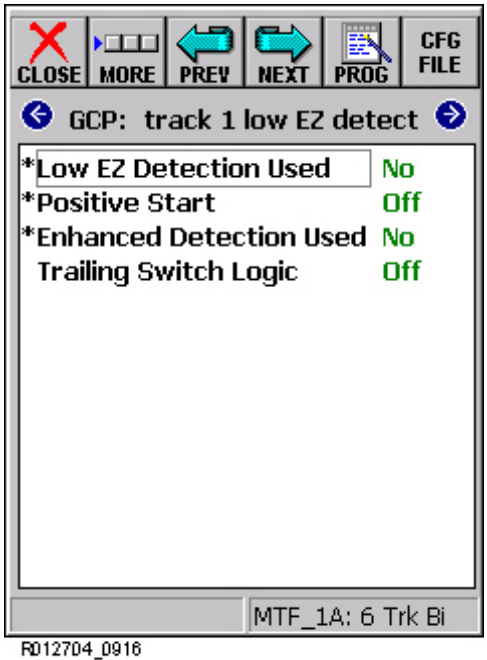


Figure 5-52. GCP: Track 1 Low EZ Detect Window

Each **GCP: track low EZ detect** window displays EZ related parameters for the corresponding Track module:

- **Low EZ Detection Used**
  - ♦ When the status field is set to **Yes** the Track Module detects a low EZ condition when the EZ level drops below the value set by the **Low EZ Detection Level** entry.
    - ▪ If the Track Module detects a low EZ condition for a period longer than specified by the **Low EZ Detection Time** entry the module is determined to be unhealthy.
    - ▪ The track module recovers 30 seconds after EZ returns to a value above the low EZ detection level
  - ♦ Default value: **No**
  - ♦ Dialog box type: *decision*

- **Low EZ Detection Level**
  - Sets the low EZ activation level
    - Displays only when a **Low EZ Detection Used** is set to **Yes** (see figure 5-53)
  - Default value: **70**
  - Valid delay range: **50** to **80**
  - Dialog box type: *numeric value entry*

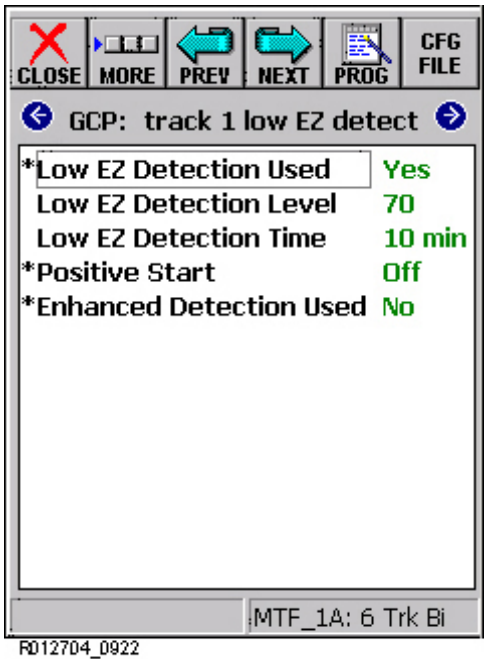


Figure 5-53. GCP: Track 1 Low EZ Detect Window

NOTE

The low EZ detection level should be set to a value so that you will not get short warning times if the track is falsely shunted above this level.

- **Low EZ Detection Time**
  - Sets the maximum time for the Track Module to indicate that a low EZ condition exists before a Low EZ error is declared.
    - Displays only when a **Low EZ Detection Used** is set to **Yes** (see figure 5-53)
  - Default value: **10 min**
  - Valid delay range: **2** to **99** minutes
  - Dialog box type: *numeric value entry*

- **Positive Start**
  - Activates crossing when EZ level is less than Positive Start EZ value.
  - No 5-second reaction delay time prior to activation.
  - When Positive Start occurs the crossing is continuously activated until either of following occurs:
    - Train enters and then clears the island circuit
    - EZ value rises to number 5 greater than programmed positive start EZ level
    - Positive Start timer exceeds programmed value.
  - Default value: **Off**
  - Selectable parameters:
    - **Timed**
    - **Off**
    - **On**
  - Dialog box type: *parameter select*
- **Positive Start Level**
  - Sets Positive Start EZ level value
  - Entry appears when **Positive Start** is set to **ON** or **Timed** (see figure 5-54A)
  - Default value: **10**

Valid Positive Start level range: 1 to 80

  - Dialog box type: *numeric value entry*
- **Positive Start Timer**
  - Sets maximum Positive Start activation time
  - Entry appears only when **Positive Start** is set to **Timed** (see figure 5-54B)
  - Default value: **10 min**
  - Valid Positive Start timer range: **0** to **99** minutes
  - Dialog box type: *numeric value entry*

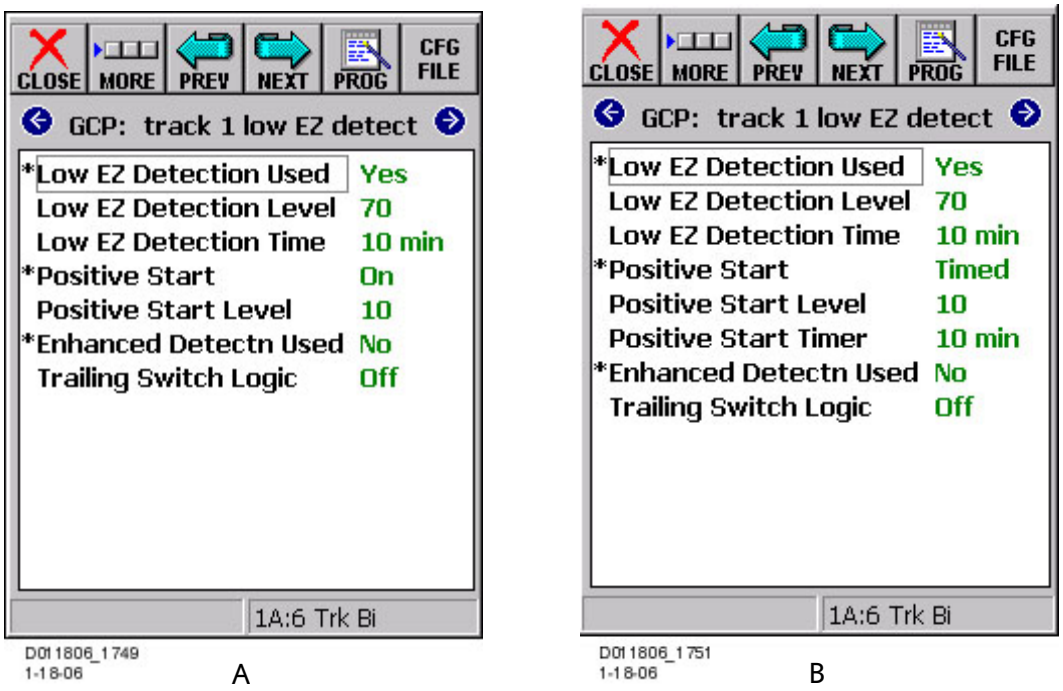


Figure 5-54. GCP: Track 1 Low EZ Detect Window with Positive Start Enabled

- **Enhanced Detection**
  - Allows use of 4000 GCP in areas where poor track shunting conditions are experienced.
  - When the **Enhanced Detectn Used** status field is set to **Yes**, the associated Track Module:
    - automatically switches from predictor to high sensitivity motion sensor operation when poor shunting conditions for the track are detected
      - poor shunting is indicated by nonlinear fluctuations of track signal
    - continues to operate as conventional grade crossing predictor as long as poor shunting conditions are not detected
  - Default value: **No**
  - Dialog box type: *decision*

NOTE

1. Enhanced Detection activation can result in longer than programmed Warning Times at:
   - remote prediction (DAX) locations
   - crossings where slower trains are encountered.
2. Enhanced Detection should be used where passenger trains, commuter, or other light rail vehicles operate.

- **Station Stop Timer**
  - ♦ Entry appears when the **Enhanced Detectn Used** status field is set to **Yes** (see figure 5-55)
  - ♦ The Station Stop Timer is used to prevent poor shunt detection for trains that make a station stop after passing the crossing.
    - ▪ Poor shunt detection may:
      - ♦ occur as the train departs from the station
      - ♦ result in tail rings
  - ♦ The timer is initiated automatically when a train stops after leaving the island circuit.
    - ▪ The timer is programmed for an interval longer than the time the train normally remains stopped at the station.
  - ♦ Default value: **10 sec**
  - ♦ Valid Station Stop Timer range: **10** to **120** seconds
  - ♦ Dialog box type: *numeric value entry*

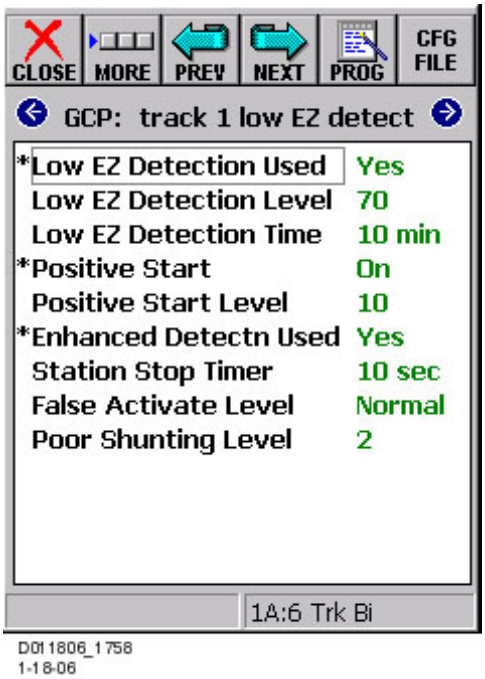


Figure 5-55. GCP: Track 1 Low EZ Detect Window with Enhanced Detection

- **False Activation Level**
  - Used to prevent false activation of the crossing caused by:
    - trains moving away from the crossing
    - trailing switches
  - Entry appears when the **Enhanced Detectn Used** status field is set to **Yes** (see figure 5-55)
  - Default value: **Normal**
  - Selectable parameters:
    - **Normal**
    - **Medium**
    - **High**
  - Dialog box type: *parameter select*
- **Trailing Switch Logic**
  - Prevents tail rings caused by the wheel noise of a train entering the approach on a trailing switch.
  - Entry is hidden when **Enhanced Detectn Used** function is set to **Yes** because the trailing switch function is always active in this mode.
  - Incorporated into enhanced detection function
  - Default value: **Off**
  - Selectable parameters:
    - **Off**
    - **On**
  - Dialog box type: *decision*
- **Poor Shunting Level**
  - Used to decrease poor shunting sensitivity
  - Default level: **2**
  - Selectable range:
    - **2** (greatest sensitivity)
    - **3**
    - **4**
    - **5** (least sensitivity)
  - Dialog box type: *decision*

5.4.2.5 GCP: Track MS Control Window

A **track MS Control** window displays following each active **track low EZ detect** window.

- The **GCP: track 1 MS Control** window, figure 5-56, is typical of all track MS Control windows.

Figure 5-56. GCP: Track 1 MS Control Menu Window

Each **GCP: track MS Control** window displays additional track control parameters for the corresponding Track module:

- **MS/GCP Ctrl IP Used**
  - ♦ This entry enables a Track module vital input to be assigned as an:
    - ▪ **MS Control** input
  - ♦ Assigned input is activated when set to **Yes**.
  - ♦ Default value: **No**
  - ♦ Dialog box type: *decision*

NOTE

When this function is set to **Yes**, an input must be program as an **MS Control** input (see paragraph 5.8.1.1).

➢ When the input is low, all predictors on this track indicated as using the MS Restart will become motion sensors.

- **MS Sensitivity Level**
  - ♦ This entry provides control of motion sensitivity.
    - ▪ normally used in conjunction with MS/GCP Restart operation
    - ▪ Motion sensitivity is increased when a value other than **0** is selected

  - A value of **0** provides motion sensitivity of approximately 30 mph at end of 3000-foot approach.
  - A value of **100** provides motion sensitivity of approximately 1 mph at the feed points and 2 mph within the approach.
- Default value: **0**
- Motion sensing level values range: **0** to **100**
- Dialog box type: *numeric value entry*

- **Compensation Level**
  - The compensation level value is a correction factor used to fine tune the system for varying ballast loads on the track.
  - Default value: **1300**
    - The default value may not be sufficient for all applications, especially those with severe loading (salted crossings).
  - Valid range of entries: **1000** to **2000**
  - Dialog box type: *numeric value entry*

⚠ WARNING

THE COMPENSATION LEVEL SHOULD NOT BE CHANGED UNLESS SPECIFICALLY INSTRUCTED BY SAFETRAN TO DO SO.

- **IF THE VALUE IS CHANGED, THE CALIBRATION PROCEDURE MUST BE PERFORMED.**
- **REFER TO SECTION 6 FOR THE GCP 4000 CALIBRATION PROCEDURE.**

- **Low EX Adjustment**
  - The EX value is a numerical indication of track ballast conditions relative to the leakage resistance between the rails.
  - As ballast resistance decreases, the leakage increases.
    - Leakage resistance may be affected by the presence of water, mud, salt, or other contaminates deposited in the track ballast.

  - Lump loading, the high concentration of contaminates in localized area, results in high leakage between rails.
- An EX value of **100** represents optimum track ballast conditions.
- When ballast is clean, and of the right makeup (no iron content, dry, etc.), an EX value of 100 is possible.
  - EX value normally falls in the range from **70** up to **100**.
  - When contamination or lump loading occurs, the EX value can approach the GCP EX operating threshold of **39**.
- The **Low EX Adjustment** entry allows the low EX operating threshold to be lowered below the GCP EX operating threshold.
- EX operating threshold default value: **39**
- Valid Low EZ adjustment range: **39** to **34**
- Dialog box type: *numeric value entry*

- **Bidirn Dax Passthru**
  - The **Bidirn DAX Passthru** function is used to allow DAXs to be cascaded through bi-directional installations and is usually used when radio DAXing. The track DAX output repeats the track DAX enable input with no contribution from the Track module DAX predictor.
  - Default value: **No**
  - Selectable parameters:
    - **No**
    - **Yes**
  - Dialog box type: *decision*

WHEN THE BIDIRN DAX PASSTHRU FUNCTION IS TURNED ON, THE DAX OUTPUTS WILL NOT BE DEENERGIZED BY THE DAX PREDICTORS ON THE TRACK MODULE. THIS FUNCTION SHOULD ONLY BE USED IN BI-DIRECTIONAL APPLICATIONS WHERE THE TRACK MODULE IS NOT DOING ANY DAXING.

5.5 ISLAND PROGRAMMING & AND TRACKS MENU ITEMS

Diagnostic Terminal (DT) Island Programming and AND tracks configuration menu items provide access to the configuration windows shown in figure 5-57.

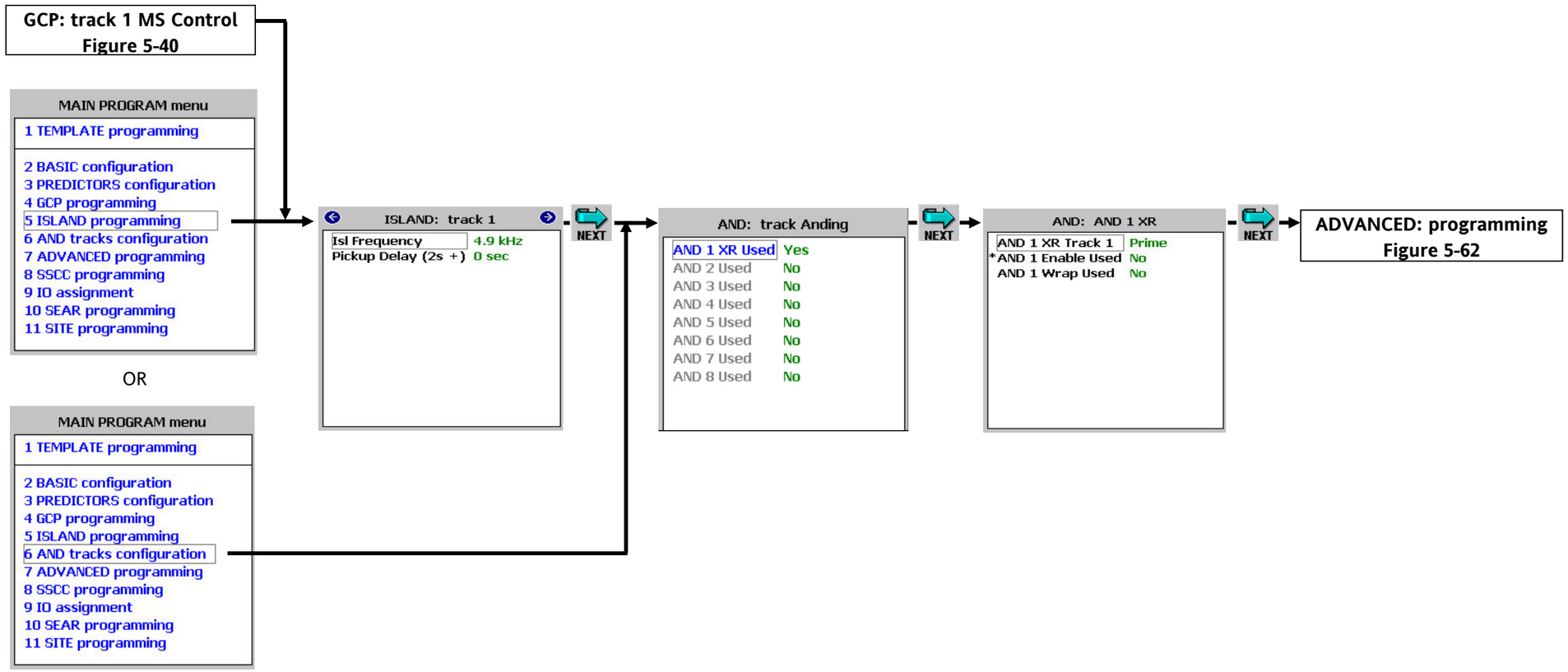


Figure 5-57. ISLAND and AND Menu Structure

5.5.1 ISLAND Programming Menu Item

Selecting the **ISLAND Programming** menu item brings up the first enabled **ISLAND: track Menu** window.

- Windows with identical parameters are provided for each island programmed as **Internal**.
  - The ISLAND: track 1 window is shown in figure 5-58.

Figure 5-58. ISLAND: Track 1 Menu Window

Each **ISLAND: track** window displays island parameters for the corresponding Track module:

- **Isl Frequency**
  - A separate island frequency must be set for each internal island.
  - Default frequency: **Not Set**
  - Selectable Parameters:

Not Set	**4.9 kHz**	**11.5 kHz**
2.14 kHz	**5.9 kHz**	**3.2 kHz**
2.63 kHz	**7.1 kHz**	**15.2 kHz**
3.24 kHz	**8.3 kHz**	**17.5 kHz**
4.0 kHz	**10.0 kHz**	**20.2 kHz**

  - Dialog box type: *parameter select*

This field does not show up for External islands

- **Pickup Delay (2s+)**
  - ♦ This entry selects the pickup delay time between the island becoming unoccupied and the energization of the island output. Note that 2 seconds of pickup delay time is automatically built in.
  - ♦ Default value: **0 sec**
  - ♦ Valid delay range: **0** to **6** seconds
  - ♦ Dialog box type: *numeric value entry*

5.5.2 AND Tracks Configuration

Selecting the **AND tracks configuration** item from the **Program** menu brings up the **AND: Track ANDing** window, figure 5-59.

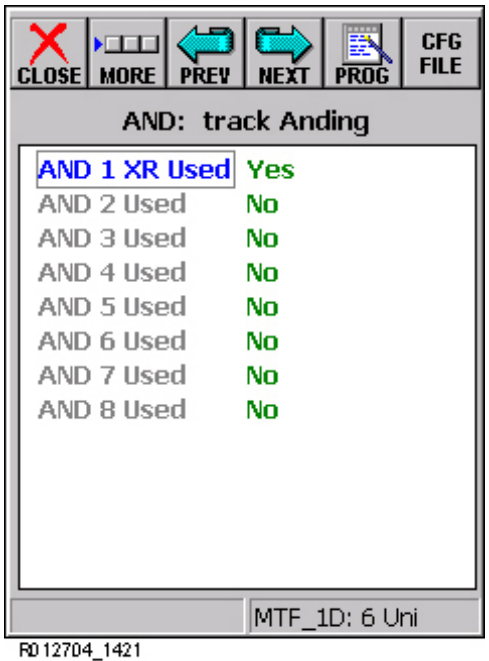


Figure 5-59. AND: Track Anding Window

- The **AND: Track ANDing** window provides links to other windows within the menu.
  - ♦ Each blue **AND** field is linked to the corresponding **AND** function window.
  - ♦ Each green **AND** status field is linked to a corresponding **Track ANDing** dialog box.
- The **AND: Track ANDing** window shows which ANDs are used.
  - ♦ AND functions are active when the corresponding **AND Used** field is set to **Yes**.
  - ♦ Default setting: *template dependent*
  - ♦ Dialog box type: *decision*

5.5.2.1 AND 1 through 8 Windows

A window similar to **AND 1 XR** is displayed for each of the eight system AND functions:

- The **AND: AND 1 XR** window, figure 5-60, is typical of the AND XR windows.

NOTE

Only **AND 1** has the **XR** designation as its primary use is in controlling the crossing equipment. It is the equivalent of the XR relay.

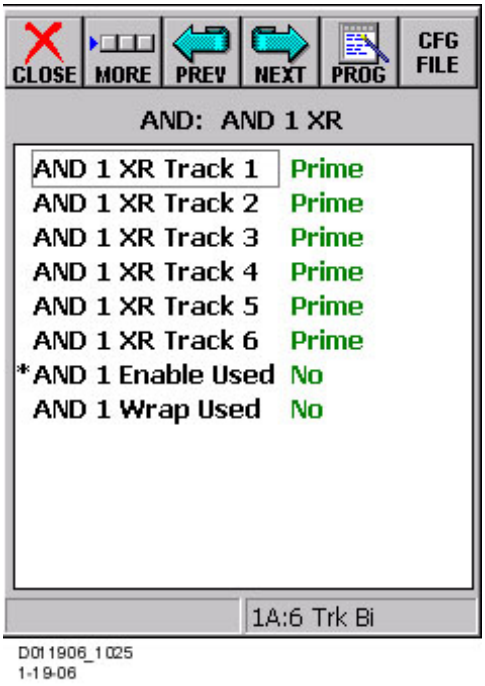


Figure 5-60. AND: AND 1 Prime Menu Window

Each **AND 1 XR** window selects which predictor is used from each track module that is used.

- The **Track 1** thru **6** entries select the And function inputs.
  - ♦ Default inputs: template dependent
  - ♦ Selectable Parameters:
    - ▪ **Dax A**
    - ▪ **Dax B**
    - ▪ **Dax C**
    - ▪ **Dax D**
    - ▪ **Dax E**
    - ▪ **Dax F**
    - ▪ **Dax G**
    - ▪ **Isl Only**
    - ▪ **Not Used**
    - ▪ **Preempt**
    - ▪ **Prime**
  - ♦ Dialog box type: *parameter select*

- The **AND Enable** field determines whether an external input is being used in the AND function.
  - If **AND Enable Used** is set to **Yes**, you must program a physical input to **AND 'n' Enable**
  - See **INPUT: assignment**, paragraph **5.8.1.1.**
  - Dialog box type: *decision*
- The **AND Enable Pickup** provides a programmable pickup delay for the AND Enable input.
  - Appears only when the **AND Enable Used** field is set to **Yes** (see figure 5-61).
  - Valid entries range from **0** to **500** seconds.
  - Dialog box type: *numeric value entry*
- The **AND 1 Enable Drop** provides a programmable drop delay for the AND Enable input.
  - Appears only when the **AND Enable Used** field is set to **Yes** (see figure 5-61).
  - Valid entries range from **0** to **500** seconds.
  - Default: **0** seconds
  - Dialog box type: *numeric value entry*

⚠ WARNING

THE AND ENABLE DROP DELAY WILL DELAY THE DROPPING OF THE AND. IF USED INCORRECTLY, THIS MAY RESULT IN SHORT WARNING TIMES.

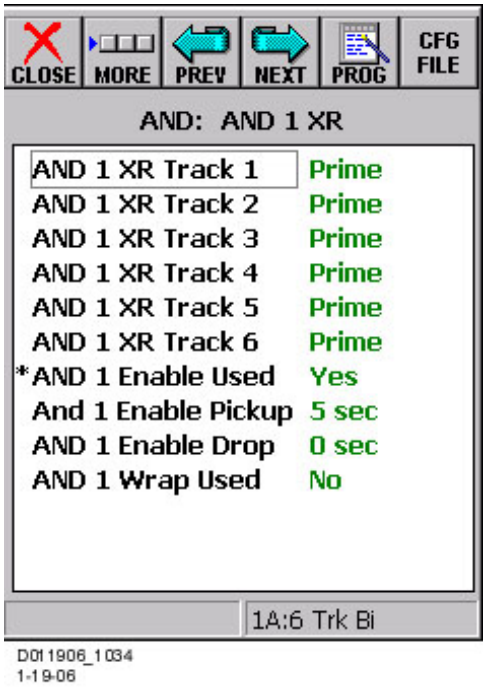


Figure 5-61. AND: AND 1 Prime Window With Prime Enable Pickup Entry

- The **AND 1 Wrap Used** function provides a way of wrapping the AND output based upon the state of the physical input. For instance, when **AND 1 Wrap Used** is set to **Yes**, an input called **AND 1 Wrap** is available to be assigned to an input. When the **AND 1 Wrap** input is energized, the AND enable will not be deenergized if the selected tracks predict, or the AND enable is deenergized. Note that an emergency activation input will still deenergize the AND output.
  - Selectable parameters:
    - **No**
    - **Yes**
  - Default: **No**
  - Dialog box type: *decision*

AN ENERGIZED AND WRAP INPUT WILL PREVENT THE AND OUTPUT FROM DEENERGIZING. IF USED INCORRECTLY, THIS MAY RESULT IN EITHER SHORT WARNING TIMES OR NO ACTIVATION OF THE WARNING DEVICES.

5.6 ADVANCED PROGRAMMING MENU ITEM

Diagnostic Terminal (DT) Advanced menu items provide access to the configuration windows shown in figure 5-62.

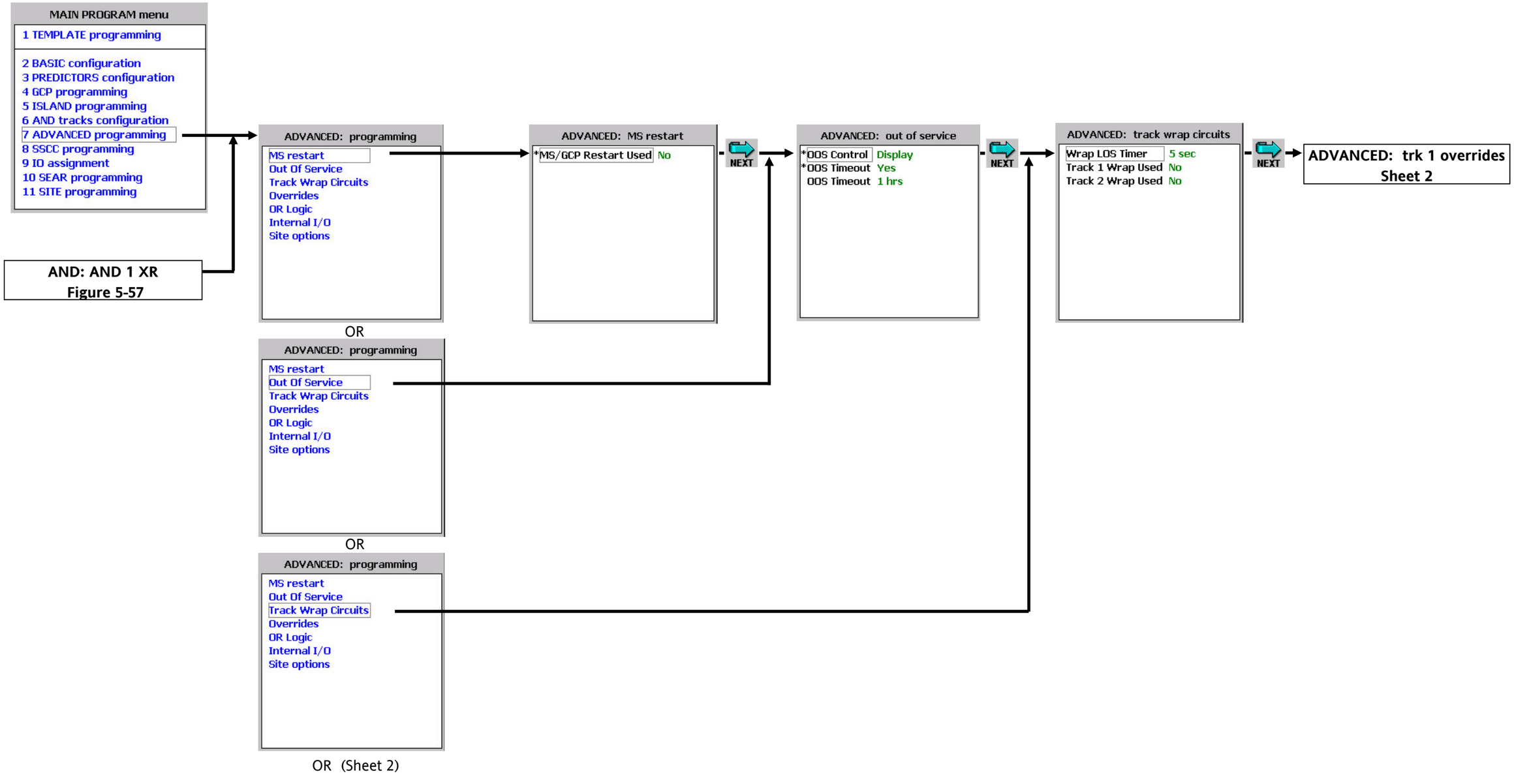


Figure 5-62. ADVANCED Menu Structure
Sheet 1 of 2

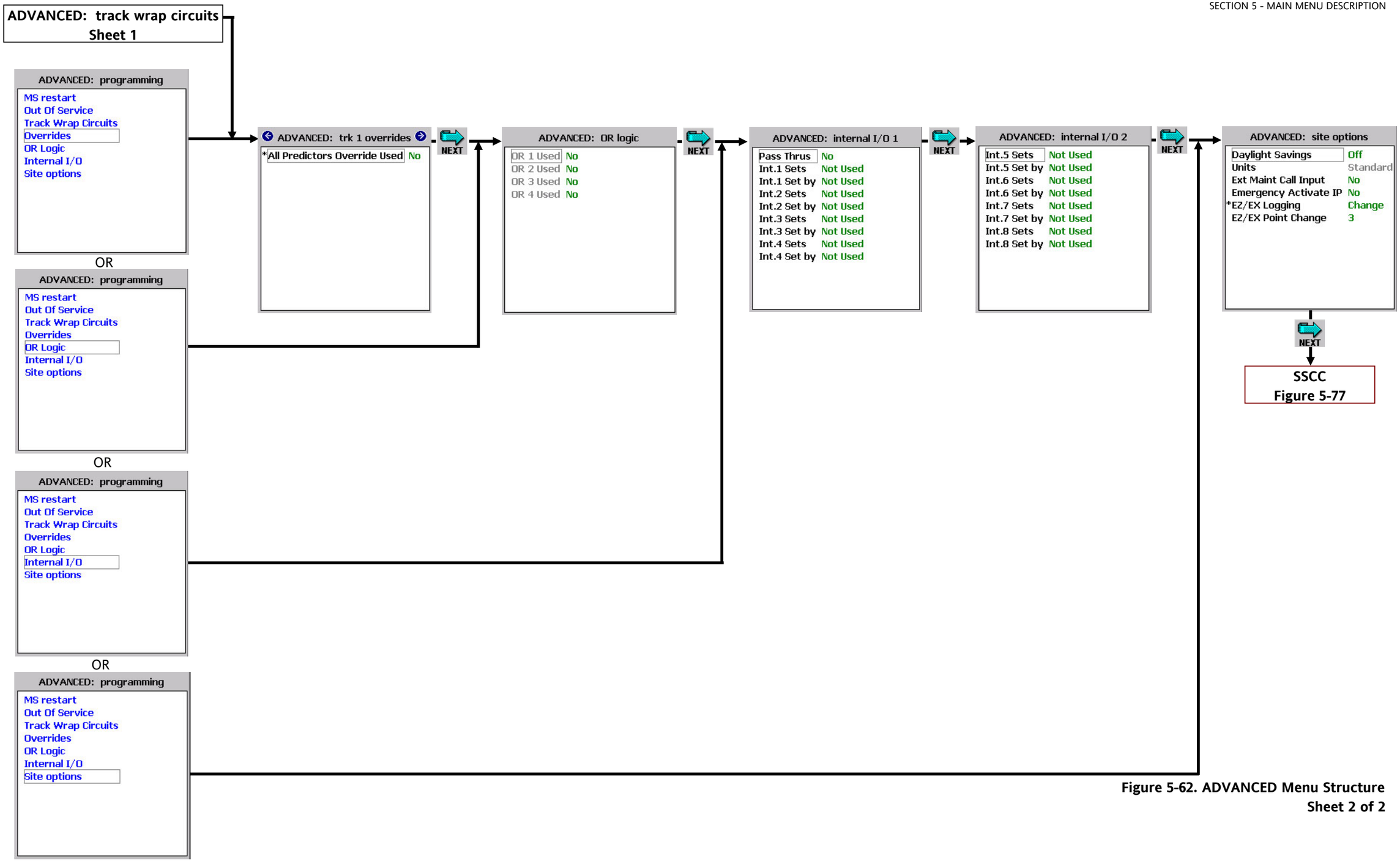


Figure 5-62. ADVANCED Menu Structure
Sheet 2 of 2

5.6.1 ADVANCED Programming Item

Selecting the **Advanced Programming** item brings up the **ADVANCED: programming** window, figure 5-63.

- This window provides links to the following windows:
  - **ADVANCED: MS restart**
  - **ADVANCED: Out Of Service**
  - **ADVANCED: Track Wrap Circuits**
  - **ADVANCED: Overrides**
  - **ADVANCED: OR Logic**
  - **ADVANCED: Internal I/O 1**
  - **ADVANCED: Internal I/O 2**
  - **ADVANCED: Site options**

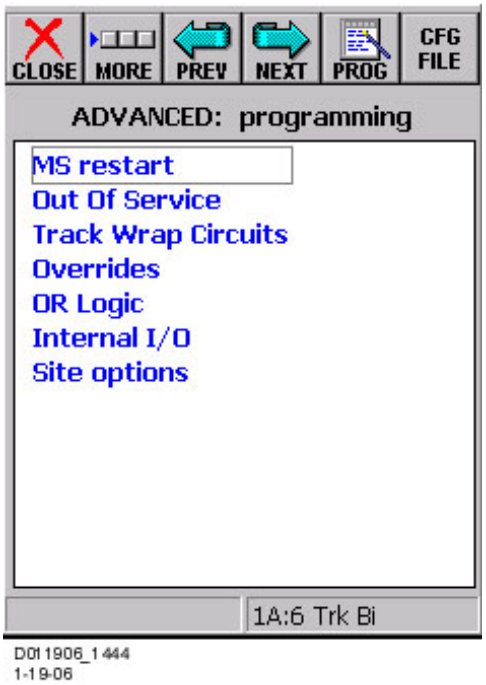


Figure 5-63. ADVANCED: Programming Window

5.6.1.1 ADVANCED: MS Restart Window

Selecting the **MS restart programming** item brings up the **ADVANCED: MS restart** window, figure 5-64.

This window is used to program the MS/GCP Restart function.

- This function allows enabled predictors to:
  - ♦ function in the predictor mode during through train moves
  - ♦ switch from predictor to motion sensor mode when:
    - ▪ the train stops at a station in the inbound approach and then proceeds toward the crossing.
    - ▪ the train stops in a remote prediction approach and then proceeds toward the crossing.

NOTE

Refer to the Model 4000 Grade Crossing Predictor (GCP) Application Guidelines, Document No. SIG-00-03-19, for examples of the MS Restart function.

Figure 5-64. ADVANCED: MS Restart Window

- **MS/GCP Restart Used**
  - ♦ When the status field of this entry is set to **Yes** two additional entries display as shown in figure 5-65.
  - ♦ Default setting: **No**
  - ♦ Dialog box type: *decision*

Figure 5-65. ADVANCED: MS/GCP Restart Window With MS/GCP Function Activated

- **MS/GCP Restart all Trks**

This entry determines if the MS/GCP Restart function is applied to all used tracks.

Appears only when the MS/GCP Restart Used entry is set to Yes

- ♦ Default setting: **Yes**
- ♦ Dialog box type: *decision*

- **MS/GCP Restart Time**

This entry sets the length of time that the selected predictors will operate in the motion sensor mode following either a train stop or the energizing of the MS/GCP Control input.

- ♦ Appears only when the **MS/GCP Restart Used** entry is set to **Yes**
  - ▪ Default value: **10 sec**
  - ▪ Valid time range: **0** to **500** seconds
  - ▪ Dialog box type: *numeric value entry*

5.6.1.2 ADVANCED: Restart Track Window

The **ADVANCED: RESTART TRACK** windows occur in the menu following the **ADVANCED: MS restart** window.

- A window displays for each used Track Module when the **MS/GCP Restart Used** entry is set to **Yes.**
- The **ADVANCED: RESTART TRACK 1** window, figure 5-66, is typical of all **RESTART TRACK** windows.
  - ♦ This window is used to select the Track Module predictors affected by the MS/GCP Restart time of the MS Control input.
  - ♦ When the MS Control input is de-energized, all selected predictors act as motion sensors.
  - ♦ When the MS Control input energizes or a station stop is detected, the MS/GCP Restart timer starts.
    - ▪ While the timer is running, all selected predictors act as motion sensors.
    - ▪ When the timer expires, the predictors revert to the predictor/motion sensor mode as specified by the MS/GCP mode.
    - ▪ a predictor is selected when set to **Yes**
  - ♦ Default setting:
    - ▪ **Prime switch to MS**: **Yes**
    - ▪ **DAX A** thru **DAX G switch to MS**: **No**
    - ▪ **Preempt switch to MS**: **Yes**
  - ♦ Dialog box type: *decision*

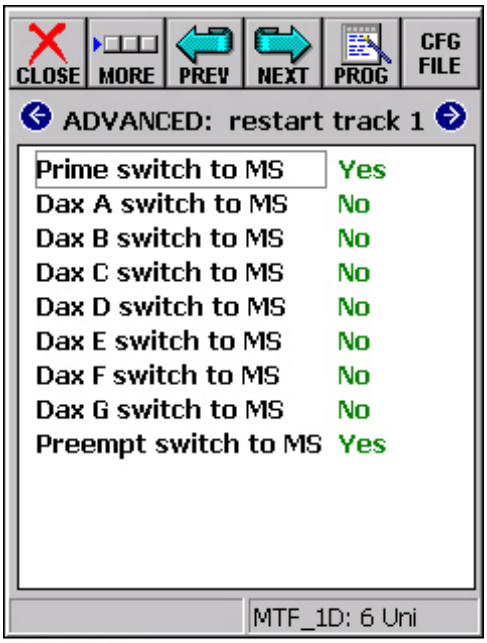


Figure 5-66. ADVANCED: Restart Track 1 Window

5.6.1.3 ADVANCED: Out Of Service Window

Selecting the **Out Of Service** item brings up the **ADVANCED: out of service** window, figure 5-67.

- **OOS Control**
  - The out of service screen displays the method by which out of service is selected; **OOS Control**. This function has the following options:
    - **Display**
    - **Display+OOS IPs**
    - **OOS IPs**
    - **4000 Case OOS IP**
  - Default setting: **Display**
  - Dialog box type: *decision*

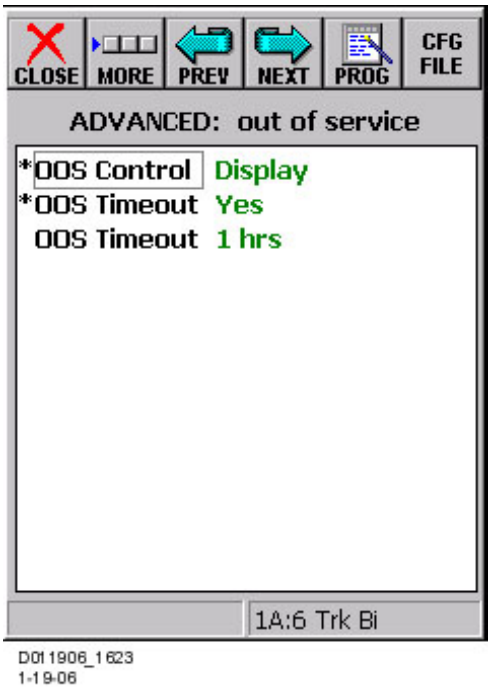
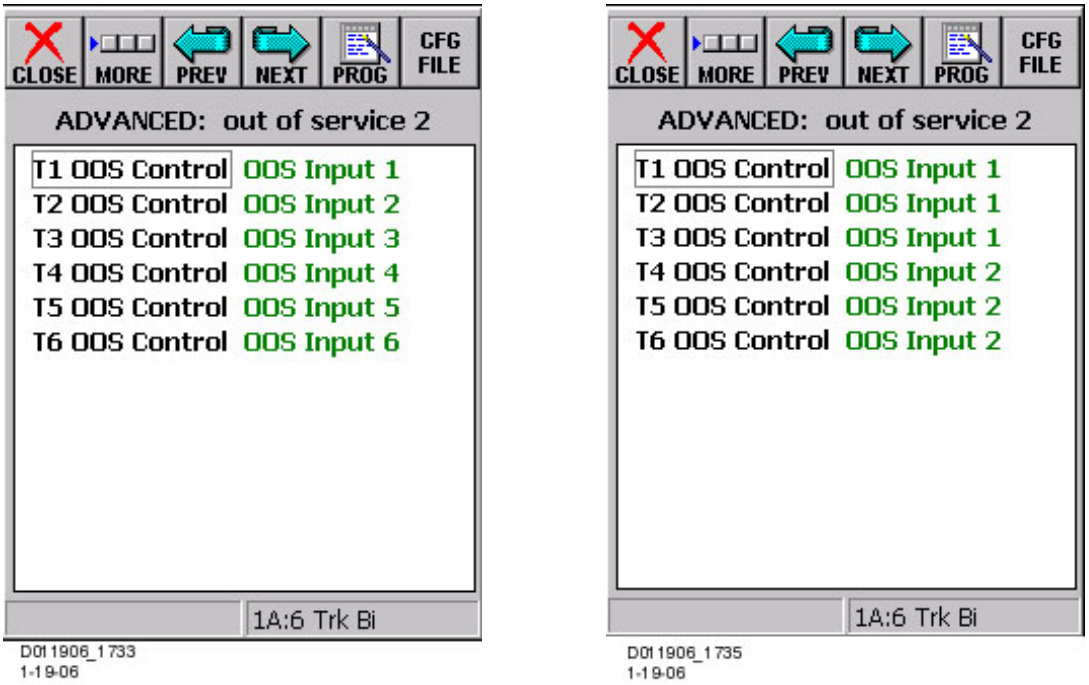


Figure 5-67. ADVANCED: Out Of Service Window

- When the **OOS Control** is set to **Display+OOS IPs**, in order to take a track out of service, the user must assign an Out of Service input to a physical input, energize this input and select to take the track out of service from the display.
  - The tracks can be grouped together so that they are controlled by individual out of service inputs (figure 5-68A) or one out of service input can control multiple tracks (figure 5-68B).



A B

Figure 5-68. OOS Control Grouping Examples (Display+OOS IPs)

- When the **OOS Control** is set to **OOS IPs**, in order to take a track out of service, the user must assign an Out of Service input to a physical input and energize this input (no action is required on the display).
  - The tracks can be grouped together so that they are controlled by individual out of service inputs or one out of service input can control multiple tracks (figure 5-69). The **ADVANCED: out of service 2** screen also allows selection of whether the out of service input will take the GCP and the Island out of service, or just the GCP.
  - When the GCP part of a track module is taken out of service, the Prime UAXes and DAX Enables are also taken out of service. AND Enables are not taken out of service.

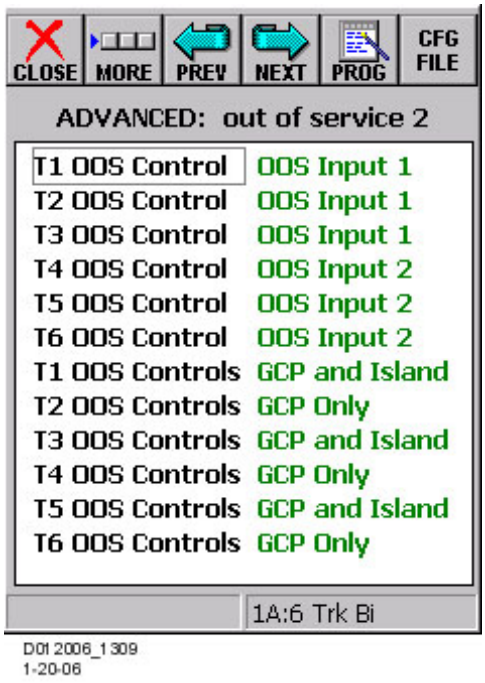


Figure 5-69. OOS Control Grouping Examples (OOS IPs)

- When the **OOS Control** is set to **4000 Case OOS IP (**figure 5-70), in order to take a track out of service, the user must assign the **4000 Case OOS IP** to a physical input and energize this input (no action is required on the display).
  - When the **4000 Case OOS IP** is energized, all GCPs and Islands are taken out of service, along with all Prime UAXes and DAX Enable. AND Enables and Advance Preempt inputs are also taken out of service. The only thing which will still activate the crossing is the Emergency Activation input.

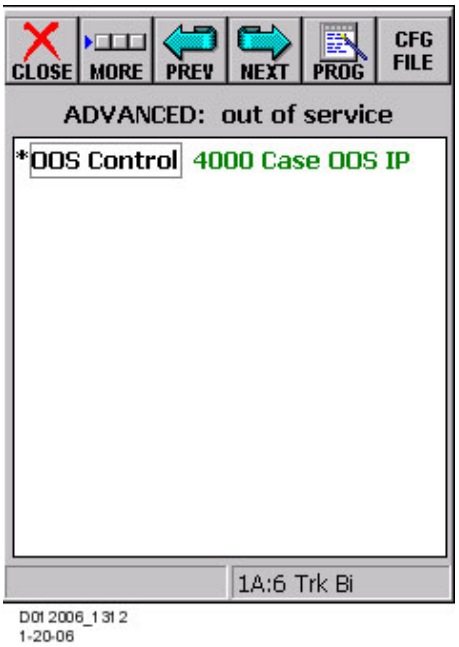


Figure 5-70. OOS Control With 4000 Case OOS IP Selected

- **OOS Timeout**
  - When the **OOS Control** is set to either **Display** or **Display+OOS IPs**, the **OOS Timeout** options are displayed (see figure 5-67). The first **OOS Timeout** entry selects whether to use a timeout for the out of service operation. The second **OOS Timeout** entry specifies how long the system is going to be out of service.
    - Timer default value: **1 hr**
    - Valid timer range: **1** to **23** hours
    - Dialog box type: *numeric value entry*

5.6.1.4 ADVANCED: Track Wrap Circuit Window

Selecting the **Track Wrap Circuits** item brings up the **ADVANCED: wrap circuits** window, figure 5-71.

- **Wrap LOS Timer**
  - ♦ Provides a configurable loss of shunt Timer for the wrap circuit inputs
  - ♦ Timer default value: **5 sec**
  - ♦ Valid timer range: **0** to 500 seconds
  - ♦ Dialog box type: *numeric value entry*
- **Track 1** thru **Track 6 Wrap Used**
  - ♦ Corresponding wrap circuit function is enabled when set to **Yes**
  - ♦ Default setting: **No**
  - ♦ Dialog box type: *decision*
- When a **Wrap** is set to **Used**, an input must also be programmed as a wrap input in the input assignment menus (paragraph 5.8.1.1).
- When a wrap input for a track is energized, the wrap will override the predictors or island on that track.

If the predictors de-energize or the island goes down, the crossing will not activate and the predictor outputs will not drop while the wrap is energized.

- The Emergency Activation will override wrap inputs and activate the crossing.

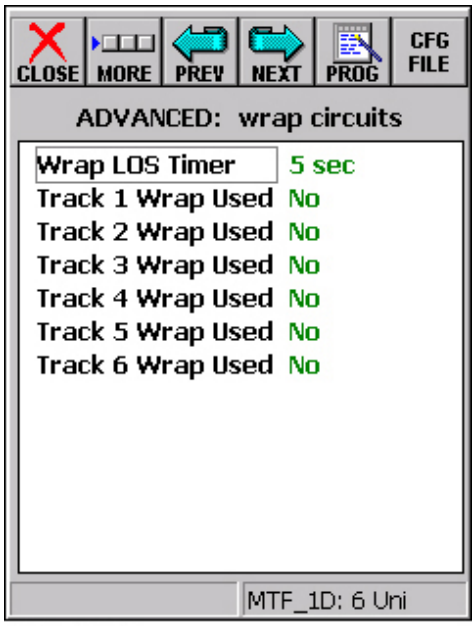


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Figure 5-71. ADVANCED: Wrap Circuits Window

5.6.1.5 ADVANCED: Overrides Windows

Selecting the **Overrides** menu item brings up a sequence of **ADVANCED Override** windows.

- The **ADVANCED: trk 1 override** window, figure 5-72A, is a typical Override window.
- A window displays for each enabled track
  - Each window may be programmed to disable (override) selected prediction outputs when a specific track condition exists:
    - e.g., when a train within an inbound approach is routed to another track that does not go through the crossing.
    - override condition is indicated by the reversed state of the inbound approach switch.

The override functions are controlled by the status field settings of each **ADVANCED: Override** window.

- **All Predictors Override Used**
  - When set to **No**, the entries shown in figure 5-72A display.
  - When set to **Yes**:
    - only the **All Predictors Override Used** entry displays as shown in figure 5-72B.
    - a **Prediction Override** input is provided for the track

NOTE

The Emergency Activation will override the override inputs.

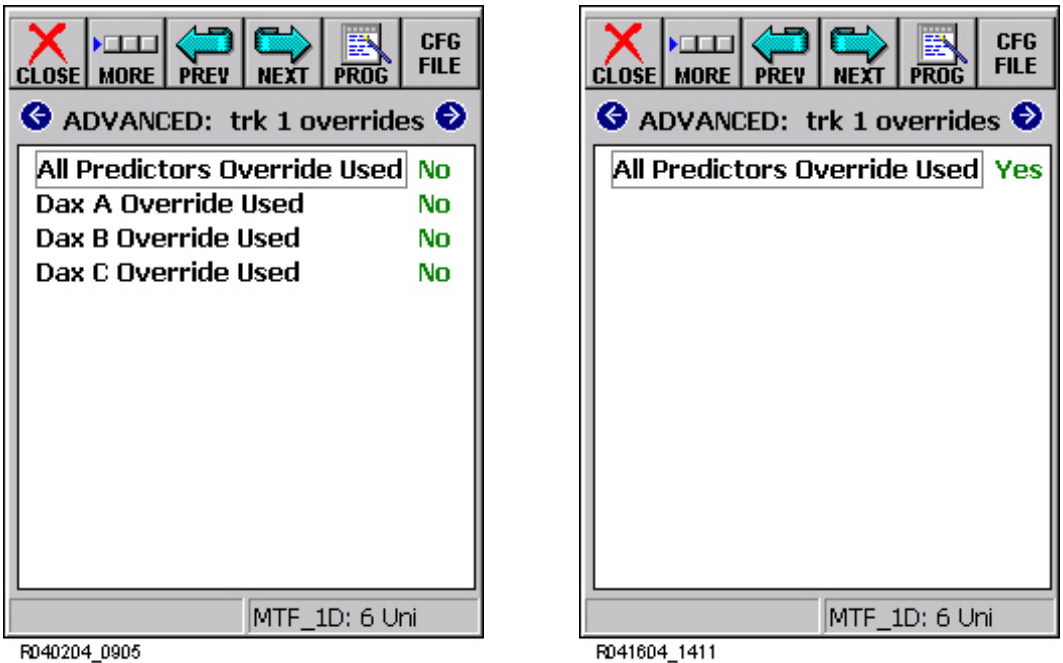

Figure 5-72. ADVANCED: Track 1 Overrides Window

        - The override functions are controlled by the status field.
        - When programmed to receive the override condition input, **all** predictors of the track are disabled when the input is energized; i.e. when the override condition occurs.
            - Prime
            - Dax A through G
            - Preempt
    - Default setting: **No**
    - Dialog box type: decision

- **Dax A Override Used**
    - When set to **Yes** a **Dax A Override** input is provided for the track
    - When programmed to receive the override condition input, Dax A of the track is disabled when the override condition occurs
    - Default setting: **No**
    - Dialog box type: decision
- **Dax B Override Used**
    - When set to **Yes** a Dax B Override input is provided for the track
        - When programmed to receive the override condition input, Dax B of the track is disabled when the override condition occurs
    - Default setting: **No**
    - Dialog box type: *decision*
- **Dax C Override Used**
    - When set to **Yes** a **Dax C Override** input is provided for the track
        - When programmed to receive the override condition input, Dax C of the track is disabled when the override condition occurs
    - Default setting: **No**
    - Dialog box type: *decision*

⚠ WARNING

USE OVERRIDES CAREFULLY. IMPROPER USE OF THESE FUNCTIONS MAY INHIBIT TRAIN PREDICTION AND PREVENT CROSSING OPERATION.

NOTE

An active Override input will not inhibit island operation or GCP and Island health errors.

- The presence of a train in the island will activate the crossing regardless of the state of the override input.
- When a High EZ condition is detected all predictors will de-energize (activate) regardless of the state of the override inputs.

5.6.1.6 ADVANCED: OR Logic Windows

Selecting the **OR Logic** menu item displays a list of which user configurable ORs are used (see figure 73).

- When an OR is set to be used (**Yes**), an OR output function is selectable to be assigned to an output.
  - Corresponding OR function is enabled when set to **Yes**
  - Default setting: **No**
  - Dialog box type: *decision*

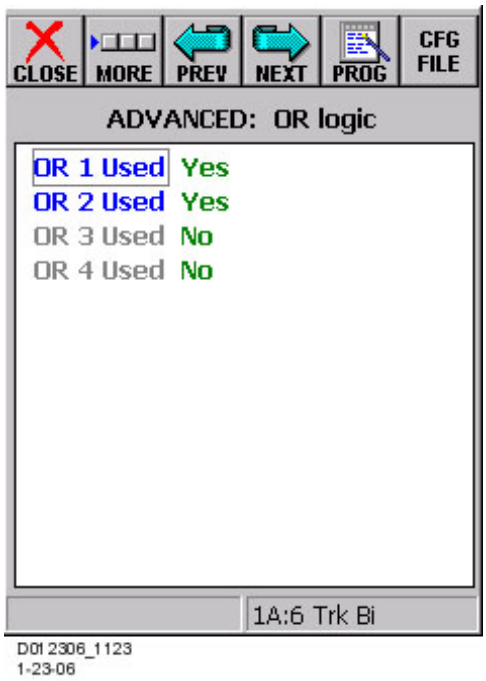

Figure 5-73. ADVANCED: OR Logic Window

- For each OR used, an **ADVANCED: OR** window is displayed which allows the selection of the inputs to the 4-input OR gate (figure 74).
  - ♦ Any of the system outputs can be used as inputs to the OR gate.
    - ▪ The system outputs listed for each OR gate input terminal may vary depending on how the system is configured. A list of all possible system outputs is provided below.

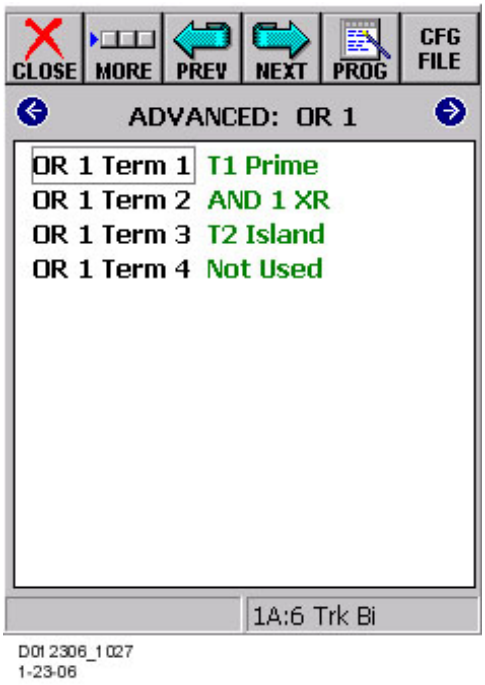

Figure 5-74. ADVANCED: OR 1 Window

- System outputs that can be assigned as OR gate inputs:.
  - **Not Used**
  - **AND 1 XR**
  - **AND 2** thru **AND 8***
  - **T1** thru **T6 Island***
  - **T1** thru **T6 Prime**
  - **T1** thru **T6 Dax A***
  - **T1** thru **T6 Dax B***
  - **T1** thru **T6 Dax C***
  - **T1** thru **T6 Dax D***
  - **T1** thru **T6 Dax E***
  - **T1** thru **T6 Dax F***
  - **T1** thru **T6 Dax G***
  - **T1** thru **T6 Preempt***
  - **Adv Preempt***
  - **Sim Preempt***
  - **Aux-1** and **Aux-2 Xng Control***
  - **T1** thru **T6 MS Control***
  - **NOT AND 1 XR**
  - **NOT AND 2** thru **8***
  - **Gate Output 1** and **Gate Output 2***
  - **Bell 1** and **Bell 2***
  - **Aux 1 Lmp Control** and **Aux 2 Lmp Control***
  - **Gate Dwn Indication***
  - **OR 1** thru **OR 4***
  - **Remote 1A** thru **Remote Output 8A***
  - **Remote 1B** thru **Remote Output 8B***
  - **Vital Link 1 OP 1** thru **Vital Link 1 OP 8***
  - **Vital Link 2 OP 1** thru **Vital Link 2 OP 8***
  - **Rmt SSCCIV OP 1** thru **Rmt SSCCIV OP 4***
  - **Pass Thru State 1** thru **Pass Thru State 4***
- Dialog box type: *parameter select*

5.6.1.7 ADVANCED: internal I/O Window

Selecting the **Internal I/O** menu item brings up the **ADVANCED: internal I/O 1** window, figure 5-75.

- Internal I/O enables the mapping of 4000 GCP output functions to 4000 GCP input functions, rather than having to use the vital inputs and outputs.
- The system provides 8 internal I/O states (states 5 to 8 are shown on the ADVANCED: internal I/O 2 window).
  - ♦ For instance, when track 1 is assigned to the crossing and track 2 is assigned as a remote in the same GCP case, and it is desired to keep the same DAX/UAX timing logic that would be used by two separate GCPs, internal inputs could be assigned as follows:
    - **Int.1 Sets T1 Prime UAX Enable**
    - **Int.2 Set by T2 DAX A**
- The window also shows an entry called **Pass Thrus**. If this is set to **Yes**, then 4 pass thru states are available to be mapped to physical inputs, physical outputs or **Int Set** or **Int Set by** states.
  - ♦ The purpose of the Pass Thru states is to allow an internal state to be set by the state of an input. Since the selection list for **Int Set by** is a list of outputs, it is not normally possible to have one input set the state of another input.
    - For example, if the **AND 1 XR Enable** needs setting by a GP input, then instead of **IN 7.1** being set to **GP**, set it with the **Pass Thru** state. Then, use the **Pass Thru** state to set the **GP** and the **AND Enable** state.
    - **IN 7.1 Passthru State 1**
    - **Int.1 Sets AND 1 XR Enable**
    - **Int.1 Set by Passthru state 1**
    - **Int.2 Sets GP 1.1**
    - **Int.2 Set by Passthru state 1**

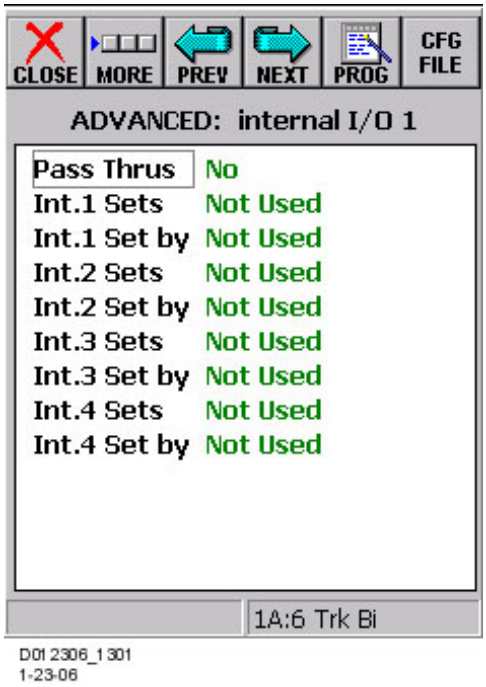

Figure 5-75. ADVANCED: Internal I/O Window

The window shows which internal I/O are used.

- **Int.1 Sets** thru **Int.4 Sets**
  - ♦ These items determine the assignment of each channel input
  - ♦ Default setting: **Not Used**
  - ♦ Assignment parameters (refer to paragraph 5.3 for descriptions):
    - ▪ **Not Used**
    - ▪ **Adv Preempt IP**
    - ▪ **T1** thru **T6 Prime UAX**
    - ▪ **Ext Island 1** thru **6**
    - ▪ **T1** thru **T6 Dax A Enable**
    - ▪ **T1** thru **T6 Dax B Enable**
    - ▪ **T1** thru **T6 Dax C Enable**
    - ▪ **T1** thru **T6 Dax D Enable**
    - ▪ **T1** thru **T6 Dax E Enable**
    - ▪ **T1** thru **T6 Dax F Enable**
    - ▪ **T1** thru **T6 Dax G Enable**
    - ▪ **T1** thru **T6 Preempt Enable**
    - ▪ **T1** thru **T6 Wrap**
    - ▪ **AND 1 XR Enable**
    - ▪ **AND 2** thru **AND 4 Enable**

- **T1 thru T6 MS Control**
- **Trf Control Health**
- **Preempt Health**
- **T1** thru **T6 Pred Override**
- **Aux-1** and **Aux-2 Xng Ctrl Hlth**
- **Remote Input 1** thru **8**
- **AND 1 Wrap** thru **AND 8 Wrap**
- **T1 Pred Override** thru **T6 Pred Override**
- **T1 Dax A Override** thru **T6 Dax A Override**
- **T1 Dax B Override** thru **T6 Dax B Override**
- **T1 Dax C Override** thru **T6 Dax C Override**
- **Vital Link 1 IP 1** thru **Vital Link 1 IP 8**
- **Vital Link 2 IP 1** thru **Vital Link 2 IP 8**
- **Emergency Activate**
- **Passthru State 1** thru **Passthru Sate 4**
- **4000 Case OOS IP**
- **Out Of Service IP 1** thru **Out Of Service IP 6**
- **3 Vehicle Detect**
- **4 Vehicle Detect**
- **Vehicle Det Hlth**
- **GP 1.1** and **GP 1.2**
- **GP 2.1** and **GP 2.2**
- **GD 1.1** and **GD 1.4**
- **GD 2.1** and **GD 2.4**

♦ Dialog box type: *parameter select*

• **Int.1 Set by thru Int.4 Set by**

♦ These items determine the assignment of each channel output

♦ Default setting: **Not Used**

♦ Assignment Parameters

- refer to paragraph 5.3 for descriptions
- **Not Used**
- **AND 1 XR**
- **AND 2** thru **AND 8***
- **T1** thru **T6 Island***
- **T1** thru **T6 Prime**
- **T1** thru **T6 Dax A***
- **T1** thru **T6 Dax B***
- **T1** thru **T6 Dax C***
- **T1** thru **T6 Dax D***
- **T1** thru **T6 Dax E***
- **T1** thru **T6 Dax F***
- **T1** thru **T6 Dax G***

- **T1** thru **T6 Preempt***
- **T1** thru **T6 MS Ctrl OP***
- **Adv Preempt***
- **Aux-1** and **Aux-2 Xng Control***
- **Gate Dwn Indication***
- **Remote Output 1A** thru **8A***
- **Remote Output 1B** thru **8B***
- **NOT AND 1 XR**
- **NOT AND 2** thru **8***
- **Gate Output 1** and **Gate Output 2***
- **Bell 1** and **Bell 2***
- **Aux 1 Lmp Control** and **Aux 2 Lmp Control***
- **OR 1** thru **OR 4***
- **Vital Link 1 OP 1** thru **Vital Link 1 OP 8***
- **Vital Link 2 OP 1** thru **Vital Link 2 OP 8***
- **Rmt SSCCIV OP 1** thru **Rmt SSCCIV OP 4***
- **Passthru State 1** thru **Passthru State 4***

♦ Dialog box type: *parameter select*

5.6.1.8 ADVANCED: Site options Window

Selecting the **Site options** item brings up the **ADVANCED: site options** window, figure 5-76A.

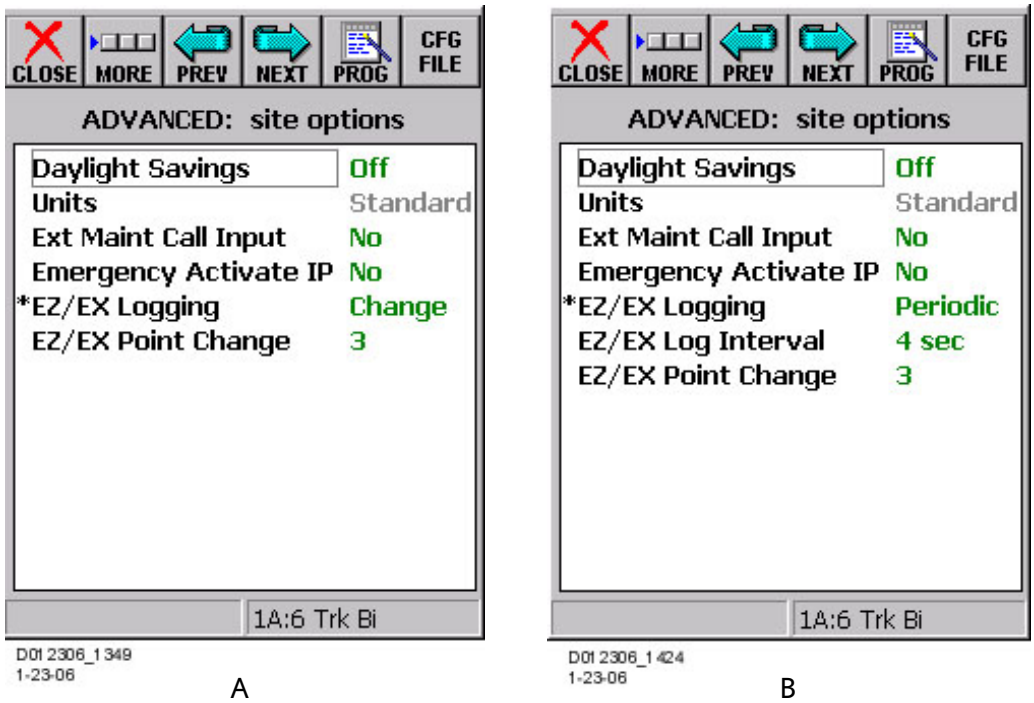

Figure 5-76. ADVANCED: Site Options Window

- **Daylight Savings** entry
  - ♦ When set to **ON**
    - ▪ The system automatically changes its time setting at the beginning and end of the daylight savings time period.
    - ▪ Daylight savings:
      - ⬩ starts at 2:00 a.m. on the first Sunday in April
      - ⬩ ends at 2:00 a.m. on the last Sunday in October
  - ♦ When set to **OFF**, the system operates only on standard time.
  - ♦ Default setting: **Off**
  - ♦ Dialog box type: *decision*
- **Units** Entry
  - ♦ This entry displays the measurement standard in use by the 4000 GCP system.
  - ♦ Default setting: **Standard**
  - ♦ Assignment parameters:
    - ▪ **Metric**
    - ▪ **Standard**
  - ♦ Dialog box type: *parameter select*

- **Ext Maint Call Input**
  - ♦ When set to **Yes**, an input may be programmed (see paragraph 5.8.1.1) as an external maintenance call input.
    - ▪ This allows the maintenance call of the GCP to be cascaded with the output of other equipment
  - ♦ Default setting: **No**
  - ♦ Dialog box type: *decision*
- **Emergency Activate IP** Entry
  - ♦ When set to **Yes**, an input may be programmed (see paragraph 5.8.1.1) as an Emergency Activation input.
    - ▪ The Emergency Activation should be energized during normal operation.
    - ▪ When Emergency Activation is deenergized, it puts all 4000 GCP outputs into a restrictive state. For example:
      - ❖ deenergizes the prime, DAX and preempt outputs from all Track modules
      - ❖ activates all SSCC modules
      - ❖ deenergizes preemption outputs

- ❖ puts any out-of-service Track modules back in service.

- ♦ Default setting: **No**
- ♦ Dialog box type: *decision*

- **EZ/EX Logging** entry
  - ♦ Sets the **EZ/EX Logging** interval.
  - ♦ Default setting: **Change**
  - ♦ Assignment parameters:
    - ▪ **Change**: A log entry is made in the CPU status log each time EZ or EX changes by more than this value.
    - ▪ **No Logging**: EZ/EX changes are not logged.
    - ▪ **Periodic**: EZ/EX changes are logged periodically rather than based upon changes.
  - ♦ Dialog box type: *parameter select*
- **EZ/EX Log Interval** entry
  - ♦ Displays when **EZ/EX Logging** entry is set to **Periodic** (see figure 5-76B).
  - ♦ Interval default value: **4 sec**
  - ♦ Valid interval range: **1** to **5** seconds
  - ♦ Dialog box type: *numeric value entry*
- **EZ/EX Point Change** entry
  - ♦ Displays the EZ/EX point change range
  - ♦ Point change default value: **3**
  - ♦ Valid point change range: **1** to **5**
  - ♦ Dialog box type: *numeric value entry*

5.7 SSCC PROGRAMMING MENU ITEM

Diagnostic Terminal (DT) SSCC menu items provide access to the configuration windows shown in figure 5-77.

Figure 5-77. SSCC Menu Structure

5.7.1 SSCC Programming Item

Selecting the **SSCC Programming** menu item brings up the **SSCC** window, figure 5-78.

- Displays high-level options for crossing operation.
- **Gates Used**
  - ♦ This item is used to specify whether gates are used at this crossing.
  - ♦ When set to **No**, number of GPs and gate delay fields of the **SSCC: 1** and **SSCC: 2** windows are hidden (see figure 5-79).
  - ♦ When set to **Yes** the gate position input (IN 5) assigned must be properly wired
  - ♦ Dialog box type: *decision*

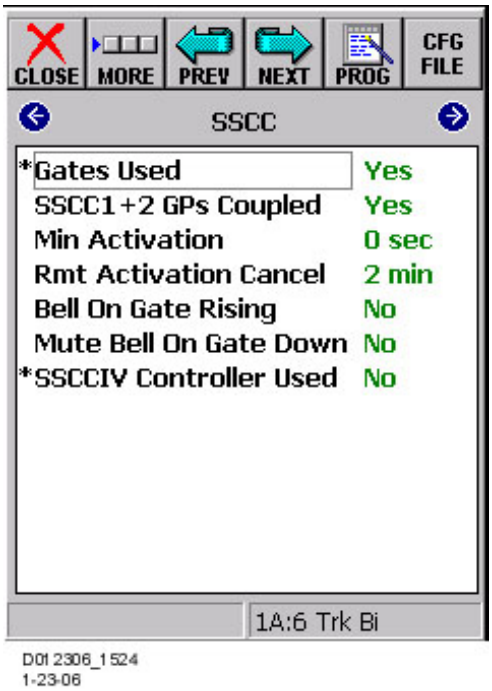

Figure 5-78. SSCC Menu Window

- **SSCC1+2 GPs Coupled**
  - ♦ This item determines whether the gate positions of the two SSCC modules are coupled together. For example,
    - ▪ if **SSCC1+2 GPs Coupled** is set to **Yes**, then:
      - ❖ deenergizing the gate position for SSCC 1 (GP 1.1) will cause the lights on SSCC 2 to flash.
      - ❖ deenergizing the gate position for SSCC 2 (GP 2.1) will cause the lights on SSCC 1 to flash.
      - ❖ this allows the gate position to be shared between two SSCC modules.

        - if **SSCC1+2 GPs Coupled** is set to **No**, then:
            - deenergizing the gate position for SSCC 1 (GP 1.1) will not cause the lights on SSCC 2 to flash.
    - Default setting: **Yes**
    - Dialog box type: *decision*
- **Min Activation**
    - This item sets the minimum crossing activation time.
    - Default value: **0 sec**
    - Valid gate delay range: **0** to 100 seconds
    - Dialog box type: *numeric value entry*
- **Rmt Activation Cancel**
    - This item determines the maximum length of time that the SSCC modules will remain activated if they are activated from a remote device, such as the SEAR IIi. Thus, if the SEAR IIi tries to activate a crossing for 5 minutes and the **Rmt Activation Cancel** was set to 2 minutes, then the crossing activation will stop after 2 minutes.
    - Default value: **2** minutes
    - Valid Rmt Activation Cancel range: **1** to **5** minutes
    - Dialog box type: *numeric value entry*
- **Bell On Gate Rising**
    - This item controls whether the bell outputs on the SSCC modules are turned on when the gate position input is deenergized.
        - If **Bell On Gate Rising** is set to **Yes**, then when the gate position (GP) is deenergized and there is no SSCC activation, the Bell output will be turned on.
        - If **Bell On Gate Rising** is set to **No**, then when the gate position (GP) is deenergized and there is no SSCC activation, the Bell output will not be turned on.
    - Default setting: **No**
    - Dialog box type: *decision*
- **Mute Bell On Gate Down**
    - This item controls whether the Bell outputs on the SSCC modules are turned off when all the gate down inputs are energized.
    - Normally, the outputs to the bells are deenergized by contacts in the gate mechanism when the gate is down. This option can be used in cases where these contacts are not being used.

- Default setting: **No**
- Dialog box type: *decision*

- **SSCCIV Controller Used**
  - This item controls whether the 4000 GCP is interfacing to an external SSCCIV module via the Echelon.
    - When **SSCCIV Controller Used** is set to **Yes**, the SSCC window shows the option **4000 Control Type**.
  - Default setting: **No**
  - Dialog box type: *decision*
- **4000 Control Type**
  - This item is displayed when **SSCCIV Control Used** is set to **Yes**. It controls whether the 4000 GCP is acting as an entrance gate controller.
    - When **4000 Control Type** is set to **Exit** (figure 5-79), the 4000 GCP is acting as an exit gate controller in a four quadrant gate system and the SSCCIV unit as an entrance gate controller.
      - In this mode the 4000 GCP provides the XR and island states using the Track modules as normal, and sends these states to the SSCCIV. The SSCCIV will perform the four quadrant gate logic and send the commands to control the exit gates back to the 4000 GCP.

Figure 5-79. SSCC Window - 4000 Control Type Set to Exit

- When **4000 Control Type** is set to **Exit**, the **SSCC1+2 GPs Coupled**, **Bell On Gate Rising** and **Mute Bell On Gate Down** options are hidden as these are not active in this mode.
- When **4000 Control Type** is set to **Entrnce**, the 4000 GCP is acting as an entrance gate controller as normal, and the SSCCIV module as an entrance gate repeater (not a four quadrant gate system) (see figure 5-80).
- In this mode the 4000 GCP will provide the activate input to the SSCCIV unit via the Echelon.

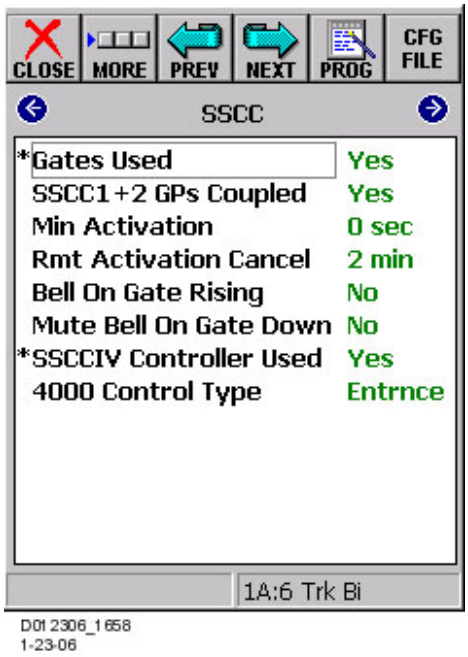

Figure 5-80. SSCC Window - 4000 Control Type Set to Entrnce

- When **SSCCIV Controller Used** is set to **Yes**, the menu following the **SSCC** window is the **SSCCIV Control and ATCS Setup** window. The options displayed depend on the setting of the **4000 Control type**.
  - When **4000 Control Type** is set to **Entrnce**, the window appears as shown in figure 5-81A.
  - When **4000 Control Type** is set to **Exit**, the window appears as shown in figure 5-81B.

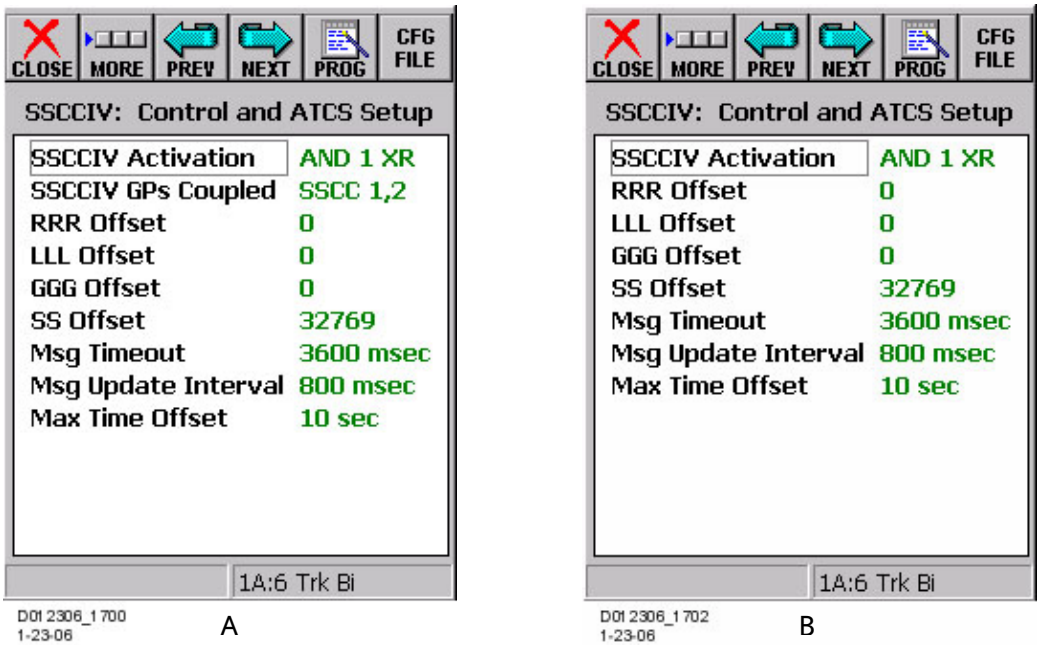

Figure 5-81. SSCCIV: Control and ATCS Setup Window

- **SSCCIV Activation**
  - This item determines which AND function is used to activate the SSCCIV.
  - Default value: **AND 1 XR**
  - Value options: **AND 1 XR**, **AND 2**, **AND 3**, **AND 4**, **None**
  - Dialog box type: *parameter select*
- **SSCCIV GPs Coupled**
  - This item determines whether the gate position inputs on the SSCC modules are coupled with the gate position inputs on the SSCCIV unit.
    - If **SSCCIV GPs Coupled** is set to **No Coupling**, then deenergizing GPs on the SSCC module has no effect on the SSCCIV unit and visa versa.
    - If **SSCCIV GPs Coupled** is set to **SSCC1**, then deenergizing GPs on the SSCC1 module flashes the lamps on the SSCCIV unit and visa versa.
    - If **SSCCIV GPs Coupled** is set to **SSCC2**, then deenergizing GPs on the SSCC2 module flashes the lamps on the SSCCIV unit and visa versa.
    - If **SSCCIV GPs Coupled** is set to **SSCC1,2**, then deenergizing GPs on the SSCC1 or SSCC2 module flashes the lamps on the SSCCIV unit and visa versa.
  - Default value: **SSCC1,2**

- Value options: **No Coupling**, **SSCC1**, **SSCC2**, **SSCC1,2**
- Dialog box type: *parameter select*

- **RRR Offset**
  - ATCS Railroad number
  - Default value: **0**
  - Valid offset value range: **999** to **–999**
    - See note.
  - Dialog box type: *numeric value entry*
- **LLL Offset**
  - ATCS Region number
  - Default value: **0**
  - Valid offset value range: **999** to **–999**
    - See note.
  - Dialog box type: *numeric value entry*
- **GGG Offset**
  - ATCS Group number
  - Default value:
    - Dax link A: **1**
    - Dax link B: **32769** (**-1**)
  - Valid offset value range: **999** to **–999**
    - See note.
  - Dialog box type: numeric value entry
- **SS Offset**
  - ATCS Site number
  - Default value: **0**
  - Valid offset value range: **99** to **–99**
    - See note.
  - Dialog box type: *numeric value entry*

NOTE

Negative numbers cannot currently be entered into these menus.

- If a negative offset is required, enter the number as 32768 plus the absolute value of the negative offset number; e.g., -5 has an absolute value of 5.
- The absolute value of the offset number is then added to 32768 to obtain the value to be entered; e.g., 5 + 32768 = 32773.

- **Msg Timeout**
  - The **Msg Timeout** entry value indicates how long the receiving unit waits for the next message from the neighbor.
    - If a message is not received within this time, the SSCCIV is considered out of session and the SSCCIIIi's coupled by the SSCCIV GPs Coupled, are activated.
  - Default interval: **3600 msec**
  - Valid timeout interval range: 1000 to 6000 milliseconds
  - Dialog box type: numeric value entry
  - The **Msg Update Interval** entry value sets the transmit interval between ATCS DAX messages.
  - Default value: **800 msec**
  - Valid interval range: **400** to **30,000** milliseconds
  - Dialog box type: *numeric value entry*
- **Max Time Offset**
  - The **Max Time Offset** entry value sets the maximum permissible delay in transferring a message from the remote to the local site.

Messages with delays that exceed the offset parameter are identified as stale.

A stale message is one that does not represent the most recent SSCCIV state.

  - Default value: **10 sec**
  - Valid interval range: **5** to **30** seconds
  - Dialog box type: *numeric value entry*

5.7.1.1 SSCC 1 and 2

The **SSCC 1** and **2** windows display following the **SSCC** window.

- The **SSCC 1** window, figure 5-82, is typical of both windows.
- **SSCC Activation**
  - Determines which AND function is used to activate the crossing controller
  - Default input: **AND 1 XR**
  - Selectable Parameters:
    - **AND 1 XR**
    - **AND 2**
- Dialog box type: *parameter select*

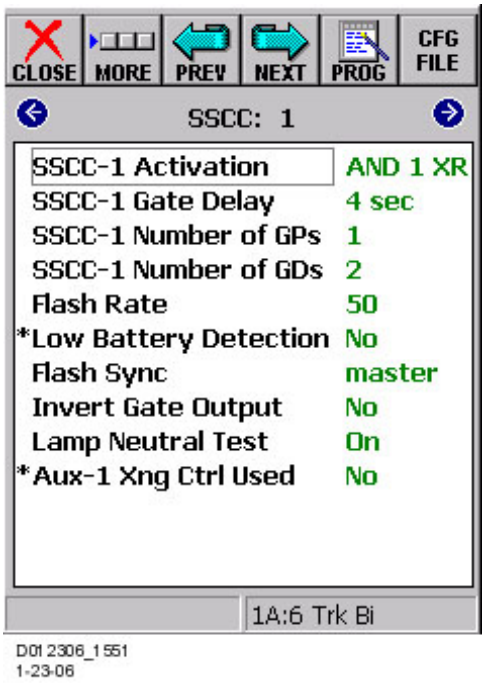

Figure 5-82. SSCC: 1 Window

- **Gate Delay**
  - ♦ This item sets the delay between crossing lamp flashing start and gate drive dropping.
  - ♦ Entry displays only when the **Gate Used** is set to **Yes**.
  - ♦ Default value: **4 sec**
  - ♦ Valid gate delay range: **3** to **100** seconds
  - ♦ Dialog box type: *numeric value entry*
- **SSCC Number of GPs**
  - ♦ This item sets how many independent gate position inputs are to be assigned to inputs at the GCP.
  - ♦ Default status for SSCC 1
    - ▪ Number of GPs: **1**
    - ▪ Number of GDs: **2**
  - ♦ Default status for SSCC 2
    - ▪ Number of GPs: **0**
    - ▪ Number of GDs: **0**
  - ♦ Assignment parameters:
    - ▪ **0**
    - ▪ **1**
    - ▪ **2**
  - ♦ Dialog box type: *parameter select*

- **Flash Rate**
  - ♦ This item selects the crossing lamp flash rate.
  - ♦ Default rate: **50** flashes per minute
  - ♦ Selectable Parameters: **30** to **70** flashes per minute in **5** flashes per minute increments.
  - ♦ Dialog box type: *parameter select*
- **Low Battery Detect**
  - ♦ This item controls the low battery detection function.
    - ▪ Detection active when set to **Yes**
  - ♦ Default setting: **No**
  - ♦ Dialog box type: *decision*
- **Low Battery Level**
  - ♦ This item sets the low battery threshold level.
  - ♦ When the battery voltage falls below this level, the maintenance call output is de-energized (activated).
  - ♦ Entry displays only when the **Low Battery Detect** is set to **Yes** (see figure 5-83).
  - ♦ Default value: **90 dV** (9.0 volts)
  - ♦ Valid gate delay range: **90** to **150** decivolts (9.0 to 15.0 volts)
  - ♦ Dialog box type: *numeric value entry*:
- **Flash Sync**
  - ♦ Determines whether the SSCC is a **Flash Sync** master or slave.

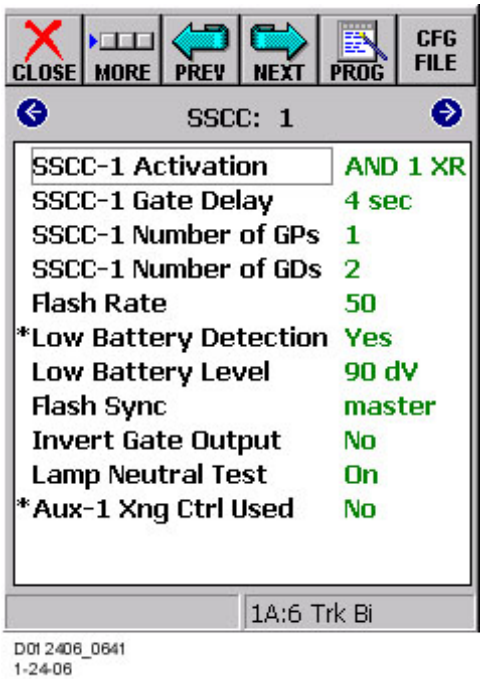

Figure 5-83. SSCC: 1 Window with Low Battery Detection Activated

- Default value:
  - SSCC I: **Master**
  - SSCC 2: **Slave**
- Selectable Parameters:
  - **Master**
  - **Slave**
- Dialog box type: *parameter select*

- **Invert Gate Output**
  - This allows the gate outputs to be inverted from the normal state so that the GC outputs on the SSCC modules can be used to drive exit gates that have to be powered down.
    - When **Inverted Gate Output** is set to **Yes**, the GC output is deenergized when the SSCC module is not activated. When the SSCC module is activated and the gate delay timer has expired, the GC output is energized.
  - Default setting: **No**
  - Dialog box type: *decision*
- **Lamp Neutral Test**
  - Enables lamp neutral test when set to **On**
  - Default setting: **On**
  - Dialog box type: *decision*

NOTE

Where only LED lamps are used, set **Lamp Neutral Test** to **Off**.

- **Aux-1** and **Aux-2 Xng Ctrl Used**
  - Enables the use of outputs to control an external crossing controller.
    - When **Aux-1 Xng Ctrl Used** is set to **Yes**, two outputs called **Aux-1 Xng Control** and **Aux-1 Lmp Control** are available to be assigned to physical outputs.
      - **Aux-1 Xng Control** is deenergized whenever SSCC-1 is activated.
      - **Aux-1 Lmp Control** is deenergized whenever SSCC-1 is activated or its GP is deenergized.
    - When **Aux-1 Xng Ctrl Used** is set to **Yes**, the option **Aux-1 Xng Ctrl Hlth IP** is displayed (see figure 5-84).
  - Default setting: **No**
  - Dialog box type: *decision*

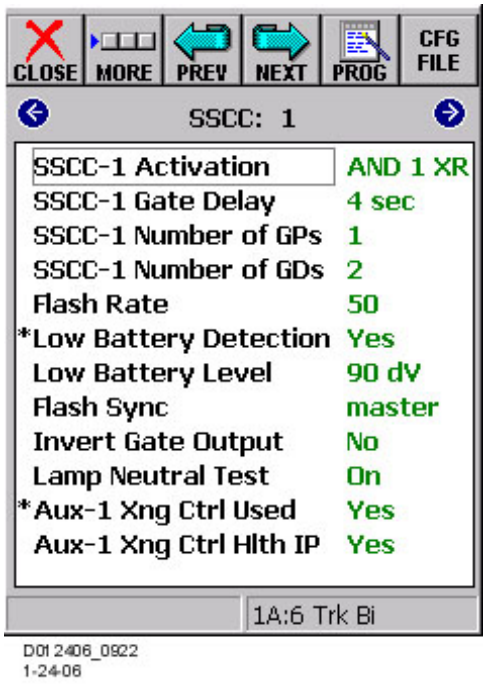

Figure 5-84. SSCC: 1 Window With Aux-1 Xng Ctrl Hlth IP Option Displayed

- **Aux-1** and **Aux-2 Xng Ctrl Hlth IP**
  - ♦ Enables the use of a health input from an external crossing controller.
    - ▪ When **Aux-1 Xng Ctrl Hlth IP** is set to **Yes**, an input called **Aux-1 Xng Ctrl Hlth** is available to be assigned to a physical input.
      - ❖ When the **Aux-1 Xng Ctrl Hlth** input is deenergized it will activate the SSCC-1 module.
    - ▪ When **Aux-1 Xng Ctrl Hlth IP** is set to **No**, **Aux-1 Xng Ctrl Hlth** need not be assigned to a physical input.
  - ♦ Default setting: **Yes**
  - ♦ Dialog box type: *decision*

5.8 IO ASSIGNMENT MENU ITEM

Diagnostic Terminal (DT) IO Assignment menu items provide access to the configuration windows shown in figure 5-85.

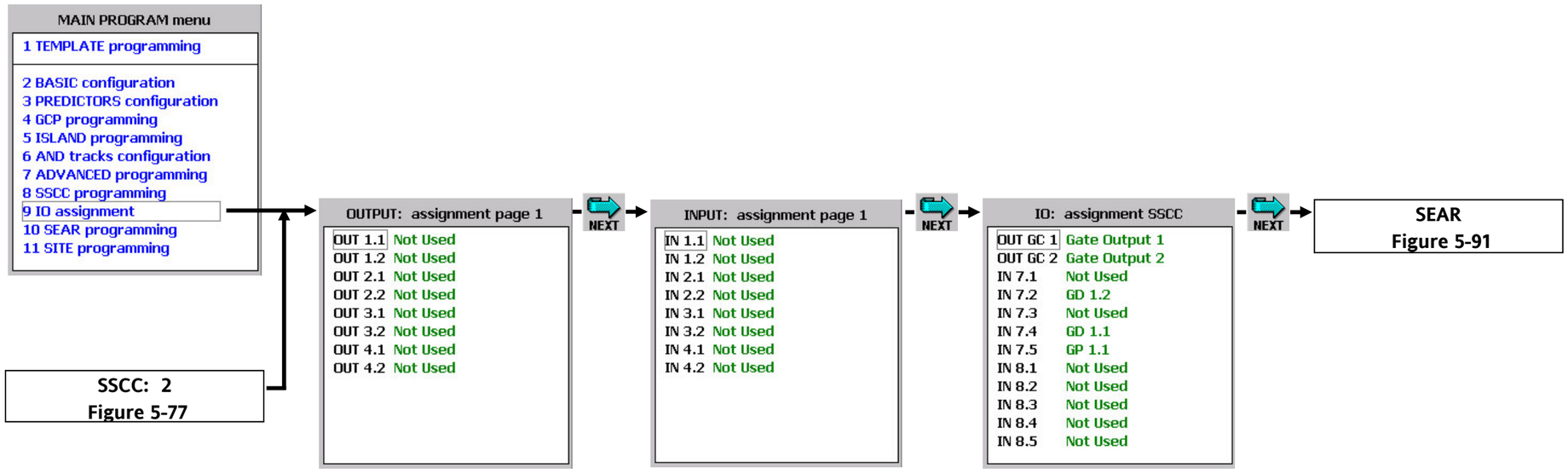

Figure 5-85. IO Assignment Menu Structure

5.8.1 OUTPUT: Assignment Windows

Selecting the **IO assignment** item from the **Program** menu brings up the **OUTPUT: assignment** windows.

- **OUTPUT: assignment page 1** window is shown in figure 5-86.
  - Two vital output assignment entries are available for active slot positions 1 thru 4:
    - **OUT 1.1** and **OUT 1.2**
    - **OUT 2.1** and **OUT 2.2**
    - **OUT 3.1** and **OUT 3.2**
    - **OUT 4.1** and **OUT 4.2**
  - Default value: **NOT USED**
  - Assignment parameters (see paragraph 5.3):
    - **Not Used**
    - **AND 1 XR**
    - **AND 2** thru **AND 8***
    - **T1** thru **T6 Island***
    - **T1** thru **T6 Prime**
    - **T1** thru **T6 Dax A***
    - **T1** thru **T6 Dax B***
    - **T1** thru **T6 Dax C***
    - **T1** thru **T6 Dax D***
    - **T1** thru **T6 Dax E***
    - **T1** thru **T6 Dax F***
    - **T1** thru **T6 Dax G***
    - **T1** thru **T6 Preempt***
    - **Adv Preempt***
    - **Sim Preempt***
    - **Aux-1 and Aux-2 Xng Control***
    - **T1** thru **T6 MS Ctrl OP***
    - **NOT AND 1 XR**
    - **NOT AND 2** thru **8***
    - **Gate Output 1** and **Gate Output 2***
    - **Bell 1** and **Bell 2***
    - **Aux 1 Lmp Control** and **Aux 2 Lmp Control***
    - **Gate Dwn Indication***
    - **OR 1** thru **OR 4***
    - **Remote Output 1A** thru **Remote Output 8A***
    - **Remote Output 1B** thru **Remote Output 8B***
    - **Vital Link 1 OP 1** thru **Vital Link 1 OP 8***
    - **Vital Link 2 OP 1** thru **Vital Link 2 OP 8***
    - **Rmt SSCCIV OP 1** thru **Rmt SSCCIV OP 4***
    - **Passthru State 1** thru **Passthru State 4***
  - Dialog box type: *parameter select*

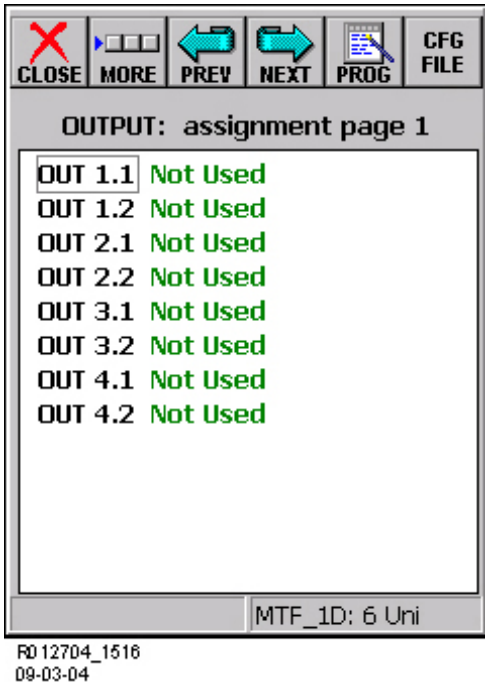

Figure 5-86. OUTPUT: Assignment Page 1 Menu Window

- **OUTPUT: assignment page 2** window when tracks 5 and 6 are used is shown in figure 5-87A.
  - Window displays only when tracks 5 and/or 6 are used.
    - Does not display when slot positions are assigned to the SEAR.
  - Two vital output assignment entries are available for active tracks 5 and 6:
    - **OUT 5.1** and **OUT 5.2**
    - **OUT 6.1** and **OUT 6.2**
  - Default value: **NOT USED**
  - Assignment parameters correspond to **OUTPUT: assignment page 1** menu window parameters
    - refer to paragraph 5.3 for descriptions
  - Dialog box type: *parameter select*

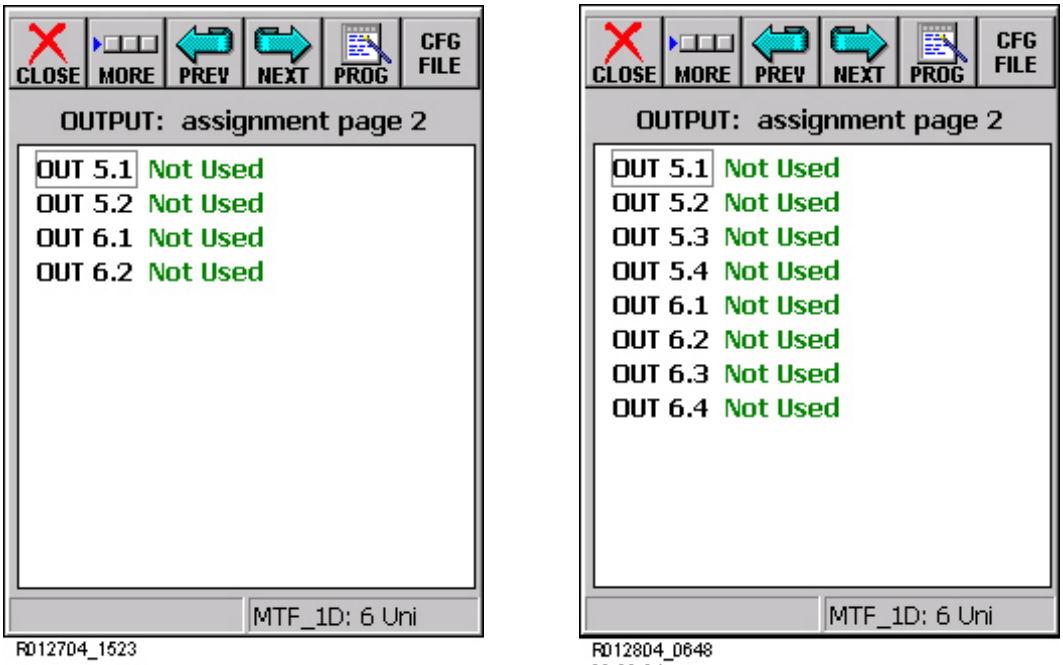

Figure 5-87. OUTPUT: Assignment Page 2 Menu Windows

- **OUTPUT: assignment page 2** window when RIO-2 and RIO-3 are used is shown figure 5-87B.
  - Window displays only when **RIO 2** and/or **RIO 3** are active.
  - Four vital output assignment entries are available for each active RIO:
    - **OUT 5.1** thru **OUT 5.4**
    - **OUT 6.1** thru **OUT 6.4**
  - Default value: **NOT USED**
  - Assignment parameters correspond to **OUTPUT: assignment page 1** menu window parameters
    - refer to paragraph 5.3 for descriptions
  - Dialog box type: *parameter select*

5.8.1.1 INPUT: Assignment Windows

The **INPUT: assignment** windows occur in the menu sequence following the **OUTPUT: assignment** windows.

- **INPUT: assignment page 1** window is shown in figure 5-88
  - ♦ Two vital input assignment entries are available for active tracks 1 thru 4:
    - **IN 1.1** and **IN 1.2**
    - **IN 2.1** and **IN 2.2**
    - **IN 3.1** and **IN 3.2**
    - **IN 4.1** and **IN 4.2**
  - ♦ Default value: **NOT USED**
  - ♦ Assignment parameters
    - refer to paragraph 5.3 for descriptions
    - **Not Used**
    - **Ext Island 1** thru **4**
    - **Adv Preempt IP**
    - **T1** thru **T6 Prime UAX**
    - **T1** thru **T6 Dax A Enable**
    - **T1** thru **T6 Dax B Enable**
    - **T1** thru **T6 Dax C Enable**
    - **T1** thru **T6 Dax D Enable**
    - **T1** thru **T6 Dax E Enable**
    - **T1** thru **T6 Dax F Enable**
    - **T1** thru **T6 Dax G Enable**
    - **T1** thru **T6 Preempt Enable**
    - **AND 1 XR Enable**
    - **AND 2** thru **AND 4 Enable**
    - **T1 thru T6 MS Control**
    - **Trf Control Health**
    - **T1** thru **T6 Wrap**
    - **Preempt Health**
    - **T1** thru **T6 Pred Override**
    - **T1** thru **T6 Dax A Override**
    - **T1** thru **T6 Dax B Override**
    - **T1** thru **T6 Dax C Override**
    - **T1** thru **T6 Dax A Override**
    - **T1** thru **T6 Dax B Override**
    - **T1** thru **T6 Dax C Override**
    - **Aux-1** and **Aux-2 Xng Ctrl Hlth**
    - **Remote Input 1** thru **8**
    - **AND 1 Wrap** thru **AND 8 Wrap**
    - **Vital Link 1 IP 1** thru **Vital Link 1 IP 8**
    - **Vital Link 2 IP 1** thru **Vital Link 2 IP 8**
    - **Emergency Activate**
    - **Passthru State 1** thru **Passthru State 4**

- **Maint Call Rpt IP**
- **4000 Case OOS IP**
- **Out Of Service IP 1** thru **Out Of Service IP 6**
- **3 Vehicle Detect**
- **4 Vehicle Detect**
- **Vehicle Det Hlth**

Dialog box type: *parameter select*

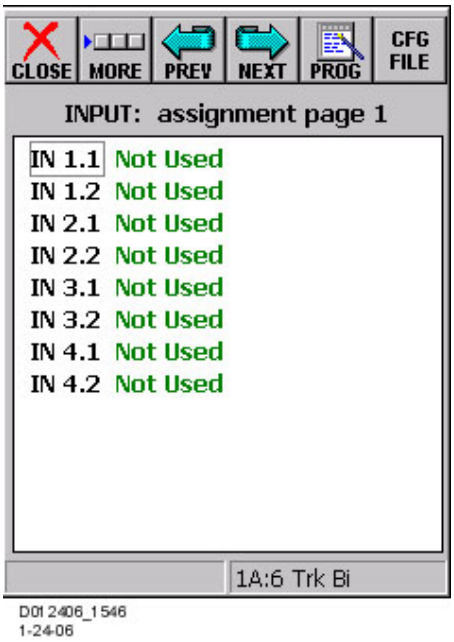

Figure 5-88. INPUT: Assignment Page 1 Menu Window

- The **INPUT: assignment page 2** window when tracks 5 and 6 are used is shown in figure 5-89A
  - Two vital input assignment entries are available for active tracks 5 and 6:
    - **IN 5.1** and **IN 5.2**
    - **IN 6.1** and **IN 6.2**
  - Default value: **NOT USED**
  - Assignment parameters correspond to **INPUT: assignment page 1** menu window parameters.
    - refer to paragraph 5.3 for descriptions
  - Dialog box type: *parameter select*

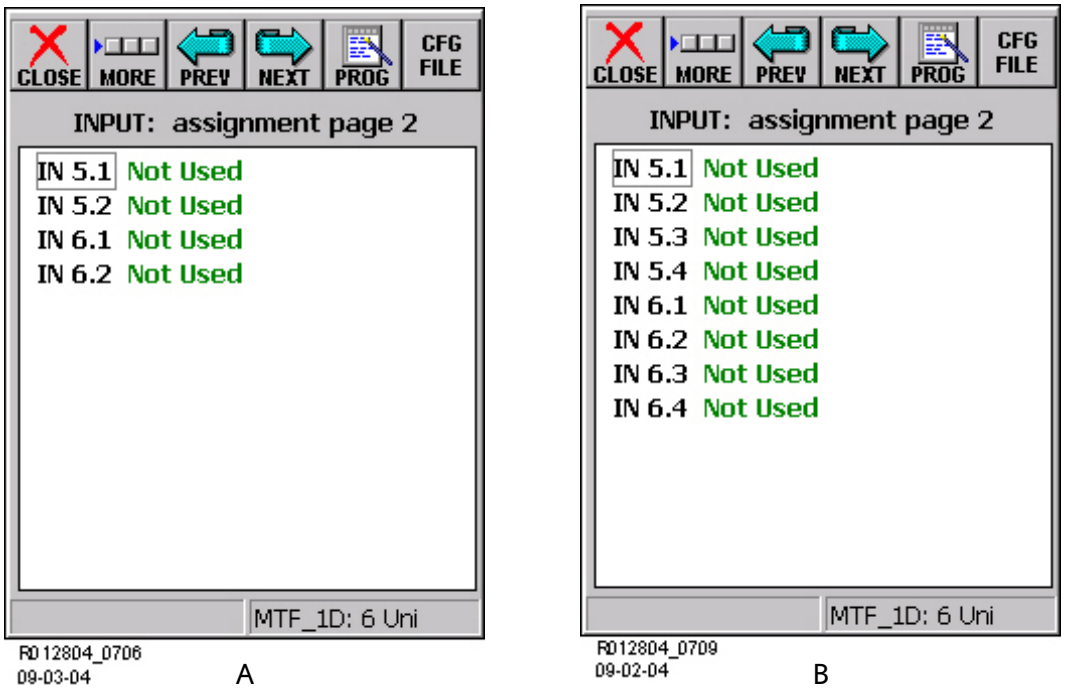

Figure 5-89. INPUT: Assignment Page 2 Menu Windows

- The **INPUT: assignment page 2** window when RIO-2 and RIO-3 are used is shown in figure 5-89B.
  - ♦ Window displays only when **RIO-2** and/or **RIO-3** are active.
  - ♦ Four vital output assignment entries are available for each active RIO module:
    - **IN 5.1** thru **IN 5.4**
    - **IN 6.1** thru **IN 6.4**
  - ♦ Default value: **NOT USED**
  - ♦ Assignment parameters correspond to **INPUT: assignment page 1** menu window parameters (refer to paragraph 5.3 for descriptions):
  - ♦ Dialog box type: *parameter select*

5.8.1.2 IO: Assignment SSCC Window

The **IO: assignment SSCC** window occurs in the menu sequence following the **INPUT: assignment** windows.

- **IO: assignment SSCC** window is shown in figure 5-90.
  - ♦ A vital output assignment entry is available for each SSCC module; **OUT GC 1** and **OUT GC 2**. These default to the gate control output for the SSCC modules.
  - ♦ Assignment parameters (refer to paragraph 5.3 for descriptions):
    - **Not Used**
    - **AND 1 XR**
    - **AND 2** thru **AND 8***
    - **T1** thru **T6 Island***
    - **T1** thru **T6 Prime**
    - **T1** thru **T6 Dax A***
    - **T1** thru **T6 Dax B***
    - **T1** thru **T6 Dax C***
    - **T1** thru **T6 Dax D***
    - **T1** thru **T6 Dax E***
    - **T1** thru **T6 Dax F***
    - **T1** thru **T6 Dax G***
    - **T1** thru **T6 Preempt***
    - **Adv Preempt***
    - **Sim Preempt***
    - **Aux-1 and Aux-2 Xng Control***
    - **T1** thru **T6 MS Ctrl OP***
    - **NOT AND 1 XR**
    - **NOT AND 2** thru **8***
    - **Gate Output 1** and **Gate Output 2***
    - **Bell 1** and **Bell 2***
    - **Aux 1 Lmp Control** and **Aux 2 Lmp Control***
    - **Gate Dwn Indication***
    - **OR 1** thru **OR 4***
    - **Remote Output 1A** thru **Remote Output 8A***
    - **Remote Output 1B** thru **Remote Output 8B***
    - **Vital Link 1 OP 1** thru **Vital Link 1 OP 8***
    - **Vital Link 2 OP 1** thru **Vital Link 2 OP 8***
    - **Rmt SSCCIV OP 1** thru **Rmt SSCCIV OP 4***
    - **Passthru State 1** thru **Passthru State 4***
  - ♦ Dialog box type: *parameter select*
  - ♦ Five vital input assignment entries are available for each SSCC module:
    - **IN 7.1** thru **IN 7.5**
    - **IN 8.1** thru **IN 8.5**

- Default value for **IN 7.1** thru **7.4**: **NOT USED**
- Default value for **IN 7.5**: **GP 1.1**
- Default value for **IN 8.1** thru **8.5**: **NOT USED**
- Assignment parameters (refer to paragraph 5.3 for descriptions):
  - **SSCC IN 7.1** thru **SSCC IN 7.5**
  - **IN 7.1** thru **IN 7.5**
    - **Not Used**
    - **Adv Preempt IP**
    - **T1** thru **T6 Wrap**
    - **AND 1 XR Enable**
    - **AND 2** thru **AND 4 Enable**
    - **Trf Control Health**
    - **Preempt Health**
    - **GP 1.1** and **GP 1.2**
    - **GD 1.1** thru **GD 1.4**
    - **Maint Call Rpt IP**
    - **Aux-1 Xng Ctrl Hlth**
    - **Remote Input 1** thru **8**
    - **AND 1 Wrap** thru **AND 8 Wrap**
    - **T1 Pred Override** thru **T6 Pred Override**
    - **T1 Dax A Override** thru **T6 Dax A Override**
    - **T1 Dax B Override** thru **T6 Dax B Override**
    - **T1 Dax C Override** thru **T6 Dax C Override**
    - **Vital Link 1 IP 1** thru **Vital Link 1 IP 8**
    - **Vital Link 2 IP 1** thru **Vital Link 2 IP 8**
    - **Emergency Activate**
    - **Passthru State 1** thru **Passthru State 4**
    - **4000 Case OOS IP**
    - **Out Of Service IP 1** thru **Out Of Service IP 6**
    - **3 Vehicle Detect**
    - **4 Vehicle Detect**
    - **Vehicle Det Hlth**
  - **IN 8.1** thru **IN 8.5**
    - **Not Used**
    - **Adv Preempt IP**
    - **T1** thru **T6 Wrap**
    - **AND 1 XR Enable**
    - **AND 2** thru **AND 4 Enable**
    - **Trf Control Health**
    - **Preempt Health**
    - **GP 2.1** and **GP 2.2**
    - **GD 2.1** thru **GD 2.4**
    - **Maint Call Rpt IP**

- **AND 1 Wrap** thru **AND 8 Wrap**
- **T1 Pred Override** thru **T6 Pred Override**
- **T1 Dax A Override** thru **T6 Dax A Override**
- **T1 Dax B Override** thru **T6 Dax B Override**
- **T1 Dax C Override** thru **T6 Dax C Override**
- **Vital Link 1 IP 1** thru **Vital Link 1 IP 8**
- **Vital Link 2 IP 1** thru **Vital Link 2 IP 8**
- **Emergency Activate**
- **Passthru State 1** thru **Passthru State 4**
- **4000 Case OOS IP**
- **Out Of Service IP 1** thru **Out Of Service IP 6**
- **3 Vehicle Detect**
- **4 Vehicle Detect**
- **Vehicle Detect Hlth**

▪ Dialog box type: *parameter select*

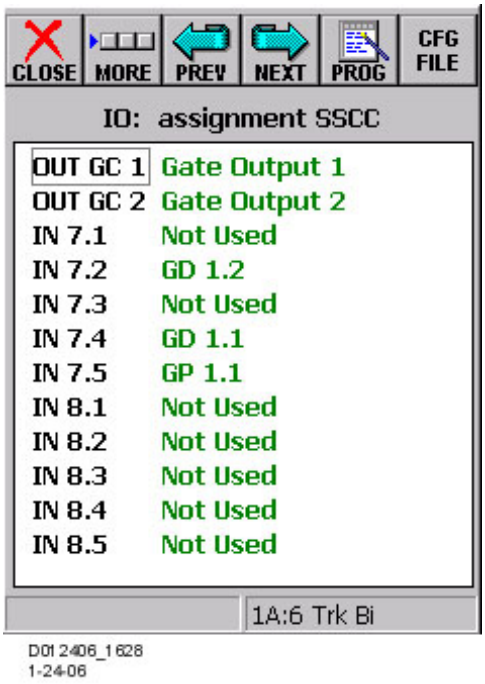

Figure 5-90. IO: Assignment SSCC Window

5.9 SEAR PROGRAMMING MENU ITEM

Diagnostic Terminal (DT) SEAR Programming menu item provide access to the configuration windows shown in figure 5-91.

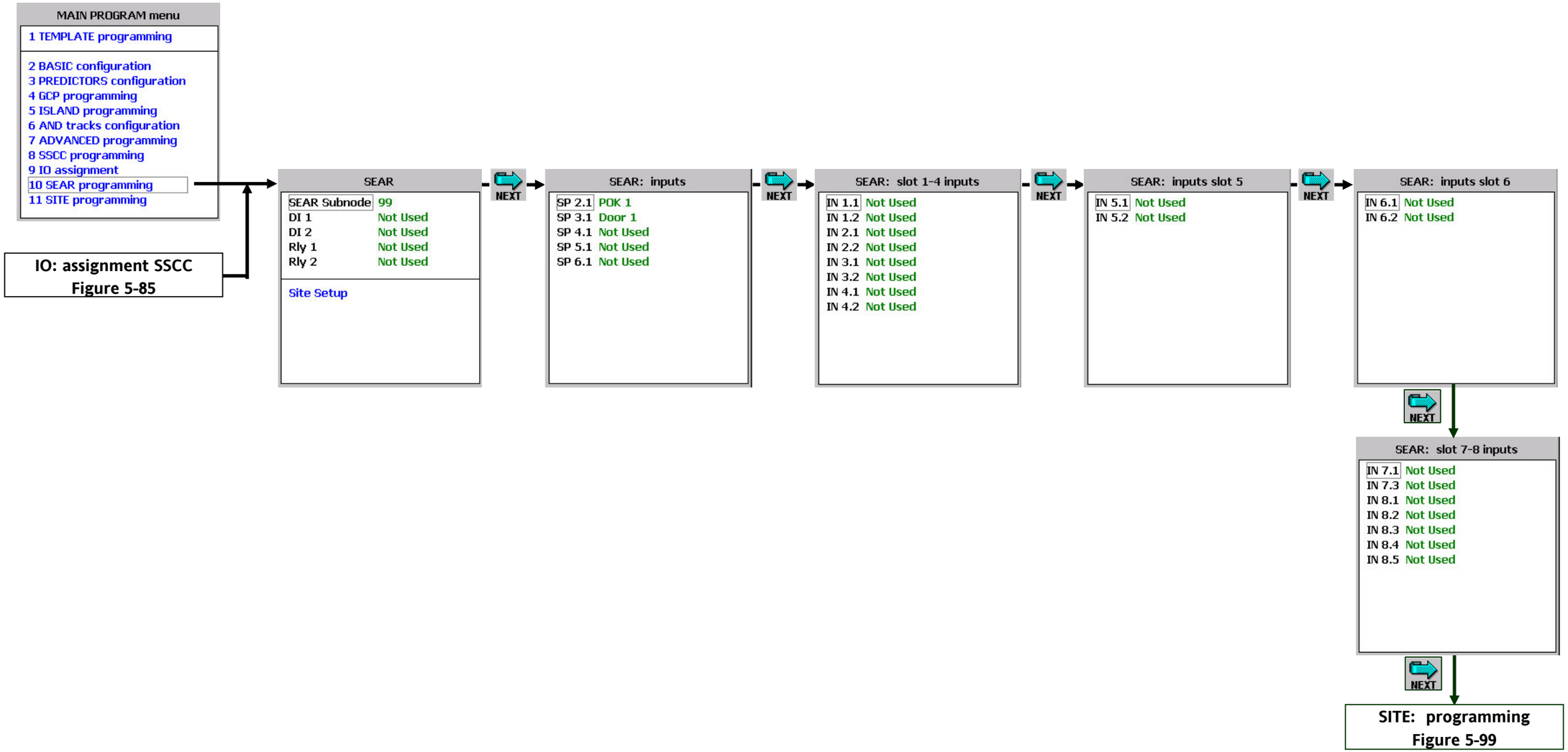

Figure 5-91. SEAR and Site Programming Menu Structure

5.9.1 SEAR Programming Item

Selecting the **SEAR Programming** item brings up the **SEAR** window, figure 5-92.

- Windows display only when **SEAR Used** is set to **Yes** (see figure 5-9).

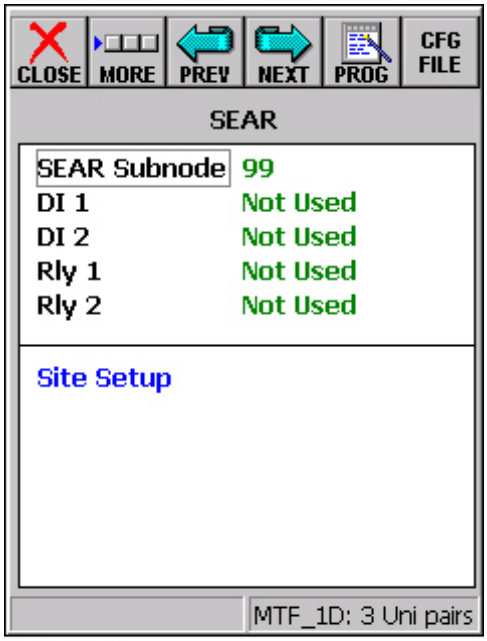

Figure 5-92. SEAR Window

- **SEAR Subnode**
  - Displays the current SEAR subnode assignment
  - Subnode default value: **99**
  - Valid subnode range: **1** to **99**
  - Dialog box type: numeric value entry

NOTE

If the SEAR subnode is changed, the GCP subnode on the SEAR IIi must also be changed (see Section 8).

- **DI 1** and **DI 2**
  - ♦ Allows functions to be assigned to the **DI 1** and **DI 2** inputs on the front panel of the SEAR IIi.
  - ♦ Assignment parameters:
    - **Not Used**
    - **POK 1** and **POK 2**
    - **Door 1** and **Door 2**
    - **3 Vehicle Detect**
    - **4 Vehicle Detect**
    - **GP 1.1**, **GP 1.2**, **GP 2.1**, **GP 2.2**
    - **GD 1.1, GD 1.2**, **GD 1.3, GD 1.4**, **GD 2.1**, **GD 2.2, GD 2.3, GD 2.4**
    - **General 1** thru **General 4**
    - **TSS 1** thru **TSS 8**
    - **Gnd Flt Tester 1** thru **Gnd Flt Tester 3**
    - **Ext Island 1** thru **Ext Island 3**
    - **Tx**
    - **Vehicle Det Hlth**
  - ♦ Default: **Not Used**
  - ♦ Dialog box type: *parameter select*
- **Rly 1** and **Rly 2**
  - ♦ Allows function names to be assigned to the **Rly 1** and **Rly 2** outputs on the front panel of the SEAR IIi.
  - ♦ Assignment parameters:
    - **Not Used**
    - **General 1** thru **General 4**
    - **AC Control**
    - **Ground Fault Test**
    - **Maint Call**
  - ♦ Default: **Not Used**
  - ♦ Dialog box type: *parameter select*

5.9.1.1 Site Setup Entry

The site setup entry provides a link to the SEAR interface (see Section 8)

5.9.1.2 SEAR Inputs Window

The **SEAR: inputs** window, figure 5-93A, allows a SEAR input to be assigned to each of five spare terminal input pairs.

- Window displays following the **SEAR** window when **SEAR input** is not assigned to either of the **Track 5/RIO 2** or **Track 6/RIO 3** slot positions.
- The GCP chassis provides five spare input terminal pairs (+ and -) that can be monitored by the SEAR IIi.

- When **RIO** is assigned to either **Track 5/RIO 2** or **Track 6/RIO 3** slot positions, the inputs corresponding to the RIO assigned slot(s) do not display (see figure 5-93B).
- Input pairs are:
  - labeled as **SP2.1** through **SP6.1** on the GCP front terminal panel
  - connected to the SEAR IIi via the internal bus
- Input pair assignment parameters:
  - **Not Used**
  - **POK 1** and **POK 2**
  - **Door 1** and **Door 2**
  - **3 Vehicle Detect**
  - **4 Vehicle Detect**
  - **GP 1.1, 1.2, 2.1, 2.2**
  - **GD 1.1, 1.2, 1.3, 1.4, 2.1, 2.2, 2.3, 2.4**
  - **General 1** thru **General 4**
  - **TSS 1** thru **TSS 8**
  - **Gnd Flt Tester 1** thru **Gnd Flt Tester 3**
  - **Ext Island 1** thru **Ext Island 3**
  - **Tx**
  - **Vehicle Det Hlth**
- Default: **Not Used**
- Dialog box type: *parameter select*

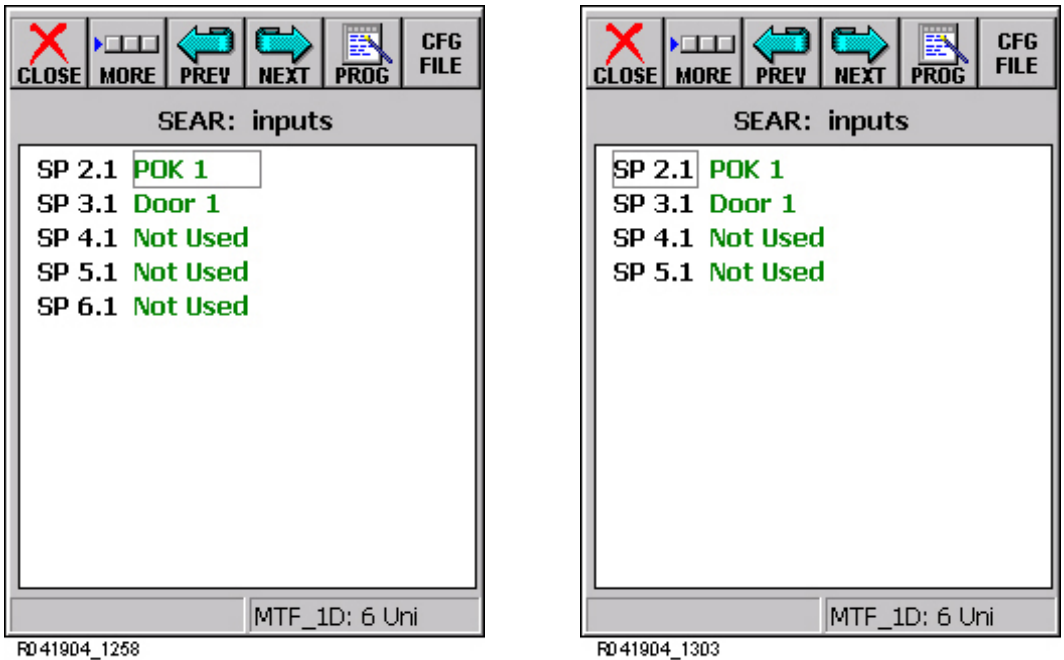

Figure 5-93. SEAR: Inputs Window

5.9.1.3 SEAR Slots 1 thru 4 Inputs Window

The **SEAR: slots 1-4 inputs** window, figure 5-94, displays following the **SEAR: inputs** window.

- This window allows unused track input pairs for slot positions 1 through 4 to be used as SEAR inputs.
  - ♦ If an input is used by the Track Module it is removed from the list of available SEAR inputs.
  - ♦ If a module slot is empty the corresponding inputs are available for use as SEAR inputs.
  - ♦ Input pairs are labeled as **IN1.1** through **IN4.2** on the GCP front terminal panel
  - ♦ Input pair assignment parameters:
    - ▪ **Not Used**
    - ▪ **POK 1** and **POK 2**
    - ▪ **Door 1** and **Door 2**
    - ▪ **3 Vehicle Detect**
    - ▪ **4 Vehicle Detect**
    - ▪ **GP 1.1, 1.2, 2.1, 2.2**
    - ▪ **GD 1.1, 1.2, 1.3, 1.4, 2.1, 2.2, 2.3, 2.4**
    - ▪ **General 1** thru **General 4**
    - ▪ **Ext Island 1** thru **Ext Island 3**
    - ▪ **Tx**
    - ▪ **Vehicle Det Hlth**
  - ♦ Default: **Not Used**
  - ♦ Dialog box type: *parameter select*

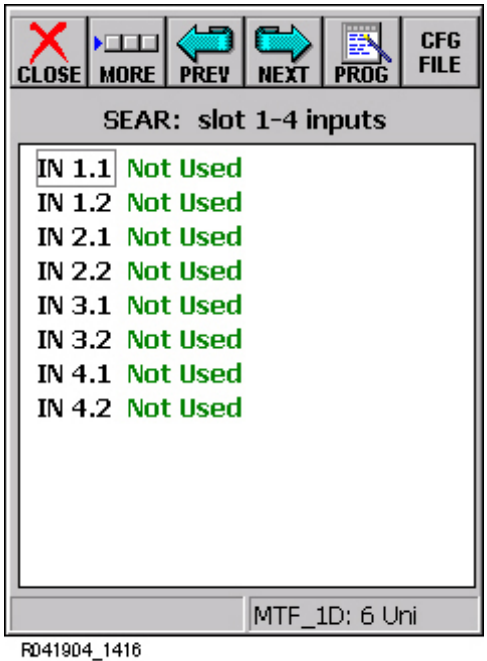

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Figure 5-94. SEAR: Slot 1-4 Inputs Window

5.9.1.4 SEAR Input Slots 5 and 6 Windows

The **SEAR: inputs slot 5** window displays following the **SEAR: input** window and appears as shown in figure 5-95 when **Track 5/RIO 2** slot position is assigned to **Track** or **Not Used**. The **SEAR: inputs slot 6** window that follows will appear similar if the **Track 6/RIO 3** slot position is assigned to **Track** or **Not Used.**

- This window allows unused front panel input pairs for slot positions 5 and 6 to be used as SEAR inputs.
  - ♦ When **RIO** is assigned to either **Track 5/RIO 2** or **Track 6/RIO 3** slot positions, two additional inputs display for the RIO assigned slot(s) as shown in figure 5-96 (**inputs slot 6** window shown).
    - **RIO** assigned to **Track 6/RIO 3** slot position.
    - Inputs are available to be used as SEAR inputs
  - ♦ Input pairs are labeled as **IN5.1** through **IN6.4** on the front terminal panel.
  - ♦ Input pair assignment parameters:
    - **Not Used**
    - **POK 1** and **POK 2**
    - **Door 1** and **Door 2**
    - **3 Vehicle Detect**
    - **4 Vehicle Detect**
    - **GP 1.1, 1.2, 2.1, 2.2**
    - **GD 1.1, 1.2, 1.3, 1.4, 2.1, 2.2, 2.3, 2.4**
    - **General 1** thru **General 4**
    - **Ext Island 1** thru **Ext Island 3**
    - **Tx**
    - **Vehicle Det Hlth**
  - ♦ Default: **Not Used**
  - ♦ Dialog box type: *parameter select*

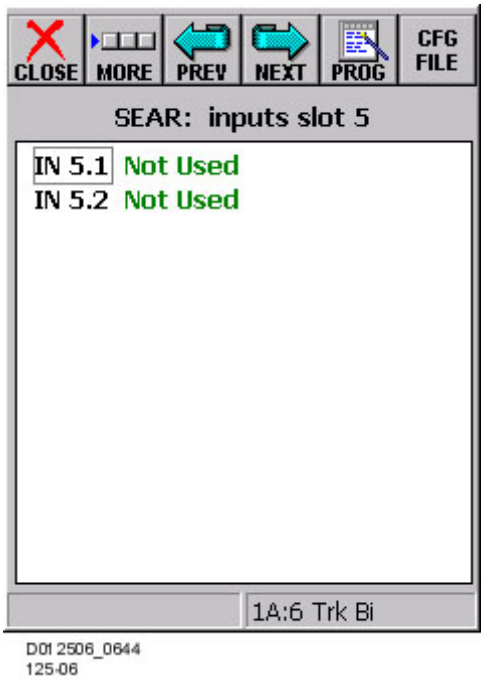

Figure 5-95. SEAR: Inputs Slot 5 Window (Track 5/RIO 2 Slot Set to Track or Not Used)

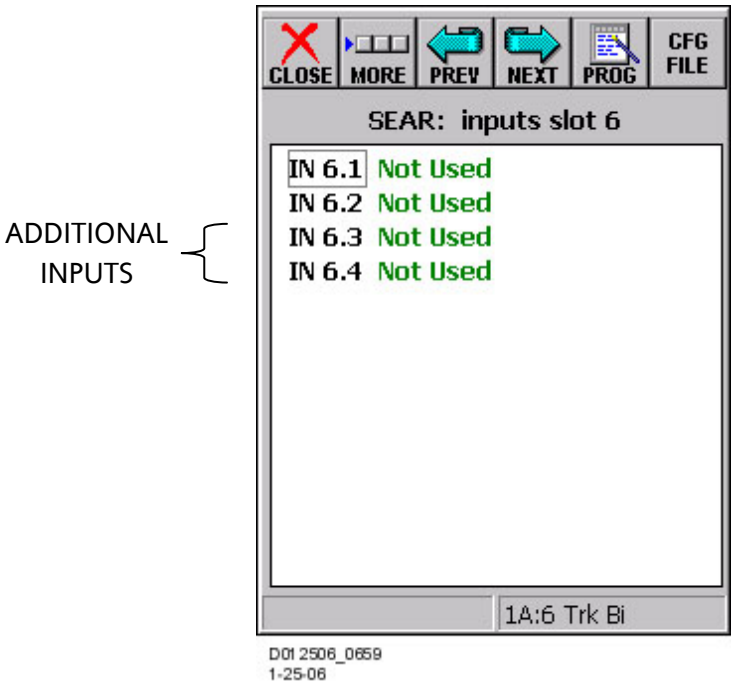

Figure 5-96. SEAR: Inputs Slot 6 Window (Track 6/RIO 3 Slot Set to RIO)

The **SEAR: inputs slot 5** and **SEAR: inputs slot 6** windows appear as shown in figure 5-97 when the corresponding slot position (**Track 5/RIO 2**, **Track 6/RIO 3)** is assigned to **SEAR**.

- These windows allow each of eight front panel input pairs for slot positions 5 and 6 to be used as SEAR inputs.
  - ♦ Input pairs for **Track 5/RIO 2** slot position are labeled as **IN5.1** through **IN5.8** on the front terminal panel and are displayed as shown in figure 5-97A.
  - ♦ Input pairs for **Track 6/RIO 3** slot position are labeled as **IN6.1** through **IN6.8** on the front terminal panel and are displayed as shown in figure 5-97B.

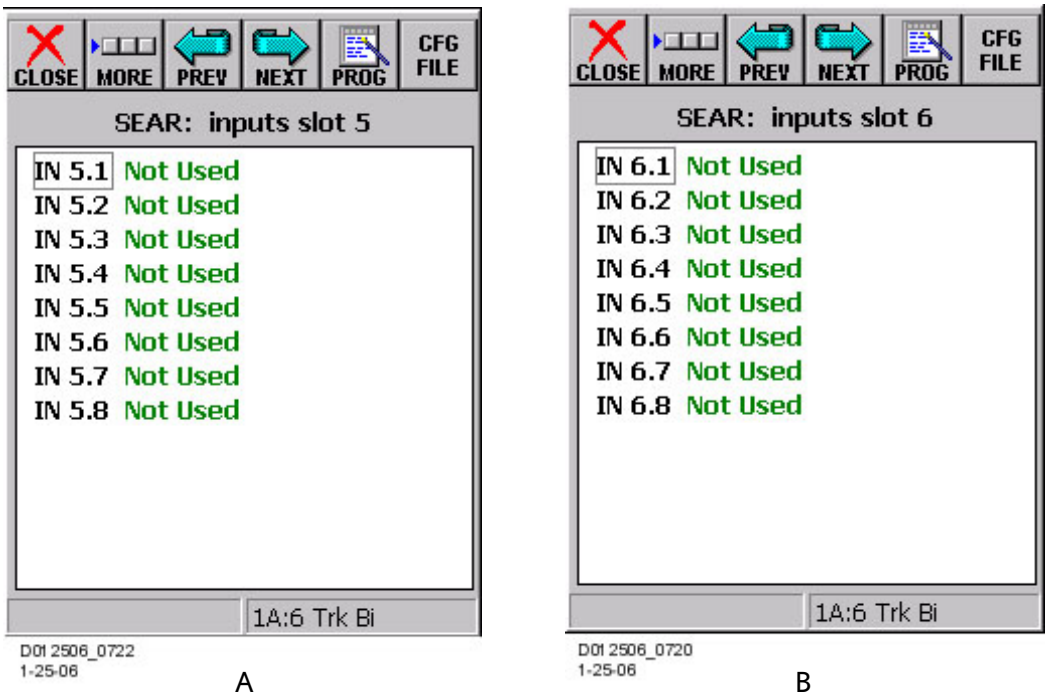

Figure 5-97. SEAR: Inputs 5 and 6 Windows (Corresponding Slot Positions Set to SEAR)

- ♦ Input pair assignment parameters:
  - **Not Used**
  - **POK 1** and **POK 2**
  - **Door 1** and **Door 2**
  - **3 Vehicle Detect**
  - **4 Vehicle Detect**
  - **GP 1.1, 1.2, 2.1, 2.2**
  - **GD 1.1, 1.2, 1.3, 1.4, 2.1, 2.2, 2.3, 2.4**

- **General 1** thru **General 4**
- **Ext Island 1** thru **Ext Island 3**
- **Tx**
- **Vehicle Det Hlth**

♦ Default: **Not Used**

♦ Dialog box type: *parameter select*

5.9.1.5 SEAR Slot 7 and 8 Inputs Window

The **SEAR: slot 7-8 inputs** window, figure 5-98, displays following the **SEAR: inputs** window.

- This window allows two front panel input pairs for slot position 7 and five front panel input pairs for slot position 8 to be used as SEAR inputs.
  - ♦ These vital inputs can be used as SEAR inputs if they are not being used by Crossing Controllers
  - ♦ The slot position 7 Input pairs are labeled as **IN7.1** and **IN7.3**.

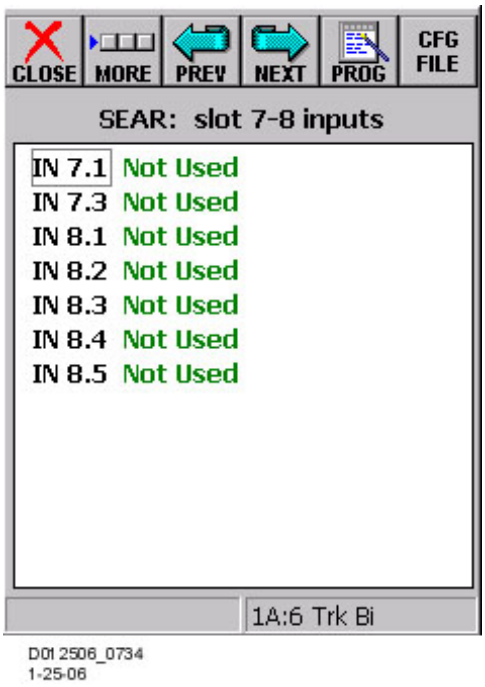

Figure 5-98. SEAR: Slot 7-8 Inputs Window

  - ♦ The slot position 8 Input pairs are labeled as **IN8.1** through **IN8.5**.
  - ♦ Input pair assignment parameters:
    - **Not Used**
    - **POK 1** and **POK 2**
    - **Door 1** and **Door 2**
    - **3 Vehicle Detect**
    - **4 Vehicle Detect**

- **GP 1.1, 1.2, 2.1, 2.2**
- **GD 1.1, 1.2, 1.3, 1.4, 2.1, 2.2, 2.3, 2.4**
- **General 1** thru **General 4**
- **TSS 1** thru **TSS8**
- **GND Flt Tester 1** thru **3**
- **Ext Island 1** thru **Ext Island 3**
- **Tx**
- **Vehicle Det Hlth**

♦ Default: **Not Used**

♦ Dialog box type: *parameter select*

5.10 SITE PROGRAMMING MENU ITEM

Diagnostic Terminal (DT) Site Programming menu item provide access to the configuration window shown in figure 5-99.

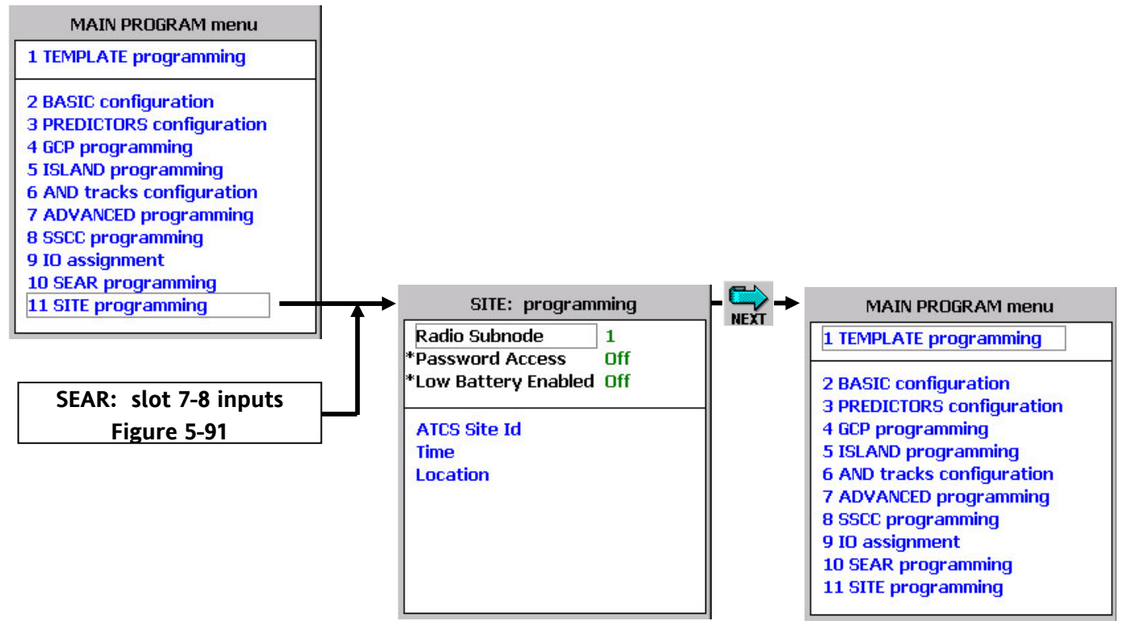

Figure 5-99. Site Programming Menu Structure

5.10.1 Site Programming Item

Selecting the **SITE Programming** item brings up the **SITE: programming** window, figure 5-100.

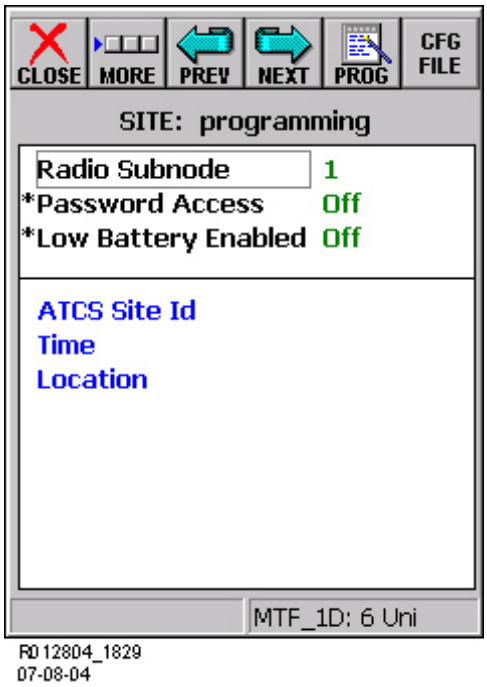

Figure 5-100. SITE Programming Window

- **Radio Subnode** entry
  - ♦ Displays the current radio subnode value.
    - ▪ Subnode default value: **1**
    - ▪ Valid subnode range: **1** to **98**
  - ♦ Dialog box type: *numeric value entry*
- **Password Access** entry
  - ♦ When set to **On:**
    - ▪ the four-digit number entered into the **Password** field must be entered into the system before any program changes can be made.
    - ▪ the **Password** entry is removed from the display.
  - ♦ Default setting: **Off**
  - ♦ Dialog box type: *decision*
- **Password** entry
  - ♦ Displays the current 4-digit password assignment
    - ▪ Entry displays when **Password Access** entry is set to **On** (see figure 5-101)
  - ♦ password default value: **1111**
  - ♦ Valid password range: **1111** to **9999**
  - ♦ Dialog box type: *numeric value entry*

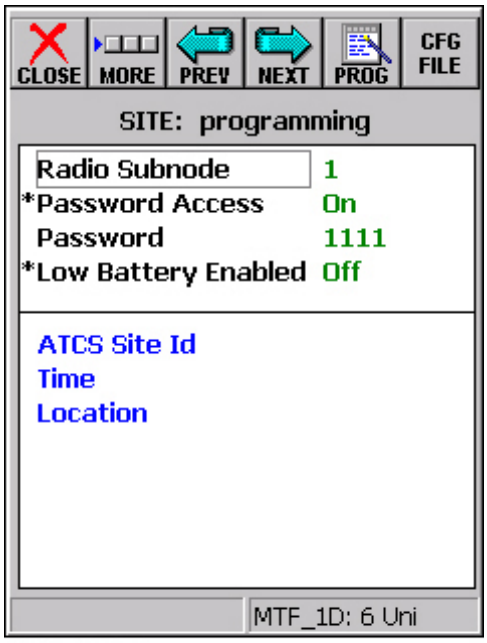

Figure 5-101. SITE: Programming Window with Password Access On

- **Low Battery Enabled**
  - When set to **On** the maintenance call input is de-energized when the battery voltage drops below a set threshold value.
  - Default setting: **Off**
  - Dialog box type: *decision*
- **Low Battery Level**
  - Displays when **Low Battery Enabled** is set to **On** (see figure 5-102)
  - Sets the **Low Battery Enabled** threshold level in decivolts (dV)
  - Threshold level default value: **90 dV**
  - Threshold level range: **1** to **150** decivolts
  - Dialog box type: numeric value entry

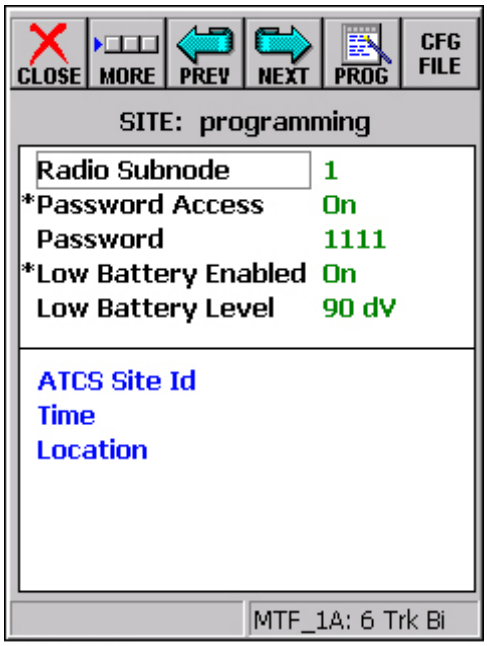

Figure 5-102. SITE: Programming Window with Low Battery Enable On

5.10.1.1 Password Dialog Window

When the **Password Access** entry of the **SITE: programming** Window set to **On** and the Status Screen **PROG** button is selected, the Password Dialog Window, figure 5-103, displays.

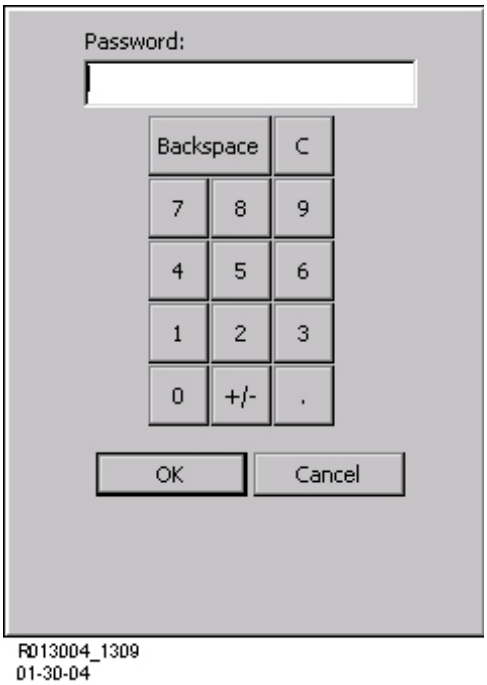

Figure 5-103. Password Dialog Window

Entering the assigned password using the keypad and selecting the **OK** button closes the window and brings up the **MAIN PROGRAM Menu**.

- If the current password is entered, the menu is active and track parameters may be changed.
- If the current password is not entered, the menu is inactive and may not be edited.

5.10.2 Site Info Entries

Three entries appear on the **TEMPLATE: programming** Window:

- ATCS Site Id
- Time
- Location

Each of these item are described in the paragraphs 5.2.3.9 to 5.2.3.12.

5.11 CONFIGURATION FILE BUTTON

Selecting the **CFG FILE** button at the top of any of the **Main Program Menu** windows brings up the Configuration File menu.

- This menu allow
  - ♦ configuration parameters and their current values to be captured and saved as configuration package files
  - ♦ configuration package file parameter reports to be generated and reviewed

5.11.1 Initial Configuration File Menu

Two Configuration File Menu items are active when the menu initially displays (see left):

- **Save to File**
- **Add Comments**

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5.11.1.1 Save To File Entry

Selecting the **Save to File** entry opens the dialog window shown in figure 5-104.

- The dialog box allows the current configuration parameters to be saved as a configuration package (*.pac) file.
  - ♦ The file name assignment for the configuration package file appears in **Name** box.
    - ▪ The file name may be modified using the **Input Panel** at the bottom of the window
  - ♦ Selecting the **OK** button closes the dialog window and initiates a save to file.
    - ▪ The current **Main Program Menu** window is deactivated for approximately five minutes during the save-to-file process.

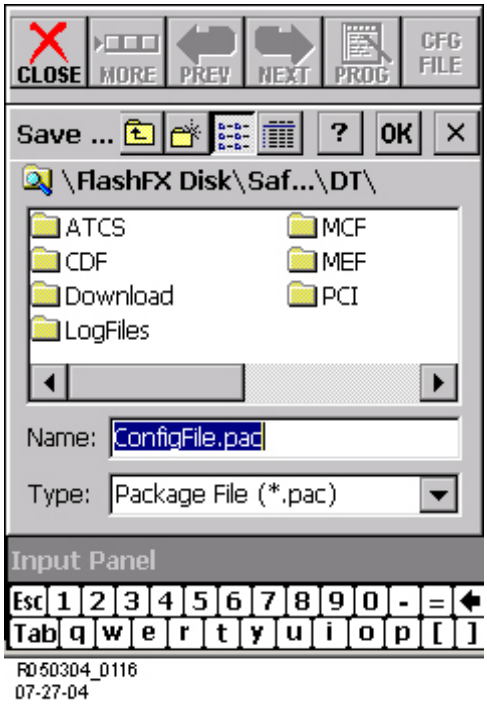


Figure 5-104. Save To File Dialog Window

5.11.1.2 Add Comments Menu Entry

Selecting the **Add Comments** menu entry opens the Comments window, figure 5-105.

- Comments are entered using the **Input Panel** keypad at bottom of window.
- Selecting the **OK** button closes the Comments window and temporarily saves the comments to the file identified by the **Name** field.
- Selecting the **Save to File** menu entry permanently saves the comments (see paragraph 5.11.1.1).

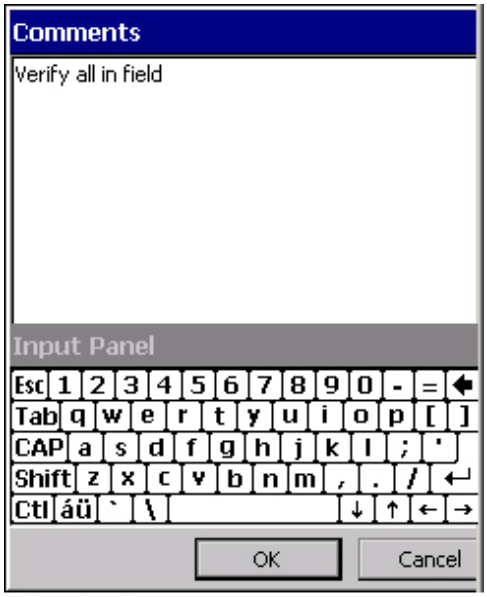
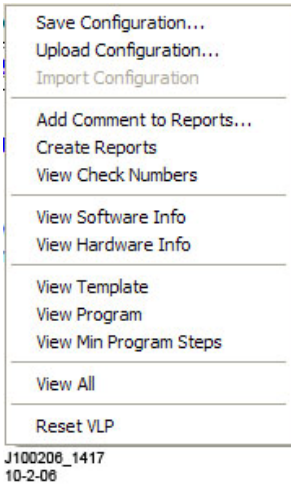


Figure 5-105. Comments Window

5.11.2 Secondary Configuration File Menu



After the current configuration has been saved to configuration package file (*.pac) selecting the **CFG FILE** button opens the drop-down menu for the saved file.

- At this time all menu items except **Import Configuration** are enabled (see left)
  - ♦ The **Import Configuration** item is only used during Office Configuration Editor operation as described in paragraph 4.2.

5.11.2.1 View Software Info Report

Selecting the **View Software Info** entry brings up the Software Report window, figure 5-106A.

- Displays the software information for each installed module.
  - ♦ Selecting the **SAVE** button opens the **Save** dialog window, figure 5-106B.
    - ▪ File name is entered using the **Input Panel** keypad at bottom of window.
      - ♦ The **Input Panel** may be positioned as required.
    - ▪ Selecting the **OK** button closes the **Save** dialog window and returns the display to the **Software Information Report** window.
      - ♦ The report is saved to the current configuration package file.
    - ▪ Selecting the **X** button closes the Comments window and returns the display to the **Software Information Report** window without saving the report.
  - ♦ Selecting the **CLOSE** button closes the **Software Information Report** window and returns the display to the current **Main Program Menu** window.

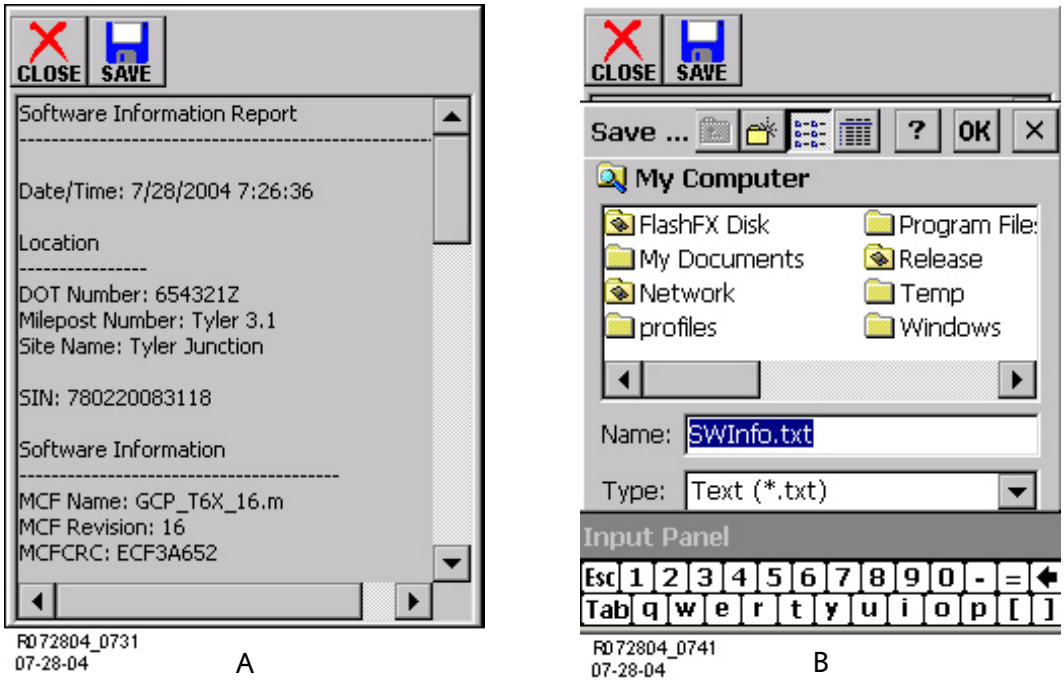


Figure 5-106. Software Information Report Windows

5.11.2.2 View Hardware Info Entry

Selecting the **View Hardware Info** entry brings up the Hardware Report window, figure 5-107A.

- Displays the hardware information for each installed module.
  - ♦ Selecting the **SAVE** button opens the **Save** dialog window, figure 5-107B.
    - ▪ File name is entered using the **Input Panel** keypad at bottom of window.
      - ♦ The **Input Panel** may be positioned as required.
    - ▪ Selecting the **OK** button closes the **Save** dialog window and returns the display to the **Hardware Information Report** window.
      - ♦ The report is saved to the current configuration package file.
    - ▪ Selecting the **X** button closes the Comments window and returns the display to the **Hardware Information Report** window without saving the report.
  - ♦ Selecting the **CLOSE** button closes the **Hardware Information Report** window and returns the display to the current **Main Program Menu** window.

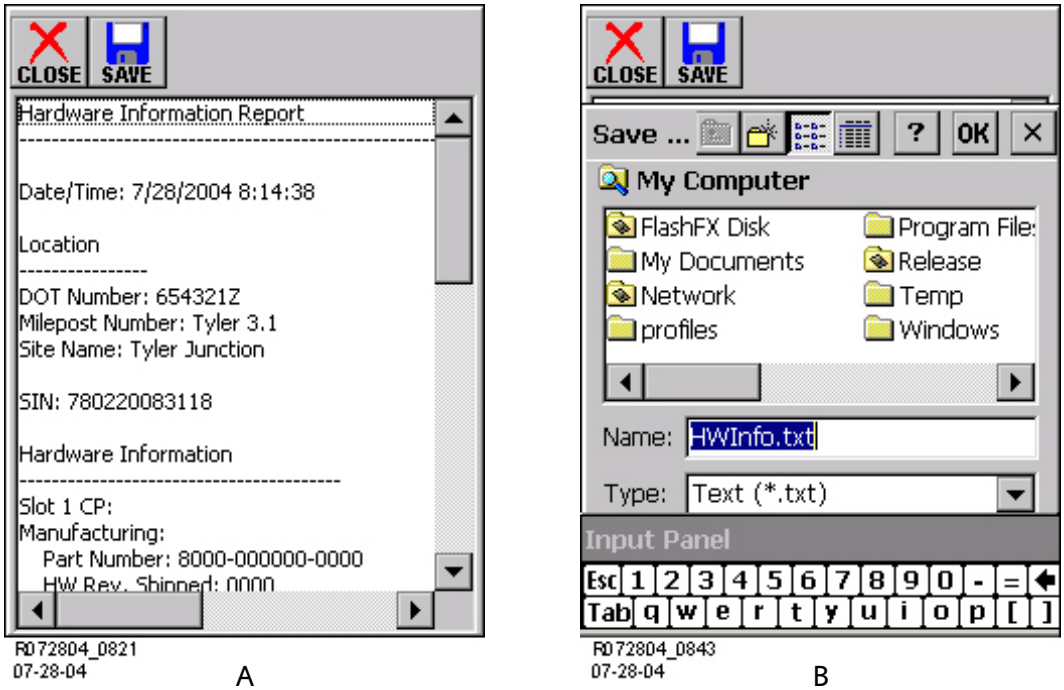


Figure 5-107. Hardware Information Report Windows

5.11.2.3 View Template Entry

Selecting the **View Template** entry brings up the Template Report window, figure 5-108A.

- Displays template configuration parameter information.
  - ♦ Selecting the **SAVE** button opens the **Save** dialog window, figure 5-108B.
    - ▪ File name is entered using the **Input Panel** keypad at bottom of window.
      - ♦ The **Input Panel** may be positioned as required.
    - ▪ Selecting the **OK** button closes the **Save** dialog window and returns the display to the **Template Report** window.
      - ♦ The report is saved to the current configuration package file.
    - ▪ Selecting the **X** button closes the Comments window and returns the display to the **Template Report** window without saving the report.
  - ♦ Selecting the **CLOSE** button closes the **Template Report** window and returns the display to the current **Main Program Menu** window.

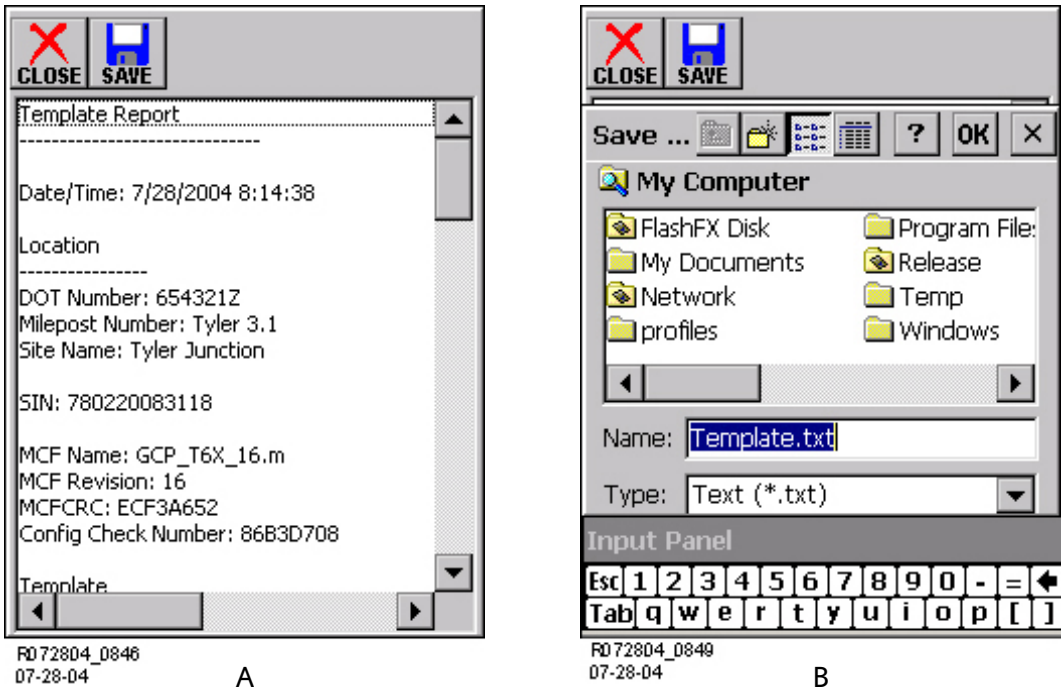


Figure 5-108. Template Report Windows

5.11.2.4 View Program Entry

Selecting the **View Program** entry brings up the Program Report window, figure 5-109A.

- Displays the configuration program settings
  - ♦ Selecting the **SAVE** button opens the **Save** dialog window, figure 5-109B.
    - ▪ File name is entered using the **Input Panel** keypad at bottom of window.
      - ♦ The **Input Panel** may be positioned as required.
    - ▪ Selecting the **OK** button closes the **Save** dialog window and returns the display to the **Program Report** window.
      - ♦ The report is saved to the current configuration package file.
    - ▪ Selecting the **X** button closes the Comments window and returns the display to the **Program Report** window without saving the report.
  - ♦ Selecting the **CLOSE** button closes the **Program Report** window and returns the display to the current **Main Program Menu** window.

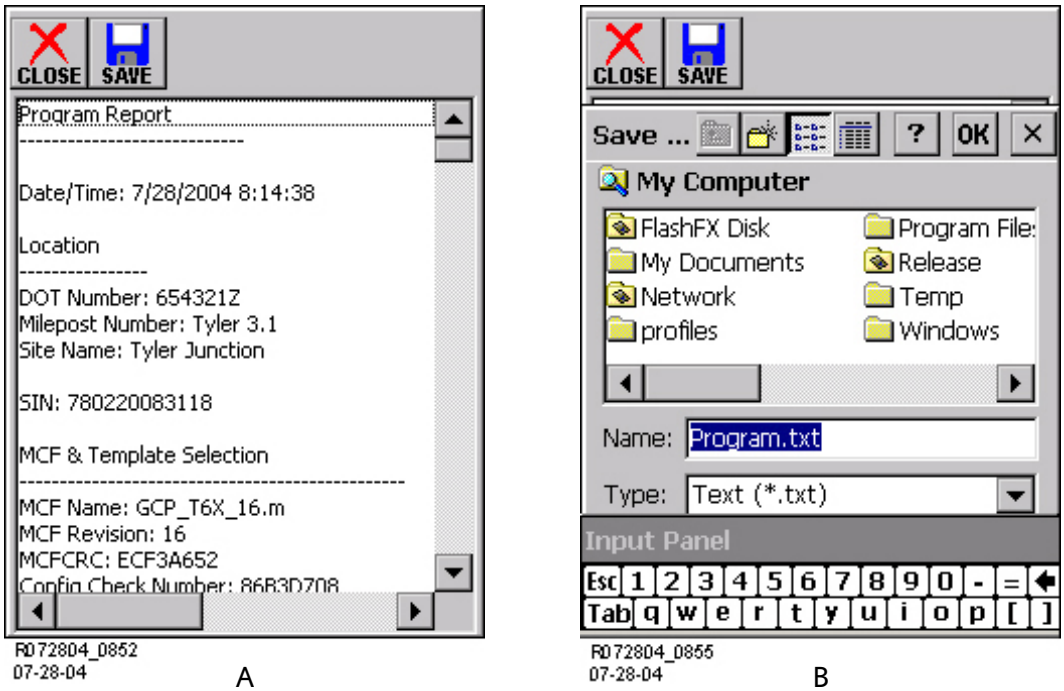


Figure 5-109. Program Report Windows

5.11.2.5 View Min Program Steps

Selecting the **View Min Program Steps** entry brings up the Minimum Program Steps Report window, figure 5-110A.

- Displays the minimum number of configuration parameters that must be set in the field to properly configure the GCP unit.
  - ♦ Selecting the **SAVE** button opens the **Save** dialog window, figure 5-110B.
    - ▪ File name is entered using the **Input Panel** keypad at bottom of window.
      - ♦ The **Input Panel** may be positioned as required.
    - ▪ Selecting the **OK** button closes the **Save** dialog window and returns the display to the **Minimum Program Steps Report** window.
      - ♦ The report is saved to the current configuration package file.
    - ▪ Selecting the **X** button closes the Comments window and returns the display to the **Minimum Program Steps Report** window without saving the report.
  - ♦ Selecting the **CLOSE** button closes the **Minimum Program Steps Report** window and returns the display to the current **Main Program Menu** window.

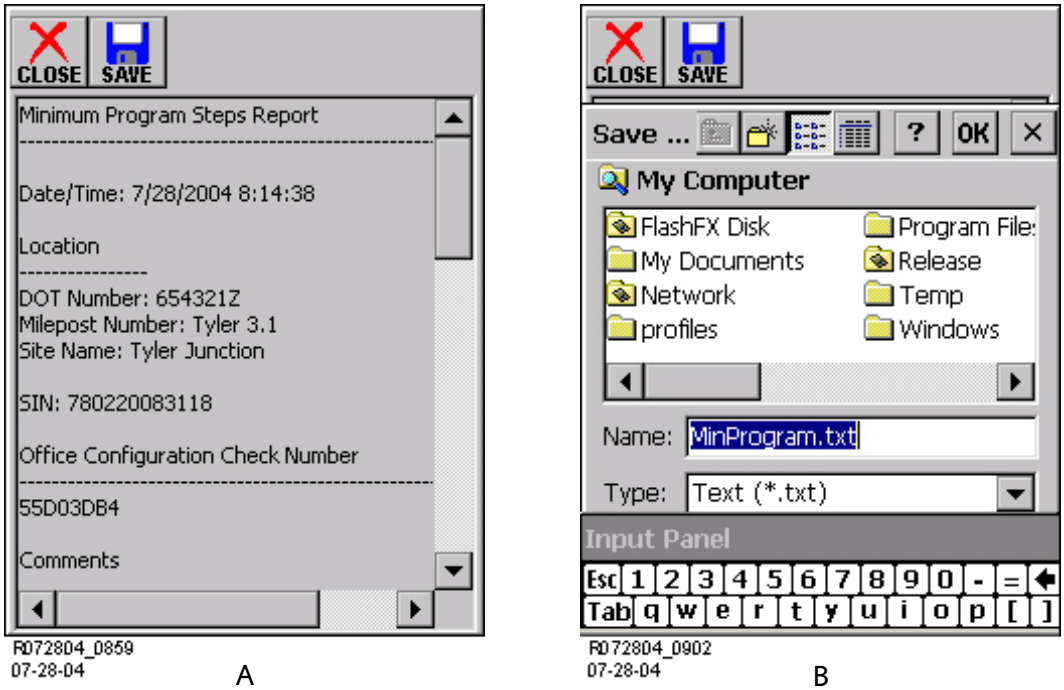


Figure 5-110. Minimum Program Steps Report Windows

5.11.2.6 View All Program Steps Entry

Selecting the **View All Program Steps** entry brings up the System Configuration Report Window, figure 5-111A.

- Displays all of the system configuration information
  - ♦ Selecting the **SAVE** button opens the **Save** dialog window, figure 5-111B.
    - ▪ File name is entered using the **Input Panel** keypad at bottom of window.
      - ♦ The **Input Panel** may be positioned as required.
    - ▪ Selecting the **OK** button closes the **Save** dialog window and returns the display to the **System Configuration Report** window.
      - ♦ The report is saved to the current configuration package file.
    - ▪ Selecting the **X** button closes the Comments window and returns the display to the **System Configuration Report** window without saving the report.
  - ♦ Selecting the **CLOSE** button closes the **System Configuration Report** window and returns the display to the current **Main Program Menu** window.

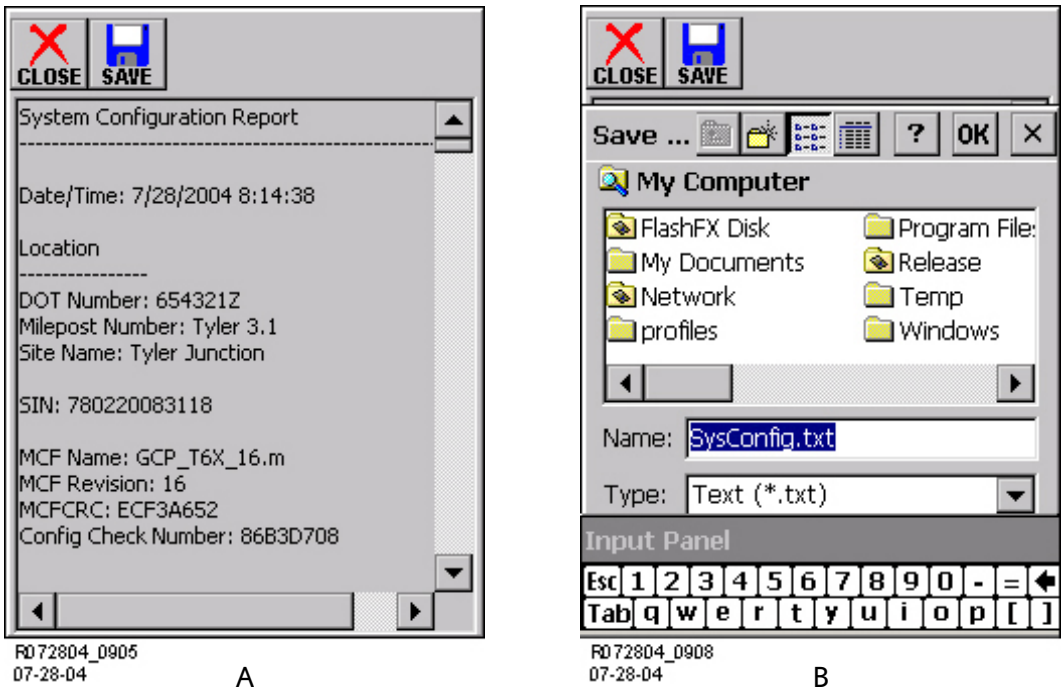


Figure 5-111. System Configuration Report Window

5.11.3 Report File Access And Display

The steps required to access and display the report files of a configuration package file are described in procedure 5-3.

- Provide GCP History Card function.

Procedure 5-3. Report File Access

Step 1	Select the **MORE** button from the Status Screen DT Buttons. • The Secondary DT Function Buttons display.
Step 2	Select the **COMM** button. • The Communication drop-down menu displays.
Step 3	Select the **Disconnect** menu item. • The DT Startup Screen displays. • **Disconnected** displays at the bottom of the screen.
Step 4	Select the **PROG** button. • The **OPEN** and **VIEW** buttons display.
Step 5	Select the **OPEN** button. • The **Ope(n)** dialog window displays.
Step 6	Select the desired configuration package file (*.pac) from the window list. • The selected file appears in the **Name** field.
Step 7	Select the **OK** button. • After approximately 3.2 minutes the dialog window closes and the DT Startup Screen again displays.
Step 8	Select the **VIEW** button. • The Reports drop-down menu displays.
Step 9	Select the desired report from the menu items. • The selected report displays
Step 10	Select the **CLOSE** button. • The report closes and the display returns to DT Startup screen.
Step 11	Repeat steps 8 through 10 for each addition report to be viewed.
Step 12	Select the **MORE** button from the Status Screen DT Buttons. • After approximately 1 minute the Primary DT Function Buttons display.
Step 13	Select the **COMM** button. • The Communication drop-down menu displays.
Step 14	Select the **Connect** menu item. • After an initialization period of approximately 2.5 minutes the Status Screen displays. • **Ready** displays at the bottom of the screen.

5.12 OUTPUT FUNCTIONS AND PHYSICAL OUTPUT ASSIGNMENTS

4000 GCP Track and RIO module physical outputs are:

- user programmable
- not dedicated to specific output functions

5.12.1 Output Requirements Due To Module Integration

Because the Track, Crossing Controller and SEAR Modules are integrated into the 4000 GCP case:

- some formally used outputs are not required
  - ♦ For example, XR or Island physical outputs are not required when using the integrated Solid State Crossing Controller Module
    - ▪ XR control is an internal software connection
- the amount of wiring required to install and maintain a crossing is reduced

5.12.2 Turning On Outputs

If a physical output is required to perform a specific application function:

- the function must first be enabled using the appropriate configuration menu
  - ♦ For example, when Dax A for track 1 is to be used in a Daxing application, **Dax A Used** must be enabled (set to **Yes**) using the **PREDICTORS: track 1** menu.
- the physical output must then be assigned (mapped) to the function using the **OUTPUT: assignment** menu.
  - ♦ For example, **T1 Dax A** mapped to **Out 1.2**

5.12.3 General Guidelines for Using Output Functions

Any output function can be assigned to any of the available 4000 GCP physical outputs.

- For an output function to be included in the output selection list for a particular physical output, the output function must be enabled.
  - ♦ For example, for **T1 DAX A** to appear in the list, the **DAX A Used** status field of the **PREDICTORS: track 1** window must be set to **Yes**.
- When an output function is enabled; i.e., track 1 **Prime Used** set to **Yes**: it does not have to be assigned to a physical output.
  - ♦ It can be used solely as an internal function to the system.
- When a function is assigned to a physical output, and the enabling condition is turned off, the output is de-energized but the function remains assigned to the output.

- For example, when **T1 DAX A** is mapped to **OUT 1.2** and the **T1 DAX A Used** status field is returned to **No**. the **OUT 1.2** assignment field is still set to **T1 DAX A**.
- Returning the input assignment field to **Not Used** removes the assignment and makes troubleshooting easier.

- The same function may be mapped (allocated) to multiple physical outputs.
  - For example, **T1 DAX A** can be assigned to both **OUT 1.1** and **OUT 1.2**.

5.12.4 Output Tables

Tables 5-2 and 5-3 show the output functions available for assignment to the physical outputs.

- Table 5-2 shows output functions that are not specific to a particular track module.
- Table 5-3 shows output functions that are specific to a track module.
  - Track 2 through Track 6 have the same set of output functions as the Track 1 functions shown in Table 5-3.

Table 5-4 shows the available physical outputs and the conditions necessary to use them.

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Table 5-2. System Outputs

Output Function Name	Condition For Output To Be Available	Found In Main Program Menu (Template Menu)	Description
Not Used			When an output is set to **Not Used**, it is always de-energized
AND 1 XR	And 1 XR Used **Yes**	AND: track Anding (TEMPLATE: track Anding)	The AND 1XR function controls the crossing. • The SSCC activation input defaults to the AND 1 XR output. • The AND 1 XR function is set up automatically when a template is selected in a 4000 case at the crossing. An enabled AND 1XR function can be used to combine (AND) DAX predictors outputs at a remote location. The following de-energizes the AND 1 XR function output: • One of the predictors combined in the AND 1 XR function is de-energized • One of the predictor UAX/Enables combined in the AND 1 XR function is de-energized • A connected island is de-energized ♦ if predictor has zero offset • The AND 1 Enable input is de-energized ♦ if configured • The Advance Preempt timer has elapsed ♦ if programmed On ♦ if Preempt Health input is low and the Preempt output is high. • A test activation of the crossing is performed and either of the SSCCs have AND 1 XR as an activation control • The emergency activation input is used and deenergized

Output Function Name	Condition For Output To Be Available	Found In Main Program Menu (Template Menu)	Description
AND 2	And 2 Used **Yes**	AND: track Anding (TEMPLATE: track Anding	AND 2 through AND 4 provide a means of ANDing DAX predictor outputs from multiple tracks to provide a single output. The following de-energizes AND 2 through AND 4: • One of the predictors included in the AND function is de-energized • Connected island is de-energized ♦ if predictor has zero offset • One of the predictor UAX/Enables included in the AND function is de-energized • The AND Enable is de-energized, ♦ if programmed On • A test activation of the crossing is performed and either of the SSCCs have the AND as an activation control • The emergency activation input is used and deenergized
AND 3	And 3 Used **Yes**		
AND 4	And 4 Used **Yes**		
AND 5	And 5 Used **Yes**	AND: track Anding (not available in template menu)	AND 5 through AND 8 provide a means of ANDing DAX predictor outputs from multiple tracks to provide a single output. The following de-energizes AND 5 through AND 8: • One of the predictors included in the AND function is de-energized • Connected island is de-energized ♦ if predictor has zero offset • One of the predictor UAX/Enables combined in the AND function is de-energized • The emergency activation input is used and deenergized
AND 6	And 6 Used **Yes**		
AND 7	And 7 Used **Yes**		
AND 8	And 8 Used **Yes**		

Output Function Name	Condition For Output To Be Available	Found In Main Program Menu (Template Menu)	Description
Adv Preempt	Prempt Logic **Advnce**	BASIC: preemption (TEMPLATE: preemption)	The adv (advance) preempt output is connected to the preempt relay and controls preemption in the traffic system. The following de-energizes the Adv Preempt output: • AND 1 XR is de-energized • One of the Preempt predictors is de-energized ♦ if the corresponding Prime predictor is enabled for the AND 1XR function • Connected island is de-energized, if predictor has zero offset • One of the Preempt predictor Enables is de-energized ♦ if the corresponding Prime predictor is part of AND 1XR • The Advance Preempt input is de-energized • SSCC is unhealthy • The emergency activation input is used and deenergized
	And 1 XR Used **Yes**	AND: track Anding (TEMPLATE: track Anding)	
Sim Preempt	Prempt Logic **Simult**	BASIC: preemption (TEMPLATE: preemption)	The sim (simultaneous) preempt output is connected to the preempt relay and controls preemption in the traffic system. The following de-energizes the Sim Preempt output: • AND 1 XR is de-energized • Connected island is de-energized, if predictor has zero offset • The emergency activation input is used and deenergized
	And 1 XR Used **Yes**	AND: track Anding (TEMPLATE: track Anding)	
Aux-1 Lmp Control	SSCC 1 Slot **SSCC3I**	BASIC: module configuration	The Aux-1 Lmp Control output is used to control the lamps on an external crossing controller shadowing the internal SSCC-1. The following de-energizes the Aux-1 Lmp Control function: • The AND function that is used in SSCC-1 activation is de-energized • GP 1.1 or GP 1.2 is de-energized on SSCC1 ♦ if used • Either SSCC 1 or SSCC 2 is unhealthy ♦ if used • The emergency activation input is used and deenergized
	Aux-1 Xng Ctrl Used **Yes**	SSCC: 1	

Output Function Name	Condition For Output To Be Available	Found In Main Program Menu (Template Menu)	Description
Aux-2 Lmp Control	SSCC 2 Slot **SSCC3I**	BASIC: module configuration	The Aux-2 Lmp Control output is used to control the lamps on an external crossing controller shadowing the internal SSCC-2. The following de-energizes the Aux-2 Lmp Control: • The AND function that is used in SSCC-2 activation is de-energized • GP 2.1 or GP 2.2 is de-energized on SSCC1 ♦ if used • Either SSCC 1 or SSCC 2 is unhealthy ♦ if used • The emergency activation input is used and deenergized
	Aux-2 Xng Ctrl Used **Yes**	SSCC: 2	
Aux-1 Xng Control	SSCC 1 Slot **SSCC3I**	BASIC: module configuration	The Aux-1 Xng Control output is used to control the lights on an external crossing controller shadowing the internal SSCC-1. The following de-energizes the Aux-1 Xng Control function: • AND 1 XR function is de-energized • GP 1.1 or GP 1.2 is de-energized on SSCC1 ♦ if used • Either SSCC 1 or SSCC 2 is unhealthy ♦ if used • The emergency activation input is used and deenergized
	Aux-1 Xng Ctrl Used **Yes**	SSCC: 1	
Aux-2 Xng Control	SSCC 2 Slot **SSCC3I**	BASIC: module configuration	The Aux-2 Xng Control output is used to control the lights on an external crossing controller shadowing the internal SSCC-2. The following de-energizes the Aux-2 Lmp Control: • AND 2 XR is de-energized • GP 2.1 or GP 2.2 is de-energized on SSCC1 ♦ if used • Either SSCC 1 or SSCC 2 is unhealthy ♦ if used • The emergency activation input is used and deenergized
	Aux-2 Xng Ctrl Used **Yes**	SSCC: 2	

Output Function Name	Condition For Output To Be Available	Found In Main Program Menu (Template Menu)	Description
Gate Dwn Indication	Preempt Logic	BASIC: preemption (TEMPLATE: preemption)	The Gate Dwn Indication output is used to Interface to a traffic control system The Gate Dwn Indication output is energized when: • The advanced premption output is deenergized and either o All the gate down inputs are energized or o An island is occupied The Gate Dwn Indication output is deenergized when: • The advanced premption output is energized or • Any gate down inputs is deenergized or • All island are unoccupied
Remote Output 1A	Radio DAX link A Used **Yes** Remote Outputs Used **Yes**	BASIC: radio Dax links (not available in template menu)	Remote Output 1A is used as a general-purpose vital output driven by a vital input from a remote GCP. Remote Output 1A is energized if Remote Input 1 is energized on the GCP connected via radio DAX link A and the link is in session. Remote Output 1A is deenergized if: • Remote Input 1 is deenergized on the GCP connected via radio DAX link A • the link is in or out of session • the emergency activation input is used and ♦ deenergized on the box with remote output 1A ♦ deenergized on the box with remote input 1
Remote Output 1B	Radio DAX link B Used **Yes** Remote Outputs Used **Yes**	BASIC: radio Dax links (not available in template menu)	Remote Output 1B is used as a general-purpose vital output driven by a vital input from a remote GCP. Remote Output 1B is energized if Remote Input 1 is energized on the GCP connected via radio DAX link A and the link is in session. Remote Output 1B is deenergized if: • Remote Input 1 is deenergized on the GCP connected via radio DAX link B • the link is in or out of session • the emergency activation input is used and ♦ deenergized on the box with remote output 1B ♦ deenergized on the box with remote input 1

Output Function Name	Condition For Output To Be Available	Found In Main Program Menu (Template Menu)	Description
Remote Output 2A	Similar to Remote Output 1 A above	Similar to Remote Output 1 A above	Similar to Remote Output 1 A above
Remote Output 2B	Similar to Remote Output 1 B above	Similar to Remote Output 1 B above	Similar to Remote Output 1 B above
Remote Output 3A	Similar to Remote Output 1 A above	Similar to Remote Output 1 A above	Similar to Remote Output 1 A above
Remote Output 3B	Similar to Remote Output 1 B above	Similar to Remote Output 1 B above	Similar to Remote Output 1 B above
Remote Output 4A	Similar to Remote Output 1 A above	Similar to Remote Output 1 A above	Similar to Remote Output 1 A above
Remote Output 4B	Similar to Remote Output 1 B above	Similar to Remote Output 1 B above	Similar to Remote Output 1 B above
Remote Output 5A	Similar to Remote Output 1 A above	Similar to Remote Output 1 A above	Similar to Remote Output 1 A above
Remote Output 5B	Similar to Remote Output 1 B above	Similar to Remote Output 1 B above	Similar to Remote Output 1 B above
Remote Output 6A	Similar to Remote Output 1 A above	Similar to Remote Output 1 A above	Similar to Remote Output 1 A above
Remote Output 6B	Similar to Remote Output 1 B above	Similar to Remote Output 1 B above	Similar to Remote Output 1 B above
Remote Output 7A	Similar to Remote Output 1 A above	Similar to Remote Output 1 A above	Similar to Remote Output 1 A above
Remote Output 7B	Similar to Remote Output 1 B above	Similar to Remote Output 1 B above	Similar to Remote Output 1 B above
Remote Output 8A	Similar to Remote Output 1 A above	Similar to Remote Output 1 A above	Similar to Remote Output 1 A above
Remote Output 8B	Similar to Remote Output 1 B above	Similar to Remote Output 1 B above	Similar to Remote Output 1 B above

Output Function Name	Condition For Output To Be Available	Found In Main Program Menu (Template Menu)	Description
Vital Link 1 Output 1	Vital Comms link 1 Used **Yes**	BASIC: Vital Comms Link (not available in template menu)	Vital Link 1 Output 1 is used as a general-purpose vital output driven by a vital input from a remote GCP or HD/Link module. Vital Link 1 Output 1 is energized if Vital Link 1 Input 1 is energized on the GCP connected via Vital comms link 1 and the link is in session. Vital Link 1 Output 1 is energized if Vital Link 1 Input 1 is energized on the HD/Link module connected via Vital comms link 1 and the link is in session. Vital Link 1 Output 1 is deenergized if: • Vital Link 1 Input 1 is deenergized on the GCP or HD/Lnk connected via Vital Comms 1 Link • the link is in or out of session • the emergency activation input is used and o deenergized on the box with vital link 1 output 1 o deenergized on the GCP4000 box with vital link 1 input 1
Vital Link 2 Output 1	Similar to Vital Link 1 Output above	Similar to Vital Link 1 Output above	Similar to Vital Link 1 Output above
Vital Link 1 Output 2	Similar to Vital Link 1 Output above	Similar to Vital Link 1 Output above	Similar to Vital Link 1 Output above
Vital Link 2 Output 2	Similar to Vital Link 1 Output above	Similar to Vital Link 1 Output above	Similar to Vital Link 1 Output above
Vital Link 1 Output 3	Similar to Vital Link 1 Output above	Similar to Vital Link 1 Output above	Similar to Vital Link 1 Output above
Vital Link 2 Output 3	Similar to Vital Link 1 Output above	Similar to Vital Link 1 Output above	Similar to Vital Link 1 Output above
Vital Link 1 Output 4	Similar to Vital Link 1 Output above	Similar to Vital Link 1 Output above	Similar to Vital Link 1 Output above
Vital Link 2 Output 4	Similar to Vital Link 1 Output above	Similar to Vital Link 1 Output above	Similar to Vital Link 1 Output above
Vital Link 1 Output 5	Similar to Vital Link 1 Output above	Similar to Vital Link 1 Output above	Similar to Vital Link 1 Output above

Output Function Name	Condition For Output To Be Available	Found In Main Program Menu (Template Menu)	Description
Vital Link 2 Output 5	Similar to Vital Link 1 Output above	Similar to Vital Link 1 Output above	Similar to Vital Link 1 Output above
Vital Link 1 Output 6	Similar to Vital Link 1 Output above	Similar to Vital Link 1 Output above	Similar to Vital Link 1 Output above
Vital Link 2 Output 6	Similar to Vital Link 1 Output above	Similar to Vital Link 1 Output above	Similar to Vital Link 1 Output above
Vital Link 1 Output 7	Similar to Vital Link 1 Output above	Similar to Vital Link 1 Output above	Similar to Vital Link 1 Output above
Vital Link 2 Output 7	Similar to Vital Link 1 Output above	Similar to Vital Link 1 Output above	Similar to Vital Link 1 Output above
Vital Link 1 Output 8	Similar to Vital Link 1 Output above	Similar to Vital Link 1 Output above	Similar to Vital Link 1 Output above
Vital Link 2 Output 8	Similar to Vital Link 1 Output above	Similar to Vital Link 1 Output above	Similar to Vital Link 1 Output above
Rmt SSCCIV OP 1	SSCCIV Controller Used **Yes**	BASIC: SSCC (not available in template menu)	Rmt SSCCIV OP 1 is used as a general-purpose vital output driven by a vital input from a remote SSCCIV module. Rmt SSCC IV OP 1 is energized if input 5 is energized on the SSCCIV connected via echelon and the link is in session. Rmt SSCC IV OP 1 is deenergized if: • input 5 is deenergized on the SSCCIV connected via the echelon • the link is in out of session • the emergency activation input is used and deenergized
Rmt SSCCIV OP 2	Similar to Rmt SSCCIV OP 1 above	Similar to Rmt SSCCIV OP 1 above	Similar to Rmt SSCCIV OP 1 above, but controlled by SSCCIV input 6
Rmt SSCCIV OP 3	Similar to Rmt SSCCIV OP 1 above	Similar to Rmt SSCCIV OP 1 above	Similar to Rmt SSCCIV OP 1 above, but controlled by SSCCIV input 7
Rmt SSCCIV OP 4	Similar to Rmt SSCCIV OP 1 above	Similar to Rmt SSCCIV OP 1 above	Similar to Rmt SSCCIV OP 1 above, but controlled by SSCCIV input 8

Output Function Name	Condition For Output To Be Available	Found In Main Program Menu (Template Menu)	Description
Gate Output 1	SSCC 1 Slot **SSCC3i** Gates Used **Yes**	BASIC: module configuration	Gate Output 1 repeats the state of the GC output on SSCC1
Gate Output 2	SSCC 2 Slot **SSCC3i** Gates Used **Yes**	BASIC: module configuration	Gate Output 2 repeats the state of the GC output on SSCC2
Bell 1	SSCC 1 Slot **SSCC3i**	BASIC: module configuration	Bell 1 output repeats the state of the bell output on SSCC1
Bell 2	SSCC 2 Slot **SSCC3i**	BASIC: module configuration	Bell 2 output repeats the state of the bell output on SSCC2
OR 1	OR 1 Used	ADVANCED: OR Logic	The OR 1 output is a general purpose output configured to OR together up to 4 system outputs. The OR 1 output is energized when any of the 4 inputs into the OR gate are energized.
OR 2	Similar to OR 1 above	Similar to OR 1 above	Similar to OR 1 above
OR 3	Similar to OR 1 above	Similar to OR 1 above	Similar to OR 1 above
OR 4	Similar to OR 1 above	Similar to OR 1 above	Similar to OR 1 above
NOT AND 1 XR	And 1 XR Used	AND: track Anding (TEMPLATE: track Anding)	The NOT AND 1 XR output provides an output that is the inverse of the AND 1 XR output The NOT AND 1 XR output is energized when the AND 1 XR is deenergized and AND 1 XR is used The NOT AND 1 XR output is deenergized when the AND 1 XR is energized
NOT AND 2	Similar to AND 1 XR above	Similar to AND 1 XR above	Similar to AND 1 XR above
NOT AND 3	Similar to AND 1 XR above	Similar to AND 1 XR above	Similar to AND 1 XR above
NOT AND 4	Similar to AND 1 XR above	Similar to AND 1 XR above	Similar to AND 1 XR above

Output Function Name	Condition For Output To Be Available	Found In Main Program Menu (Template Menu)	Description
NOT AND 5	Similar to AND 1 XR above	Similar to AND 1 XR above	Similar to AND 1 XR above
NOT AND 6	Similar to AND 1 XR above	Similar to AND 1 XR above	Similar to AND 1 XR above
NOT AND 7	Similar to AND 1 XR above	Similar to AND 1 XR above	Similar to AND 1 XR above
NOT AND 8	Similar to AND 1 XR above	Similar to AND 1 XR above	Similar to AND 1 XR above
Passthru State 1	Pass Thrus	ADVANCED: internal I/O 1	The Passthru State 1 Output repeats the state of the Passthru State 1 input. It is used to convert an input state to an output state so it can be used to set internal states.
Passthru State 2	Similar to Passthru State 1	Similar to Passthru State 1	Similar to Passthru State 1
Passthru State 3	Similar to Passthru State 1	Similar to Passthru State 1	Similar to Passthru State 1
Passthru State 4	Similar to Passthru State 1	Similar to Passthru State 1	Similar to Passthru State 1

Table 5-3. Track Specific Output Functions

Output Name	Condition For Output To Be Available	Found In Main Program Menu (Template Menu)	Description
T1 Island	Track 1 Slot **Track**	BASIC: module configuration (not available in template menu)	This output reflects the state of the island on track 1. • This output is used if the track 1island state is required in some equipment outside of the GCP4000 system. The following de-energizes the island output: • A train occupies the island circuit • The island frequency is not programmed • The island is not calibrated • The island is unhealthy • The emergency activation input is used and deenergized
	Island 1 Used **Internal**	BASIC: island operation (not available in template menu)	
T1 Prime	Track 1 Slot **Track**	BASIC: module configuration (TEMPLATE: module configuration)	The prime predictor output reflects the state of the prime prediction on the track module. The following de-energizes the Prime: • Prime prediction on the track module • Prime UAX is de-energized ♦ input or radio DAX state is de-energize • Prime UAX is running its pickup delay • Advance preemption is used, and the advance preempt timer has elapsed • Connected island is de-energized ♦ if Prime has zero offset • Track health error • The emergency activation input is used and deenergized
	Track 1 MS/GCP Operation **Yes**	BASIC: MS/GCP Operation (not available in template menu)	
	Prime Used **Yes**	PREDICTORS: track 1 (not available in template menu)	

Output Name	Condition For Output To Be Available	Found In Main Program Menu (Template Menu)	Description
T1 DAX A	Track 1 Slot **Track**	BASIC: module configuration (TEMPLATE: module configuration)	The DAX A predictor output reflects the state of the DAX A prediction on the track module. The following de-energizes DAX A: • DAX A prediction on the track module • DAX A Enable is de-energized ♦ input or radio DAX state is de-energized • DAX A Enable is running its pickup delay • Connected island is de-energized ♦ if DAX A has zero offset • Track health error • The emergency activation input is used and deenergized
	Track 1 MS/GCP Operation **Yes**	BASIC: MS/GCP Operation (not available in template menu)	
	DAX A Used **Yes**	PREDICTORS: track 1 (TEMPLATE: track 1 Daxes)	
T1 DAX B	Similar to T1 DAX A above	Similar to T1 DAX A above	Similar to T1 DAX A above
T1 DAX C	Track 1 Slot **Track**	BASIC: module configuration (TEMPLATE: module configuration)	The DAX C predictor output reflects state of DAX C prediction on track module. The following de-energizes DAX C: • DAX C prediction on the track module • DAX C Enable is de-energized ♦ input or radio DAX state is de-energized • Connected island is de-energized ♦ if DAX C has zero offset • Track health error • The emergency activation input is used and deenergized
	Track 1 MS/GCP Operation **Yes**	BASIC: MS/GCP Operation (not available in template menu)	
	DAX C Used **Yes**	PREDICTORS: track 1 (TEMPLATE: track 1 Daxes)	
T1 DAX D	Similar to T1 DAX C above	Similar to T1 DAX C above	Similar to T1 DAX C above
T1 DAX E			
T1 DAX F			
T1 DAX G			

Output Name	Condition For Output To Be Available	Found In Main Program Menu (Template Menu)	Description
T1 Preempt	Track 1 Slot **Track**	BASIC: module configuration (TEMPLATE: module configuration)	The Preempt predictor output reflects the state of the preemption prediction on the track module. • The Preempt is generally used in conjunction with advance preemption. The following de-energizes the Preempt: • Preempt prediction on the track module • Preempt Enable is de-energized ♦ input or radio DAX state is de-energized • Preempt Enable is running its pickup delay • Connected island is de-energized ♦ if Preempt has zero offset • Track health error • The emergency activation input is used and deenergized
	Track 1 MS/GCP Operation **Yes**	BASIC: MS/GCP Operation (not available in template menu)	
	Preempt Logic **Advnce** or **Simult**	BASIC: preemption (TEMPLATE: preemption)	
	Adv Preempt IP Used **Yes**	BASIC: preemption TEMPLATE: preemption)	
T1 MS Ctrl OP	Track 1 Slot **Track**	BASIC: module configuration	The MS Ctrl OP is used to control whether the selected predictors at a down stream adjacent crossing are switched to motions sensors. • When the MS/GCP restart is on, the MS Control is normally energized. • The MS Control is de-energized when a train stop is detected on the track, and remains de-energized until programmed MS/GCP Restart Time elapses. ♦ The MS Control output can also be de-energized if another input is configured as a MS Control input and it is de-energized
	MS/GCP Restart Used **Yes**	ADVANCED: MS restart (not available in template menu)	

Table 5-4. 4000 GCP Physical Outputs

Output Name	Condition For Output To Be Available	Found In Main Program Menu / Template Menu	Description
OUT 1.1	Track 1 Slot **Track**	BASIC: module configuration (TEMPLATE: module configuration)	Vital outputs from track slot 1
OUT 1.2			
OUT 2.1	Track 2 Slot **Track**	BASIC: module configuration (TEMPLATE: module configuration)	Vital outputs from track slot 2
OUT 2.2			
OUT 3.1	Track 3 Slot **Track**	BASIC: module configuration (TEMPLATE: module configuration)	Vital outputs from track slot 3
OUT 3.2			
OUT 4.1	Track 4 Slot **Track**	BASIC: module configuration (TEMPLATE: module configuration)	Vital outputs from track slot 4
OUT 4.2			
OUT 5.1	Track 5/RIO 2 Slot **Track**	BASIC: module configuration (TEMPLATE: module configuration)	Vital outputs from track slot 5
OUT 5.2			
OUT 6.1	Track 6/RIO 3 Slot **Track**	BASIC: module configuration (TEMPLATE: module configuration)	Vital outputs from track slot 6
OUT 6.2			
OUT 2.1	Track 2/RIO 1 Slot **RIO**	BASIC: module configuration (TEMPLATE: module configuration)	Vital outputs from RIO 1
OUT 2.2			
OUT 2.3			
OUT 2.4			
OUT 5.1	Track 5/RIO 2 Slot **RIO**	BASIC: module configuration (TEMPLATE: module configuration)	Vital outputs from RIO 2
OUT 5.2			
OUT 5.3			
OUT 5.4			

Output Name	Condition For Output To Be Available	Found In Main Program Menu / Template Menu	Description
OUT 6.1	Track 6/RIO 3 Slot **RIO**	BASIC: module configuration (TEMPLATE: module configuration)	Vital outputs from RIO 3
OUT 6.2			
OUT 6.3			
OUT 6.4			
Out GC 1	SSCC 1 Slot **SSCC3i** Gates Used **Yes**	IO: assignment SSCC	The Out GC 1 is located on the SSCC IIIi module in SSCC slot 1. The default is Gate Output 1. • Other selections are the same as a track output
Out GC 2	SSCC 2 Slot **SSCC3i** Gates Used **Yes**	IO: assignment SSCC	The Out GC 2 is located on the SSCC IIIi module in SSCC slot 2. The default is Gate Output 2. • Other selections are the same as a track output

5.13 INPUT FUNCTIONS AND PHYSICAL INPUT ASSIGNMENTS

4000 GCP Track, RIO module, and Crossing Controller physical inputs are:

- user programmable
- not dedicated to specific output functions

5.13.1 Input Requirements Due To Module Integration

Because the Track, Crossing Controller and SEAR Modules are integrated into the 4000 GCP case some formally used inputs are not required by the 4000 GCP System.

5.13.2 Turning on Inputs

When a physical input is required to perform a specific application function:

- the function must first be enabled using the appropriate configuration menu
  - ♦ For example, when prime UAX for track 1 is to be used, **Prime UAX** must be enabled using the **GCP track 1 prime** menu.
- the physical input must then be assigned (mapped) to the function using the **INPUT: assignment** menu.
  - ♦ For example, **T1 Prime UAX** mapped to **In 1.1**

5.13.3 General Guidelines for Using Input Functions

Any input function can be assigned to any of the available 4000 GCP physical inputs.

- the same input function can be allocated to multiple physical inputs.
  - ♦ As a result, the allocated input function will de-energize when either input is de-energized.

For example, with T1 Prime UAX allocated to both IN 1.1 and IN 1.2, T1 Prime UAX will de-energize if either IN 1.1 or IN 1.2 is de-energized.

- For an input function to appear in the selection list for a particular physical input, all of the precursor settings for that function must be enabled.
  - ♦ For example, for **AND 2 Enable** to appear in the list:
    - **AND 2 Used** of the **AND: track Anding** window must first be set to **Yes**
    - **AND 2 Enable Used** of the **AND: AND 2** window is then set to **Yes**
- If an input function is enabled, but is not assigned to a physical input, it is treated as de-energized.
  - ♦ For example, when the **AND 2 Enable** function is enabled but not assigned to a physical input.

- If an input function is assigned to a physical input and the enabling condition is turned off, the input is ignored but the function remains assigned to the output.
  - For example, when **AND 1 XR Enable** is mapped to **IN 1.1** and the **AND 2 Enable Used** status field is returned to **No**. the **IN 1.1** assignment field is still set to **AND 1 XR Enable**.
    - The input is no longer turned on
    - the physical input does not have to be wired high
  - Returning the input assignment field to **Not Used** removes the assignment and makes troubleshooting easier.

5.13.4 Input Tables

Tables 5-5, 5-6, and 5-7 show the input functions available to be assigned to a physical input: e.g., IN 1.1.

- Table 5-5 shows input functions that are not specific to a particular track module.
- Table 5-6 shows Input functions specific to a track module.
  - Track 2 through Track 6 have a similar set of input functions as the Track 1 functions.
- Table 5-7 shows inputs that are specific to the crossing controller.
- Table 5-8 shows the available physical inputs and the conditions necessary to use them.

NOTE

Physical inputs for the SEAR IIi can be connected to the GCP 4000's front connectors, located along the top of the case. Details and a table of physical input assignments are contained in the Configuration Summary for SEAR IIi, Application 9V864 (Safetran document# SIG-00-05-02-001) included at the front of this manual.

NOTE

1. All predictors are de-energized if the MS/GCP on the Track Module is:
   - not calibrated
   - not approach calibrated
   - not linearized
   - unhealthy
2. When an input is set to **Not Used** it is treated as de-energized.

Table 5-5. System Input Functions

Input Name	Condition For Input To Be Available	Found in Main Program Menu (Template Menu)	Description
Adv Preempt IP	Preempt Logic **Advnce**	BASIC: preemption (TEMPLATE: preemption)	The Adv Preempt Control input starts the advance preempt timer in response to a DAX signal input from a remote unit. • Advance preempt timer starts when input goes low. ♦ The timer runs to completion even when the input drops for only a short period.
	Adv Preempt IP Used **Yes**	BASIC: preemption (TEMPLATE: preemption)	
	And 1 XR Used **Yes**	AND: track Anding (TEMPLATE: Track Anding)	
AND 1 XR Enable	And 1 XR Used **Yes**	AND: track Anding (TEMPLATE: Track Anding)	AND 1 XR Enable de-energizes the AND 1 XR in response to an external input received by the system. • AND 1 XR is de-energized when AND 1 XR Enable is de-energized after the optional drop delay timer has expired. • AND 1 is energized when AND 1 XR Enable is energized after the optional pickup delay timer has expired.
	And 1 Enable Used **Yes**	AND: AND 1 XR (TEMPLATE: AND 1 XR)	
AND 2 Enable	And 2 Used **Yes**	AND: track Anding (TEMPLATE: Track Anding)	AND 2 Enable de-energizes the AND 2 in response to an external input received by the system. • AND 2 is de-energized when AND 2 Enable is de-energized after the optional drop delay timer has expired. • AND 2 is energized when AND 2 Enable is energized after the optional pickup delay timer has expired.
	And 2 Enable Used **Yes**	AND: AND 2 (TEMPLATE: AND 2)	
AND 3 Enable	And 3 Used **Yes**	AND: track Anding (TEMPLATE: Track Anding)	Similar to And 2 Enable
	And 3 Enable Used **Yes**	AND: AND 3 (TEMPLATE: AND 3)	
AND 4 Enable	And 4 Used **Yes**	AND: track Anding (TEMPLATE: Track Anding)	Similar to And 2 Enable
	And 4 Enable Used **Yes**	AND: AND 4 (TEMPLATE: AND 4)	
AND 5 Enable	And 5 Used **Yes**	AND: track Anding	Similar to And 2 Enable
	And 5 Enable Used **Yes**	AND: AND 5 (TEMPLATE: AND 5)	

Input Name	Condition For Input To Be Available	Found in Main Program Menu (Template Menu)	Description
AND 6 Enable	And 6 Used **Yes**	AND: track Anding	Similar to And 2 Enable
	And 6 Enable Used **Yes**	AND: AND 6 (TEMPLATE: AND 6)	
AND 7 Enable	And 7 Used **Yes**	AND: track Anding	Similar to And 2 Enable
	And 7 Enable Used **Yes**	AND: AND 7 (TEMPLATE: AND 7)	
AND 8 Enable	And 8 Used **Yes**	AND: track Anding	Similar to And 2 Enable
	And 8 Enable Used **Yes**	AND: AND 8 (TEMPLATE: AND 8)	
Emergency Activate	Emergency Activate IP **Yes**	ADVANCED: site options	The Emergency Activate input is used to set all the GCP outputs to a restrictive state from a single input When the emergency activate input is deenergized • all GCP 4000 outputs are deenergized (with the exception of NOT AND outputs and inverted gate outputs) • all out of service GCP or Islands are put back in service • Wraps and Overrides inputs are deenergized
AND 1 Wrap	And 1 XR Used **Yes**	AND: track Anding (TEMPLATE: Track Anding)	The AND 1 Wrap input is used to energize the AND 1 XR output if the AND 1 Wrap input is energized. If the AND 1 Wrap input is energized the AND 1 XR output will be energized unless the emergency activation input is deenergized.
	AND 1 Wrap **Yes**	AND: AND 1 XR	
AND 2 Wrap	Similar to AND 2 Wrap above	Similar to AND 1 Wrap above	Similar to AND 1 Wrap above
AND 3 Wrap	Similar to AND 3 Wrap above	Similar to AND 1 Wrap above	Similar to AND 1 Wrap above
AND 4 Wrap	Similar to AND 4 Wrap above	Similar to AND 1 Wrap above	Similar to AND 1 Wrap above
AND 5 Wrap	Similar to AND 5 Wrap above	Similar to AND 1 Wrap above	Similar to AND 1 Wrap above
AND 6 Wrap	Similar to AND 6 Wrap above	Similar to AND 1 Wrap above	Similar to AND 1 Wrap above
AND 7 Wrap	Similar to AND 7 Wrap above	Similar to AND 1 Wrap above	Similar to AND 1 Wrap above

Input Name	Condition For Input To Be Available	Found in Main Program Menu (Template Menu)	Description
AND 8 Wrap	Similar to AND 8 Wrap above	Similar to AND 1 Wrap above	Similar to AND 1 Wrap above
Trf Control Health	Preempt Logic **Advnce**	BASIC: preemption (TEMPLATE: preemption)	The Trf (traffic) Control Health input from the traffic controller indicates the health of the controller. • The input is de-energized when the controller is unhealthy. ♦ Sets advance preemption timer is set to zero ♦ Initiates simultaneous preemption
	Traffic Sys Hlth IP Used **Yes**	BASIC: preemption (TEMPLATE: preemption)	
	And 1 XR Used **Yes**	AND: track Anding (TEMPLATE: Track Anding)	
Preempt Health	Preempt Logic **Advnce** or **Simult**	BASIC: preemption (TEMPLATE: preemption)	The Preempt health input checks the correspondence of the traffic relay. • Battery over a front contact of the relay is brought back into the preempt health input. • The crossing is activated when the 4000 GCP detects that the traffic relay drive is present but the preempt health input is down. ♦ This condition may occur when the wire to the traffic relay coil opens or falls off.
	Preempt Hlth IP Used **Yes**	BASIC: preemption (TEMPLATE: preemption)	
	And 1 XR Used **Yes**	AND: track Anding (TEMPLATE: Track Anding)	
Maint Call Rpt IP	Ext Maint Call Input **Yes**	ADVANCED: site options (not available in template menu)	This input • receives the maintenance call from external equipment:; e.g., SSCC3+ • is combined with the 4000 GCP maintenance call to produce the front panel Maint Call output.
Aux-1 Xng Ctrl Hlth	SSCC-1 Slot **SSCCIIIi**	BASIC: module configuration (TEMPLATE: module configuration)	The Aux-1 Xng Ctrl Hlth input enables the health of an auxiliary lamp (crossing) controller to be brought into the GCP 4000. • When Aux-1 Xng Ctrl Hlth de-energizes it activates internal crossing controllers SSCC-1 and SSCC-2.
	Aux-1 Xng Ctrl Used **Yes**	SSCC: 1 (not available in template menu)	
	Aux-1 Xng Ctrl Hlth IP **Yes**	SSCC: 1 (not available in template menu)	

Input Name	Condition For Input To Be Available	Found in Main Program Menu (Template Menu)	Description
Aux-2 Xng Ctrl Hlth	SSCC-1 Slot **SSCCIIIi**	BASIC: module configuration (TEMPLATE: module configuration)	The Aux-2 Xng Ctrl Hlth input enables the health of an auxiliary lamp (crossing) controller to be brought into the GCP 4000. • When Aux-2 Xng Ctrl Hlth de-energizes it activates internal crossing controllers SSCC-1 and SSCC-2.
	Aux-2 Xng Ctrl Used **Yes**	SSCC: 2 (not available in template menu)	
	Aux-2 Xng Ctrl Hlth IP **Yes**	SSCC: 2 (not available in template menu)	
Remote Input 1	Radio DAX link A Used **Yes**	BASIC: radio Dax links (not available in template menu)	Remote Input 1 is used to send the state of an input to a remote GCP via the radio network.
	Remote Outputs Used **Yes**		
Remote Input 2	Similar to Remote Input 1 above	Similar to Remote Input 1 above	Similar to Remote Input 1 above
Remote Input 3	Similar to Remote Input 1 above	Similar to Remote Input 1 above	Similar to Remote Input 1 above
Remote Input 4	Similar to Remote Input 1 above	Similar to Remote Input 1 above	Similar to Remote Input 1 above
Remote Input 5	Similar to Remote Input 1 above	Similar to Remote Input 1 above	Similar to Remote Input 1 above
Remote Input 6	Similar to Remote Input 1 above	Similar to Remote Input 1 above	Similar to Remote Input 1 above
Remote Input 7	Similar to Remote Input 1 above	Similar to Remote Input 1 above	Similar to Remote Input 1 above
Remote Input 8	Similar to Remote Input 1 above	Similar to Remote Input 1 above	Similar to Remote Input 1 above
Vital Link 1 Input 1	Vital Comm Link 1 Used Yes	BASIC: Vital Comms Links	Vital Link 1 Input 1 is used to send the state of an input to a remote GCP or HD/Link via the radio or echelon network.
Vital Link 1 Input 2	Similar to Vital Link 1 Input 1 above	Similar to Vital Link 1 Input 1 above	Similar to Vital Link 1 Input 1 above

Input Name	Condition For Input To Be Available	Found in Main Program Menu (Template Menu)	Description
Vital Link 1 Input 3	Similar to Vital Link 1 Input 1 above	Similar to Vital Link 1 Input 1 above	Similar to Vital Link 1 Input 1 above
Vital Link 1 Input 4	Similar to Vital Link 1 Input 1 above	Similar to Vital Link 1 Input 1 above	Similar to Vital Link 1 Input 1 above
Vital Link 1 Input 5	Similar to Vital Link 1 Input 1 above	Similar to Vital Link 1 Input 1 above	Similar to Vital Link 1 Input 1 above
Vital Link 1 Input 6	Similar to Vital Link 1 Input 1 above	Similar to Vital Link 1 Input 1 above	Similar to Vital Link 1 Input 1 above
Vital Link 1 Input 7	Similar to Vital Link 1 Input 1 above	Similar to Vital Link 1 Input 1 above	Similar to Vital Link 1 Input 1 above
Vital Link 1 Input 8	Similar to Vital Link 1 Input 1 above	Similar to Vital Link 1 Input 1 above	Similar to Vital Link 1 Input 1 above
Vital Link 2 Input 1	Vital Comm Link 2 Used **Yes**	BASIC: Vital Comms Links	Vital Link 2 Input 1 is used to send the state of an input to a remote GCP or HD/Link via the radio or echelon network.
Vital Link 2 Input 2	Similar to Vital Link 2 Input 1 above	Similar to Vital Link 2 Input 1 above	Similar to Vital Link 2 Input 1 above
Vital Link 2 Input 3	Similar to Vital Link 2 Input 1 above	Similar to Vital Link 2 Input 1 above	Similar to Vital Link 2 Input 1 above
Vital Link 2 Input 4	Similar to Vital Link 2 Input 1 above	Similar to Vital Link 2 Input 1 above	Similar to Vital Link 2 Input 1 above
Vital Link 2 Input 5	Similar to Vital Link 2 Input 1 above	Similar to Vital Link 2 Input 1 above	Similar to Vital Link 2 Input 1 above
Vital Link 2 Input 6	Similar to Vital Link 2 Input 1 above	Similar to Vital Link 2 Input 1 above	Similar to Vital Link 2 Input 1 above
Vital Link 2 Input 7	Similar to Vital Link 2 Input 1 above	Similar to Vital Link 2 Input 1 above	Similar to Vital Link 2 Input 1 above
Vital Link 2 Input 8	Similar to Vital Link 2 Input 1 above	Similar to Vital Link 2 Input 1 above	Similar to Vital Link 2 Input 1 above
Passthru State 1	Pass Thrus **Yes**	ADVANCED: internal I/O 1	The Passthru State 1 input is used to convert an input state to an output state so it can be used to set internal states.

Input Name	Condition For Input To Be Available	Found in Main Program Menu (Template Menu)	Description
Passthru State 2	Similar to Passthru State 1 above	Similar to Passthru State 1 above	Similar to Passthru State 1 above
Passthru State 3	Similar to Passthru State 1 above	Similar to Passthru State 1 above	Similar to Passthru State 1 above
Passthru State 4	Similar to Passthru State 1 above	Similar to Passthru State 1 above	Similar to Passthru State 1 above

Table 5-6. Track Specific Input Functions

Input Name	Condition for input to be available	Found in Main Program Menu (Template Menu)	Description
Ext Island 1	Track 1 Slot **Track**	BASIC: module configuration (not available in template menu)	The Ext Island 1 input brings in the state of a DC island, when the island on the track module is not being used. • Predictors and UAX functions are the same with the external island as with the internal island. ♦ state of the external island is received via a physical input
	Island 1 Used **External**	BASIC: island operation (not available in template menu)	
Ext Island 2	Similar to Ext Island 1	Similar to Ext Island 1	Similar to Ext Island 1
Ext Island 3	Similar to Ext Island 1	Similar to Ext Island 1	Similar to Ext Island 1
Ext Island 4	Similar to Ext Island 1	Similar to Ext Island 1	Similar to Ext Island 1
Ext Island 5	Similar to Ext Island 1	Similar to Ext Island 1	Similar to Ext Island 1
Ext Island 6	Similar to Ext Island 1	Similar to Ext Island 1	Similar to Ext Island 1
Out Of Service IP 1	Tn OOS Control **OOS Input 1**	ADVANCED: out of service 2	If OOS Control is set to Display+OOS IPs, the Out Of Service input works in conjunction with the Out Of Service Window to take either the GCP or the Island on specified track modules out of service. If OOS Control is set to OOS IPs, the Out Of Service input when energized it takes either the GCP or the Island on the configured track modules out of service. • The Out Of Service Window is described in paragraph 4.1.4.1.2. • The Out Of Service input 1 must be energized when the out of service is requested.
	OOS Control **Display+OOS IPs** Or OOS Control **OOS IPs**	ADVANCED: out of service (not available in template menu)	
Out Of Service IP 2	Similar to Out Of Service IP 1 above	Similar to Out Of Service IP 1 above	Similar to Out Of Service IP 1 above
Out Of Service IP 3	Similar to Out Of Service IP 1 above	Similar to Out Of Service IP 1 above	Similar to Out Of Service IP 1 above
Out Of Service IP 4	Similar to Out Of Service IP 1 above	Similar to Out Of Service IP 1 above	Similar to Out Of Service IP 1 above

Input Name	Condition for input to be available	Found in Main Program Menu (Template Menu)	Description
Out Of Service IP 5	Similar to Out Of Service IP 1 above	Similar to Out Of Service IP 1 above	Similar to Out Of Service IP 1 above
Out Of Service IP 6	Similar to Out Of Service IP 1 above	Similar to Out Of Service IP 1 above	Similar to Out Of Service IP 1 above
4000 Case OOS IP	OOS Control **4000 Case OOS IP**	ADVANCED: out of service (not available in template menu)	The 4000 Case OOS IP is used to take the whole GCP case out of service with one input. When the 4000 Case OOS IP is energized, • All GCP and Island functions are taken out of service. • All used AND are energized (even if there AND Enable inputs are deenergized) • Advance Preemption outputs are energized If the Emergency activation input is used and deenergized it will override the 4000 Case OOS IP and deenergize all outputs.
3 Vehicle Detect	SSCCIV Controller Used **Yes**	SSCC (not available in template menu)	The 3 Vehicle Detect input is used to interface to loop detectors to detect road traffic on the crossing, when the 4000 GCP is used in a four quadrant gate application. The 3 Vehicle Detect input is associated with the exit gate sector 3 (SSCC 1 on the 4000).
	4000 Control Type **Exit**	SSCC (not available in template menu)	
4 Vehicle Detect	SSCCIV Controller Used **Yes**	SSCC (not available in template menu)	The 4 Vehicle Detect input is used to interface to loop detectors to detect road traffic on the crossing, when the 4000 GCP is used in a four quadrant gate application. The 4 Vehicle Detect input is associated with the exit gate sector 4 (SSCC 2 on the 4000).
	4000 Control Type **Exit**	SSCC (not available in template menu)	

Input Name	Condition for input to be available	Found in Main Program Menu (Template Menu)	Description
Vehicle Detect Hlth	SSCCIV Controller Used **Yes**	SSCC (not available in template menu)	The Vehicle Detect Hlth input is used to monitor the health of the to loop detectors, when the 4000 GCP is used in a four quadrant gate application.
	4000 Control Type **Exit**	SSCC (not available in template menu)	
T1 Prime UAX	Track 1 Slot **Track**	BASIC: module configuration (TEMPLATE: module configuration)	The Track 1 Prime UAX drops the Track 1 Prime predictor output in response to a DAX signal from a remote GCP. • UAX only effects the Track 1 Prime predictor, and no other predictors on this or other tracks. ♦ However if Track 1 Prime is used in an AND function, the AND de-energizes when the Prime UAX de-energizes. • The Prime UAX can be programmed with a pickup delay of between 0 and 500 seconds. ♦ The pickup delay timer starts when the UAX input energizes ♦ When the train leaves the island, the pickup delay timer is stopped short of its programmed time (truncated) ▪ This allows UAX to recover before its programmed time if the Prime predictor has zero offset.
	Track 1 MS/GCP Operation **Yes**	BASIC: MS/GCP Operation (not available in template menu)	
	Prime Used **Yes**	PREDICTORS: track 1 (not available in template menu)	
	Prime UAX **IP, RDAX** or **IP+RDAX**	GCP: track 1 prime (TEMPLATE: track 1)	
T1 DAX A Enable	Track 1 Slot **Track**	BASIC: module configuration (TEMPLATE: module configuration)	The Track 1 DAX A Enable drops the Track 1 DAX A output in response to a signal input from a remote GCP. • This input is typically used to cascade DAXes. • This Enable affects only the Track 1 DAX A, and no other predictors on this or other tracks. ♦ However if track 1 DAX A is used in an AND function, the AND de-energizes when the DAX A Enable de-energizes. • The DAX A Enable can be programmed with a pickup delay of between 0 and 500 seconds. ♦ The pickup delay timer starts when the Enable input energizes ▪ When the DAX has an offset the DAX pickup delay timer always runs its programmed time. If the DAX has zero offset the DAX pickup delay timer recovers when the train leaves the island.
	Track 1 MS/GCP Operation **Yes**	BASIC: MS/GCP Operation (not available in template menu)	
	DAX A Used **Yes**	PREDICTORS: track 1 (TEMPLATE: track 1 Daxes)	
	DAX A Enable **IP, RDAX** or **IP+RDAX**	GCP: track 1 Dax A (TEMPLATE: track 1 Daxes)	

Input Name	Condition for input to be available	Found in Main Program Menu (Template Menu)	Description
T1 DAX B Enable	Similar to T1 DAX A Enable above	Similar to T1 DAX A Enable above	Similar to T1 DAX A Enable above
T1 DAX C Enable			
T1 DAX D Enable	Track 1 Slot **Track**	BASIC: module configuration (TEMPLATE: module Configuration)	Similar to T1 DAX A Enable above, except with no programmable pickup delay.
	Track 1 MS/GCP Operation **Yes**	BASIC: MS/GCP Operation (not available in template menu)	
	DAX D Used **Yes**	PREDICTORS: track 1 (not available in template menu)	
	DAX D Enable **IP**	GCP: track 1 Dax D (not available in template menu)	
T1 DAX E Enable	Similar to T1 DAX D Enable above	Similar to T1 DAX D Enable above	Similar to T1 DAX A Enable above, except with no programmable pickup delay.
T1 DAX F Enable			
T1 DAX G Enable			

Input Name	Condition for input to be available	Found in Main Program Menu (Template Menu)	Description
T1 Preempt Enable	Track 1 Slot **Track**	BASIC: module configuration (TEMPLATE: module Configuration)	The track 1 Preempt Enable drops the Track 1 Preempt output in response to a signal input from a remote GCP. • This Enable effects only the Track 1 Preempt, and no other predictors on this or other tracks. • The Preempt predictor is usually used only when Advance Preemption is turned on. ♦ When the Preempt Enable de-energizes, it starts the Advance preempt timer. • The Preempt Enable can be programmed with a pickup delay of between 0 and 500 seconds. ♦ The pickup delay timer starts when the Preempt Enable input energizes ♦ When the train leaves the island, the pickup delay timer is stopped short of its programmed time (is truncated). This allows Preempt Enable to recover before its programmed time if the Prime predictor has zero offset.
	Track 1 MS/GCP Operation **Yes**	BASIC: MS/GCP Operation (not available in template menu)	
	Preempt Used **Yes**	PREDICTORS: track 1 (not available in template menu)	
	Preempt Enable **IP, RDAX** or **IP+RDAX**	GCP: track 1 Preempt (TEMPLATE: track 1 Daxes)	
T1 Wrap	Track 1 Slot **Track**	BASIC: module configuration (TEMPLATE: module Configuration)	The Track 1 Wrap input ties the operation of the Track 1 module GCP and island to that of an external track circuit. • When the wrap input is energized all track 1 predictors and the track 1 island are considered to be energized regardless of their actual state. • Generally, the LOS timer should be set for a minimum of 5 seconds.
	Track 1 Wrap Used **Yes**	ADVANCED: wrap circuits (not available in template menu)	

Input Name	Condition For Input To Be Available	Found in Main Program Menu (Template Menu)	Description
T1 MS Control	Track 1 Slot **Track**	BASIC: module configuration (TEMPLATE: module Configuration)	The Track 1 MS Control input switches certain predictors to motion sensor mode. • When this input is de-energized, all predictors (prime and DAX) that are programmed for MS/GCP restart operation start to function as motion sensors. • When the Track 1 MS Control input is again energized, the MS/GCP Restart Timer is started. • The predictors remain in the motion sensor mode until the MS/GCP Restart Timer count-down is complete.
	Track 1 MS/GCP Operation **Yes**	BASIC: MS/GCP Operation (not available in template menu)	
	MS/GCP Ctrl IP Used **Yes**	GCP: track 1 MS Control (not available in template menu)	
T1 Pred Override	All Predictors Override Used **Yes**	ADVANCED: trk 1 overrides (not available in template menu)	The Track 1 Prediction Override input disables all track 1 predictors when a predetermined track condition exists. • When the T1 Pred Override input is energized: ♦ all predictors of the track are disabled ♦ The override input does override the predictor outputs if: ▪ the island is deenergized and the predictor has no offset ▪ the track GCP is unhealthy ▪ the emergency activation input is used an deenergized
T1 DAX A Override	All Predictors Override Used **No**	ADVANCED: trk 1 overrides (not available in template menu)	The Track 1 Dax A Override input disables the Dax A predictor when a predetermined track condition exists. • When the T1 Dax A Override input is energized it will not override the T1 Dax A output if: ▪ the island is deenergized and DAX A has no offset ▪ the track GCP is unhealthy ▪ the emergency activation input is used an deenergized
	Dax A Used **Yes**		
	Dax A Override Used **Yes**		
T1 DAX B Override	Similar to T1 DAX A Override above	Similar to T1 DAX A Override above	Similar to T1 DAX A Override above
T1 DAX C Override			

Table 5-7. Crossing Controller Specific Input Functions

Input Name	Condition For Input To Be Available	Found in Main Program Menu (Template Menu)	Description
GP 1.1	SSCC-1 Slot **SSCC3i**	BASIC: module configuration (TEMPLATE: module configuration	GP1.1 input on SSCC-1 receives the gate position signal from the crossing gates.
	Gates Used **Yes**	SSCC (TEMPLATE: SSCC)	
	SSCC-1 Number GPs **1** or **2**	SSCC: 1 (TEMPLATE: SSCC)	
GP 1.2	SSCC 1 Slot **SSCC3i**	BASIC: module configuration (TEMPLATE: module configuration	GP1.2 input on SSCC-1 receives a second gate position signal from gates where two GP signals are desired at an installation. • GP 1.2 is Anded internally with GP 1.1 • De-energizing either GP flashes the lamps
	Gates Used **Yes**	SSCC (TEMPLATE: SSCC)	
	SSCC-1 Number GPs **2**	SSCC: 1 (TEMPLATE: SSCC)	
GP 2.1	SSCC-1 Slot **SSCC3i**	BASIC: module configuration (TEMPLATE: module configuration	Similar to GP1.1 for SSCC-2
	Gates Used **Yes**	SSCC (TEMPLATE: SSCC)	
	SSCC-1 Number GPs **1** or **2**	SSCC: 1 (TEMPLATE: SSCC)	
GP 2.2	SSCC 1 Slot **SSCC3i**	BASIC: module configuration (TEMPLATE: module configuration	Similar to GP1.2 for SSCC-2
	Gates Used **Yes**	SSCC (TEMPLATE: SSCC)	
	SSCC-1 Number GPs **2**	SSCC: 1 (TEMPLATE: SSCC)	

Input Name	Condition For Input To Be Available	Found in Main Program Menu (Template Menu)	Description
GD 1.1	SSCC 1 Slot **SSCC3I**	BASIC: module configuration (TEMPLATE: module configuration	GD1.1 input receives the gate down signal from a gate connected to gate output 1GC on SSCC-1. The gate down signal is not used by the GCP or SSCC logic at the present, but by assigning this, it can be monitored by the SEAR
	Gates Used **Yes**	SSCC (TEMPLATE: SSCC)	
	SSCC 1 Number GPs **1** thru **4**	SSCC: 1 (TEMPLATE: SSCC)	
GD 1.2	SSCC 1 Slot **SSCC3I**	BASIC: module configuration (TEMPLATE: module configuration	GD1.2 input receives the gate down signal from a second gate connected to gate output 1GC on SSCC-1. • The gate down is not used by the GCP or SSCC logic at the present, but by assigning this, it can be monitored by the SEAR
	Gates Used **Yes**	SSCC (TEMPLATE: SSCC)	
	SSCC 1 Number GPs **2** thru **4**	SSCC: 1 (TEMPLATE: SSCC)	
GD 1.3	SSCC 1 Slot **SSCC3I**	BASIC: module configuration (TEMPLATE: module configuration	GD1.3 input receives the gate down signal from a third gate connected to gate output 1GC on SSCC-1. The gate down is not used by the GCP or SSCC logic at the present, but by assigning this, it can be monitored by the SEAR
	Gates Used **Yes**	SSCC (TEMPLATE: SSCC)	
	SSCC 1 Number GPs **3** and **4**	SSCC: 1 (TEMPLATE: SSCC)	
GD 1.4	SSCC 1 Slot **SSCC3I**	BASIC: module configuration (TEMPLATE: module configuration	GD1.4 input receives the gate down signal from a fourth gate connected to gate output 1GC on SSCC-1. The gate down is not used by the GCP or SSCC logic at the present, but by assigning this, it can be monitored by the SEAR
	Gates Used **Yes**	SSCC (TEMPLATE: SSCC)	
	SSCC 1 Number GPs **4**	SSCC: 1 (TEMPLATE: SSCC)	

Input Name	Condition For Input To Be Available	Found in Main Program Menu (Template Menu)	Description
GD 2.1	SSCC 2 Slot **SSCC3I**	BASIC: module configuration (TEMPLATE: module configuration	Similar to GD1.1 for SSCC-1
	Gates Used **Yes**	SSCC (TEMPLATE: SSCC)	
	SSCC 2 Number GPs **1** thru **4**	SSCC: 2 (TEMPLATE: SSCC)	
GD 2.2	SSCC 2 Slot **SSCC3I**	BASIC: module configuration (TEMPLATE: module configuration	Similar to GD1.2 for SSCC-1
	Gates Used **Yes**	SSCC (TEMPLATE: SSCC)	
	SSCC 2 Number GPs **2** thru **4**	SSCC: 2 (TEMPLATE: SSCC)	
GD 2.3	SSCC 2 Slot **SSCC3I**	BASIC: module configuration (TEMPLATE: module configuration	Similar to GD1.3 for SSCC-1
	Gates Used **Yes**	SSCC (TEMPLATE: SSCC)	
	SSCC 2 Number GPs **3** and **4**	SSCC: 2 (TEMPLATE: SSCC)	
GD 2.4	SSCC 2 Slot **SSCC3I**	BASIC: module configuration (TEMPLATE: module configuration	Similar to GD1.4 for SSCC-1
	Gates Used **Yes**	SSCC (TEMPLATE: SSCC)	
	SSCC 2 Number GPs **4**	SSCC: 2 (TEMPLATE: SSCC)	

Table 5-8 4000 GCP Physical Inputs

Input Name	Condition For Input To Be Available	Found in Menu	Description
IN 1.1	Track 1 Slot **Track**	BASIC: module configuration (TEMPLATE: module configuration)	Vital inputs to track slot 1
IN 1.2			
IN 2.1	Track 2 Slot **Track**	BASIC: module configuration (TEMPLATE: module configuration	Vital inputs to track slot 2
IN 2.2			
IN 2.1	Track 2/ RIO 1 Slot **RIO**	BASIC: module configuration (TEMPLATE: module configuration	Vital inputs to RIO 1
IN 2.2			
IN 2.3			
IN 2.4			
IN 3.1	Track 3 Slot **Track**	BASIC: module configuration (TEMPLATE: module configuration	Vital inputs to track slot 3
IN 3.2			
IN 4.1	Track 4 Slot **Track**	BASIC: module configuration (TEMPLATE: module configuration	Vital inputs to track slot 4
IN 4.2			
IN 5.1	Track 5/ RIO 2 Slot **Track**	BASIC: module configuration (TEMPLATE: module configuration	Vital inputs to track slot 5
IN 5.2			
IN 6.1	Track 6/ RIO 3 Slot **Track**	BASIC: module configuration (TEMPLATE: module configuration	Vital inputs to track slot 6
IN 6.2			
IN 5.1	Track 5/ RIO 2 Slot **RIO**	BASIC: module configuration (TEMPLATE: module configuration	Vital inputs to RIO 2
IN 5.2			
IN 5.3			
IN 5.4			

Input Name	Condition For Input To Be Available	Found in Menu	Description
IN 6.1	Track 6/ RIO 3 Slot **RIO**	BASIC: module configuration (TEMPLATE: module configuration	Vital inputs to RIO 3
IN 6.2			
IN 6.3			
IN 6.4			
IN 5.1	Track 5/ RIO 2 Slot **SEAR input**	BASIC: module configuration (TEMPLATE: module configuration	BASIC: module configuration (TEMPLATE: module configuration
IN 5.2			
IN 5.3			
IN 5.4			
IN 5.5			
IN 5.6			
IN 5.7			
IN 5.8			
IN 6.1	Track 6/ RIO 3 Slot **SEAR input**	BASIC: module configuration (TEMPLATE: module configuration	BASIC: module configuration (TEMPLATE: module configuration
IN 6.2			
IN 6.3			
IN 6.4			
IN 6.5			
IN 6.6			
IN 6.7			
IN 6.8			
SSCC1 IN 7.1	SSCC 1 Slot **SSCC3i**	BASIC: module configuration (TEMPLATE: module configuration	Vital inputs to SSCC3I
SSCC1 IN 7.2			
SSCC1 IN 7.3			
SSCC1 IN 7.4			
SSCC1 IN 7.5			

Input Name	Condition For Input To Be Available	Found in Menu	Description
SSCC2 IN 8.1	SSCC 2 Slot **SSCC3i**	BASIC: module configuration (TEMPLATE: module configuration)	Vital inputs to SSCC3I
SSCC2 IN 8.2			
SSCC2 IN 8.3			
SSCC2 IN 8.4			
SSCC2 IN 8.5			

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SECTION 6 – GCP CALIBRATION & SYSTEM OPERATIONAL CHECKS

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SECTION 6 - GCP CALIBRATION & SYSTEM OPERATIONAL CHECKS

6.1 GENERAL

4000 System Calibration consists of GCP calibration, SSCC lamp adjustment, and system checkout.

GCP calibration is divided into the following automated procedures:

- GCP calibration (GCP CAL)
- Approach distance calibration (APP CAL)
- Approach linearization (LIN CAL)
- Island calibration (ISL CAL)

NOTE

- The Main and Standby set of modules require independent GCP and island calibration.
  - ➢ Following successful completion of Main Track Module calibration, the APP CAL and LIN CAL steps for the Standby Track Modules may be bypassed as described in Paragraph 6-5, STANDBY MODULES CALIBRATION.
    - ✧ Accepts the Main Track Module calculations.
- It is not necessary to turn off Enhanced Detection when calibrating track modules.

The SSCC lamp adjustment is required when SSCC Modules are used.

Operational testing consists of:

- Lamp, bell, and gate operation verification when SSCC modules are used.
- GCP crossing operation.

An optional remote GCP calibration procedure may be used if the required interface hardware is available.

6.1.1 Calibration Required Message

The Track Status Screen, figure 6-1, shows the calibration status for each active track

- **GCP, ISL CAL Req** message appears before calibration initiation.

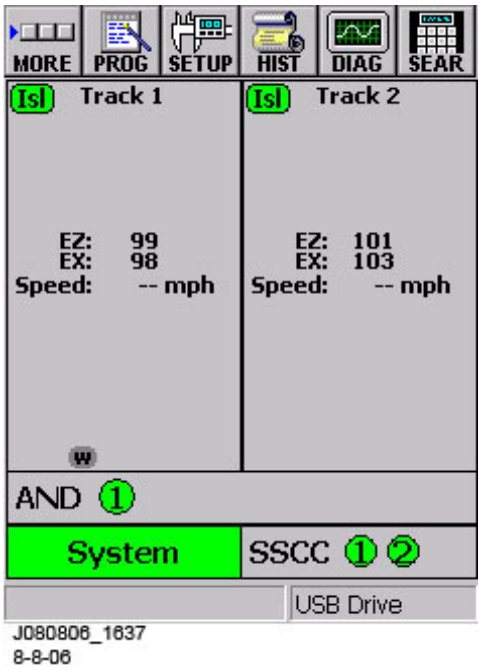


Figure 6-1. Two-Track Status Screen Display Prior To Calibration

6.1.2 System Programming Requirements

Before calibration, the 4000 GCP must be programmed using the procedures provided in Section 5.

- If the system was previously programmed, verify that system programming corresponds to the railroad application instructions for the applicable tracks.
- The main and standby set of modules are not programmed independently.
  - ♦ System programming is done only once.
  - ♦ Both module sets operate from the same stored application program.

6.1.3 Out of Service Recalibration

When a track is programmed 'out of service' the track GCP, APP and LIN calibrations can be performed without affecting the In-service operation of other tracks at the crossing. When the island is 'out of service', it also can be calibrated without affecting crossing operation.

- Track Out Of Service window on main menu provides no EZ or EX values.
- Use the track "Detailed Status View" for values after calibrating.

6.1.4 In-service Recalibration Due to Failed Modules

The following in-service modules may be replaced without recalibration of the GCP or readjustment of lamp voltage:

- CPU, A80403
- RIO, A80413
- SSCC, A80405
- Transfer Modules, A80406 or A80468
- Display Module, A80407

In-service Track Module recalibration may be required due to:

- Failed module replacement
- Program changes
- Track equipment changes
- Module software (mef) is changed in the field

6.1.4.1 In-Service Recalibration Requirements Due To Failed Track Module Replacement

Recalibration must be performed for the associated track when a failed A80418 Track Module is replaced.

- Only the GCP (**GCP CAL**) and Island (**ISL CAL**) procedures must be completed.
  - ♦ The Island calibration (**ISL CAL**) procedure is initiated only if the island is used.
- The GCP Approach distance (**GCP APP**) and GCP Linearization (**GCP LIN**) procedures may be bypassed by selecting the **BYPASS** button.
  - ♦ Previous approach distance and linearization values remain unchanged, eliminating the need for additional track shunt placement.
- SEAR Site Setup is required only when the A89410 SEAR module is replaced.

NOTE

It is not necessary to remove power from the 4000 GCP case before removing or installing modules.

6.1.4.2 Recalibration Requirements Due to Program Changes

The GCP program changes that require track recalibration are indicated in table 6-1.

- Recalibration is required if **Yes** is included in the corresponding column:
  - ♦ For example if the number of tracks in the installation is increased, perform the following calibration procedures for the added tracks only:
    - Setup for calibration
    - Setup for approach distance
    - Linearization
    - Island (if used)

Table 6-1. Recalibration Requirements Due To Programming Changes

Program Changes	Calibration Required				Reprogramming Required	Notes
	GCP CAL	GCP APP	GCP LIN	ISL CAL		
Increased Number of Tracks	Yes[1]	Yes[1]	Yes[1]	Yes[2]	Yes[1]	1. For added tracks only 2. If island is used
GCP Frequency Change	Yes[3]	Yes[3]	Yes[3]	No	No	3. For tracks with new GCP frequencies
Island Frequency Change	No	No	No	Yes	No	4. For tracks with new island frequencies
Application changed from: Unidirectional to Bidirectional, Bidirectional to Unidirectional, or Unidirectional to Simulated Bidirectional	Yes[5]	Yes[5]	Yes[5]	No	No	5. For changed tracks only
Transmit Level Changed From: Medium to Maximum or Maximum to Medium						
Approach distance Changed						
Ballast Compensation Value Changed						
Island Operation Changed from No to Internal or from Internal to No	Yes[6]	No[7]	No[7]	Yes[8]	No	6. If EZ varies more than 2 7. Can be bypassed 8. If changed to internal.
Template Changed	Yes[9]	Yes[9]	Yes[9]	Yes[9]	Yes[10]	9. For all tracks 10. Complete re-programming required
Template Set To Default selected						

6.1.5 Recalibration Requirements Due To Track Equipment Changes

Changes made to the existing track equipment that require track recalibration are shown in table 6-2.

- Recalibration is required if **Yes** is included in the corresponding column:
  - ♦ For example, when existing termination shunts in an installation are moved to a different location:
    - The approach distance entered in the Program menu for that track must be changed to reflect the new approach distance.
    - The GCP, Calibration, Approach distance and Linearization procedures must be performed.

NOTE

Approach distance in the Program menu must be changed to reflect the new approach distance prior to start of track calibration.

Table 6-2. Recalibration Requirements Due to Track Equipment Changes

Track Equipment Changes	Calibration Required				Notes
	GCP CAL	GCP APP	GCP LIN	ISL CAL	
Termination Shunts Changed	Yes[1]	No	No	No	1. For changed tracks only
Termination Shunts Moved to New Location	Yes[1]	Yes[1]	Yes[1]	No	
Termination Shunts of Other Frequencies Added, Removed From, or Moved Within the 4000 GCP Approach(es)	Yes[1]	Yes[1]	Yes[1]	No	
Wide band Insulated Joint Couplers (8A076 or 8A077) Replaced in 4000 GCP Approach(es)	Yes[1]	No[2]	No[2]	No	2. Requires bypass
Tuned Insulated Joint Couplers (62785-f) Replaced in 4000 GCP Approaches)	Yes[1]	Yes[1]	Yes[1]	No	
4000 GCP Track Wire(s) Replaced	Yes[1]	No[2]	No[2]	Yes	

6.1.6 In-Service Recalibration If Minor Change In EZ Occurs Due To Ballast Drying

In general, an in-service recalibration of a 4000 GCP is seldom required. However, if there is a minor change of EZ away from 100 that is consistently observed while ballast is dry, then a one-time recalibration using only the **GCP CAL** procedure may be used along with the following BYPASS procedures for **GCP APP** and **GCP LIN**.

- The BYPASS procedure accepts the current values for the computed approach and linearization steps and places a green check mark within both **CAL** boxes.
  - This eliminates placing hardwire shunts on the track as required by the calibration procedure.
- Once **GCP CAL** is completed, bypass the approach calibration by first selecting **GCP APP** and then **BYPASS**.
  - Do not select **START**.
- Bypass the linearization calibration by first selecting **GCP LIN** and then **BYPASS**.
  - Do not select **START**.

⚠ WARNING

1. **USE THE BYPASS PROCEDURE ONLY IF THE CURRENT COMPUTED APPROACH DISTANCE AND LINEARIZATION VALUES ARE KNOWN TO BE CORRECT.**
2. **DO NOT RECALIBRATE IF AN IN-SERVICE TRACK SUDDENLY HAS A LARGE JUMP IN EZ OR HIGH SIGNAL ERROR. THE CAUSE MAY BE A TRACK, BOND, COUPLER OR SHUNT RELATED PROBLEM WHICH MUST BE INVESTIGATED AND CORRECTED BEFORE CONSIDERING RECALIBRATION.**

⚠ WARNING

BEFORE STARTING CALIBRATION, ENSURE THAT:

- **TRACK BONDING IS GOOD**
- **ALL TERMINATION SHUNTS, INSULATED JOINT COUPLERS, AND TRACK ISOLATION DEVICES ARE INSTALLED**
- **NO TRAINS ARE IN THE GCP APPROACHES**

6.2 GCP MAIN MODULES CALIBRATION

When possible, all GCP Calibration procedures should be done when ballast is dry. If calibration is done when ballast is wet, recalibration may be required later when the ballast is dry.

NOTE

An empty, red check box displays within the CAL button of each track parameter requiring calibration.

Procedure 6-1. GCP CALIBRATION

Step 1 If transfer module A80406 or A80468 is present set the transfer switch to **MAIN**.

Step 2 Go to the Main Menu and select the **SETUP** button at the top of the display (see figure 6-1).

Step 3 From the menu that appears, select the track to calibrate (see figure 6-2).

- Only enabled tracks appear on the menu.

Step 4 Select the **GCP CAL** button.

- The **GCP Calibration** Window appears, as shown in figure 6-3A.
  - The current **EZ** and **EX** values appear.
  - If calibration is required**, Calibration Req.** appears below the **EZ** and **EX** values.

Step 5 Select the **START** button.

- The **START** button deactivates (grays out).
- The display shows an **Initiating** then an **In Progress** message during the calibration.
- The track module requires about 15 seconds to calibrate.
- If calibration is successful
  - The **Calibration Select** Window, figure 6-3B, appears.
    - EZ should be 98 to 102 and the **GCP CAL** button has a green check in the box.
- If calibration is not successful, the display shows a **Failed** message.
  - Refer to Section 7 for troubleshooting procedures.

Step 6 To record the date and time stamped reason for the recalibration and store it in the Maintenance log, select the **GCP CAL** button and then the **ADD LOG ENTRY** button.

- Type any notes on the reason for recalibration and select **OK** to save the entry.
- The **Log Entry** Window closes and the display returns to the **GCP Calibration** Window, figure 6-3A.
- Select the **CAL SELECT** button.
  - The display changes to **Calibration Select** Window, figure 6-3B.

This completes the GCP Calibration. Proceed to paragraph 6.3, Approach distance and Linearization Calibration.

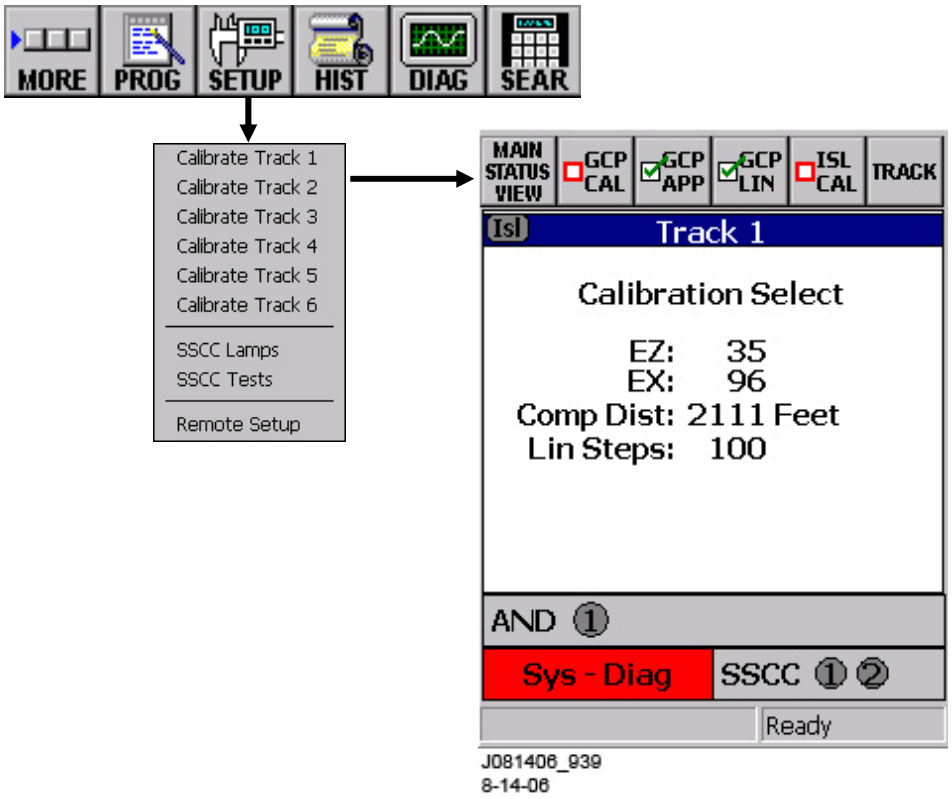
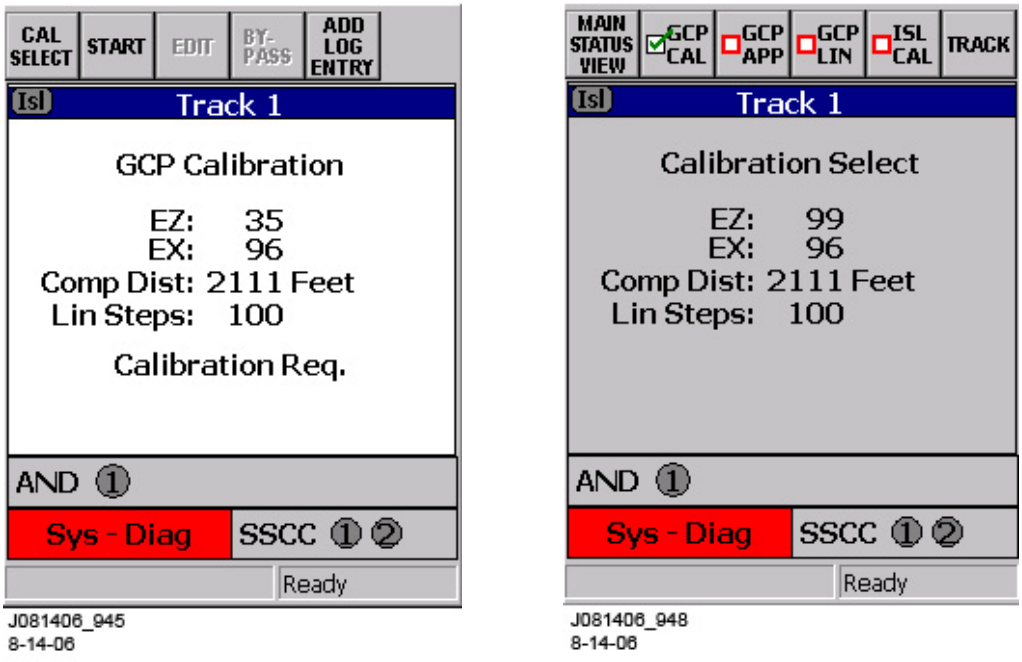


Figure 6-2. Opening the Calibration Window



A **B**

Figure 6-3. GCP Calibration Windows Before And After GCP Calibration

6.3 APPROACH DISTANCE AND LINEARIZATION CALIBRATION

NOTE

1. The setup for approach distance and setup for linearization procedures are combined into a single procedure to simplify track-shunting requirements.
   a. The combined procedure calculates a modified approach distance based on actual approach distance (distance to the termination shunt from the crossing track wires) plus the electrical characteristics of the termination shunt and any simulated track impedance placed in series with the shunt.
   b. This procedure is essential to improving warning time accuracy, especially for DAX and prime prediction offset circuits.
2. The linearization procedure compensates for lumped loads in the 4000 GCP approach that can affect the linearity of EZ over the length of the approach as a train approaches the crossing.
   a. The linearization is essential to improving warning time accuracy.
3. The types of loads that can affect the linearity of the approach circuit include:
   a. Narrow-band shunts of other frequencies in the 4000 GCP approach circuits, which may occur when other GCP approaches overlap the GCP approach circuit.
   b. Other track equipment in the 4000 GCP approaches such as audio frequency overlay track circuits, coded track circuits, etc.
   c. Missing or incorrect track battery chokes.

⚠ WARNING

1. **THE APPROACH AND LINEARIZATION PROCEDURES REQUIRE THE RECORDING OF THE COMPUTED APPROACH DISTANCES IN FEET (NOT THE EZ VALUE).**
2. **WHEN EDITING THE COMPUTED APPROACH DISTANCES, ENTER THE VALUE IN FEET (NOT THE EZ VALUE).**
3. **FAILURE TO ENTER DISTANCES IN FEET MAY RESULT IN SHORTER WARNING TIMES THAN INTENDED.**

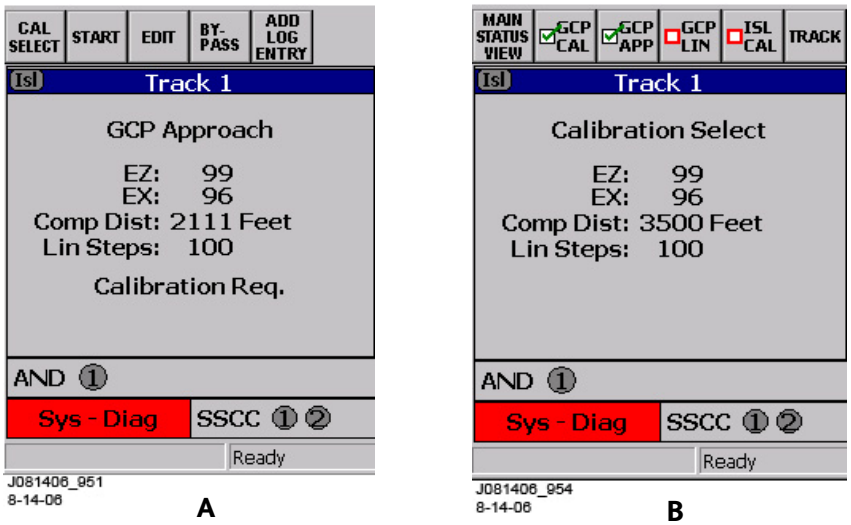


Figure 6-4. GCP Approach Calibration Window Before And After Approach Calibration

Procedure 6-2. APPROACH AND LINEARIZATION CALIBRATION	
Step 1	Record the EZ and EX values for the track (before installing hardwire shunt) in the **Step 1** column (**Calibrated Values**) on the CALIBRATION VALUES HISTORY form (pages 6-17 6-18). Then, temporarily place a hardwire shunt across the termination shunt. • For bidirectional installations, use the termination shunt farthest from the crossing.
Step 2	Record the EZ and EX values for the track in the **First Approach**, **Step 2** column on the CALIBRATION VALUES HISTORY form (pages 6-17, 6-18).
Step 3	Select the **GCP APP** button. • The **GCP Approach** Window, figure 6-4A, appears.
Step 4	Select the **START** button. • **START** button deactivates (grays out). • Display shows an **Initiating** then an **In Progress** message during calibration. • If calibration is successful: ♦ **Calibration Select** window, figure 6-4B, appears. ♦ Computed approach distance (**Comp Dist**) appears. ♦ **GCP APP** button has a green check in the box. • If calibration is not successful, the display shows a Failed message. ♦ Refer to Section 7 for troubleshooting procedures.

⚠ WARNING

1. **THE APPROACH AND LINEARIZATION PROCEDURES REQUIRE THE RECORDING OF THE COMPUTED APPROACH DISTANCES IN FEET (NOT THE EZ VALUE).**
2. **WHEN EDITING THE COMPUTED APPROACH DISTANCES, ENTER THE VALUE IN FEET (NOT THE EZ VALUE).**
3. **FAILURE TO ENTER DISTANCES IN FEET MAY RESULT IN SHORTER WARNING TIMES THAN INTENDED.**

Procedure 6-2. APPROACH AND LINEARIZATION CALIBRATION

Step 5 Record the computed approach distance in feet for the track in the **First Approach**, **Step 5** column (**Comp Dist**) on CALIBRATION VALUES HISTORY form (pages 6-17, 6-18).

Step 6 Accurately (within 1%) locate the midpoint of the longest approach and move the hardwire shunt to that point on the rails (see Figure 6-5).

Step 7 Select the **GCP LIN** button.
The **GCP Linearization** Window, Figure 6-6A, appears.

Step 8 Select the **START** button.
- **START** button deactivates (grays out).
- Display shows an **Initiating** then an **In Progress** message during calibration.
- If calibration is successful:
  - **Calibration Select** window, Figure 6-6B, appears.
  - **GCP LIN** button has a green check in the box.
- If calibration is not successful, the display shows a **Failed** message.
  - Refer to Section 7 for troubleshooting procedures.

Step 9 Record the linearization step value for the track in the **First Approach**, **Step 9** column (**Lin Steps**) on the CALIBRATION VALUES HISTORY form (pages 6-17, 6-18).
- value between 68 and 132.

Step 10 **Verify** that the computed approach distance in feet (**Comp Dist**, **Step 5**) and the linearization steps (**Lin Steps**, **Step 9**) values recorded on the CALIBRATION VALUES HISTORY form are the same as the values displayed on the **Calibration Select** window, Figure 6-6B.

Step 11 Remove the hardwire shunt from the track.

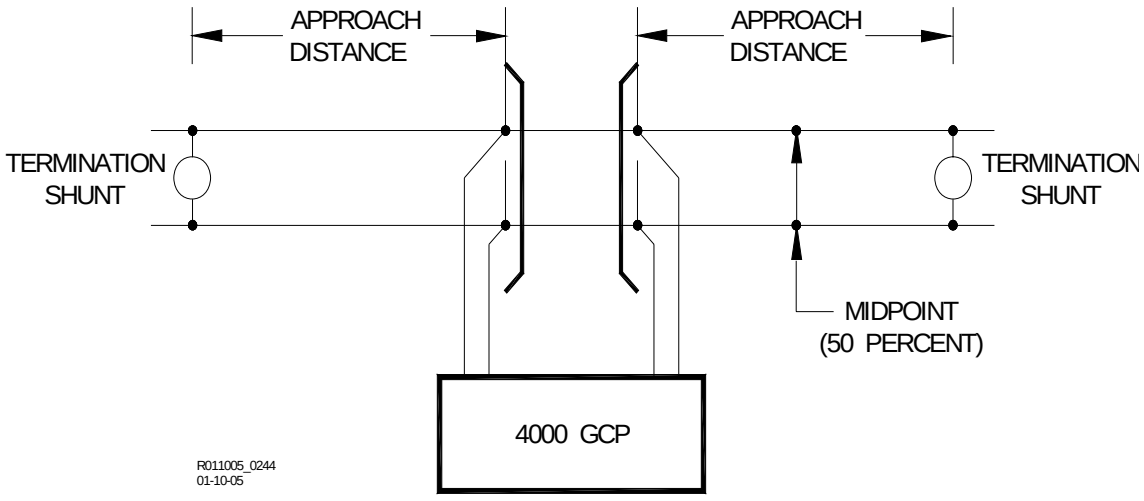


Figure 6-5. Midpoint Location

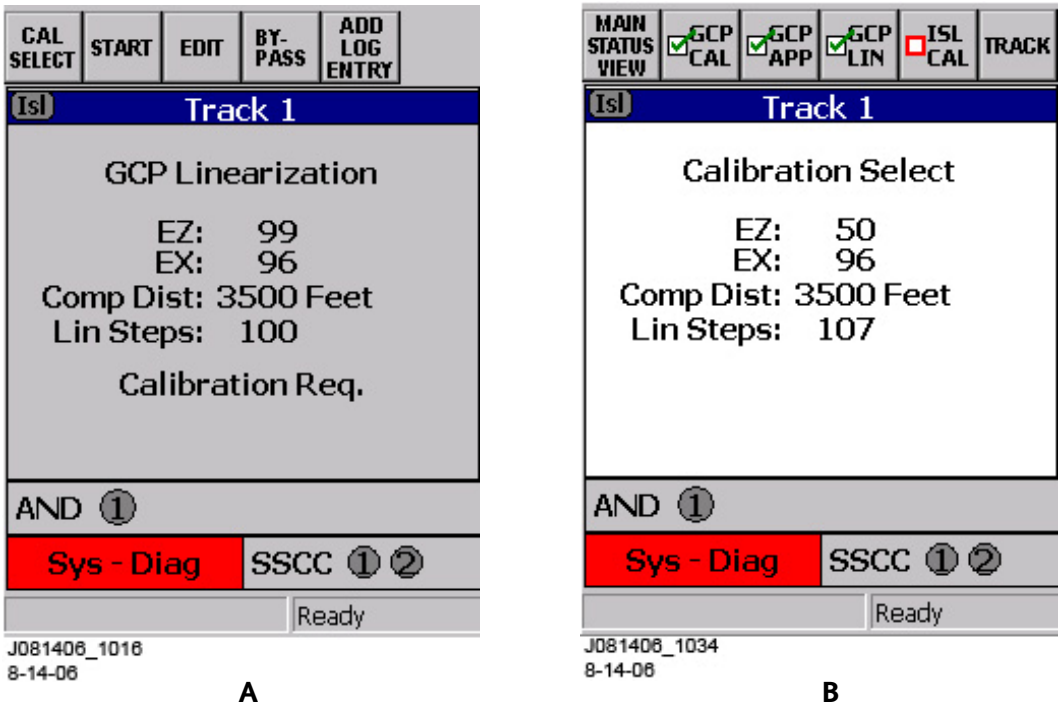


Figure 6-6. GCP Linearization Window Before and After GCP Linearization

Procedure 6-2. APPROACH AND LINEARIZATION CALIBRATION	
Step 12	• If the approach is unidirectional or simulated bidirectional, go to step 31. • If the track is bidirectional and the measured distance to the other termination shunt is within 10 % of the distance of the first approach, go to step 13. • Otherwise, if the distance is clearly shorter, go to step 31.
Step 13	Temporarily place a hardwire shunt across the termination shunt of the other approach.
Step 14	Record the EZ and EX values for the track in the **Second Approach**, **Step 14** column on the CALIBRATION VALUES HISTORY form (pages 6-17, 6-18).
Step 15	Select the **GCP APP** button. • The **GCP Approach** Window, figure 6-4A, appears.
Step 16	Select the **START** button. • **START** button deactivates (grays out). • Display shows an **Initiating** then an **In Progress** message during calibration. • If calibration is successful: ♦ **Calibration Select** window, figure 6-4B, appears. ♦ Computed approach distance (**Comp Dist**) appears. ♦ **GCP APP** button has a green check in the box. • If calibration is not successful, the display shows a **Failed** message. ♦ Refer to Section 7 for troubleshooting procedures.

Procedure 6-2. APPROACH AND LINEARIZATION CALIBRATION

Step 17 Record the computed approach distance in feet for the track in the **Second Approach, Step 17** column (**Comp Dist**) on the CALIBRATION VALUES HISTORY form (pages 6-17, 6-18).

Step 18 Accurately (within 1%) locate the midpoint of this approach and move the hardwire shunt to that point on the rails (see Figure 6-5).

Step 19 Select the **GCP LIN** button.
The **GCP Linearization** Window, Figure 6-6A, appears.

Step 20 Select the **START** button.
- **START** button deactivates (grays out).
- Display shows an **Initiating** then an **In Progress** message during calibration.
- If calibration is successful:
  - **Calibration Select** window, Figure 6-6B, appears.
  - **GCP LIN** button has a green check in the box.
- If calibration is not successful, the display shows a **Failed** message.
  - Refer to Section 7 for troubleshooting procedures.

Step 21 Record the linearization (**Lin Steps**) for the track in the **Second Approach, Step 21** column (**Lin Steps**) on the CALIBRATION VALUES HISTORY form (pages 6-17, 6-18).
- Value between 68 and 132.

Verify that the computed approach distance in feet (**Comp Dist**, step 17) and the linearization steps (**Lin Steps**, step 21) values recorded are the same as the values displayed on the **Calibration Select** window, Figure 6-6B.

Step 22 Remove the hardwire shunt from the track.

Step 23
- If the Lin Steps value for the second approach, step 21, is greater than or the same as the Lin Steps value recorded for the first approach, step 9, go to step 31.
- If the Lin Steps value for the second approach, step 21, is less than the value recorded for the first approach, step 9, go to step 24.

Step 24 Select the **GCP LIN** button.
The **GCP Linearization** Window, figure 6-6A, appears.

Step 25 Select the **EDIT** button.
- The **Linearization Steps** dialog box, figure 6-7, appears.

Step 26 Enter the Linearization Step Value (Lin Steps) recorded for the first approach, step 9, (see CALIBRATION VALUES HISTORY form (pages 6-17, 6-18) into the **New Value field** using the keypad numbers and select **UPDATE**.
- The **Calibration Select** Window, figure 6-6B, appears.

Step 27 Select the **GCP APP** button.
- The **GCP Approach** Window, figure 6-4A, appears.

Step 28 Select the **EDIT** button.
The **Computed Approach Distance** dialog box appears.

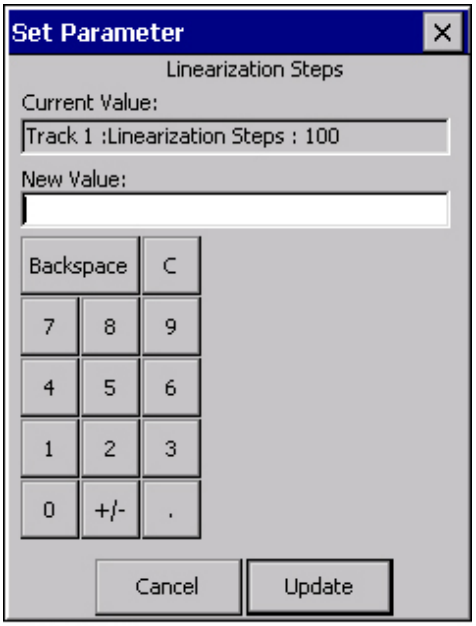


Figure 6-7. Linearization Steps Dialog Box

Procedure 6-2. APPROACH AND LINEARIZATION CALIBRATION	
Step 29	Enter the computed approach distance (**Comp Dist**) value (in feet) recorded for the first approach, step 5, into the **New Value field** using the keypad numbers and select **UPDATE**. • The **Calibration Select** Window, figure 6-6B, appears.
Step 30	**Verify** that the computed approach distance (**Comp Dist**, step 5) and the linearization steps (**Lin Steps**, step 9) values recorded on the CALIBRATION VALUES HISTORY form for the first approach are the same as those displayed on the **Calibration Select** window, figure 6-6B.
Step 31	To record the reason for the Calibration and store it in the Maintenance log, select the **GCP LIN** button and then the **ADD LOG ENTRY** button. • Type any notes about the calibration and select **OK** to save the entry.

This completes Approach and Linearization Calibration. Proceed to paragraph 6.4 for Island calibration. If an island is not present, select **MAIN STATUS VIEW** button, then:

- ♦ if a **Standby** set of modules is present, go to paragraph 6.5, **STANDBY MODULES CALIBRATION**.
- ♦ if a **Standby** set of modules is not present, go to paragraph 6.6, **LAMP VOLTAGE ADJUSTMENT**.
- ♦ if an **SSCC Module** is not present, go to paragraph 6.8, **GCP OPERATIONAL CHECKS**

1	**CALIBRATION VALUES HISTORY FORM (APPROACH AND LINEARIZATION CALIBRATION)**

GCP #: _____

Date of Calibration: _____ Name: _____

Location Information: _____

CALIBRATION VALUES HISTORY

	Calibrated Values (Step 1)		First Approach E/W ( ) N/S				Second Approach E/W ( ) N/S			
			Hardwire Across Term. Shunt (Step 2)		Computed Approach Distance (Comp Dist) (Step 5)	Linearization Step Value (Lin Steps) (Step 9)	Hardwire Across Term. Shunt (Step 14)		Computed Approach Distance (Comp Dist) (Step 17)	Linearization Step Value (Lin Steps) (Step 21)
	EZ	EX	EZ	EX			EZ	EX		
Track 1										
Track 2										
Track 3										
Track 4										
Track 5										
Track 6										

2	**CALIBRATION VALUES HISTORY FORM (APPROACH AND LINEARIZATION CALIBRATION)**

GCP #: _____

Date of Calibration: _____ Name: _____

Location Information: _____

CALIBRATION VALUES HISTORY

	Calibrated Values (Step 1)		First Approach E/W ( ) N/S				Second Approach E/W ( ) N/S			
			Hardwire Across Term. Shunt (Step 2)		Computed Approach Distance (Comp Dist) (Step 5)	Linearization Step Value (Lin Steps) (Step 9)	Hardwire Across Term. Shunt (Step 14)		Computed Approach Distance (Comp Dist) (Step 17)	Linearization Step Value (Lin Steps) (Step 21)
	EZ	EX	EZ	EX			EZ	EX		
Track 1										
Track 2										
Track 3										
Track 4										
Track 5										
Track 6										

3	**CALIBRATION VALUES HISTORY FORM (APPROACH AND LINEARIZATION CALIBRATION)**

GCP #: _____

Date of Calibration: _____ Name: _____

Location Information: _____

CALIBRATION VALUES HISTORY

	Calibrated Values (Step 1)		First Approach E/W ( ) N/S				Second Approach E/W ( ) N/S			
			Hardwire Across Term. Shunt (Step 2)		Computed Approach Distance (Comp Dist) (Step 5)	Linearization Step Value (Lin Steps) (Step 9)	Hardwire Across Term. Shunt (Step 14)		Computed Approach Distance (Comp Dist) (Step 17)	Linearization Step Value (Lin Steps) (Step 21)
	EZ	EX	EZ	EX			EZ	EX		
Track 1										
Track 2										
Track 3										
Track 4										
Track 5										
Track 6										

4	**CALIBRATION VALUES HISTORY FORM (APPROACH AND LINEARIZATION CALIBRATION)**

GCP #: _____

Date of Calibration: _____ Name: _____

Location Information: _____

CALIBRATION VALUES HISTORY

	Calibrated Values (Step 1)		First Approach E/W ( ) N/S				Second Approach E/W ( ) N/S			
			Hardwire Across Term. Shunt (Step 2)		Computed Approach Distance (Comp Dist) (Step 5)	Linearization Step Value (Lin Steps) (Step 9)	Hardwire Across Term. Shunt (Step 14)		Computed Approach Distance (Comp Dist) (Step 17)	Linearization Step Value (Lin Steps) (Step 21)
	EZ	EX	EZ	EX			EZ	EX		
Track 1										
Track 2										
Track 3										
Track 4										
Track 5										
Track 6										

6.4 ISLAND CALIBRATION

Procedure 6-3. ISLAND CALIBRATION

Step 1 If an Island circuit is used, select the **ISL CAL** button. If not used, select **MAIN STATUS VIEW** button and then go to step 5.

- The **ISLAND CALIBRATION** Window, figure 6-8A, appears.

Step 2 Temporarily install a hardwire shunt beyond the island receiver rail connections at the appropriate distance specified below the **Calibration Req. message**.

- The shunt distances for all island frequencies are provided in table 6-3.

Step 3 Select the **START** button.

- The **START** button deactivates (grays out).
- The display shows an **Initiating** then an **In Progress** message during the calibration.
- If calibration is successful:
  - The **Calibration Select** window, Figure 6-8B, appears.
  - The **ISL CAL** button has a green check in the box.
- If calibration is not successful, the display shows a **Failed** message.
  - Refer to Section 7 for troubleshooting procedures.

Step 4 Verify that the island LED on the Main Status menu is off and remove the hardwire shunt. The island LED is now on.

Step 5 Repeat all GCP, approach, linearization and island calibration steps in this section for each remaining MAIN side Track Module installed.

Step 6 Temporarily install a 0.06 ohm shunt inside the island receiver connections.

- Verify by observing the ISLAND LED on the Track Module that the Island Circuit detected the shunt (LED goes out).
- Remove the 0.06 ohm shunt.
- Verify Island Pickup Delay Interval by the observing the flashing ISLAND LED on the Track Module. (Delay interval ended when LED is on steady.

- When GCP, approach, linearization and island calibration are complete for each remaining MAIN side Track Module installed, do one of the following:
  - If a **Standby** set of modules is present, go to paragraph 6.5, **STANDBY MODULES CALIBRATION**.
  - If a **Standby** set of modules is not present, go to paragraph 6.6, **LAMP VOLTAGE ADJUSTMENT**.
  - If an **SSCC Module** is not present, go to paragraph 6.8, **GCP OPERATIONAL CHECKS**.

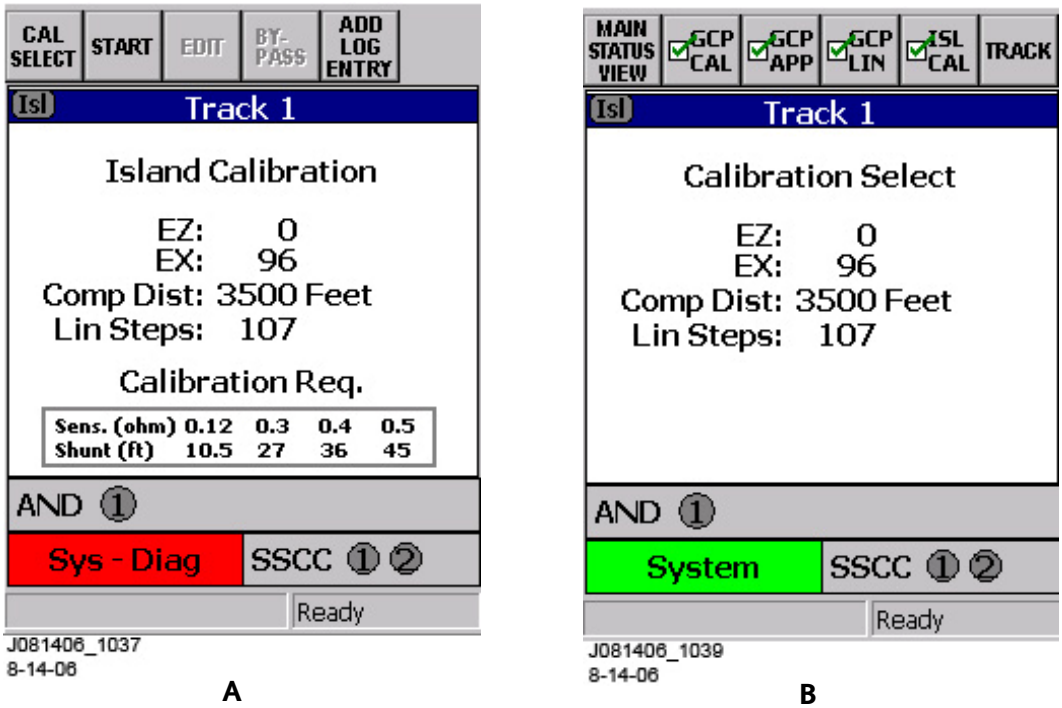


Figure 6-8. Island Calibration Window Before and After Island Linearization

Table 6-3. Island Shunt Distance

Island Frequency (kHz)	Shunt Distance (Feet)			
	0.12 ohm Sensitivity	0.3 ohm Sensitivity	0.4 ohm Sensitivity	0.5 ohm Sensitivity
2.14	20	50	67	84
2.63	17	43	58	72
3.24	13	33	44	55
4.0	10.5	27	36	45
4.9	9.0	23	31	39
5.9	7.5	19	26	32
7.1	6.5	17	23	29
8.3	6.0	15	20	25
10.0	5.0	13	18	22
11.5	4.5	12	16	20
13.2	4.0	10	14	17
15.2	3.5	9	12	15
17.5	3.0	8	11	14
20.2	3.0	8	11	14

6.5 STANDBY MODULES CALIBRATION

⚠ CAUTION

GATES WILL BEGIN TO LOWER IMMEDIATELY (WITHOUT GATE DELAY TIME) WHEN THE TRANSFER SWITCH IS USED TO SWAP BETWEEN HEALTHY UNITS. USE CAUTION WHEN TRANSFERRING CONTROL TO AVOID GATES HITTING VEHICLES OR PEDESTRIANS.

NOTE

Under normal conditions in the AUTO Transfer mode, gate delay time will run when the gates initially operate. If the trouble continues, the gates will already be lowered when the Transfer Module later swaps units.

Procedure 6-4. STANDBY MODULES CALIBRATION

Step 1 On Transfer module A80406 (A80468), set the transfer switch to **STBY**.

Step 2 Go to the main Status menu and select the **SETUP** button at the top of the display (see Figure 6-1).

Step 3 From the menu that appears, select the track to calibrate (see figure 6-2).

- Only enabled tracks appear on the menu.

Step 4 Select the **GCP CAL** button.

- The **GCP Calibration** Window appears, as shown in figure 6-3A.
  - The current **EZ** and **EX** values appear.
  - If calibration is required**, Calibration Req.** appears below the **EZ** and **EX** values.

Step 5 Select the **START** button.

- The **START** button deactivates (grays out).
- The display shows an **Initiating** then an **In Progress** message during the calibration.
- The track module requires about 15 seconds to calibrate.
- If calibration is successful:
  - The **Calibration Select** window, Figure 6-3B, appears.
  - EZ should be 98 to 102 and the **GCP CAL** button has a green check in the box.
- If calibration is not successful, the display shows a Failed message.
  - Refer to Section 7 for troubleshooting procedures.

Step 6 Select the **GCP APP** button.

- The **GCP Approach** Window, figure 6-4A, appears.
  - The computed approach distance (**Comp Dist)** appears.
    - This is the value calculated on the MAIN side in Procedure 6-2.
    - **Calibration Req.** appears at the bottom of the window.

Procedure 6-4. STANDBY MODULES CALIBRATION

Step 7 Select the **BYPASS** button.

- The computed approach distance is accepted as correct and the **GCP APP** button shows a green check in the box.

Step 8 Select the **GCP LIN** button.

- The **GCP Linearization** Window displays.
  - ♦ The current value for Linearization Steps displays.
  - ♦ This is the value calculated on the MAIN side in Procedure 6-2.

Step 9 Select the **BYPASS** button.

- The **Linearization steps** value is accepted as correct and the **GCP LIN** button shows a green check in the box.

Step 10 If an internal Island circuit is used, select the **ISL CAL** button. If not used, go to step 14.

- The **ISLAND CALIBRATION** Window appears.

Step 11 Temporarily install a hardwire shunt beyond the island receiver rail connections. at the appropriate distance specified below the Calibration Req. message.

- The shunt distances for all island frequencies are shown in table 6-3.

Step 12 Select the **START** button.

- **START** button deactivates (grays out).
- Display shows an **Initiating** then an **In Progress** message during calibration.
- If calibration is successful:
  - ♦ The **Calibration Select** window appears.
  - ♦ The **ISL CAL** button has a green check in the box.
- If calibration is not successful the display shows a **Failed** message.
  - ♦ Refer to Section 7 for troubleshooting procedures.

Step 13 Verify the island LED is out and remove the hardwire shunt. Island LED is now on.

Step 14 Repeat steps 1 through 13 for each remaining standby-side Track Module installed.

6.5.1 Calibration Completion

At the completion of the successful GCP calibration, set the Transfer switch on the transfer module to the **MAIN** and then to the **AUTO** position.

- This completes the Standby Modules Calibration. Do one of the following:
  - ♦ If an **SSCC Module** is present, go to paragraph 6.6, **LAMP VOLTAGE ADJUSTMENT**.
  - ♦ If an **SSCC Module** is not present, go to paragraph 6.8, **GCP OPERATIONAL CHECKS**.

6.6 LAMP VOLTAGE ADJUSTMENT

NOTE

- Before performing the lamp voltage adjustment procedure, the crossing controllers must be inactive; i.e. gates up, lamps off, and bell off.
  - Lamp voltage EDIT button is "grayed out" (disabled) when lamps are flashing
- If a train approaches during lamp adjustment, the crossing controllers will activate and the lamps will flash.
- The regulated output is a pulse-width modulated output that produces a square wave. A meter with a "True RMS AC + DC" scale is required to accurately measure the voltage. Section 8, paragraph 8.8 includes a conversion chart for measuring voltages with a conventional meter.
- When "far gate" lamps and "near gate" lamps are driven from the same output, first adjust the lamp voltage on the far gate. Then adjust the lamp voltage on the near gate using adjustment resistors.

WARNING

TO BE ACCURATE, LAMP VOLTAGES MUST BE MEASURED AT THE LAMP. THE VOLTAGE ON THE DISPLAY IS THE VOLTAGE AT THE SSCC CONNECTOR. INACCURATE MEASUREMENTS MAY RESULT IN DIM LAMPS OR EARLY LAMP FAILURE.

NOTE

The lamp output voltage is displayed in decivolts (dV).

- One dV = 0.1 volt
- Lamp adjustment range: 90 dV (9.0 V) to 150 dV (15.0 V)

Procedure 6-5. LAMP VOLTAGE ADJUSTMENT

Step 1	Select the **Setup** button on the Main Status Menu from the DT Function Buttons (see Figure 6-9) • The Track Setup Menu appears
Step 2	Select the **SSCC Lamps** entry of the Track Setup Menu • The Lamp Setup window, Figure 6-10, appears
Step 3	• Select the **Slot 8 SSCC3I** tab at the bottom of the window.

Procedure 6-5. LAMP VOLTAGE ADJUSTMENT

Step 4 Select the **Edit** button to the right of the **Lamp 1 Voltage** field. It may take a few seconds for the Edit button to become active (black, not grayed out).

- The **Lamp 1 Voltage** field highlights.
- The corresponding lamp output is turned on steady.

Step 5 Set the **Lamp 1 Voltage** field to the output voltage required to set the correct voltage at the lamps.

- Select either the Fine or Coarse adjustment radio button.
  - **Fine** changes the voltage in 1 dV (0.1 V) steps
  - **Coarse** changes the voltage in 5 dV (0.5 V) steps
- Increment the voltage display using the **+** or **–** buttons to the right of the Lamp Voltage 1 field.
- Measure voltage at the actual lamps using the correct meter (see Section 8).

Step 6 When the meter displays the correct voltage, select the **Enter** button at the bottom of the keypad.

- The **Lamp 1 Voltage** field deactivates.
- The new voltage value is saved.
- The corresponding lamp output is turned off.

Step 7 Select the **Edit** button to right of the **Lamp 2 Voltage** field.

- The **Lamp 2 Voltage** field highlights.
- The corresponding lamp output is turned on.

Step 8 Set the **Lamp 2 Voltage** field to the output voltage required to set the correct voltage at the lamps.

- Select either the Fine or Coarse adjustment radio button.
- Increment the voltage display using the **+** or **–** buttons to the right of the Lamp Voltage 2 field.
- Measure the voltage at the actual lamps using the correct meter (see Section 8).

Step 9 When your meter reads the correct voltage, select the **Enter** button at the bottom of the keypad.

- The **Lamp 2 Voltage** field deactivates.
- The new voltage value is saved.
- The corresponding lamp output is turned off.

Step 10 Select the **Slot 9 SSCC3I** tab at the bottom of the window.

Step 11 Repeat steps 4 through 9 for the second SSCCIIIi module.

This completes the SSCC Lamp Voltage Adjustment.. Go to paragraph 6.7, **SSCC OPERATIONAL TESTS**.

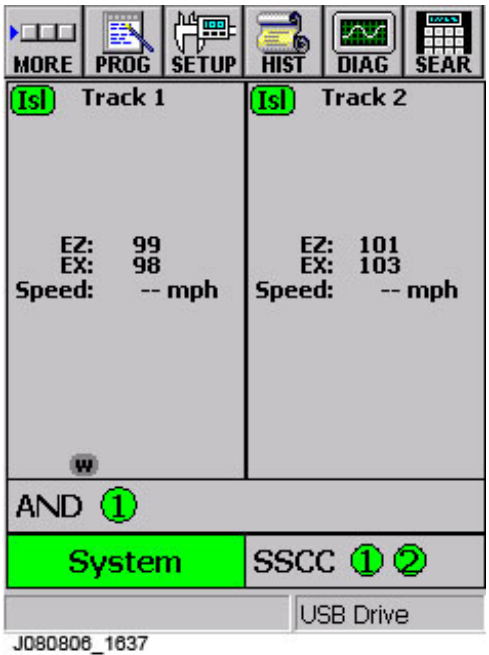


Figure 6-9. Setup Button Location

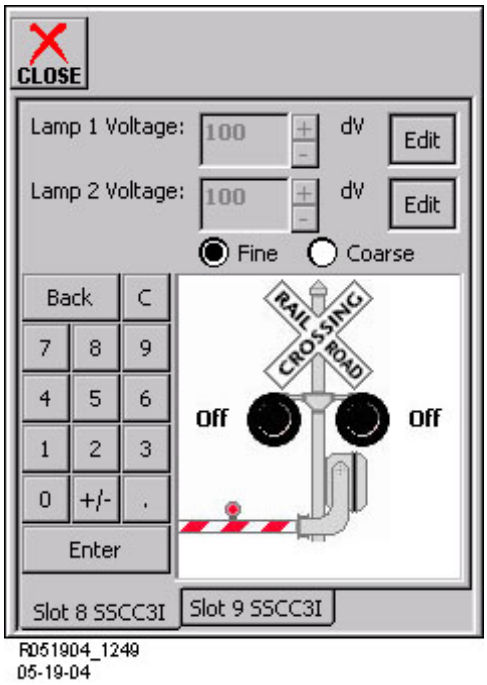


Figure 6-10. Lamp Setup Window

6.7 SSCC OPERATIONAL TESTS

After the GCP and SSCC system has been programmed, GCP calibrated and the lamp voltages have been adjusted, tests must be performed to verify the operation of the SSCC prior to placing the system in service. In addition to the operational tests required by the maintaining railroad, the SSCC operation should be further tested and verified as described in Procedure 6-6.

⚠ WARNING

AFTER INITIAL PROGRAMMING OR PROGRAMMING CHANGES, TESTS MUST BE PERFORMED TO VERIFY PROPER OPERATION OF THE SSCC PRIOR TO PLACING THE SYSTEM IN SERVICE.

NOTE

While in Test Mode, if a train approaches (XR input logic de-energizes), the test is cancelled and the crossing activates normally.

- When the train departs, the system remains in normal operation.

NOTE

If advance preemption is used, the preemption output and warning devices will operate as follows for the indicated method of activation:

- For a train move:
  - Pre-emption Output de-energizes at the pre-empt warning time.
  - Activation of the warning devices will be delayed until the Advance Pre-empt Timer times out, or the Prime Warning time is reached.
- Advance Pre-empt Input de-energized:
  - Pre-emption Output de-energizes
  - Activation of the warning devices will be delayed until the Advance Pre-empt Timer times out.
- AND 1 Enable Input de-energized:
  - Pre-emption Output de-energizes
  - Activation of the warning devices occurs simultaneously (no advance pre-empt time).
- "Test the Crossing" Test Mode;
  - Pre-emption Output de-energizes
  - Activation of the warning devices occurs simultaneously (no advance pre-empt time).

Procedure 6-6. SSCC OPERATIONAL TESTS	
Step 1	Verify that the light/gate battery is charged.
Step 2	Verify that all connectors on the SSCC have been properly positioned, seated and secured.
Step 3	Verify that all the electrical connections in the Bell, Lamp, and Gate circuits are properly assembled, tightened and secured.
Step 4	Verify that all flashing lamps light and none are burned out.
Step 5	Verify that all lights have been aligned.
Step 6	Verify that the gates are operational.
Step 7	Verify that the bells are operational.
Step 8	Verify that all SSCC programming is correct
Step 9	Verify that all lamp voltages have been set.
Step 10	Momentarily turn on the flashers from the TEST menu and verify that the battery charger is operational and providing current to the lamps and battery.
Step 11	Verify that each input controls the crossing warning devices as determined by the programming.
Step 12	Verify that the gate delay time is correct.
Step 13	Verify that the lights continue to flash while the gates are rising.

This completes the **SSCC OPERATIONAL TESTS**. Go to paragraph 6.8, **GCP OPERATIONAL CHECKS**.

6.8 GCP OPERATIONAL CHECKS

Prior to placing a system in service, tests must be performed to verify proper system operation and I/O wiring. Proceed to next step if a feature is not used.

⚠ WARNING

AFTER INITIAL PROGRAMMING OR PROGRAMMING CHANGES, TESTS MUST BE PERFORMED TO VERIFY PROPER OPERATION OF THE GCP PRIOR TO PLACING THE SYSTEM IN SERVICE.

Procedure 6-7. GCP OPERATIONAL CHECKS

Step 1 UAX, DAX Enables & AND Enable input(s), if these features are used:

- Crossing activates when each remote DAX line circuit that controls a UAX, DAX Enable or AND Enable input (controlling the crossing) is de-energized or opened from the far end of the circuit.
- Pickup Delay time is correct when input closes.

Step 2 DAX outputs and "Radio DAX" operation using Spread Spectrum Radio, if these features are used:

- Downstream crossing activates when the appropriate DAX output or Radio DAX message is deenergized
- DAX Pickup Delay time is correct

Step 3 WRAP logic, if this feature is used:

- WRAP logic **W** is displayed on Main status screen for each corresponding wrapped track (when WRAP inputs are energized as seen on system I/O view).
  - ♦ **W** is removed from corresponding track on Main status screen when:
    - ▪ Corresponding track with wrap is shunted or
    - ▪ Corresponding wrap input is deenergized
- Measure WRAP LOS pickup delay from the time the wrap input is energized until the **W** is displayed on corresponding track status screen.
  - ♦ Verify the LOS pickup delay time (minimum of 5 seconds).

Step 4 OVERRIDE logic, if this feature is used.

There may be one or up to three OVERRIDE inputs used depending on OVERRIDE programming. The OVERRIDE options are: ALL PREDICTORS Override or DAX A, DAX B and DAX C Override.

- When corresponding OVERRIDE input is energized, OVERRIDE Input Status is GREEN on System I/O view.
  - ♦ Observe that corresponding Override input changes to RED when:
    - ▪ Corresponding switch in GCP approach is reversed or
    - ▪ Corresponding signal field apparatus is changed from energized to deenergized or deenergized to energized depending on field signal logic for OVERRIDE.

Procedure 6-7. GCP OPERATIONAL CHECKS - *continued*

Step 5 Traffic Signal Preemption, if this feature is used:

- The preempt output deenergizes:
  - ♦ When the prime deenergizes for simultaneous preemption
  - ♦ At the programmed preemption warning time for advance preemption
    - ▪ The warning devices activate when the prime predictor predicts, or after the Advance Preempt Delay timer times out, which ever is sooner. Time should be equal to Adv Preemption timer value or shorter.
- When used, Advance Preempt IP input open causes Preempt Output to de-energize and activates warning devices after the Advance Preempt Delay Timer times out. (Observe input on I/O view).
- When used, Preemption Health IP input open activates warning devices immediately (without advance preempt Delay time interval). (Observe input on I/O view).
- When used, Traffic Signal Health open initiates simultaneous preemption, rather than advance preemption, upon train detection

Step 6 Island detection

- **When used,** observe the ISLAND symbol on tracks on the Main Status display.
  - ♦ Place a 0.06 ohm shunt on island track wires
    - ▪ ISLAND symbol is GRAY
  - ♦ Observe island LED on track module as shunt is removed and while ISLAND Pickup Delay is timing
    - ▪ ISLAND LED is flashing
  - ♦ After the island pickup delay time expires on module and island LED is steady RED
    - ▪ ISLAND symbol on Main display is GREEN, and warning devices are deactivated.

Step 7 Out of Service, OOS, if this feature is used:

⚠ WARNING

THE RAILROAD PROCEDURES GOVERNING HOW TO TAKE A TRACK CIRCUIT OUT OF SERVICE SHALL BE FOLLOWED. THE INSTRUCTIONS IN THIS SECTION MAY BE FOLLOWED ONLY IF ALLOWED BY THE RAILROAD.

Procedure 6-7. GCP OPERATIONAL CHECKS - *concluded*

Step 7a

- If the Display method is used:
  - ♦ Take each track out of service using the display.
  - ♦ Observe
    - ▪ Display indicates track is OOS
  - ♦ Return track to service
    - ▪ Display indicates track is back in service

Step 7b

- If Display + OOS IP input is used, then for each track:
  - ♦ Turn on OOS input for the track. (observe input on I/O view).
  - ♦ Take track OOS using the display
    - ▪ Display indicates track is OOS
  - ♦ Turn off OOS input
    - ▪ Display indicates track is back in service

Step 7c

- If OOS IP Input is used:
  - ♦ Turn on OOS input for the track (observe input on I/O view).
    - ▪ Main Display indicates track is OOS
  - ♦ Turn off OOS input
    - ▪ Display indicates track is back in service

Step 7d

- If 4000 Case OOS IP Input used:
  - ♦ Turn on 4000 Case OOS input. (observe input on I/O view).
    - ▪ Main Display indicates all track are OOS
  - ♦ Turn off 4000 Case OOS input
    - ▪ Main Display indicates all tracks are back in service

Step 8 Train Detection, Warning Times and Crossing Operation

- EZ continuity check on train moves:
  - ♦ Crossing devices activate and EZ value decreases smoothly (without rapid change) for an approaching train.
  - ♦ Crossing devices turn off when island recovers after train move and the EZ rises smoothly (without rapid change) as the train recedes.

⚠ WARNING

IF A RAPID CHANGE OCCURS IN THE VALUE OF EZ AT ANY TIME THE TRAIN IS MOVING WITHIN THE TERMINATION SHUNTS, TRACK DISCONTINUITY CAUSED BY A HIGH RESISTANCE BOND OR A DEFECTIVE COUPLER IS INDICATED. LOCATE AND CORRECT THE PROBLEM IMMEDIATELY.

- For MAIN and STANDBY, check warning times for inbound train moves on each approach including DAX operation.
- If the SSCC is used, check for proper gate / flasher / bell operation on all train moves.

This completes the GCP OPERATIONAL CHECKS.

6.9 TRANSFER INTERVAL SELECTION

The transfer timer interval is preset in the factory for 3 minutes and normally does not require any change. A shorter time than 3 minutes is not recommended. If a longer time is desired, the interval time is selected by means of DIP switch S3 located on the Transfer Module.

6.9.1 Transfer Module A80406

The switch levers of S3 on the A80406 module are set to the positions designated in the Delay Interval Table to obtain the required delay time (see figure 6-11 and table 6-4).

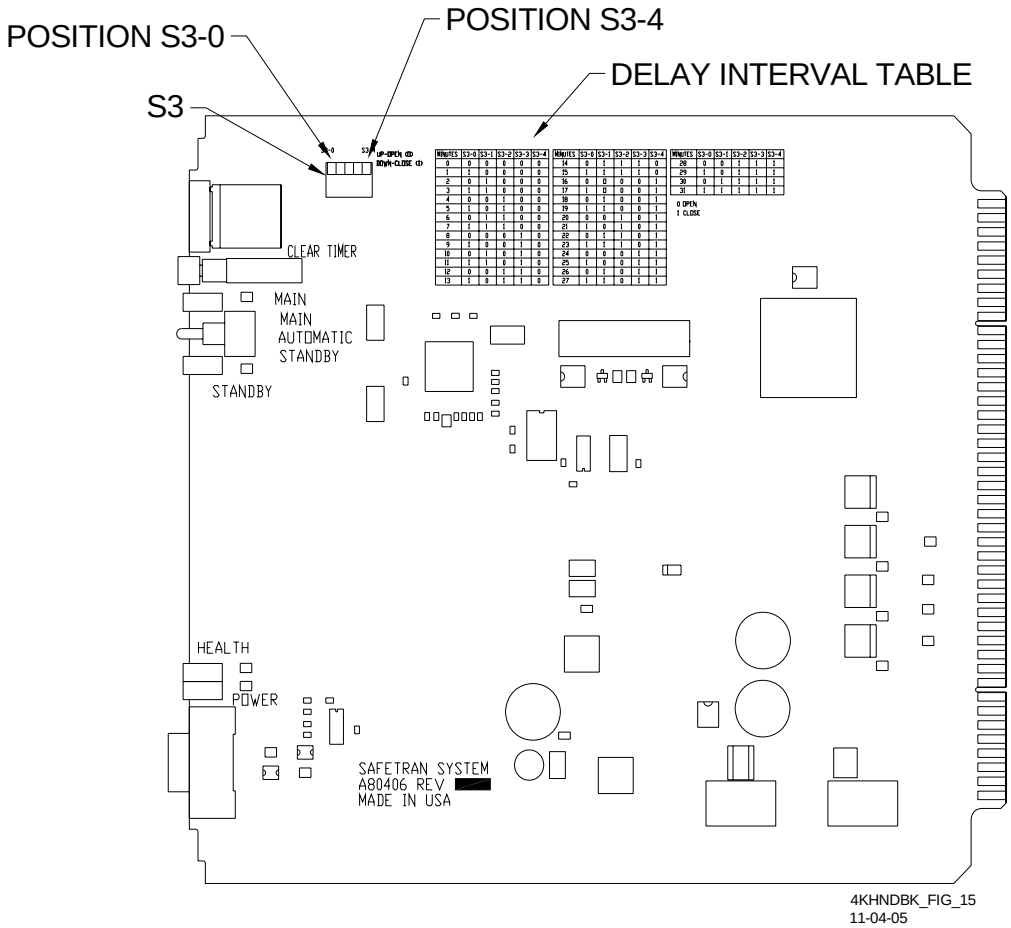


Figure 6-11. Transfer Module, A80406, S3 Switch Positions

6.9.2 Transfer Module A80469 on Transfer Assembly A80468

The transfer timer interval is selected by means of DIP switch S3 located on the back of the A80469 Transfer Module as shown in figure 6-12.

- The module is accessible by removing the mounting screws on either side of the A80468 assembly and unplugging the unit from the front of the 4000 GCP case.
- The switch levers of S3 are set to the positions designated in table 6-4 to obtain the required delay time (see figure 6-12).

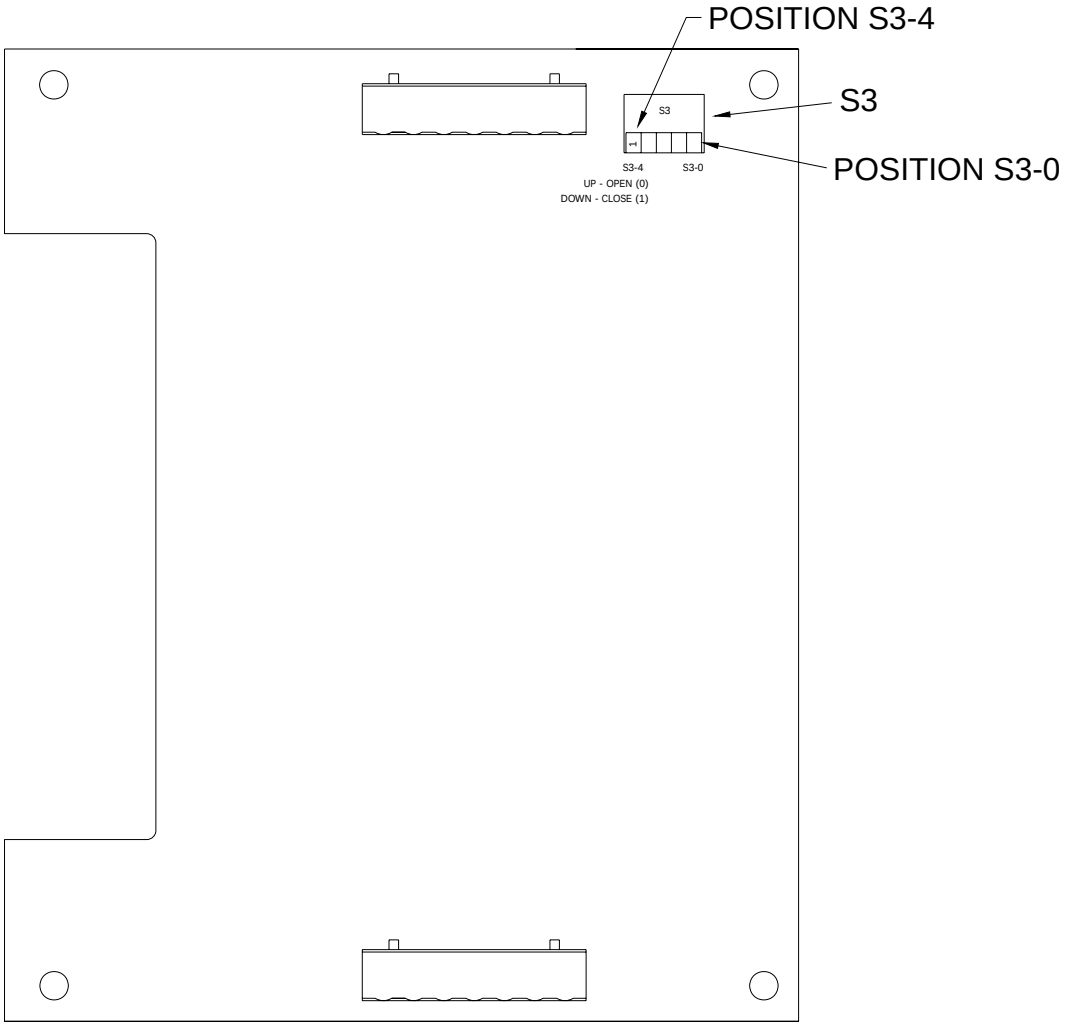


Figure 6-12. Transfer Module Assembly, A80468, S3 Switch Position

Table 6-4. Transfer Delay Interval Table (for S3 on A80406/A80468 Module Assembly)

Minutes	S3-0	S3-1	S3-2	S3-3	S3-4
0	0	0	0	0	0
1	1	0	0	0	0
2	0	1	0	0	0
3	**1**	**1**	**0**	**0**	**0**
4	0	0	1	0	0
5	1	0	1	0	0
6	0	1	1	0	0
7	1	1	1	0	0
8	0	0	0	1	0
9	1	0	0	1	0
10	0	1	0	1	0
11	1	1	0	1	0
12	0	0	1	1	0
13	1	0	1	1	0
14	0	1	1	1	0
15	1	1	1	1	0
16	0	0	0	0	1
17	1	0	0	0	1
18	0	1	0	0	1
19	1	1	0	0	1
20	0	0	1	0	1
21	1	0	1	0	1
22	0	1	1	0	1
23	1	1	1	0	1
24	0	0	0	1	1
25	1	0	0	1	1
26	0	1	0	1	1
27	1	1	0	1	1
28	0	0	1	1	1
29	1	0	1	1	1
30	0	1	1	1	1
31	1	1	1	1	1

0 = OPEN
1 = CLOSE
Bold = Default

6.9.3 Operation Without Transfer Module A80406

To disable the A80406 Transfer Module, remove the module from the chassis and move the jumper from the storage position, STG, to the MAIN or standby (STBY) position (see figure 6-13).

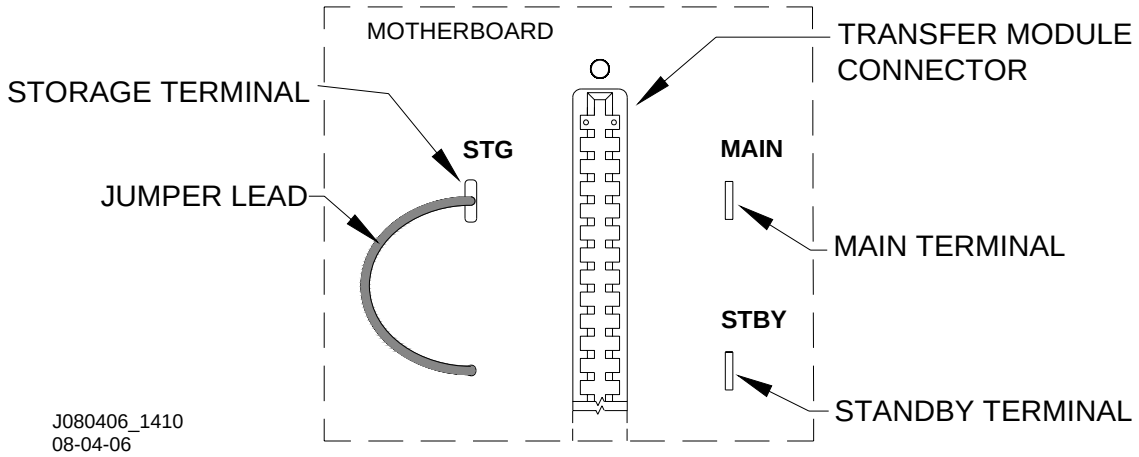


Figure 6-13. Transfer Module (A80406) Jumper Positions

6.9.4 Operation Without Transfer Module Assembly A80468

To disable the A80468 Transfer Module Assembly, remove the module from the chassis and move the jumper from the storage position, STG, to the MAIN or standby (STBY) position (see figure 6-14).

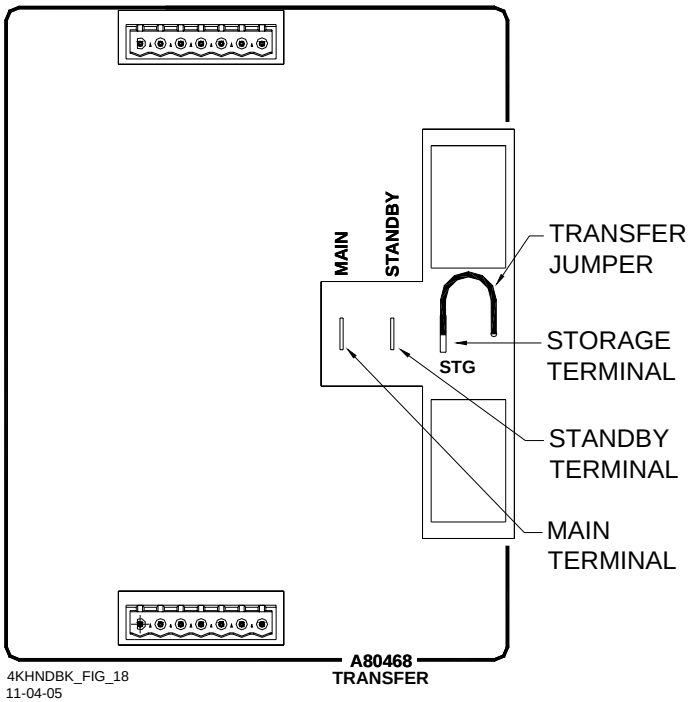


Figure 6-14. Transfer Module (A80468) Jumper Positions

6.10 REMOTE MONITORING AND CALIBRATION OPERATION

The remote monitoring and calibration operation function allows the GCP to be monitored and calibrated from any location in the GCP approaches.

- This calibration operation is generally conducted outside of the bungalow.

For Remote operation a Safetran A80276 VHF Communicator and a compatible hand-held VHF radio are required.

- Refer to the VHF Communicator User's Guide; document number SIG-00-03-05-002, for a complete discussion of the A80276 Communicator.
- Connection between the A80276 and the 4000 GCP is shown in figure 6-15.

6.10.1 Remote User Interface Menu

Before remote monitoring and calibration can be performed, the 4000 GCP system must be primed using the Display module.

- The Remote instructions to the 4000 GCP are sent as DTMF tones using the keypad of the hand-held VHF radio.
- These tones are received by the A80276 and converted to instructions for the 4000 GCP.
- The GCP responses are sent back to the hand-held VHF radio as voice messages.
- The remote user interface menu is shown in figure 6-18.

6.10.2 Remote Calibration

Remote Calibration allows all used track modules to be calibrated and the EZ and EX values to be remotely listened to for a particular track.

- The 4000 GCP remote calibration setup is provided in Procedure 6-7.
- The 4000 GCP remote calibration steps are provided in Procedure 6-8.

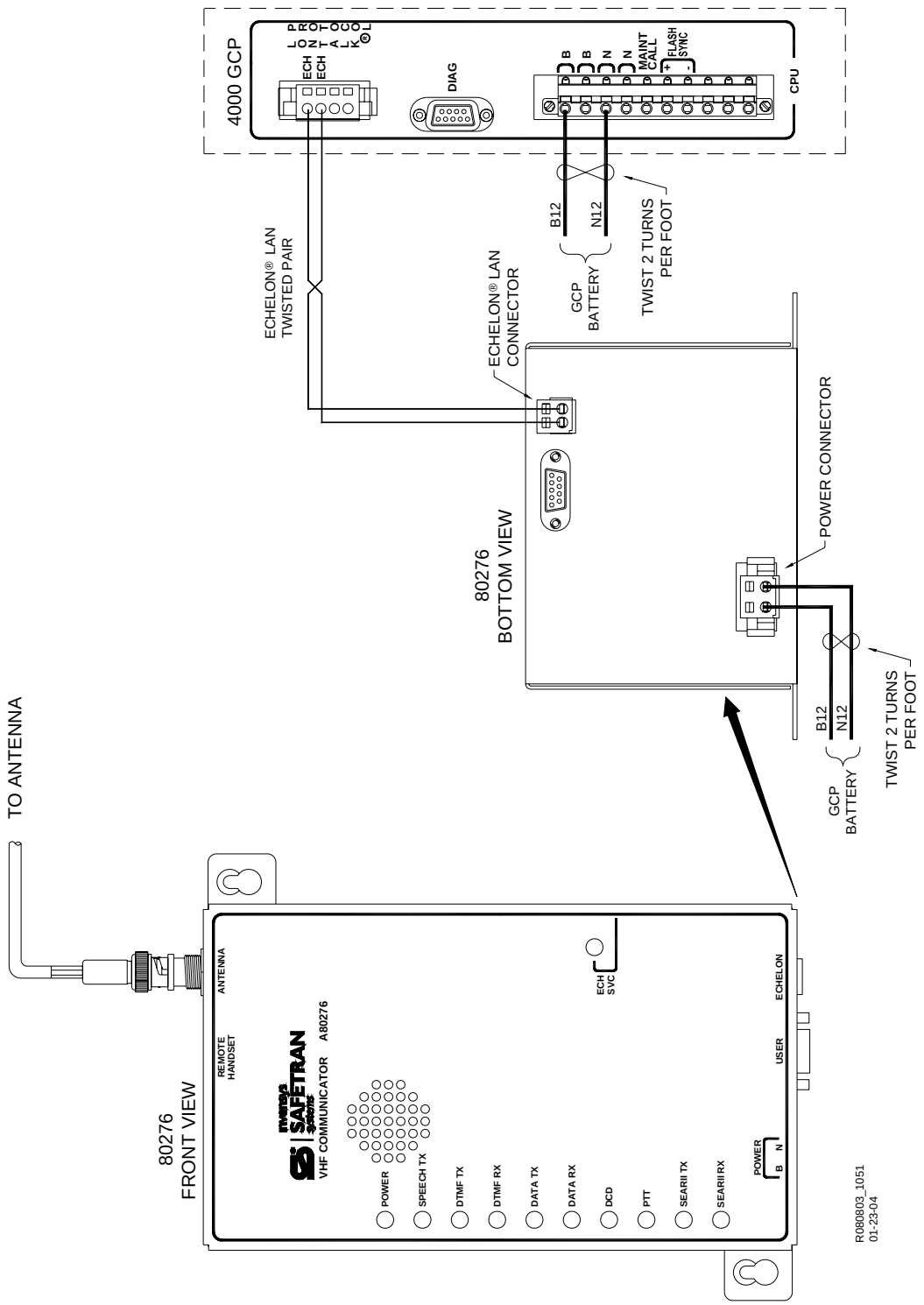


Figure 6-15. VHF Communicator To 4000 GCP Interconnection Diagram

6.11 REMOTE CALIBRATION SETUP

Procedure 6-8. REMOTE CALIBRATION SETUP	
Step 1	Select the **Setup** button at the top of the Main status Screen.
Step 2	From the menu that appears, select **REMOTE SETUP**. • The **Remote Setup** dialog box, figure 6-16A, displays.
Step 3	Select the **GET PASS** button. • A **Push button** message appears in the message box at the bottom of the window.
Step 4	Press the **SEL** pushbutton on the front panel of the CPU module. • The **Remote Setup** dialog box changes, as shown in figure 6-16B. ♦ A four-digit password appears in the **Remote Password** value field. ♦ Check boxes for each used track module and the SSCC appear below the **Remote Password** value field.
Step 5	Record the four-digit password.
Step 6	If the default 60 minute timeout is not long enough, select the **EDIT TIMER** button. • The **Set Timer** dialog box, figure 6-17, displays.
Step 7	Using the keypad numbers, enter the required Setup Timeout value into the **New Value** field.
Step 8	Select the **Update** button. • The dialog box closes and the **Remote Setup** dialog box appears. • The new **Remote Setup Timeout** value displays.
Step 9	Individually select each field of the Track and SSCC to be calibrated • A check appears in the check box of each selected field.
Step 10	Select the **CLOSE** button. • The Status Screen, figure 6-1, displays.
Step 11	To perform an Island Calibration, go to the Island Calibration screen and record the shunt placement distance for shunting sensitivity.

⚠ WARNING

AFTER PERFORMING REMOTE GCP CALIBRATION USING THE VHF COMMUNICATOR, RETURN TO THE 4000 GCP AND VERIFY THAT EACH CALIBRATION IS PROPERLY IMPLEMENTED.

- **REVIEW THE MAINTENANCE LOG OR THE CPU STATUS LOG AS PART OF THE VERIFICATION PROCESS.**

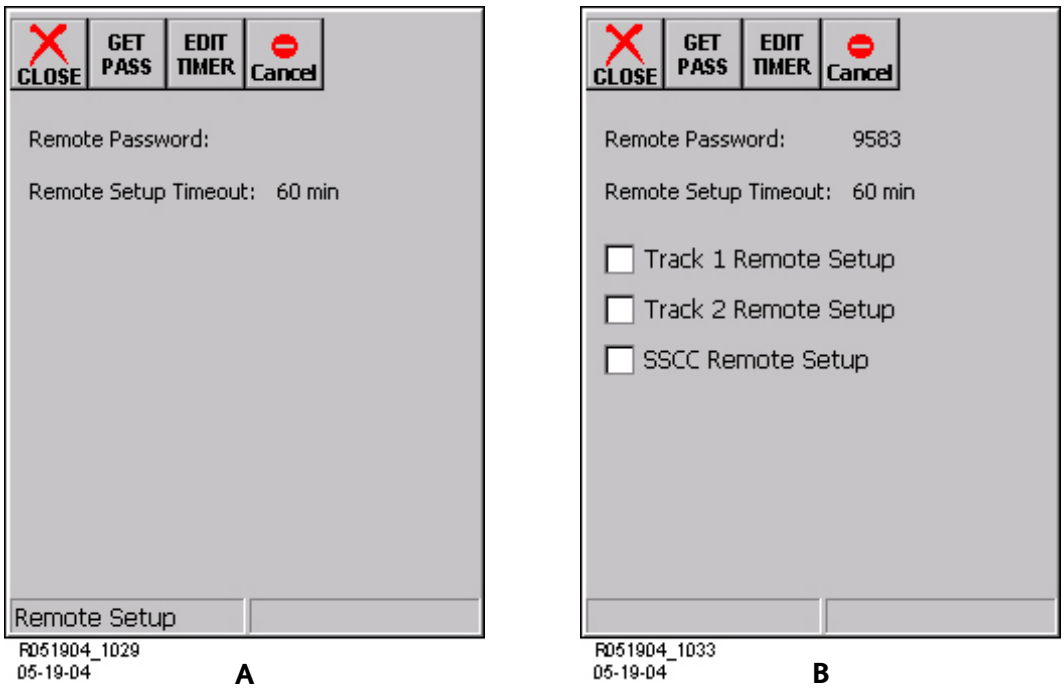


Figure 6-16. Remote Setup Dialog Windows

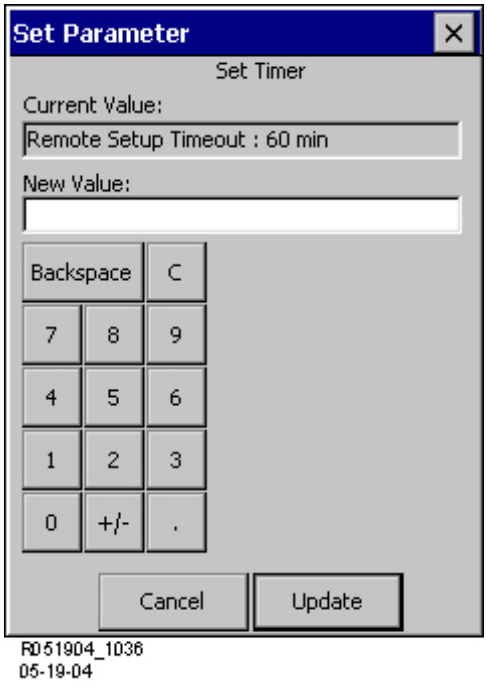


Figure 6-17. Set Timer Dialog Box

6.12 REMOTE CALIBRATION

Procedure 6-9. REMOTE CALIBRATION

Step 1 Press and Hold the Transmit button of the hand-held VHF radio.

Step 2 Enter ***#*** followed by the password recorded in step 5 of Procedure 6-7.

Step 3 Release the Transmit button of the hand-held VHF radio.

- An assigned Department Of Transportation (DOT) number (***XXX***) is verbally announced.
- The Root menu options are announced:
  - ***"For location press 1"***
  - ***"For GCP press 2"***
  - ***"For SSCC press 3"***
  - ***"For Help press 4"***

Step 4 Press and Hold the Transmit button then Press **2**.

- GCP is selected.

Step 5 Release the Transmit button.

- An ***"Enter track number"*** message is announced

Step 6 Press and Hold the Transmit button.

- Enter the track number (*N*) to be calibrated (N = 1 to 6).

Step 7 Release the Transmit button.

- The Track Menu options are announced:
  - ***"For GCP calibration press 1"***
  - ***"For approach calibration press 2"***
  - ***"For linearization press 3"***
  - ***"For island calibration press 4"***
  - ***"To monitor EZ EX press 5"***
  - ***"To monitor island press 6"***

6.13 REMOTE GCP CALIBRATION SETUP

Procedure 6-10. REMOTE GCP CALIBRATION

Step 1 To perform the GCP Calibration:
- Press and Hold the Transmit button then press **3**.
- GCP calibration is selected.

Step 2 Release the Transmit button.
- The Calibration Menu options are announced:
  - ***"To start track N GCP calibration press 1"***
  - **"To monitor EZ EX press 2"**

Step 3 Press and Hold the Transmit button then Press **1**.

Step 4 Release the Transmit button.
- ***"Enter password for DOT XXX"*** is announced.

Step 5 Press and Hold the Transmit button then enter the password recorded in step 5 of Procedure 6-7.

Step 6 Release the Transmit button.
- The following information messages are sequentially announced:
  - "***Initiating track N GCP calibration"***
  - ***"Track N GCP calibration in progress"***
- If GCP calibration passes:
  - The information messages are concluded with:
    - ***"Track N GCP calibration passed"***
    - ***"EZ is ___"***
    - ***"EX is ___"***
  - The Track Menu options in step 7 of Procedure 6-8 are repeated.
- If GCP calibration fails:
  - The information messages conclude with:
    - ***"Track N GCP calibration failed"***
    - The calibration menu of step 2 is repeated.
  - Refer to Section 7 for troubleshooting procedures.
    - When the cause of the failure is corrected, repeat this procedure starting at step 3.
    - If the Remote Setup Timeout selected in Procedure 6-7 step 6 expires, start again from Procedure 6-7.

6.14 REMOTE APPROACH DISTANCE AND LINEARIZATION CALIBRATION

Procedure 6-11. REMOTE APPROACH AND LINEARIZATION CALIBRATION

Step 1 Temporarily place a hardwire shunt across the termination shunt.
- For bidirectional installations, use the termination shunt farthest from the crossing

Step 2 Press and Hold the Transmit button then Press **2**.
- Approach calibration is selected.

Step 3 Release the Transmit button.
- The Calibration Menu options are announced:

"To start track N approach calibration press 1"

- ***"To monitor EZ EX press 2"***

Step 4 Press and Hold the Transmit button. Then Press **1**.

Step 5 Release the Transmit button.
- ***"Enter password for DOT ___"*** is announced.

Step 6 Press and Hold the Transmit button then enter the password recorded in step 5 of Procedure 6-7.

Step 7 Release the Transmit button.
- The following information messages are sequentially announced:
  - "***Initiating track N approach calibration"***
  - ***"Track N approach calibration in progress"***
- If approach calibration passes:
  - The information messages conclude with:
    - ***"Track N approach calibration passed"***
    - ***"Computed approach distance ____ feet"***
      - Record this distance as the first approach distance.
  - The Track Menu options in step 7 Procedure 6-8, are repeated.
- If approach calibration fails:
  - The information messages conclude with:
    - ***"Track N approach calibration failed"***
    - The calibration menu in step 3 is repeated.
  - Refer to Section 7 for troubleshooting procedures.
  - When the failure is corrected, repeat the procedure starting at step 3.
  - If the Remote Setup Timeout selected in Procedure 6-7 step 6 expires, start again from Procedure 6-7.

Procedure 6-10. REMOTE APPROACH AND LINEARIZATION CALIBRATION

Step 8 Accurately (within 1%) locate the midpoint of the longest approach and move the hardwire shunt to that point on the rails.

Step 9 Press and Hold the Transmit button and then Press **4**.
- Linearization is selected.

Step 10 Release the Transmit button.
- The Calibration Menu options are announced:
  - ***"To start track N linearization press 1"***
  - ***"To monitor EZ EX press 2"***

Step 11 Press and hold the Transmit button then Press **1**.

Step 12 Release the Transmit button.
- An ***"Enter password for DOT ___"*** directive is announced

Step 13 Press and hold the Transmit button and then enter the password recorded in step 5 of Procedure 6-7.

Step 14 Release the Transmit button.
- The following information messages are sequentially announced:
  - "***Initiating track N linearization"***
  - ***"Track N linearization in progress"***
- If linearization passes:
  - the information messages conclude with:
    - ***"Track N linearization passed"***
    - ***"Linearization number ____ "***
      - ❖ Record this number as the first approach value.
  - The Track Menu options, step 7, Procedure 6-8, are repeated.
- If approach linearization fails:
  - The information messages are concluded with:
    - ***"Track N linearization failed"***
  - Release the Transmit button.
    - The calibration menu from step 10 is repeated.
  - Refer to Section 7 for troubleshooting procedures.
    - When the failure is corrected, repeat the procedure from step 10.

Step 15 Remove the hardwire shunt from the track.

Step 16 If the approach is unidirectional or simulated bidirectional, go to step 38.

If the track is bidirectional and the measured distance to the other termination shunt is within 10 % of the first approach go to step 17.

Otherwise, if distance is clearly shorter, go to step 38.

Step 17 Temporarily place a hardwire shunt across the termination shunt of the other approach.

Procedure 6-10. REMOTE APPROACH AND LINEARIZATION CALIBRATION

Step 18 Press and Hold the Transmit button then Press **2**.
- Approach calibration is selected.

Step 19 Release the Transmit button.
- The Calibration Menu options are announced:

"To start track N approach calibration press 1"

- ***"To monitor EZ EX press 2"***

Step 20 Press and Hold the Transmit button. Then Press **1**.

Step 21 Release the Transmit button.
- ***"Enter password for DOT ___"*** is announced

Step 22 Press and Hold the Transmit button then enter the password recorded in step 5 of Procedure 6-7.

Step 23 Release the Transmit button.
- The following information messages are sequentially announced:
  - "***Initiating track N approach calibration"***
  - ***"Track N approach calibration in progress"***
- If approach calibration passes:
  - The information messages conclude with:
    - ***"Track N approach calibration passed"***
    - ***"Computed approach distance ____ feet"***
      - Record this distance as the second approach distance value.
  - The Track Menu options in step 7 of Procedure 6-8, are repeated.
- If approach calibration fails:
  - The information messages conclude with:
    - ***"Track N approach calibration failed"***
    - The calibration menu in step 3 is repeated.
  - Refer to Section 7 for troubleshooting procedures.
  - When the failure is corrected, repeat the procedure starting at step 3.
  - If the Remote Setup Timeout selected in Procedure 6-7 step 6 expires, start again from Procedure 6-7.

Step 24 Accurately (within 1%) locate the midpoint of this approach and move the hardwire shunt to that point on the rails.

Step 25 Press and Hold the Transmit button and then Press **4**.
- Linearization is selected.

Step 26 Release the Transmit button.
- The Calibration Menu options are announced:
  - ***"To start track N linearization press 1"***
  - ***"To monitor EZ EX press 2"***

Procedure 6-10. REMOTE APPROACH AND LINEARIZATION CALIBRATION

Step 27 Press and hold the Transmit button then Press **1**.

Step 28 Release the Transmit button.

- An ***"Enter password for DOT ___"*** directive is announced

Step 29 Press and hold the Transmit button and then enter the password recorded in step 5 of Procedure 6-7.

Step 30 Release the Transmit button.

- The following information messages are sequentially announced:
  - "***Initiating track N linearization"***
  - ***"Track N linearization in progress"***
- If linearization passes:
  - the information messages conclude with:
    - ***"Track N linearization passed"***
    - ***"Linearization number ____ "***
      - ❖ Record this number as the second approach linearity value.
  - The Track Menu options, step 7, Procedure 6-8, are repeated.
- If approach linearization fails:
  - The information messages are concluded with:
    - ***"Track N linearization failed"***
  - Release the Transmit button.
    - The calibration menu from step 10 is repeated.
  - Refer to Section 7 for troubleshooting procedures.
    - When the failure is corrected, repeat the procedure from step 10.

Step 31 Remove the hardwire shunt from the track.

Step 32 If the Lin Steps value for the second approach is greater than or the same as the value recorded for the first approach in step 14, record the Lin Steps value.

- Go to step 38.

If the Lin Steps value for the second approach is less than the value recorded in step 14, return to the bungalow and select the **EDIT** button of the track Linearization calibration menu.

- The **Linearization Steps** dialog box displays.

Step 33 Enter the Lin Steps value recorded for the first approach in step 14 into the **New Value** field using the keypad numbers and select **UPDATE**.

Step 34 Select the **GCP APP** button.

- The **GCP Approach** Window appears.

Step 35 Select the **EDIT** button.

- The **Computed Approach Distance** dialog box appears.

Step 36	Enter the computed approach distance (**Comp Dist**) value recorded for the first approach in step 5 into the **New Value field** using the keypad numbers and select **UPDATE**. • The **Calibration Select** Window appears.
Step 37	Verify that the computed approach distance (**Comp Dist**) and the linearization steps (**Lin Steps**) values recorded for the first approach in steps 14 and 30 are the same as those displayed on the **Calibration Select** window
Step 38	Enter the distance and linearity values recorded for the first and second (if applicable) approach(es) on the **CALIBRATION VALUES** history on page 21 of the Application History card.
Step 39	This completes Approach and Linearization calibration. To record the reason for the Calibration and store it in the Maintenance log, select the **ADD LOG ENTRY** button. • Type any notes about the calibration and select **OK** to save the entry.

6.15 REMOTE ISLAND CALIBRATION

Procedure 6-12. REMOTE ISLAND CALIBRATION

Step 1 Temporarily install a hardwire shunt beyond the island receiver rail connections.
- Place the shunt at the distance recorded in Procedure 6-7, step 12.

Step 2 Press and Hold the Transmit button then press **6**.
- Island calibration is selected.

Step 3 Release the Transmit button.
- The Calibration Menu options are announced:
  - ***"To start track N island calibration press 1"***
  - ***"To monitor island signal level press 2"***

Step 4 Press and Hold the Transmit button then press **1**.

Step 5 Release the Transmit button.
- An ***"Enter password for DOT ___"*** message is announced

Step 6 Press and Hold the Transmit button and enter the password recorded in step 5 of Procedure 6-7.

Step 7 Release the Transmit button.
- The following information messages are sequentially announced:
  - "***Initiating track N island calibration"***
  - ***"Track N island calibration in progress"***
- If island calibration passes:
  - The information messages conclude with:
    - ***"Track N island calibration passed"***
    - ***"Island signal level n"*** (where n is around 100).
  - The Track Menu options in step 7 Procedure 6-8 are repeated.
- If island calibration fails:
  - The information messages conclude with:
    - ***"Track N island calibration failed"***
  - Release the Transmit button.
    - The calibration menu from step 3 is repeated.
  - Refer to Section 7 for troubleshooting procedures.
    - When the failure is corrected, repeat the procedure starting at step 2.

Step 8 Remove the hardwire shunt.

6.16 REMOTE LAMP VOLTAGE ADJUSTMENT

NOTE

Before performing the remote lamp voltage adjustment procedure, the crossing controllers must be inactive; i.e. gates up, lamps off, and bell off.

- If a train approaches during lamp adjustment, the crossing controllers will activate and the lamps will flash.

Procedure 6-13. REMOTE LAMP VOLTAGE ADJUSTMENT

Step 1 Press and Hold the Transmit button. Then Press **3**.
- The remote SSCC menu is selected.

Step 2 Release the Transmit button.
- The SSCC Menu options are announced:
  - **"SSCC 1 press 1"**
  - **"SSCC 2 press 2"**
  - **"Crossing press 3"**

Step 3 Press and Hold the Transmit button. Then Press **1**.
- The SSCC Lamp 1 Menu is selected.

Step 4 Release the Transmit button.
- The SSCC 1 Lamp Menu options are announced:
  - **"Lamp 1 press 1"**
  - **"Lamp 2 press 2"**
  - **"Lamp 1 voltage press 3"**
  - **"Lamp 2 voltage press 4"**

Step 5 Press and Hold the Transmit button. Then Press **3**.

Step 6 Release the Transmit button.

"SSCC 1 lamp 1 voltage ___ volts" is announced

Step 7 Press and Hold the Transmit button. Then Press *****.
- The SSCC 1 Lamp 1 Voltage Menu is selected.

Step 8 Release the Transmit button.
- **"SSCC 1 Lamp 1 Voltage"** is announced, followed by:
  - **"up 1 volt press 1"**
  - **"up one-half volt press 2"**
  - **"up one-tenth volt press 3"**
  - **"down 1 volt press 4"**
  - **"down one-half volt press 5"**
  - **"down one-tenth volt press 6"**
- SSCC 1 lamp 1 output is on and steady.

Procedure 6-12. REMOTE LAMP VOLTAGE ADJUSTMENT

Step 9 Press and Hold the Transmit button. Then Press the number required to appropriately increment the voltage level at lamp 1.

Step 10 Release the Transmit button.
"SSCC 1 lamp 1 voltage ___ volts" is announced.

Step 11 Repeat step 9 and 10 until the specified voltage reading is obtained at lamp 1.
- Measure the voltage at lamp 1 using the correct meter (see Section 8).

Step 12 Press and Hold the Transmit button. Then Press *****.
- The SSCC 1 Lamp Menu is selected.

Step 13 Release the Transmit button.
- The new lamp 1 voltage value is saved.
- The lamp 1 output is turned off.
- The SSCC 1 Lamp Menu options are announced:
  - **"Lamp 1 press 1"**
  - **"Lamp 2 press 2"**
  - **"Lamp 1 voltage press 3"**
  - **"Lamp 2 voltage press 4"**

Step 14 Press and Hold the Transmit button. Then Press **4**.

Step 15 Release the Transmit button.
"SSCC 1 lamp 2 voltage ___ volts" is announced

Step 16 Press and Hold the Transmit button. Then Press *****.
- The SSCC 1 Lamp 2 Voltage Menu is selected.

Step 17 Release the Transmit button.
- **"SSCC 1 Lamp 2 Voltage"** is announced, followed by:
  - **"up 1 volt press 1"**
  - **"up one-half volt press 2"**
  - **"up one-tenth volt press 3"**
  - **"down 1 volt press 4"**
  - **"down one-half volt press 5"**
  - **"down one-tenth volt press 6"**
- SSCC 1 lamp 2 output is on and steady.

Step 18 Press and Hold the Transmit button. Then Press the number required to appropriately increment the voltage level at lamp 2.

Step 19 Release the Transmit button.
- **"SSCC 1 lamp 2 voltage ___ volts"** is announced.

Step 20 Repeat steps 18 and 19 until the specified voltage reading is obtained at lamp 2.
- Measure the voltage at lamp 2 using the correct meter (see Section 8).

Step 21 Press and Hold the Transmit button. Then Press *****.
- The SSCC 1 Lamp Menu is selected.

Procedure 6-12. REMOTE LAMP VOLTAGE ADJUSTMENT

Step 22 Release the Transmit button.
- The new voltage value is saved.
- The lamp 1 output is turned off.
- The SSCC 1 Lamp Menu options are announced:
  - **"Lamp 1 press 1"**
  - **"Lamp 2 press 2"**
  - **"Lamp 1 voltage press 3"**
  - **"Lamp 2 voltage press 4"**

Step 23 Press and Hold the Transmit button. Then Press *****.
- The SSCC Menu is selected.

Step 24 Release the Transmit button.
- The SSCC Menu options are announced:
  - **"SSCC 1 press 1"**
  - **"SSCC 2 press 2"**
  - **"Crossing press 3"**

Step 25 Press and Hold the Transmit button. Then Press **2**.

Step 26 Release the Transmit button.
- The SSCC 2 Lamp Menu options are announced:
  - **"Lamp 1 press 1"**
  - **"Lamp 2 press 2"**
  - **"Lamp 1 voltage press 3"**
  - **"Lamp 2 voltage press 4"**

Step 27 Repeat steps 5 through 20 for SSCC 2.

6.17 COMPLETING REMOTE CALIBRATION

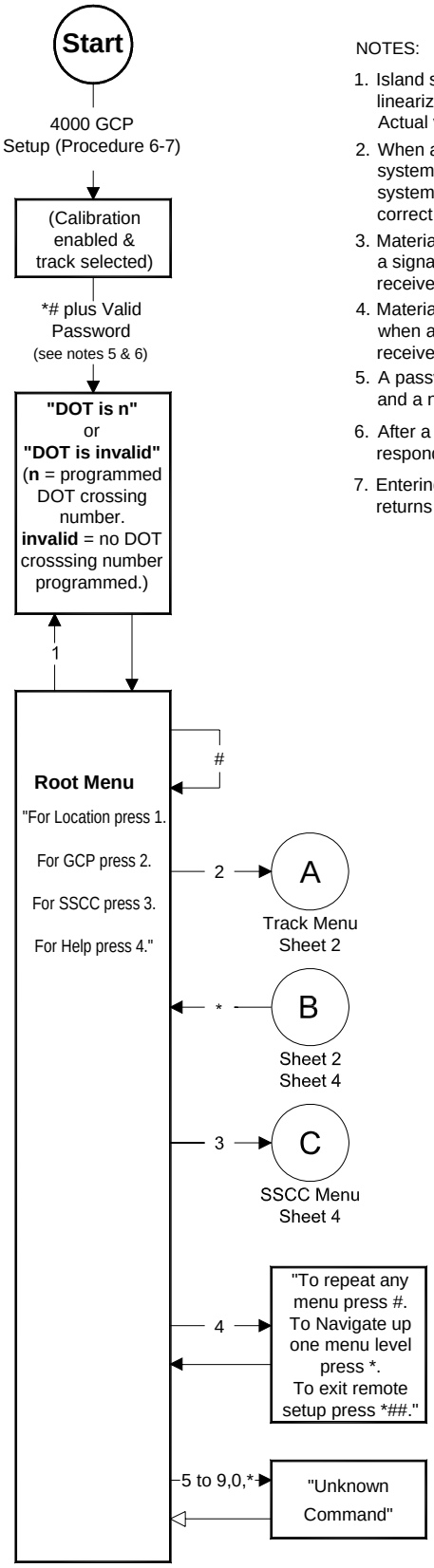
Procedure 6-14. COMPLETING REMOTE CALIBRATION

Step 1 Repeat procedures 6-9, 6-10, 6-11 and 6-12 for each track module selected in Procedure 6-8.

Step 2 To terminate the remote session:
- Press and Hold the Transmit button then press ***##**.

Step 3 Release the Transmit button.
- The remote setup is finished

Step 4 Return to the bungalow and check the Status log to ensure that the tracks were correctly calibrated.



NOTES:

1. Island signal levels, EZ values, EX values, and linearization numbers are shown as examples only. Actual values may vary.
2. When an invalid password is received, the menu system is disabled for 30 seconds. When the menu system is reactivated (after 30 seconds), the correct password must be entered to continue.
3. Material within quotation marks is announced when a signal designated by a solid arrow head is received.
4. Material within quotation marks is not announced when a signal designated by an open arrow head is received.
5. A password must be preceeded by an asterisk (*****) and a number symbol (**#**) to be accepted as valid.
6. After a valid password is entered, the system will respond with the DTMF tones for "*##".
7. Entering "*##" at any time during remote operation returns the function to the initial Start position.

Figure 6-18. Remote User Interface Menu, Sheet 1 of 5

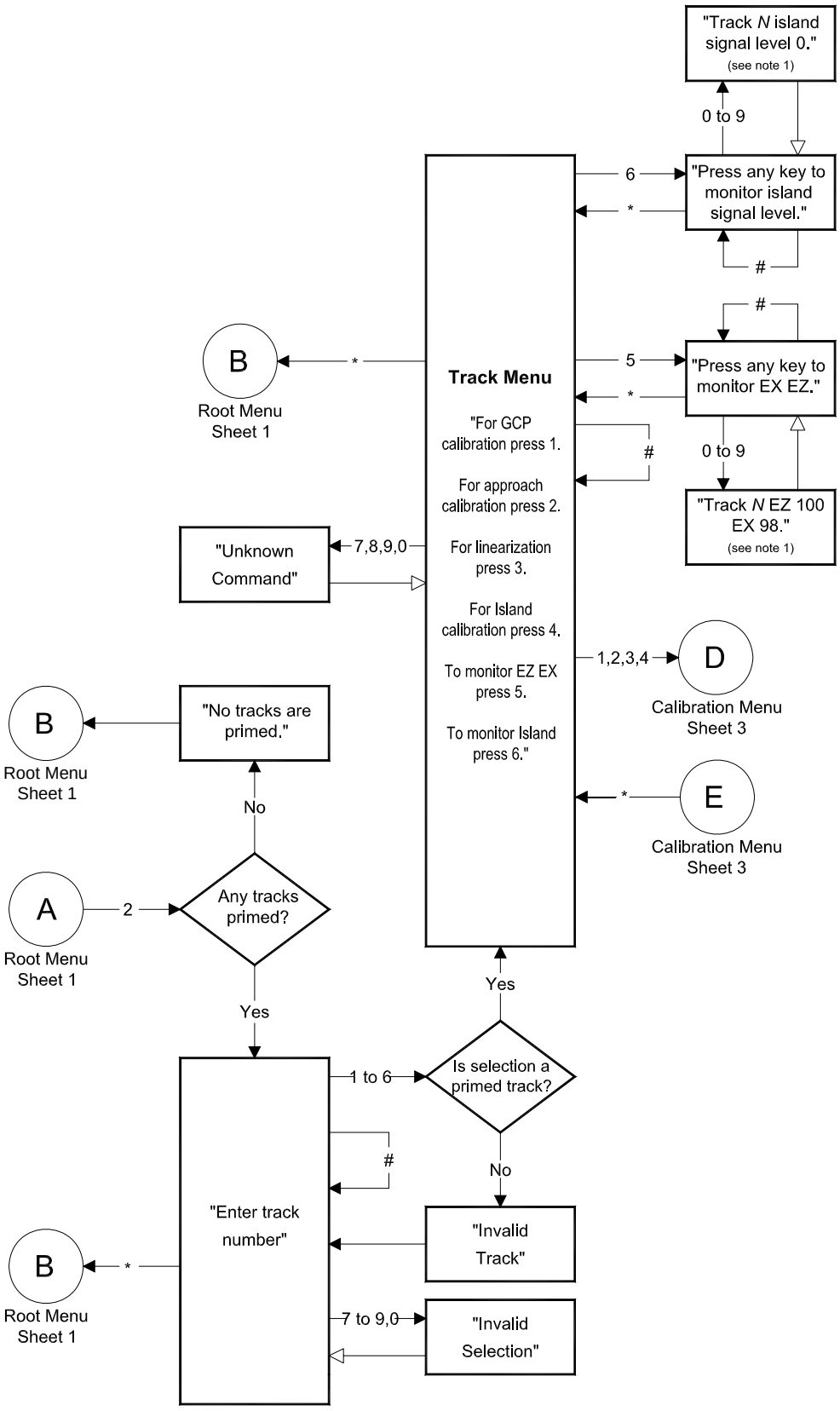


Figure 6-18. Remote User Interface Menu, Sheet 2 of 5

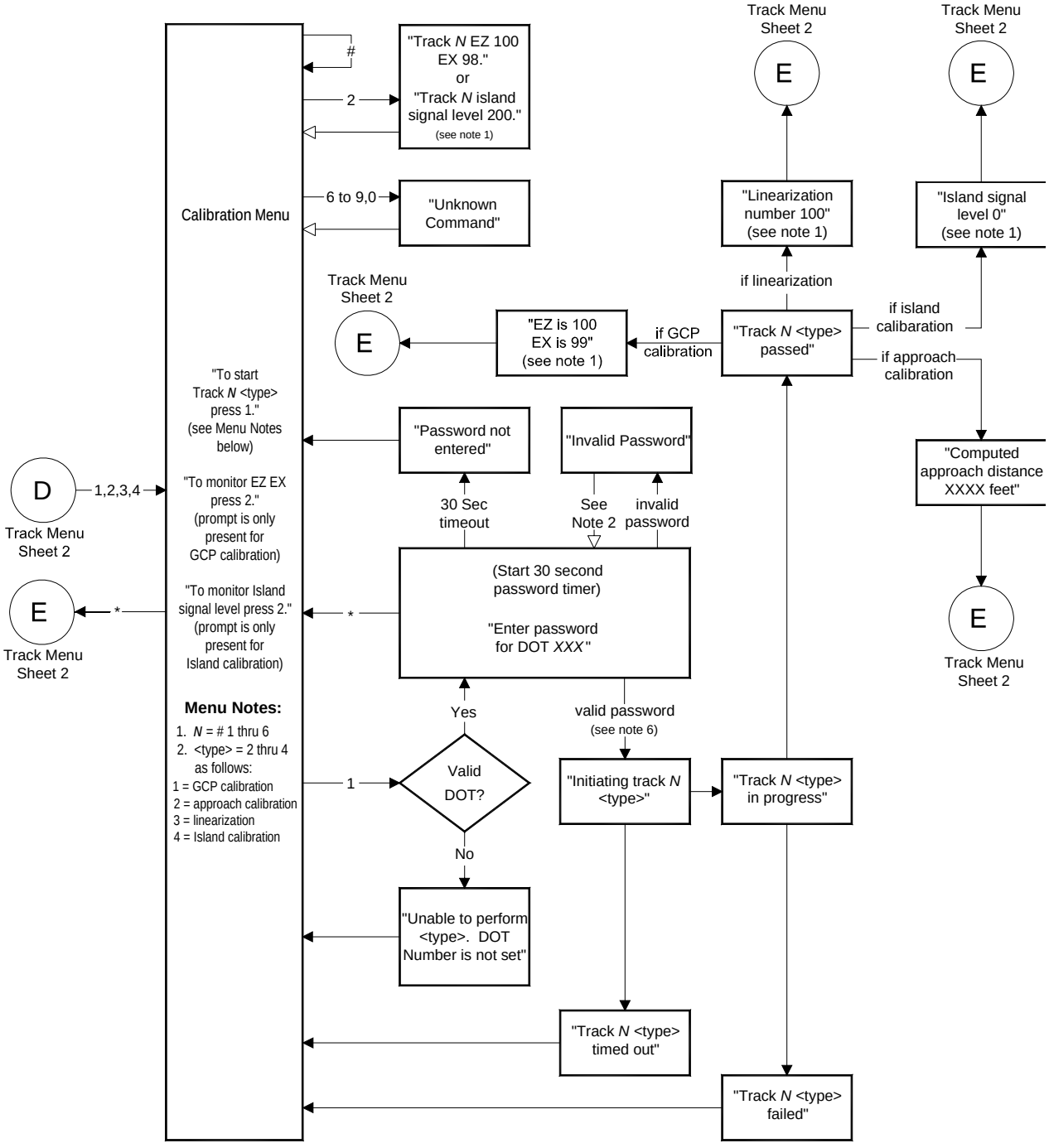


Figure 6-18. Remote User Interface Menu, Sheet 3 of 5

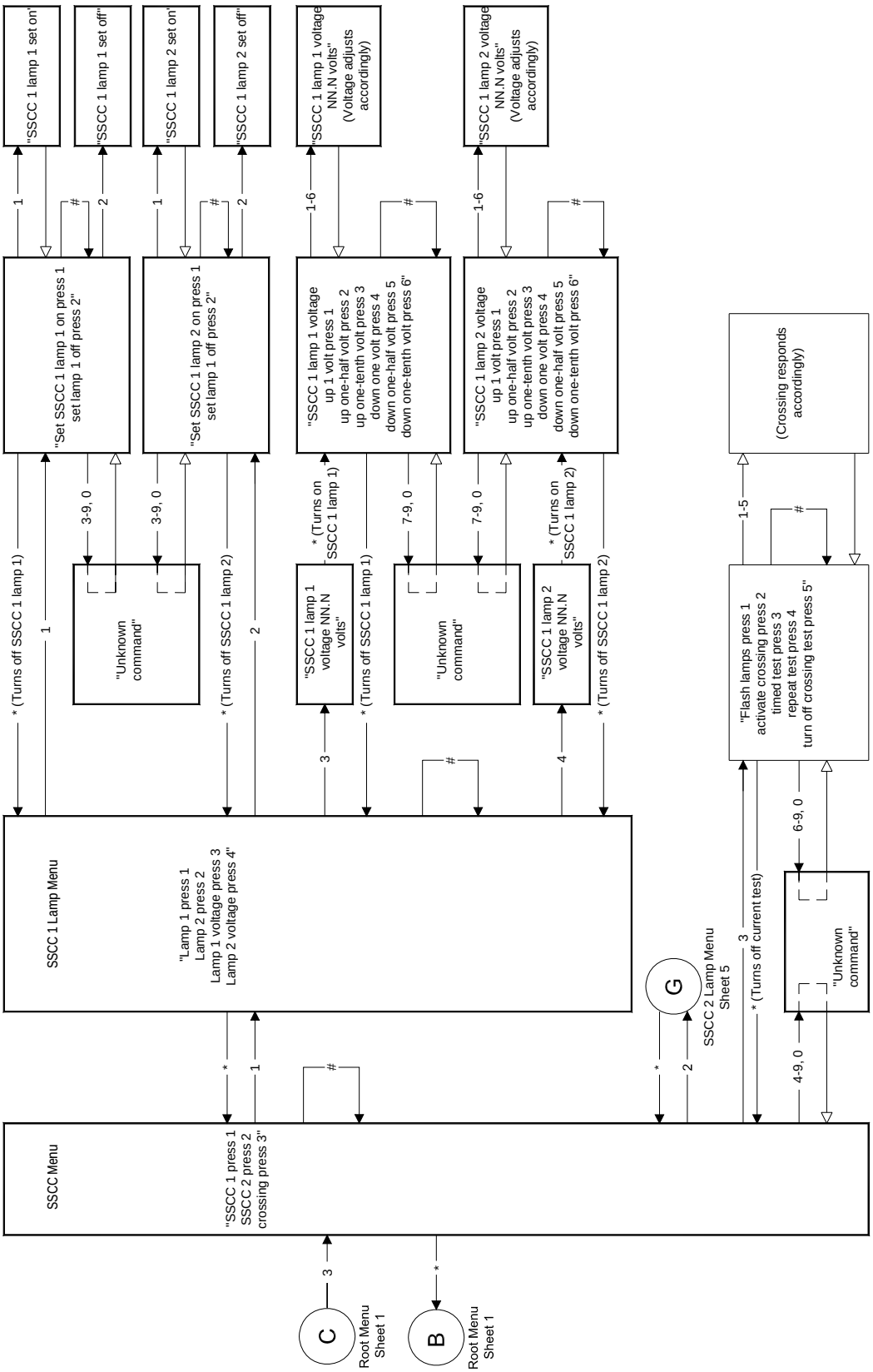


Figure 6-18. Remote User Interface Menu, Sheet 4 of 5

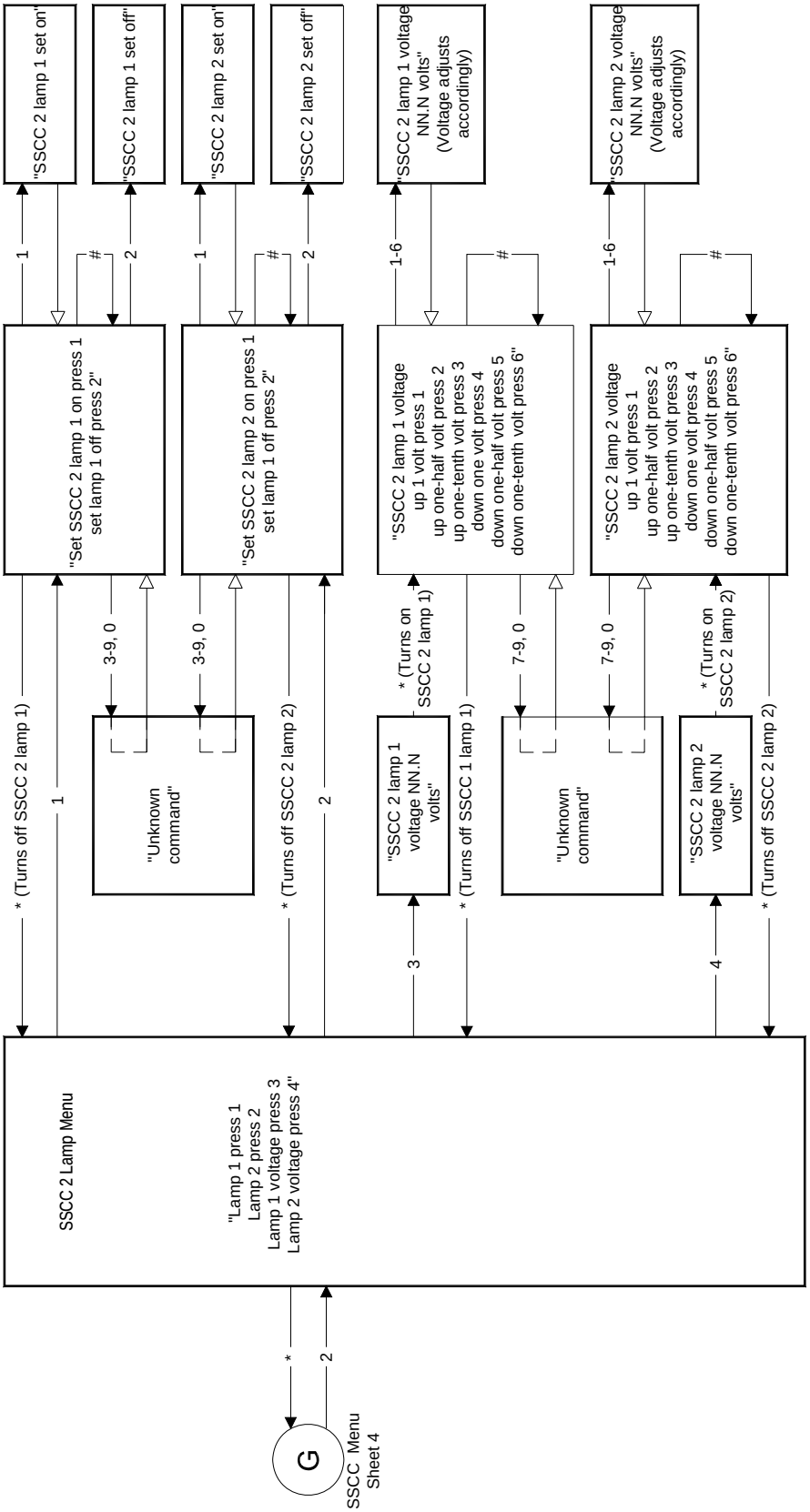


Figure 6-18. Remote User Interface Menu, Sheet 5 of 5

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SECTION 7 - DIAGNOSTICS AND TROUBLE SHOOTING

7.1 DIAGNOSTICS

This section describes how to diagnose and troubleshoot the 4000 GCP.

- There are two areas of the Diagnostic Terminal (DT) where problems are readily observed:
  - The DT Status Screen
    - A red track panel indicates the track is unhealthy.
  - System Status bar
    - A red Status bar indicates that something in the 4000 GCP is unhealthy.
    - The text shown in the bar describes the problem.
- An overview of the DT diagnostic and troubleshooting features is provided in Table 7-1.
  - Most of these features may be accessed from the DT Status Screen.
  - This table also describes:
    - possible solutions to the problem
    - what additional solutions are available and where to find them

When an error message is displayed, more information can be obtained by:

- selecting the message on the screen
  - If using the computer-based DT, double click on the message.
  - If using the Display Module DT terminal, quickly double-tap on the message.
- observing the new information that displays on the screen

Table 7-1. Features Accessed From DT Status Screen

Feature	Displays	Additional Information
Track Diagnostic Window	Lists the currently occurring diagnostic messages for the selected track module.	Window displays by selecting the track window from the Status Screen and then selecting the **Track** Diagnostic item from the displayed popup menu. • List of possible causes for the diagnostic message display. ♦ A diagnostic message code appears at end of each message. • Selecting an item from the list opens a detailed description of that message.
System Diagnostic Window	List of current diagnostic messages for all modules in the system.	Window displays by selecting the Diagnostic (**Diag**) Button from the Status Screen and then selecting the **System Diagnostic** item from the displayed popup menu. • A list of possible causes for the diagnostic message display. ♦ A diagnostic message code appears at end of each message. • Selecting an item from the list opens a detailed description of that message.

Table 7-1 continued

Feature	Displays	Additional Information
Track Detailed View Screen	Shows data only for the selected track.	Window displays by selecting the Track Window of the Status Screen and then selecting the **Detailed Status View** item from the displayed popup menu. Diagnostic data is displayed in four windows: • The Track Information Window (**GCP**) contains **EZ** and **Chk EZ** levels • The Predictor/UAX Status Window (**Predictors**) contain the states of: ♦ All enabled predictors ▪ Prime, ▪ DAX ▪ Preempt ♦ All associated UAX and Enables • The **Island** Window contains the island EZ Level. • The **I/O Status** Window contains the status of all inputs and outputs with programmed functions.
Train Log	Shows a list of warning times and train speeds for the last 40 train moves.	Select the History (**HIST)** Button from the Status Screen and then selecting the **Train Log** item from the displayed popup menu. • The Train Move History Log displays. • Selecting a message from the Log opens the corresponding Train Move History Detail Window
Diagnostic Log	Shows a date and time stamped list of diagnostic messages (past error events) from both the main and standby units.	Select the Diagnostics (**DIAG)** Button from the Status Screen and then selecting the **Diagnostics Log** item from the displayed popup menu. • The Diagnostic Log displays. • Selecting a message from the Log opens the corresponding Diagnostics Log Detailed Report Window
Status Log	Provides a date and time stamped list of events from currently active (main or standby) CPU • List shows details of: ♦ train moves ▪ EZ values ▪ EX values ♦ GCP errors ♦ GCP reboots	Select the History (**HIST)** Button from the Status Screen and then selecting the **Status Log** item from the displayed popup menu. • The Status Log displays. • Select the desired message for display

Table 7-1 continued

Feature	Displays	Additional Information
Summary Log	Provides a date and time stamped list of all past error events from the currently active (main or standby) CPU • List shows a summary of GCP errors, programming changes and reboots	Select the History (**HIST)** Button from the Status Screen and then selecting the **Summary Log** item from the displayed popup menu. • The Summary Log displays. • Select the desired message for display
Maintenance Log	Provides a place to view and record User notes on periodic maintenance, weather conditions, and etc. • Log changes are automatically date and time stamped.	Select the History (**HIST)** Button from the Status Screen and then selecting the **Maintenance Log** item from the displayed popup menu. • The Maintenance Log displays. • Select the desired message for display • Selecting the **ADD LOG ENTRY** button opens the **Log Entry** window. • Selecting the **ADD STATE** button places the current track circuit parameters at the end of the Maintenance Log.
SEAR Alarms	Shows alarms for items such as short warning times, long activations, gate up or down.	TBD
SEAR Report	Shows an independent time stamped record about crossing operation.	TBD
CPU LEDs	Indicates the state of key system states, such as AND 1 XR, AND 2, DAX A Link Communications, etc.	See Table 7-2
Track LEDs	Indicate the state of key track module states, such as Prime, DAX and Preempt states, Island Occupancy, and Motion detection.	TBD
SEAR LEDs	Indicate the SEAR Alarm Conditions	TBD
CPU 4-Character Display	Shows CPU module status and diagnostic messages	See Table 7-3
SEAR Character Display	Shows track module status and diagnostic messages	TBD

7.1.1 CPU Module

The CPU module, figure 7-1, includes LEDs and a 4-character display.

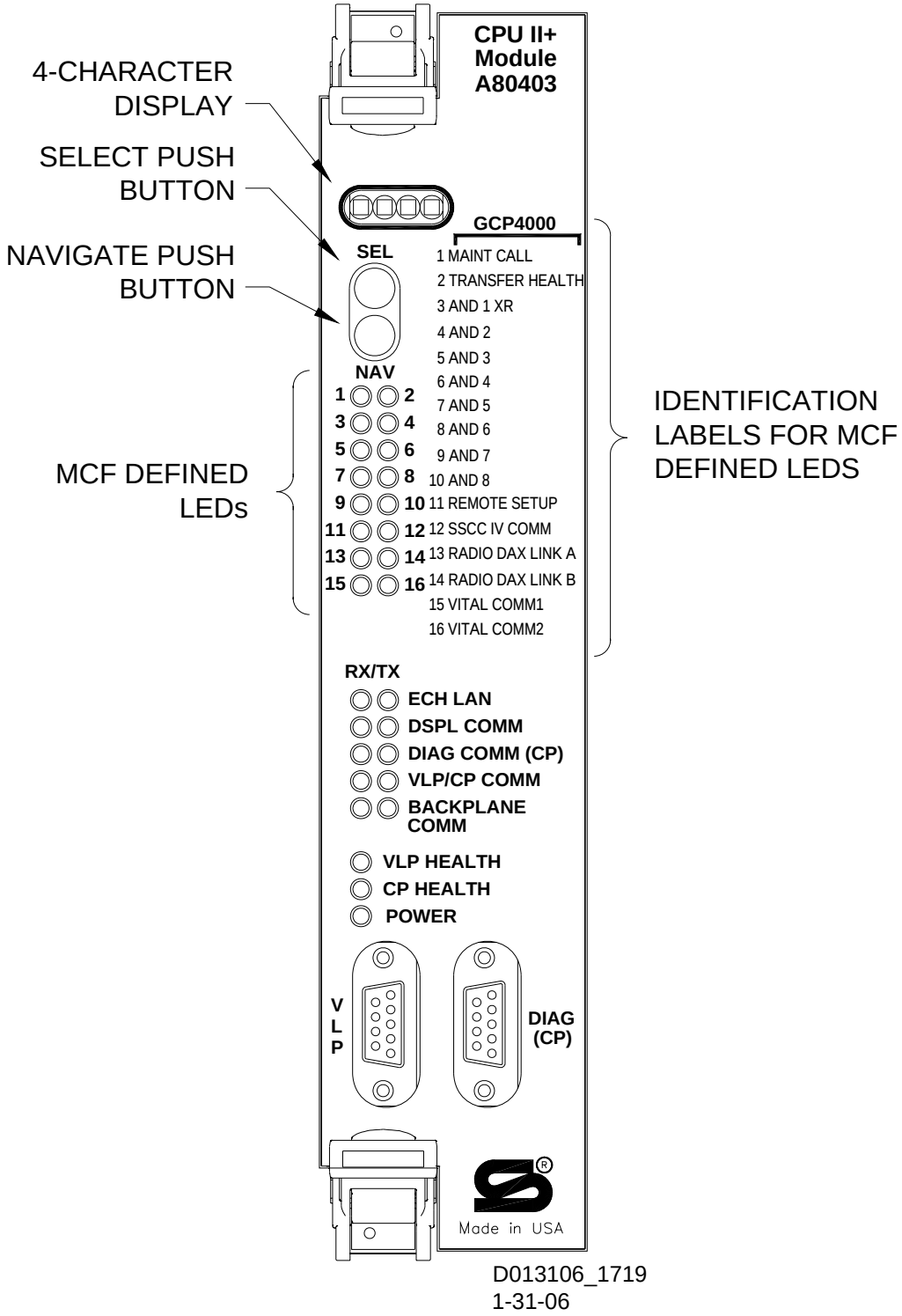


Figure 7-1. CPU Modules

7.1.1.1 CPU Front Panel LED's

The function and description of the LED's of the CPU are described in table 7-2.

- LED's 3 through 10 indicate the internal state of the AND functions.
- To find the external state of the AND function observe the state of the AND function's programmed physical output.

Table 7-2. Front Panel LED Descriptions

LED Name	Color	Function	Description
1	Red	Maintenance Call • see maintenance call logic section	On – maintenance call output on Off - maintenance call output off
2	Red	Transfer Output • see transfer output section	On – transfer signal is being generated • transfer card should not be counting down Off – transfer signal is not being generated • If transfer card is in **AUTO** it should be counting down
3	Red	AND 1 XR	On – AND 1 XR is energized Off – AND 1 XR is Deenergized
4	Red	AND 2	On – AND 2 is Energized Off – AND 2 is Deenergized or Not Used
5	Red	AND 3	On – AND 3 is Energized Off – AND 3 is Deenergized or Not Used
6	Red	AND 4	On – AND 4 is Energized Off – AND 4 is Deenergized or Not Used
7	Red	AND 5	On – AND 5 is Energized Off – AND 5 is Deenergized or Not Used
8	Red	AND 6	On – AND 6 is Energized Off – AND 6 is Deenergized or Not Used
9	Red	AND 7	On – AND 7 is Energized Off – AND 7 is Deenergized or Not Used
10	Red	AND 8	On – AND 8 is Energized Off – AND 8 is Deenergized or Not Used
11	Red	Remote Setup Session	On – the GCP has been primed for a remote one person setup • see section 6-10. Off – No remote setup is in progress
12	Red	Remote Setup Active	On – a remote setup action (GCP Approach calibration etc) is in progress Off – no remote setup action is in progress

Table 7-2 continued

LED Name	Color	Function	Description
13	Red	Radio DAX Link A	On – Radio DAX Link A is in session Off – Radio DAX Link A is not used or not in session
14	Red	Radio DAX Link B	On – Radio DAX Link B is in session Off – Radio DAX Link B is not used or not in session
15	Red	Vital Comm1	On – Vital Comm1 is in session Off – Vital Comm1 is not used or not in session
16	Red	Vital Comm2	On – Vital Comm2 is in session Off – Vital Comm2 is not used or not in session
ECH LAN TX	Red	Echelon Message Transmitted	Flashes when a message is transmitted by the CPU to another device on the echelon; e.g. SEAR2I, SSER
ECH LAN RX	Green	Echelon Message Received	Flashes when a message is received by the CPU from another device on the echelon; e.g. SEAR2I, SSER
DSPL COMM TX	Red	Display Port Message Transmitted	Flashes when a message is transmitted by the CPU to the display
DSPL COMM RX	Green	Display Port Message Received	Flashes when a message is received by the CPU from the display
DIAG COMM TX	Red	Diag Port Message Transmitted	Flashes when a message is transmitted by the CPU to the diagnostic port
DIAG COMM RX	Green	Diag Port Message Received	Flashes when a message is received by the CPU from the diagnostic port
VLP/CP COMM TX	Red	VLP to CP Comms Message Transmitted	Flashes when a message is transmitted by the CP to the VLP
VLP/CP COMM RX	Green	VLP to CP Comms Message Received	Flashes when a message is received by the CP from the VLP
BACKPLANE COMM TX	Red	Backplane Message Transmitted	Flashes when a message is transmitted by the VLP to an IO module
BACKPLANE COMM RX	Green	VLP to CP Comms Message Received	Flashes when a message is received by the VLP from an IO module
VLP HEALTH	Yellow	VLP Health Status	Flashes slowly (1Hz) when the VLP is healthy Flashes fast (4Hz) when the VLP is unhealthy
CP HEALTH	Yellow	CP Health Status	Flashes slowly (1Hz) when the CP is healthy Flashes fast (2Hz) when the CP is unhealthy
POWER	Green	Power Indication	On steady when power is applied to the module

7.1.1.2 CPU 4-Character Display

The 4-character display on the VLP shows the current state of the CPU.

- The meanings of the display's indications are described in table 7-3.

Table 7-3. CPU 4-Character Display

Indication	Mode	Meaning	System State
MCF Name; e.g. **GCP_T6X_10**	Scrolling	VLP is healthy	CPU is healthy.
VLP UCFG	Scrolling	VLP is unconfigured	No communication to I/O modules. • Crossing is activated
VLP INITIAL	Scrolling	The CP is transferring the configuration from NVRAM to the VLP	No communication to I/O modules. • Crossing is activated
NO VLP COMMS	Scrolling	The CP is not communicating with the VLP. • The VLP could be rebooting or performing its initial configuration checks	No communication to I/O modules. • Crossing is activated
EFLA	Steady	Erasing its flash memory in preparation for copying the MCF from the ECD into flash memory.	No communication to I/O modules. • Crossing is activated
CMCF / *MCF	Scrolling	The CP is copying the MCF from the ECD into flash memory.	No communication to I/O modules. • Crossing is activated

7.1.1.3 Setup Menu Display

The CPU has two processors:

- communication processor (CP)
- Vital Logic Processor (VLP).

When new software is installed into the CP, the VLP continues running without interruption until the CP setup is complete.

- This means that if the 4000 GCP system is healthy and the crossing is not active, the VLP continues to correctly control the crossing while the new software installation into the CP is in progress.
- However, while the software transfer is in progress, the CP is not capable of logging state changes or communicating to the SEAR IIi.

Table 7-4. Setup Menu Display

Indication	Mode	Meaning
DOWNLOADING SETUP	Scrolling	The setup program is being down-loaded into the CP.
SETUP	Scrolling	The CP is in setup mode; i.e., MCF, MCF CRC, or CP MEF is being changed.
WAIT	Steady	CP is erasing flash memory.
WAITING FOR MEF	Scrolling	CP is waiting for a new MEF.
DOWNLOADING MEF	Scrolling	A new MEF is being downloaded into the CP.
WAITING FOR MCF	Scrolling	CP is waiting for a new MCF.
DOWNLOADING MCF	Scrolling	A new MCF is being downloaded into the CP.
DONE	Steady	Setup mode is ending.
BOOT	Steady	The CP is rebooting.

7.1.2 Track Module

The Track module, figure 7-2, includes LEDs and a 4-character display.

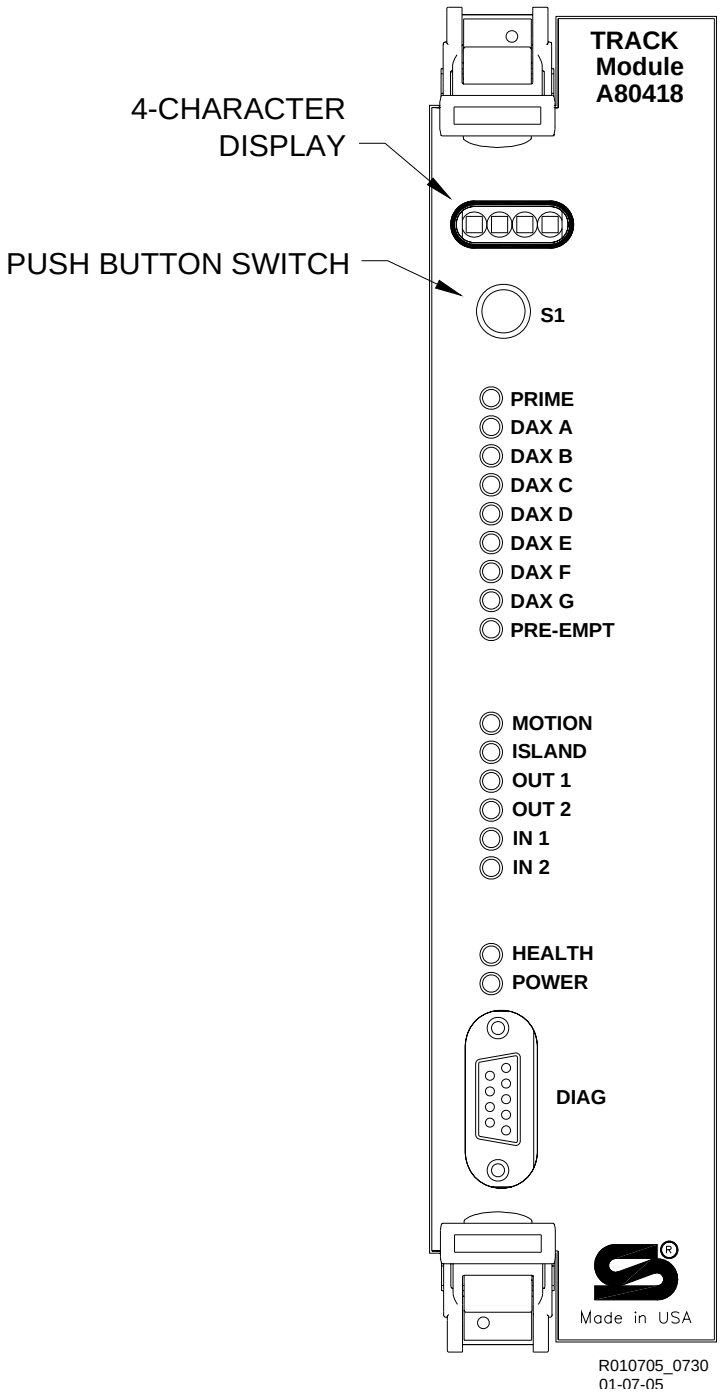


Figure 7-2. Track Module

7.1.2.1 Track LEDS

The track module LEDs are described in table 7-5

- The island LED of a module indicates the state of the island used by the MS/GCP operation.
  - The island is specified by the Island Connection programming option.
  - For example, in a back-to-back unidirectional application where the track 1 island is active and track 2 uses the track 1 island, the island LED on track 2 reflects the state of the island on track 1.

Table 7-5. Track LEDs

LED Name	Color	Description
PRIME	Red	On – Prime predictor is energized Off – Prime predictor is deenergized or not used Flashing – Prime predictor is running the programmed pickup delay
DAX A	Red	On – DAX A predictor is energized Off – DAX A predictor is deenergized or not used Flashing – DAX A predictor is running its pickup delay
DAX B	Red	On – DAX B predictor is energized Off – DAX B predictor is deenergized or not used Flashing – DAX B predictor is running its pickup delay
DAX C	Red	On – DAX C predictor is energized Off – DAX C predictor is deenergized or not used Flashing – DAX C predictor is running its pickup delay
DAX D	Red	On – DAX D predictor is energized Off – DAX D predictor is deenergized or not used Flashing – DAX D predictor is running its pickup delay
DAX E	Red	On – DAX E predictor is energized Off – DAX E predictor is deenergized or not used Flashing – DAX E predictor is running its pickup delay
DAX F	Red	On – DAX F predictor is energized Off – DAX F predictor is deenergized or not used Flashing – DAX F predictor is running its pickup delay
DAX G	Red	On – DAX G predictor is energized Off – DAX G predictor is deenergized or not used Flashing – DAX G predictor is running its pickup delay
PRE-EMPT	Red	On – Preempt predictor is energized Off – Preempt predictor is deenergized or not used Flashing – Preempt predictor is running its pickup delay
MOTION	Red	On – GCP has not detected motion Off – GCP has detected motion

Table 7-5 continued

LED Name	Color	Description
ISLAND	Red	On – Island is unoccupied Off – Island is occupied Flashing – Island is running its pickup delay
OUT 1	Red	On – output energized Off – output deenergized or failed
OUT 2	Red	On – output energized Off – output deenergized or failed
IN 1	Red	On – input energized Off – input deenergized or failed
IN 2	Red	On – input energized Off – input deenergized or failed
HEALTH	Yellow	Slow (1Hz) – module is healthy and communicating with CPU Fast (2Hz) – module is not communicating with CPU Very Fast (4Hz) – module is unhealthy and communicating with CPU
POWER	Green	LED is on steady when power is applied to the module

7.1.2.2 Track 4-Character Display

The 4-character display on the Track Module shows the current module function.

- The information can be broken into five categories:
  - ♦ Normal Operation
  - ♦ Calibration
  - ♦ Diagnostics
  - ♦ Boot up
  - ♦ Software Installation

7.1.2.2.1 Normal Operation

The messages that appear during normal operation are shown in table 7-6.

Table 7-6. Normal Messages

Indication	Mode	Meaning	Module State
***GCP**	* blinks on and off	Module is healthy • MS/GCP Operation is on • No trains are detected on the approach.	Performing train predictions
***ISL**	* blinks on and off	Module is healthy • MS/GCP Operation is not used • Island Operation is used.	Performing Island detection • train prediction disabled
I*nnn* e.g. **I085**	Steady	The module has detected inbound motion • EZ is given by the value 'nnn'.	Performing train predictions
S*nnn* e.g. **S045**	Steady	The module has not detected inbound or outbound motion • EZ is given by the value 'nnn'.	Performing train predictions
O*nnn* e.g. **O049**	Steady	The module has detected outbound motion • EZ is given by the value 'nnn'.	Performing train predictions

7.1.2.2.2 Calibration

The messages that appear during calibration are shown in table 7-7.

Table 7-7. Calibration Messages

Indication	Mode	Meaning	Module State
GCAL	blinks on and off	GCP Calibration in progress	All predictors deenergized
GAPP	blinks on and off	GCP Approach in progress	All predictors deenergized
GLIN	blinks on and off	GCP Linearization in progress	All predictors energized
ICAL	blinks on and off	Island Calibration in progress	Island deenergized

7.1.2.2.3 Diagnostics

When the Track Module is unhealthy or requires calibration, a 4-character diagnostic code is shown in its display.

- If more than one diagnostic code is present, the module scrolls around the list of messages.
- The possible diagnostic codes are shown in table 7-8.

Table 7-8. Diagnostics Messages

Indication	Meaning	Module State
CKEX	The Check wire phase is incorrect	All predictors deenergized
CHK 1	The receive wire EZ reading is very low in comparison with the check wire EZ	All predictors deenergized
CHK2	The check wire EZ reading is very low in comparison with the receive wire EZ	All predictors deenergized
CHK4	The check wire and receive wire readings are more than 50 point different	All predictors deenergized
GAPP	GCP Approach Calibration is required	All predictors deenergized
GCAL	GCP Calibration is required	All predictors deenergized
GEXP	GCP has detected a decreasing phase that could be a bad bond	All predictors deenergized
GFREQ	GCP frequency not set	All predictors deenergized
GHWR	GCP hardware error	All predictors deenergized
GIPS	Enhanced detection has been turned on and the GCP has detected poor shunting	Prime and Preempt deenergized (any zero offset predictors)
GLIN	GCP Linearization Calibration is required	All predictors are energized
GLCK	EZ or check EZ is below 3 after GCP has booted up. • possible broken wires	All predictors deenergized
GOFS	MS/GCP Operation is Out of Service	All used predictors are energized All unused predictors are deenergized
GRCV	GCP receiver error	All predictors are deenergized
GSLV	GCP slaving error	No effect on predictors
GSTB	GCP is stabilizing after transmitter has been turned on	All predictors are deenergized
GXMT	GCP transmitter error	All predictors are deenergized
HIEZ	High EZ (>115) detected on main or check wires	All predictors are deenergized
ICAL	Island Calibration is required	Island is deenergized

Table 7-8 continued

Indication	Meaning	Module State
IFREQ	Island frequency not set	Island is deenergized
IOFS	Island Operation is Out of Service	Island is energized
ISTB	Island is stabilizing after transmitter has been turned on	Island is deenergized
ITST	Island has detected a possible interfering signal	No effect on Island occupancy
IXMT	Island transmitter error	Island is deenergized
LWEX	Low EX detected • Low EX Adjustment is usually 39	All predictors are deenergized
LWEZ	Low EZ detection is turned on and EZ has remained below the low detection level for longer than the low EZ detection time.	All predictors are deenergized
RECV (RECOVERY)	The GCP is running a 30 sec. Recovery time-out after an error has cleared	All predictors are deenergized
RECV (RECOVERY)	The Island is running a 30 sec. Recovery Time-out after an error has cleared	Island is occupied
RXEX	The receive wire phase is incorrect	All predictors deenergized
UCFG	Track module is unconfigured	All predictors deenergized Island deenergized • Outputs deenergized Inputs deenergized
VOER	Output hardware failure detected. • Output is commanded on but is detected as off	Failed output(s) deenergized

7.1.2.2.4 Boot Up

The messages that can appear during bootup are shown in table 7-9.

Table 7-9. Boot up Messages

Indication	Mode	Meaning	Module State
BOOT	Steady	The module is rebooting	All predictors, island, inputs and outputs are deenergized
INIT	Steady	The module is performing its initialization	All predictors, island, inputs and outputs are deenergized

The normal sequence of messages that may be seen on boot up of a healthy track module that is fully calibrated is shown in table 7-10.

Table 7-10. Module State During Bootup

Indication	Module State
BOOT	Rebooting
INIT	Initializing
GHWR	Checking hardware
UCFG	The module is unconfigured and awaiting its configuration from the CPU
GSTB and ISTB	The GCP and Island are stabilizing
***GCP**	Module is healthy

7.1.2.2.5 Software Installation

When new software is installed, the message shown in table 7-11 normally displays while the software is being downloaded.

Table 7-11. Software Installation Messages

Indication	Mode	Meaning
BOOT	Steady	• The setup program is being downloaded into the CP • The module is in setup mode • The module is having a new MEF downloaded

7.1.3 SSCCIIIi Module

Twelve LEDs are on the front Panel of SSCCIIIi Module as shown in figure 7-3.

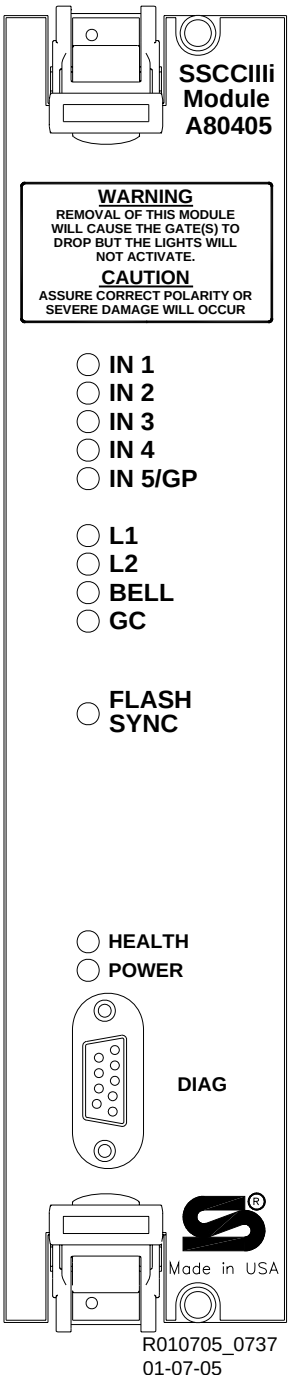


Figure 7-3. SSCCIIIi Module

7.1.3.1 SSCC IIIi LEDS

The functional descriptions of the SSCCIIIi Module LEDs are provided in table 7-12.

- IN 5 is normally used as the Gate Position (GP) input on SSCC

Table 7-12. SSCC IIIi Module Front Panel Indicators

LED	Color	Description
IN 1	Red	On – input 1 energized Off – input 1 deenergized
IN 2	Red	On – input 2 energized Off – input 2 deenergized
IN 3	Red	On – input 3 energized Off – input 3 deenergized
IN 4	Red	On – input 4 energized Off – input 4 deenergized
IN 5/GP	Red	On – input 5 energized Off – input 5 deenergized
L1	Red	On – lamp 1 is in steady Off – lamp 1 is in off Flashing – lamp 1 is flashing
L2	Red	On – lamp 2 is in steady Off – lamp 2 is in off Flashing – lamp 2 is flashing
BELL	Red	On – bell is on Off – bell is off
GC	Red	On – gate control output is energized Off – gate control output is deenergized
FLASH SYNC	Red	If the SSCC3I is set as the flash sync master, the master is generating the flash sync signal If the SSCC3I is set as the flash sync slave, the slave is receiving the flash sync signal
HEALTH	Yellow	Slow (1Hz) – module is healthy and communicating with CPU Fast (2Hz) – module is not communicating with CPU Very Fast (4Hz) - module is unhealthy and communicating with CPU
POWER	Green	This LED is on steady when power is applied to the module

7.1.4 RIO Module

Ten LEDs are on the front panel of the RIO module as shown in figure 7-4.

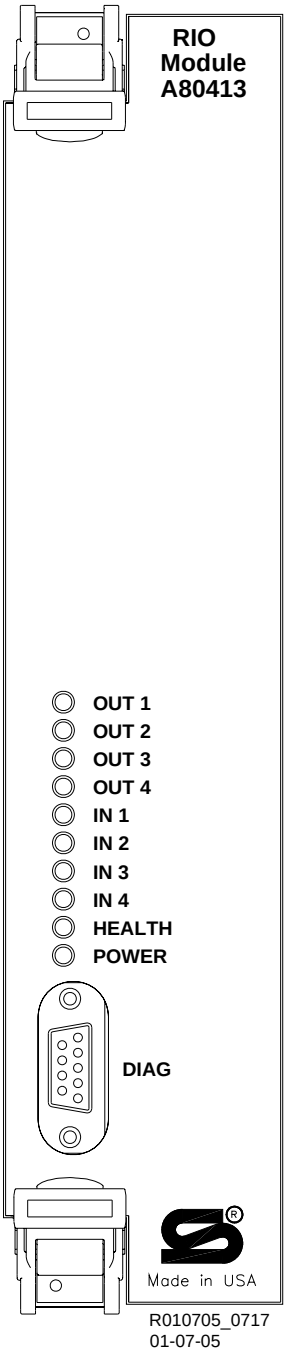


Figure 7-4. RIO Module

7.1.4.1 RIO LEDS

The functional descriptions of the RIO Module LEDs are provided in table 7-13.

Table 7-13. Front of the RIO Module

LED	Color	Description
OUT 1	Red	On – output 1 energized Off – output 1 deenergized
OUT 2	Red	On – output 2 energized Off – output 2 deenergized
OUT 3	Red	On – output 3 energized Off – output 3 deenergized
OUT 4	Red	On – output 4 energized Off – output 4 deenergized
IN 1	Red	On – input 1 energized Off – input 1 deenergized
IN 2	Red	On – input 2 energized Off – input 2 deenergized
IN 3	Red	On – input 3 energized Off – input 3 deenergized
IN 4	Red	On – input 4 energized Off – input 4 deenergized
HEALTH	Yellow	Slow (1Hz) – module is healthy and communicating with CPU Fast (2Hz) – module is not communicating with CPU Very Fast (4Hz) - module is unhealthy
POWER	Green	This LED is on steady when power is applied to the module

7.1.5 Transfer Module

The transfer module, figure 7-5, includes 4 LEDs and a 4-character display.

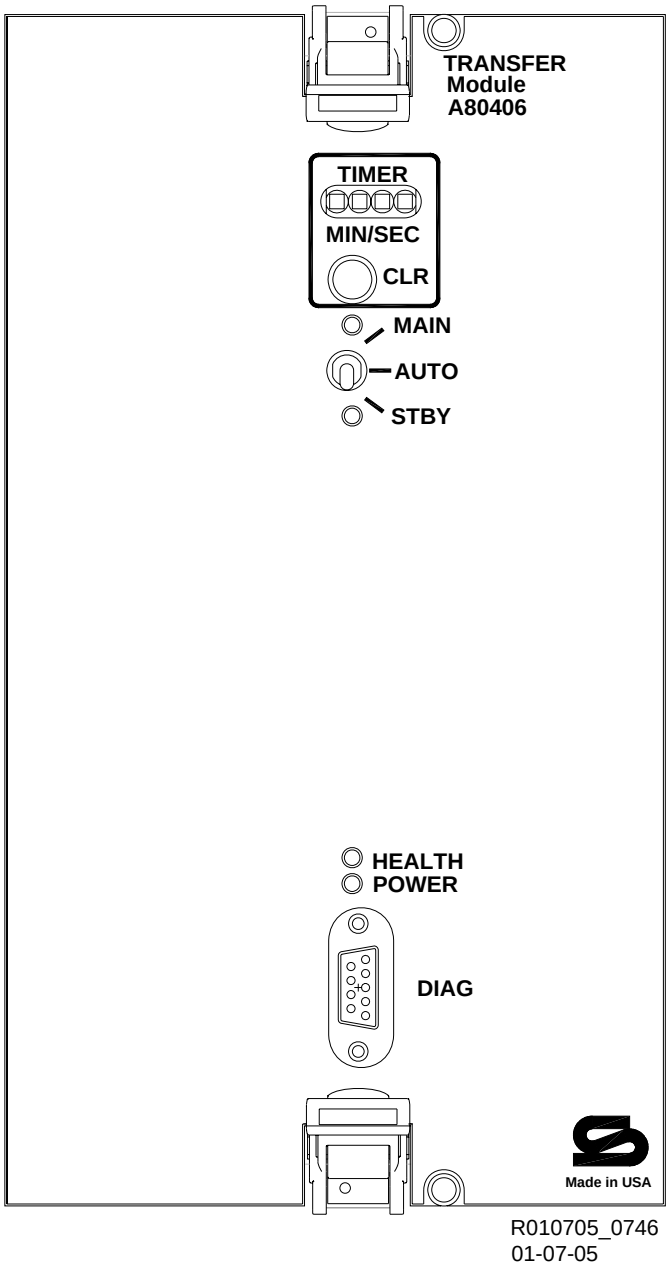


Figure 7-5. Transfer Module

7.1.5.1 Transfer Module Indicators

The functional descriptions of the Transfer Module LEDs are shown in table 7-14.

The functional meaning for each Indication on the 4-character display is shown in table 7-15.

Table 7-14. Transfer Module LEDs

LED	Color	Description
MAIN	Red	On – the Main side is currently being powered Off – the Main side is not currently being powered
STDY	Red	On – the Standby side is currently being powered Off – the Standby side is not currently being powered
HEALTH	Yellow	Slow (1Hz) – module is healthy
POWER	Green	This LED is on steady when power is applied to the module

Table 7-15. Transfer Module 4-Charactere Display

Indication	Display State	Description
MAIN	Steady	Module switch is set to Main • Main side is powered
STBY	Steady	Module switch is set to Standby • Standby side is powered
MMSS e.g. 0240 (2 minutes 40 seconds)	Steady	If the number is not changing, and the module is set to **AUTO**, indication represents the programmed transfer time. • Either Main of Standby side may be powered.
MMSS e.g. 0200 (2 minutes 00 seconds)	Decreasing	If the number is decreasing and the module is set to **AUTO**, the currently selected side is unhealthy and the number represents the time left until a transfer occurs • Either Main of Standby side may be powered.
MMSS alternating with **SWCH**	Steady	**SWCH** indicates that the module has transferred since the **CLR** button was last pressed. • Either Main of Standby side may be powered.

7.1.6 SEARIIi

The SEARIIi Module, figure 7-6, has front panel LEDs and a Display Interface that may be accessed from the Display Module.

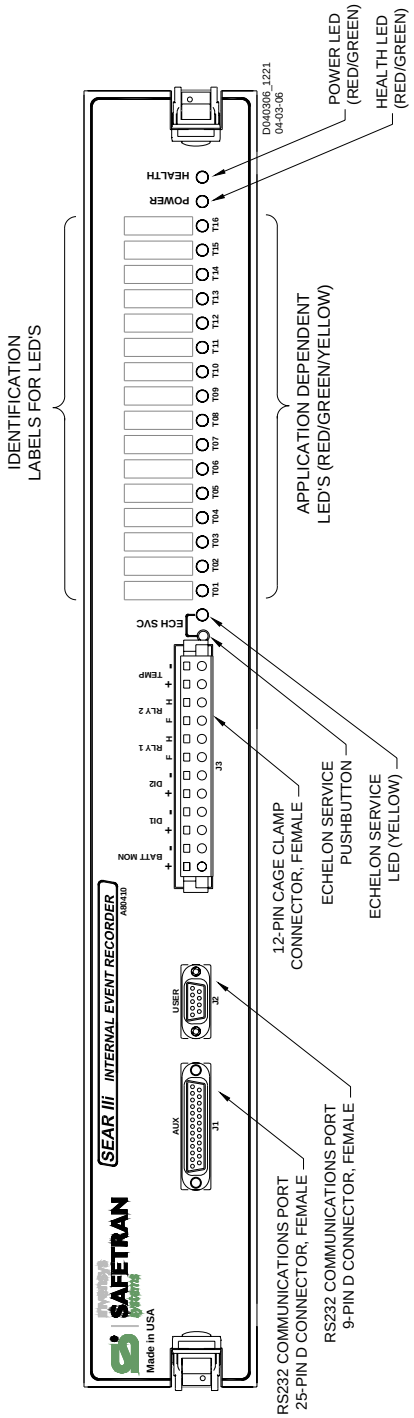


Figure 7-6. SEARIIi Module

7.1.6.1 SEAR IIi LEDS

The Standard SEARIIi Application includes the 19 front-panel LEDs that indicate LAN, SEAR IIi and event status:

- **ECH SCV** LED flashes red until the SEAR IIi is initialized
- **POWER** LED lights green while power is applied
- **HEALTH** LED
  - ♦ Flashes green if backup battery output is within acceptable voltage range.
  - ♦ Flashes yellow if backup battery is below minimum acceptable voltage.
  - ♦ Off while SEAR IIi is inoperative.
- 16 user programmed event LEDs (**T01 – T16**):
  - ♦ Light when programmed event occurs
    - ▪ Light red, green, or yellow
    - ▪ Event color predetermined by program
  - ♦ Are described in table 7-16.

Table 7-16. SEARIIi LED Indicators

LED	Alarm Label	Designator	Checked	LED States
T01	LA, CL	**Long Activation Alarm**	**Always**	**Off** when alarm is disabled **Green** when alarm is enabled **Red** when an alarm condition exists **Yellow** when CL or IP condition exists
T02	Reserved	Reserved	Reserved	Reserved
T03	Reserved	Reserved	Reserved	Reserved
T04	GD	Gate Down Alarm	Train Move	**Off** when alarm is disabled **Green** when alarm is enabled **Red** when an alarm condition exists
T05	GU	Gate Up Alarm	Train Move	
T06	TR	Trouble Light	Always	
T07	BA	Battery	Always	
T08	EO	Light Out	Always	
T09	IP, PK, OP	Power Off	Always	**Off** when alarm is disabled **Green** when alarm is enabled **Red** when an alarm condition exists **Yellow** when CL or IP condition exists **Slow flashing Green** if OP condition exists
T10	DO	Door Alarm	Always	**Off** when alarm is disabled **Green** when alarm is enabled **Red** when an alarm condition exists **Fast flashing Green** when door is opened and Door Open alarm is armed

Table 7-16 continued

LED	Alarm Label	Designator	Checked	LED States
T11	TP	Temperature	Always	**Off** when alarm is disabled **Green** when alarm is enabled **Red** when an alarm condition exists
T12	AF	Analyzer Failure	Always	
T13	VH	Vehicle Detector Health	Always	
T14	GF	Ground Fault	Always	
T15	NO	Normal Operation	Always	**Green** when alarm is enabled **Red** when an alarm condition exists
T16	OL	Online	Always	**Green** when online **Red** when offline

7.1.6.2 SEAR IIi ALARMS

The alarms generated by the SEAR Iii are described in table 7-17.

Table 7-17. SEARIIi Alarms

Alarm Number	Alarm Label	Designator	Condition
1	LA	Long Activation Alarm	Crossing active for more than 20 minutes
2	n/a	Reserved	• Reserved
3	n/a	Reserved	Reserved
4	GD	Gate Down Alarm	Gate not down 45 seconds after crossing is active
5	GU	Gate Up Alarm	Gate not up 180 seconds after crossing clears
6	TR	Trouble LITE	Trouble light off and POK1, 2 on for more than 60 seconds
7	BA	Battery	Any battery input that is below or above the user defined thresholds for more than 10 minutes. Low Battery Threshold 75% to 90% of normal operating battery. High Battery Threshold 110% to 120% of normal operating battery.
8	EO	LITE Out	1 or 2 bulbs out or flash rate <35 or >65
9	IP	Initial Power Off	POK off for more then 20 minutes
10	PK	Power Off	POK off for more than 2 hours
11	DO	Door Alarm	Intrusion alarm (see paragraph 7.1.6.2.1)
12	TP	Temperature	Temperature above 150° Fahrenheit

Table 7-17 continued

Alarm Number	Alarm Label	Designator	Condition
13	AF	Analyzer Failure	SEAR loses communications with any of its installed Echelon nodes, ground faults, or TSS units
14	VH	Vehicle Detector Health	Vehicle health output down for more than 15 seconds
15	GF	Ground Fault	Ground fault detected for more than 20 seconds
101	CL	XING Cleared	Indicates crossing cleared for 5 minutes after long activation alarm
102	OP	Power	POK on for 5 minutes after an IP or PK alarm
103	NO	Online	Pressing the **CLEAR ALARM** key one time sends the SEAR offline. • No alarms are reported during this time. Pressing the **CLEAR ALARM** key a second time brings the SEAR back online and resets all alarms. • The SEAR always powers up online (2 minutes after power applied). • If left offline, SEAR will automatically return to online in 60 minutes. • SEAR will set itself offline for 2 minutes, if the GCP transfers, to allow the GCP to power up.
104	CK	Unit Health	Sends a health message to the office on a periodic time base determined by the user.

7.1.6.2.1 Intrusion Alarm Operation

Enabling the alarm:

- Alarm is enabled by setting up a door1 or door2 input on the GCP 4000.
  - ♦ LED T10 indicates green to show that the intrusion alarm is enabled.

Arming the alarm:

- The alarm is automatically armed when LED T10 indicates green and the door is closed for 10 seconds
  - ♦ "Intrusion alarm armed" appears in log
  - ♦ CRTU 4 output energizes for 2 seconds.
  - ♦ This output may be connected to a buzzer to audibly indicate the intrusion alarm is armed.

Disarming the alarm:

- Upon Entering an armed site, LED T10 will be flashing green at a fast rate to indicate that the alarm must be disarmed within 60 seconds or an intrusion alarm will occur.
  - ♦ Touch display screen to activate screen.

- Press MORE button until SEAR button is displayed at top of screen.
- Press CLEAR ALARM button once (on SEAR IIi interface screen).
- This will not take the SEAR IIi off line.

NOTE

Closing the door will not stop the alarm timer if the door has been opened for more than 2 seconds. The 2 seconds of debounce is intended to prevent vibration from falsely activating the alarm.

Intrusion alarm operation:

- If the alarm is not disarmed in time:
  - The log will indicate that a DO alarm has occurred and LED T10 will indicate red.
  - Closing the door will not rearm the system until the alarm is cleared by pressing **CLEAR ALARM** button once.
  - LED T10 will indicate green and if the door was the only alarm active, a NO will occur as well.
  - This will **not** take the SEAR IIi offline or **clear** the alarm.

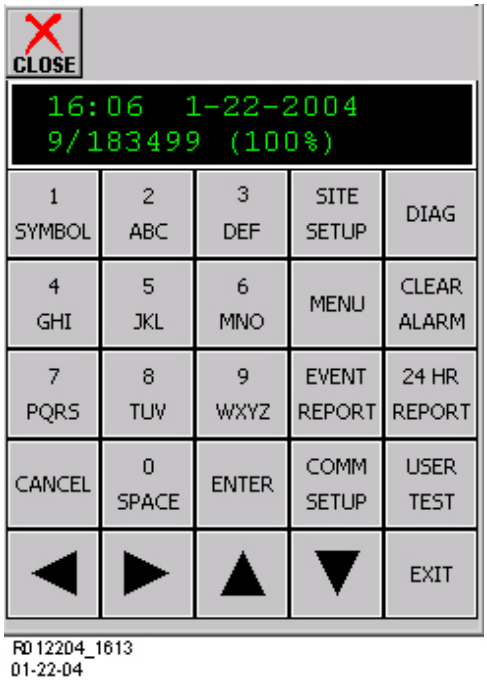


Figure 7-7. SEARIIi Display Interface Screen

7.1.6.3 Display Interface

Select the **SEAR** button on the Status Screen to open the SEAR Interface.

- Using the Interface screen, figure 7-7, existing alarms may be observed and cleared

7.1.7 Display Module

The Display module, figure 7-8, may be used to determine the status of the 4000 GCP system and aid in the diagnosis of any system problem.

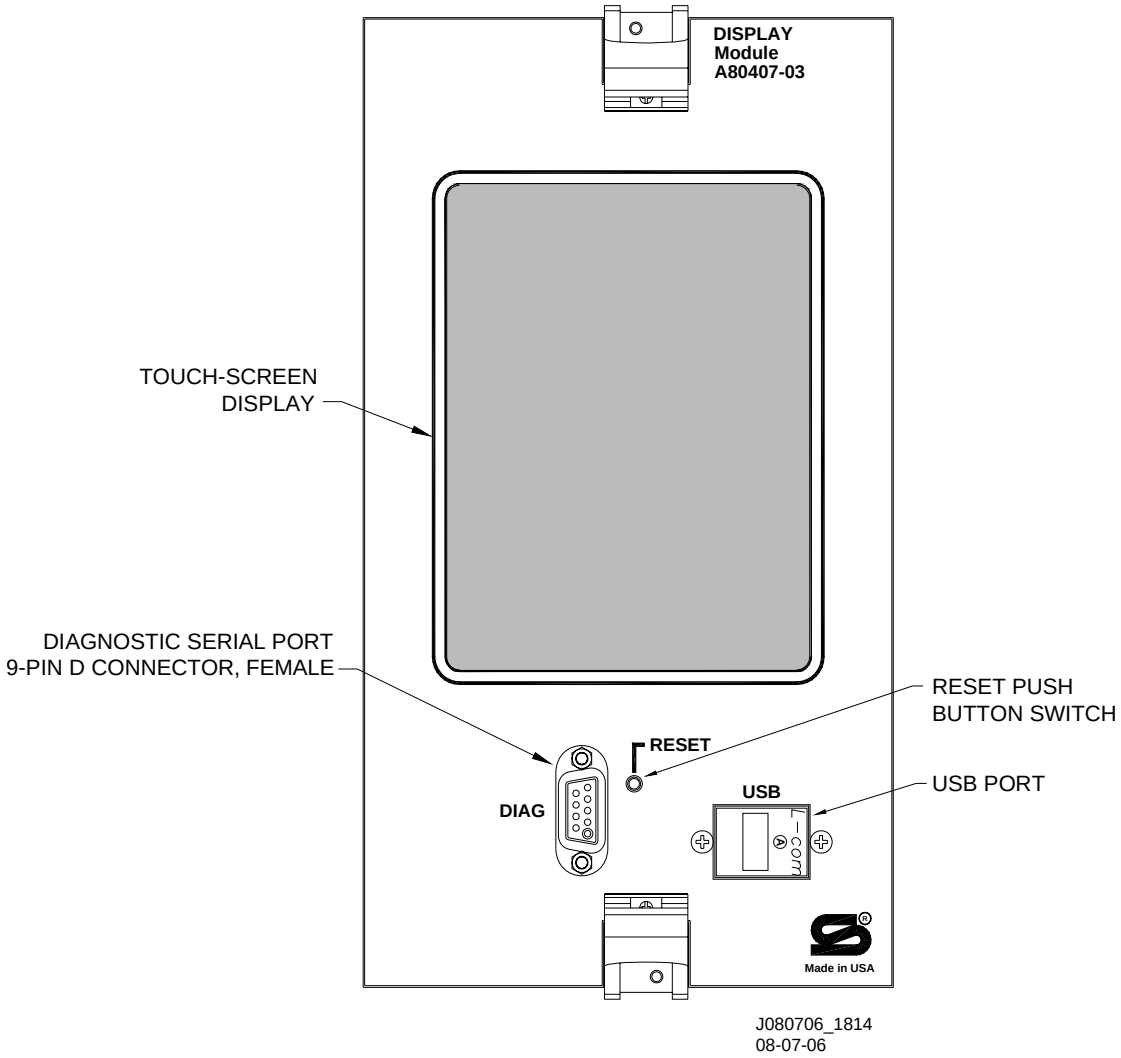


Figure 7-8. Display Module

7.1.7.1 Track and System Diagnostic Windows

The Main DT Display immediately shows the health of the system.

7.1.7.1.1 Unhealthy Track Condition

If any track is unhealthy, the corresponding track window is red or shows the Calibrations Required message.

If any module in the system is unhealthy, the System Status Bar is red.

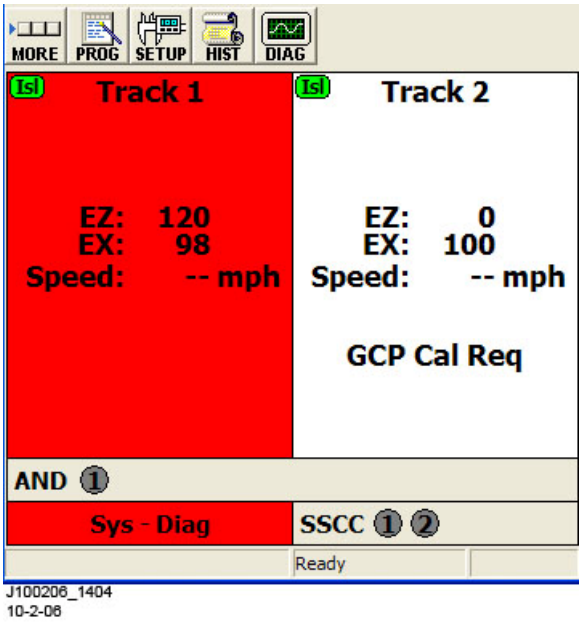


Figure 7-9 Example Unhealthy Screen

7.1.7.1.2 Healthy Track Condition

If all track modules are healthy, all the track windows are:

- gray if no trains are detected
- white if trains are detected

If any module in the system is unhealthy the System Status Bar is red

7.1.7.1.3 Unhealthy Track Module

When a Track Module window is red, the diagnostics messages for that Module appear within the Track Diagnostic Window.

- This window may be accessed by first selecting the red track window and then the **Track Diagnostic** item from the displayed pop-up menu.
- The Track Diagnostic window, figure 7-10A, displays a list of the diagnostic messages currently reported by the module.
- Additional information on each diagnostic message item may be obtained by selecting the item from the list.
  - ♦ The Message Description Window, figure 7-10B, displays, providing:
    - ▪ a list of the possible causes
    - ▪ the steps required to correct the problem

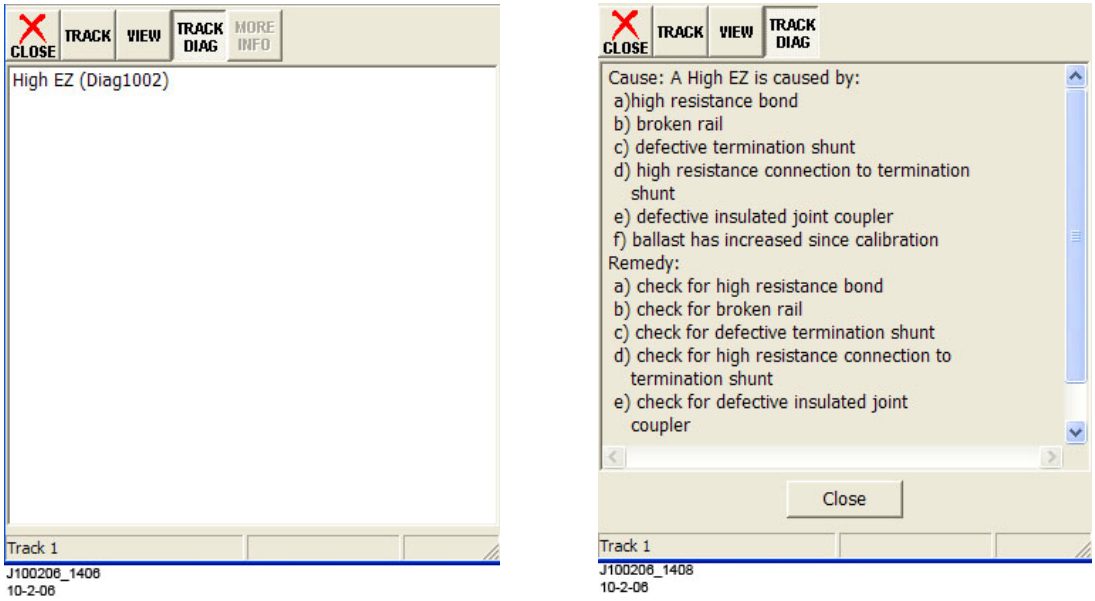


Figure 7-10. Track Diagnostic Message Windows

Some diagnostic messages appear after the initial problem has been eliminated and the GCP is recovering.

- Two examples are:
  - ♦ GCP recovering
  - ♦ Island Recovering
- A Track Module is considered unhealthy during its recovery period.
  - ♦ Predictors of module are deenergized

If the system status bar is red, the diagnostics messages for all unhealthy modules appear within the Module Diagnostic Window, figure 7-11A.

- This window may be accessed by first selecting the red status bar and then the **View System Diagnostics** item from the displayed pop-up menu.
- The display shows a list of all the module diagnostic messages present in the system.
  - ♦ If multiple tracks have problems, the list includes diagnostic messages from all of the unhealthy tracks.
  - ♦ It also includes diagnostic messages from the CPU, SSCCIIIi, and RIO Modules.
- Additional information on each diagnostic message may be obtained by selecting the item from the list.
  - ♦ The Message Description Window, figure 7-11B, displays, providing:
    - ▪ a list of the possible causes
    - ▪ the steps required to correct the problem

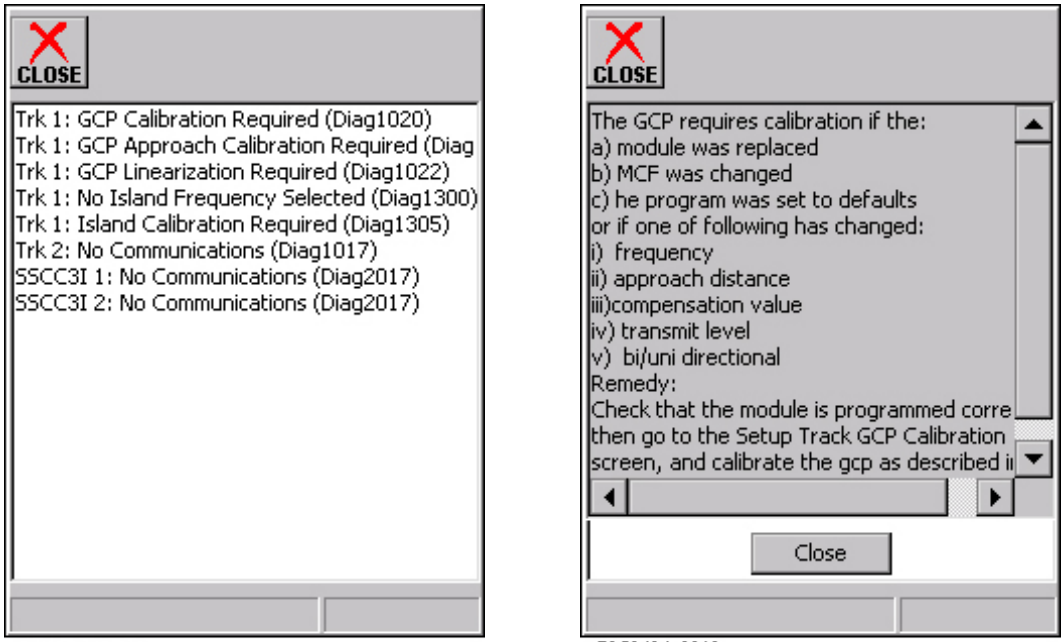


Figure 7-11. Module Diagnostic Message Windows

7.1.7.2 Diagnostic Log

The Track Diagnostic and Module Diagnostic windows show diagnostics messages that currently are present in the system.

- Previous diagnostic (error) messages may be viewed by selecting the **Diagnostic Log** entry from the History menu.
  - ♦ The Diagnostic Log, figure 7-12A, displays.
    - ▪ Diagnostic log is resident in the Display Module
    - ▪ Enables events from main and standby side to be stored
    - ▪ The events in the diagnostic log are date and time stamped to indicate when the event occurred.
- Detailed information of a particular diagnostic event in the log can be viewed by selecting the corresponding log entry.
  - ♦ opens the detailed report window for that event (see figure 7-12B)

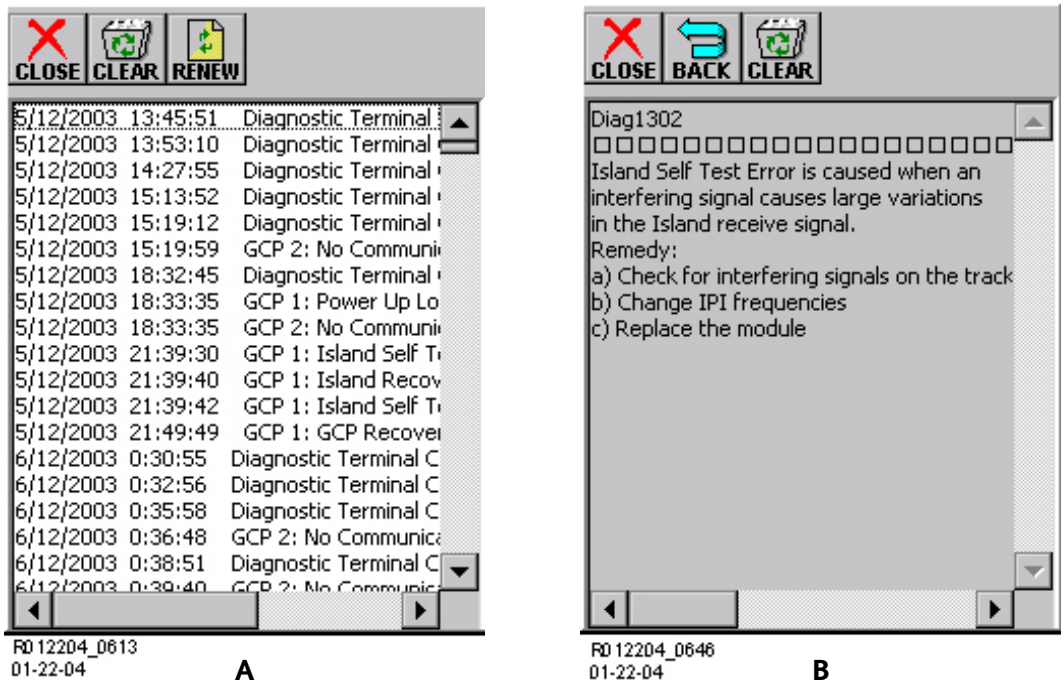


Figure 7-12. Diagnostic Log Report Windows

Some diagnostic messages appear after the initial problem has been eliminated and the GCP is recovering.

- Two examples are:
  - ♦ GCP recovering
  - ♦ Island Recovering
- A Track Module is considered unhealthy during its recovery period.
  - ♦ Predictors of module are deenergized

7.1.7.3 SEAR Logs

Modules in the system (main or standby) that previously were unhealthy are shown in the SEAR log

- The SEAR log provides a date and time stamped record of:
  - ♦ state changes that the SEAR observed by directly monitoring the 4000 GCP's inputs and outputs
  - ♦ messages the SEAR received from the CPU module
- log shows when the unhealthy condition occurred but does not provide details of the cause
  - ♦ Refer to Diagnostic Logs for detailed information.

A SEAR log of a typical train move is show in figure 7-13.

```
Wed  2-04-2004  9:17:28.46  GCP4K: Track 1 Train On Approach Yes
Wed  2-04-2004  9:17:30.48  GCP4K: Track 1 Prime Deenergized
Wed  2-04-2004  9:17:30.48  GCP4K: Track 1 EZ 83
Wed  2-04-2004  9:17:30.48  GCP4K: Track 1 EX 98
Wed  2-04-2004  9:17:30.48  GCP4K: Track 1 Speed 58 mph
Wed  2-04-2004  9:17:30.48  GCP4K: And 1 Prime Deenergized
Wed  2-04-2004  9:17:30.48  O1.2-T1 Prime: Deenergized
Wed  2-04-2004  9:17:30.48  O1.1-And 1 XR: Deenergized
Wed  2-04-2004  9:17:30.59  XING START
Wed  2-04-2004  9:17:30.89  SSCC1 Bell: On
Wed  2-04-2004  9:17:32.07  GCP4K: SSCC 1 Lamps are  Flashing
Wed  2-04-2004  9:17:49.77  SSCC1 Gate: Off
Wed  2-04-2004  9:17:58.96  GCP4K: Track 1 Crossing Island Speed 58 mph
Wed  2-04-2004  9:17:58.96  GCP4K: Track 1 Crossing Warning Time 28 sec
Wed  2-04-2004  9:17:59.05  GCP4K: Track 1 Train Detect Speed 58 mph
Wed  2-04-2004  9:17:59.05  GCP4K: Track 1 Train Island Speed 58 mph
Wed  2-04-2004  9:17:59.05  GCP4K: Track 1 Train Average Speed 58 mph
Wed  2-04-2004  9:17:59.05  GCP4K: Track 1 Train Warning Time 28 sec
Wed  2-04-2004  9:17:59.10  GCP4K: Track 1 Island Occupied
Wed  2-04-2004  9:17:59.37  WARNING TIME 29 sec
Wed  2-04-2004  9:18:03.37  GCP4K: Track 1 Island Unoccupied
Wed  2-04-2004  9:18:04.07  GCP4K: Track 1 Train On Approach No
Wed  2-04-2004  9:18:05.29  GCP4K: Track 1 Prime Energized
Wed  2-04-2004  9:18:05.29  GCP4K: And 1 Prime Energized
Wed  2-04-2004  9:18:05.33  O1.2-T1 Prime: Energized
Wed  2-04-2004  9:18:05.33  O1.1-And 1 XR: Energized
Wed  2-04-2004  9:18:05.47  XING END 35 sec
Wed  2-04-2004  9:18:05.68  SSCC1 Bell: Off
Wed  2-04-2004  9:18:06.13  SSCC1 Gate: On
Wed  2-04-2004  9:18:07.28  GCP4K: SSCC 1 Lamps are  Off
```

Figure 7-13. Typical SEAR Train Move Log

7.1.7.3.1 SEAR Log Structure

SEAR Log entries are designated as shown in table 7-18.

Table 7-18. SEAR Entry Designation

Identifier	Entry Function
GCP4K:	Internal echelon messages from the GCP
O1.2, O1.1 etc:	Physical outputs from the GCP monitored by inputs on the SEAR
SSCC1 Bell:	Bell output from SSCC3I's monitored by SEAR inputs
SSCC1 Gate:	Gate output from SSCC3I's monitored by SEAR inputs

Events may be identified by noting the entry information that follows the date and time data.

- For example:
  - ♦
    ```
    O1.2-T1 Prime: Deenergized
    O1.1-And 1 XR: Deenergized
    ```
    Indicate that OUT 1.1 and OUT 1.2 of the GCP are deenergizing.
    - These outputs are detected by SEAR inputs connected on the 4000 GCP backplane.
  - ♦
    ```
    GCP4K: Track 1 Prime Deenergized
    GCP4K: Track 1 EZ 83
    GCP4K: Track 1 EX 98
    GCP4K: Track 1 Speed 58 mph
    GCP4K: And 1 Prime Deenergized
    ```
    Indicate that track 1 Prime has deenergized at an EZ of 86, an EX of 98, and a train speed of 58 mph.
    - SEAR information received from 4000 GCP internal messages.

7.1.7.4 CPU Logs

Two additional logs are provided by the CPU Module:

- the Status Log
- the Summary Log

These logs are stored in non-volatile memory on the CPU module

- Because only the main or the standby CPU can be powered, only the logs on the powered CPU may be accessed.

When troubleshooting a problem that occurred on the Main before the system was transferred to the Standby, start by examining the Diagnostic Log.

- The problem will not appear on the CPU Logs of the standby CPU.
- If the Diagnostic log does not provide enough information to diagnose the problem, switch the system back to the Main and examine the CPU Logs.

7.1.7.4.1 CPU Status Log

The Status log provides detailed information about each train move.

- The information provided includes:
  - changes in predictor states
  - UAX states
  - input and output states
  - EZ levels
  - EX levels
  - speed recordings
  - observed warning times
- A CPU log of a typical train move is show in figure 7-14.

```
E7 04FEB04 08:29:26.8  Track 1 Train Present
E7 04FEB04 08:29:26.9  Track 1 EZ: 88           EX: 98      Speed: 56   mph
E7 04FEB04 08:29:27.2  Track 1 Prime Deenergized,       EZ: 86  EX: 98 Spd: 59
E7 04FEB04 08:29:27.2  AND XR 1 Deenergized
E7 04FEB04 08:29:28.4  Track 1 EZ: 83           EX: 98      Speed: 59   mph
E7 04FEB04 08:29:28.8  OUT 1.1 Deenergized
E7 04FEB04 08:29:28.8  OUT 1.2 Deenergized
E7 04FEB04 08:29:30.3  Track 1 EZ: 78           EX: 98      Speed: 58   mph
E7 04FEB04 08:29:31.6  Track 1 EZ: 73           EX: 98      Speed: 58   mph
E7 04FEB04 08:29:33.6  Track 1 EZ: 68           EX: 98      Speed: 59   mph
E7 04FEB04 08:29:35.1  Track 1 EZ: 63           EX: 98      Speed: 59   mph
E7 04FEB04 08:29:37.1  Track 1 EZ: 58           EX: 98      Speed: 58   mph
E7 04FEB04 08:29:38.7  Track 1 EZ: 53           EX: 98      Speed: 58   mph
E7 04FEB04 08:29:40.7  Track 1 EZ: 47           EX: 98      Speed: 59   mph
E7 04FEB04 08:29:42.7  Track 1 EZ: 42           EX: 99      Speed: 59   mph
E7 04FEB04 08:29:44.3  Track 1 EZ: 37           EX: 99      Speed: 58   mph
E7 04FEB04 08:29:46.3  Track 1 EZ: 32           EX: 99      Speed: 59   mph
E7 04FEB04 08:29:47.8  Track 1 EZ: 27           EX: 99      Speed: 59   mph
E7 04FEB04 08:29:49.8  Track 1 EZ: 22           EX: 99      Speed: 59   mph
E7 04FEB04 08:29:51.4  Track 1 EZ: 17           EX: 99      Speed: 58   mph
E7 04FEB04 08:29:53.3  Track 1 EZ: 12           EX: 99      Speed: 59   mph
E7 04FEB04 08:29:55.0  Track 1 EZ: 7            EX: 100     Speed: 59   mph
E7 04FEB04 08:29:57.0  Track 1 EZ: 2   CHK: 0   EX: 99      Speed: 57   mph
E7 04FEB04 08:29:57.0  Track 1 Island Deenergized
E7 04FEB04 08:29:57.0  Trk: 1 Crossing Warning Time: 29 s, Isl Speed: 58    mph
E7 04FEB04 08:29:57.0  Train Move Trk: 1, Wtime: 29  s, Speeds: 59  58  58  mph
E7 04FEB04 08:30:04.5  Track 1 EZ: 23           EX: 99      Speed: 1    mph
E7 04FEB04 08:30:04.9  Track 1 EZ: 48           EX: 99      Speed: 1    mph
E7 04FEB04 08:30:05.3  Track 1 EZ: 73           EX: 99      Speed: 1    mph
E7 04FEB04 08:30:06.1  Track 1 EZ: 98           EX: 99      Speed: 1    mph
E7 04FEB04 08:30:06.1  Track 1 Island Energized
E7 04FEB04 08:30:06.9  Track 1 No Train Present
E7 04FEB04 08:30:08.0  Track 1 Prime    Energized
E7 04FEB04 08:30:08.0  AND XR 1 Energized
E7 04FEB04 08:30:09.7  OUT 1.1 Energized
E7 04FEB04 08:30:09.7  OUT 1.2 Energized
 END OF BUFFER
```

Figure 7-14. CPU Status Log

This log contains the following information:

- Train is detected in the approach at 8:29:26.8
- Track 1 Prime Predictor is deenergized at 8:29:27.2
  - EZ at 86
  - train speed at 45 mph
- AND 1 XR deenergized at 8:29:27:2
  - responds to Track 1 Prime
- OUT 1.1 and OUT 1.2 deenergized at 8:29:28:8
  - Out 1.1 is programmed as AND 1 XR
  - Out 1.2 is programmed as Track 1 Prime
- The progress of the train may be determined by observing the EZ levels.
- The island is deenergized at 08:29:57.0.
- The crossing and train move warning time is recorded as 29 seconds.
- The train clears the crossing Island at 08:30:06.1.
- The Prime Predictor and AND 1 XR recover at 08:30:08.0.
- OUT 1.1 and OUT 1.2 recover at 08:30:09.7.

7.1.8 Maintenance CALL Output

(LED #1 on CPU Module)

When the 4000 GCP system is healthy, the maintenance call output is energized.

- The maintenance call output de-energizes when:
  - the CPU detects a battery voltage less than the programmed and enabled low battery threshold
  - an enabled SSCCIIIi module is unhealthy
  - an enabled SSCCIIIi module with detection on detects a battery voltage less than the programmed low battery threshold
  - the maintenance call repeater input is enabled and the maintenance call input is low

7.1.9 Transfer Output

(LED #2 on CPU Module)

When the 4000 GCP system is healthy, the transfer output is energized (on).

- This output level inhibits the Transfer Module counting down and the subsequent transfer to the backup side when the Transfer Module is in the auto mode.
- The transfer output is deenergized (off) when:
  - a module is programmed as used but is not communicating with the CPU
  - MS/GCP or Island operation on a Track Module is unhealthy
  - A vital output on a Track or RIO Module is commanded on, but the module cannot provide the 12-volt output.
    - Module has failed.

7.2 TROUBLESHOOTING

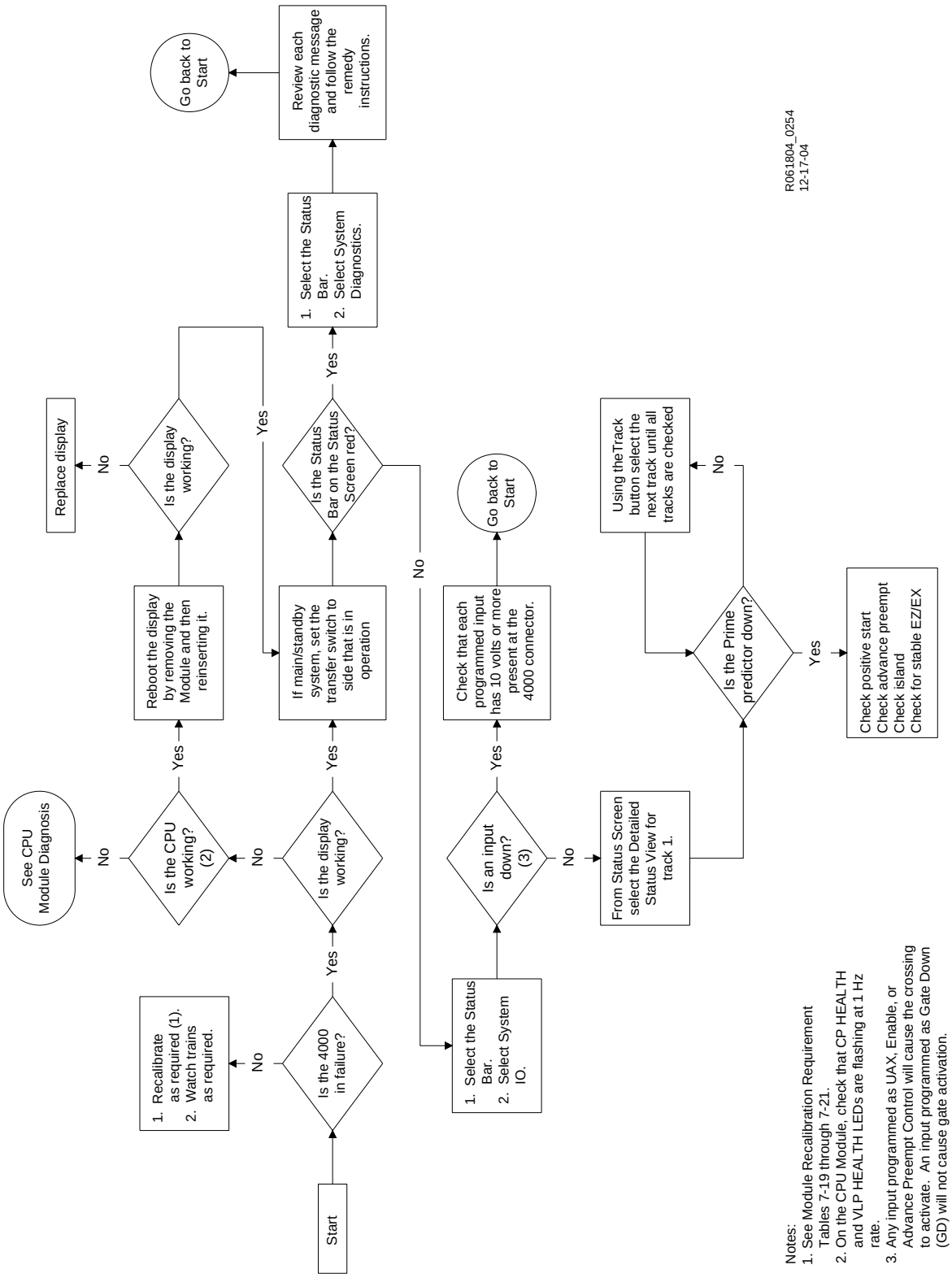
This subsection describes the method of troubleshooting a problem in a system that has previously been in service.

The first step in troubleshooting a problem is to determine whether the GCP track circuit continuity and components of a 4000 GCP system are healthy.
When the 4000 GCP system is healthy it shows the following:

- Track windows:
  - ♦ are gray (or white if a train is present) on DT Display
  - ♦ have no calibration required messages on DT Display
- System Status bar on DT Status Screen is green
- Health LEDs on all module are flashing slowly (1HZ)
  - ♦ CPU
  - ♦ Track
  - ♦ RIO
  - ♦ SSCCIIIi
- Transfer Module display time is not counting down
- SEAR Alarm LED's indicate that no alarms are present
- CPU LED **1** is on, indicating that the Maintenance Call output is on
- CPU LED **2** is on, indicating that the transfer signal is not allowing transfer
- Power LEDs on all modules are on and steady

If the system is unhealthy use the System Diagnostics or the Track Diagnostics to locate the problem.

- Refer to the Troubleshooting Flow Chart, figure 7-15, to assist in system and track problem diagnosis (a removable copy of the Troubleshooting Flow Chart is located at the back of this manual).



Notes:
1. See Module Recalibration Requirement Tables 7-19 through 7-21.
2. On the CPU Module, check that CP HEALTH and VLP HEALTH LEDs are flashing at 1 Hz rate.
3. Any input programmed as UAX, Enable, or Advance Preempt Control will cause the crossing to activate. An input programmed as Gate Down (GD) will not cause gate activation.

Figure 7-15. Troubleshooting Flow Chart

7.2.1 Track Recalibration Requirements

The Track Module calibration requirements for new installations and GCP modules already in service can be determined by observing the following:

- Track Module 4-character display
  - ♦ Shows one of the following:
    - ▪ **GCAL**
    - ▪ **GAPP**
    - ▪ **GLIN**
    - ▪ **ICAL**
- DT Status Screen on the Display Module
  - ♦ Shows one of the following:
    - ▪ **GCP Cal Req**
    - ▪ **GCP Approach Req**
    - ▪ **Linearization Req**
    - ▪ **Island Cal Req**

⚠ WARNING

RECALIBRATION OF AN IN-SERVICE TRACK MODULE SHOULD BE DONE ONLY:

- ➢ **WHEN A FAILED TRACK MODULE IS REPLACED**
- ➢ **AFTER TRACK, BOND, COUPLER OR SHUNT RELATED PROBLEMS ARE INVESTIGATED AND CORRECTED IF AN IN-SERVICE TRACK MODULE SUDDENLY HAS A HIGH EZ (HIGH SIGNAL ERROR).**

NOTE

Removal of power from the 4000 GCP case is not required before removing or installing modules.

NOTE

If CPU Module MCF or Track Module MEF are changed, complete programming and recalibration are required.

7.2.1.1 Module Replacement Recalibration Requirements

The recalibration requirements due to the replacement of a module are shown in table 7-19.

Table 7-19. Recalibration Requirements Due to Module/Chassis Replacement

Module/Assembly Replacement		Calibration Required				Reprogramming Required	Notes
		GCP CAL	GCP APP	GCP LIN	ISL CAL		
A80403	CPU	No	No	No	No	No	
A40418	Track	Yes[1]	Yes/No[2]	Yes/No[2]	Yes	No	1. For track with changed A80418 2. May be bypassed using **BYPASS** button instead of the **START** button in calibration procedure
A40413	RIO (I/O)	No	No	No	No	No	
A80406	Transfer	No	No	No	No	No	
A80405	SSCC[3]	No	No	No	No	No	3. SSCC lamp voltages must be readjusted
A80407	Display (DT)	No	No	No	No	No	
A80410	SEAR	No	No	No	No	N/A[4]	4. Site setup required
A80438-2	ECD[5]	No	No	No	No	No	5. Plug-in located on chassis behind CPU Module. Requires same MCF as previously in use.
N/A	Chassis	Yes	Yes	Yes	Yes	Yes	

7.2.1.2 Program Changes Procedure Requirements

The GCP program changes that require track recalibration are indicated in table 7-20

Table 7-20. Programming Changes Recalibration Requirements

Program Changes	Calibration Required				Reprogramming Required	Notes
	GCP CAL	GCP APP	GCP LIN	ISL CAL		
Increased Number of Tracks	Yes[1]	Yes[1]	Yes[1]	Yes[2]	Yes[1]	1. For added tracks only 2. If island is used
GCP Frequency Change	Yes[3]	Yes[3]	Yes[3]	No	No	3. For tracks with new frequencies
Application changed from: Unidirectional to Bidirectional or Bidirectional to Unidirectional	Yes[4]	Yes[4]	Yes[4]	No	No	4. For changed tracks only
Transmit Level Changed From: Medium to Maximum or Maximum to Medium						
Approach Length Changed						
Ballast Compensation Value Changed						
Island Operation Changed to Internal	Yes[5]	No[6]	No[6]	Yes	No	5. If EZ is less than 98 or greater than 102 6. Calibration can be bypassed
Template Changed	Yes[7]	Yes[7]	Yes[7]	Yes[7]	Yes[8]	7. For all tracks 8. Complete re-programming required
Template Set To Default selected						

7.2.2 Recalibration Due To Track Equipment Changes

Changes made to the existing track equipment that require track recalibration are shown in table 7-21.

NOTE

Approach length in the Program menu must be changed to reflect the new approach length prior to start of track calibration.

Table 7-21. Recalibration Requirements Due to Track Equipment Changes

Program Changes	Calibration Required				Notes
	GCP CAL	GCP APP	GCP LIN	ISL CAL	
Termination Shunts Changed	Yes[1]	No	No	No	1. For changed tracks only
Termination Shunts Moved to New Location	Yes[1]	Yes[1]	Yes[1]	No	
Termination Shunts of Other Frequencies Added, Removed From, or Moved Within the 4000 GCP Approach(es)	Yes[1]	Yes[1]	Yes[1]	No	
Wide band Insulated Joint Couplers (8A076 or 8A077) Replaced in 4000 GCP Approach(es)	Yes[1]	No[2]	No[2]	No	2. Calibration can be bypassed
Tuned Insulated Joint Couplers (62785-f) Replaced in 4000 GCP Approaches)	Yes[1]	Yes[1]	Yes[1]	No	
4000 GCP Track Wire(s) Replaced	Yes[1]	No[2]	No[2]	Yes	

7.2.3 Determining the Cause of a Deenergized Predictor

If the Track Module is healthy, predictors can be deenergized for the reasons indicated in table 7-22.

Table 7-22. Troubleshooting A Deenergized Predictor

Reason	Cause
The track module senses that EZ is decreasing at a rate that is fast enough to trigger the prediction.	An approaching train.
The predictor (usually Prime and Preempt) has a zero offset distance and the island used by the MS/GCP is deenergized	If the Island LED on the Track Module is off, the island is deenergized.
The predictor is running its pickup delay	If the Track Module LED for this predictor is flashing or the Track Detail View shows an hour glass symbol for the predictor, the predictor is running its pickup delay. • If the predictor does not recover after its programmed pickup delay time, it should be treated as deenergized.
Positive Start is enabled and the EZ level is below the programmed Positive Start EZ Level	Positive start is de-energizing the predictor. • Enabled in the **GCP: track *n* low EZ detect** program menu. • Predictor will remain deenergized while the EZ is less than the positive state level plus 5. • The current Track Module EZ is shown on the module's 4-character display and the Track Window of the DT Status Screen.
A UAX unit is deenergized	A UAX input is programmed for the Track Module and the input is not energized or is running UAX Pickup delay.
A DAX Enable input is deenergized	A DAX Enable input is programmed for the Track Module and the input is not energized or is running DAX Enable Pickup delay.
A Preempt Health input is deenergized	A Preempt Health input is programmed for the Track Module and the input is not energized.
Interference is causing large EZ fluctuations which appear to be an approaching train	The rapid fluctuation of the displayed track EZ level by 5 to 10 points (or more) indicates the presence of interference.

7.2.4 Trouble shooting a Physical Input

After it is determined that a problem is caused by a deenergized physical input, use procedure 7-1 to isolate the cause.

Procedure 7-1. TROUBLESHOOTING INPUTS

Step 1	Determine the connections to the physical inputs by referring to the circuit plans for the location. These inputs may include: • a DAX circuit from a remote site • a preempt health input from a traffic preempt relay • other external inputs
Step 2	If the input is connected to other equipment that is not in this bungalow, go to step 5.
Step 3	Verify that the output of the other equipment is energized using either the indications from that equipment or a meter.
Step 4	If the output of the other equipment is energized but the GCP input is not, check the wiring between the equipment and the GCP.
Step 5	Using a meter, check the remote connection input at the point it enters the bungalow. • If the input is deenergized, check the wiring from this point through to the GCP terminals. • If the input is energized, go to the remote site and check the output.

7.2.5 Track Module Diagnostics

Table 7-23 may be used as an aid in the diagnosis of Track Module Problems.

Table 7-23. Diagnosing Track Module Problems

Display		Description	Cause	Remedy
Panel	**Diag**			
RECV	**GCP Recovering (Diag1000)**	30 sec. recovery time-out	Clearing of system error	Wait
GSTB	**GCP Stabilizing (Diag1001)**	20 sec. stabilization period prior to start of normal operation.	System startup	Wait
HIEZ	**High EZ (Diag1002)**	High EZ or high EZ check value detected	High-resistance track bond wire connection	Repair high resistance bond
			Broken rail	Repair broken rail
			Defective termination shunt	Repair defective termination shunt
			High resistance termination shunt connection	Repair high resistance connection to termination shunt
			Defective insulated joint coupler	Replace defective insulated joint coupler
			Poor calibration	Recalibrate only after verifying that no other cause exists.
			Ballast has increased significantly since calibration	

⚠ WARNING

TEMPORARY APPROACH LENGTH REDUCTION MUST BE ACCOMPANIED BY A CORRESPONDING REDUCTION IN APPROACH TRAIN SPEED.

Table 7-23 continued

Display		Description	Cause	Remedy
Panel	**Diag**			
LWEX	**Low EX (Diag1003)**	Low track ballast resistance detected.	Salted crossing	• Use a lower GCP frequency
			Poor drainage at crossing	• Temporarily shorten the approach (see WARNING)
			Mud or other contaminants within ballast	• Verify EX Adjust as described in paragraph 5.2.9
			Low ballast	Determine cause of low ballast and compensate
			Broken rail	Repair broken rail
			Low ballast and high resistance bond	Repair high resistance bond
			Low ballast and defective insulated joint coupler	Replace defective insulated joint coupler
LWEZ	**Low EZ Detected (Diag1004)**	Low EZ Detection is programmed ON and its timer interval is exceeded.	A train is on the approach for a time longer than the timer setting.	Temporarily turn off low EZ detection until train has left.
			A false shunt on the track	Remove false shunts from the track
				Check that EZ returns to normal after false shunt removal.
			Open receive track wire	If false shunt is not found, refer to the diagnostics messages for open receive wire.
				Repair
RXEX	**Receive Wire EX Error (Diag1005)**	Transmit and receive wires are out of phase • Generally observed at cutover	The receive and transmit wires are connected to the wrong rail (mis-phased)	Change the track wire connections so that: • T1 & R1 are connected to rail 1 • T2 & R2 are connected to rail 2
CKEX	**Check Wire EX Error (Diag1006)**	Check wires and transmit wires are out of phase • Generally occurs at cutover with 6-wire installations	The check wires and transmit wires are mis-phased.	Change the check wires connections so that: • T1 & C1 are tied together • T2 and C2 are tied together

Table 7-23 continued

Display		Description	Cause	Remedy
Panel	**Diag**			
CHCK2	**Gain Check – Check Wire Error (Diag1007)**	Check signal level is low while transmit and receive levels are normal. Check EZ is very low while track EZ is normal value	High resistance or open connection in a check wire.	Locate and repair high resistance or open connection in check wires.
CHCK1	**Gain Check – Receive Wire Error (Diag1008)**	Receive signal level is low while check signal level is normal. Check EZ is normal and track EZ is very low value	High resistance or open connection in a receive wire.	Locate and repair open connection in the receive wires
CHCK4	**Gain Check Error (Diag1010)**	Receiver and check signal levels differ by a significant amount	If no train is present: • High resistance in receiver or check receiver track wires • open track connection	Locate and repair: • High resistance connections in receive or check track wires • open connections in receive or check track wires
			If a train is present: • High resistance in transmitter track wires	Locate and repair: • High resistance connections in transmitter track wires
GMXT	**Transmitter Error (Diag1011)**	Transmitter cannot maintain a constant current	All installation: • High resistance or open transmit track wire • High resistance or open track wire rail connection	Locate and repair open transmit wires or high resistance transmit wires connections.
			Unidirectional installations only: • open termination • open coupler • open bond	Locate and repair: • open termination • open coupler • open bond
GFRQ	**No GCP frequency Selected (Diag1012)**	No track frequency set	MS/GCP Operation has been programmed as ON, but no GCP frequency has been selected	Select a GCP frequency from the **GCP: track *n*** program menu

Table 7-23 continued

Display		Description	Cause	Remedy
Panel	**Diag**			
GIPS	**IPS Mode (Diag1013)**	Inbound poor shunting (IPS) detected	**IPS Mode** is shown when the Track Module is configured with the Enhanced Detection option On and the module detects in-bound poor shunting	None
GRCV	**Receiver Error (Diag1014) Or (Diag1015)**	Track Module internal receiver channels differ	Unacceptable difference between the redundant receivers on the Track Module is detected	Replace Track Module
GEXP	**EX Process Error (Diag1016)**	Phase (EX) decreases as train approaches crossing	Possibly caused by: • poor shunting • high resistance bond generally located near the GCP track wires	Locate and repair high resistance bonds
UCFG	**No Communications (Diag1017)**	No communication to a Track Module.	Track Module is not communicating with the CPU.	Verify that a module is in appropriate slot
				Replace the module if the Track Module is continuously rebooting. • **BOOT** displays on 4-character display at one minute (approximate) intervals.
				If the Track Module is not continuously rebooting determine if **UCFG** is shown on the module's display. • If only this module displays **UCFG**, replace it • if all Track Modules display **UCFG** replace the CPU Module

NOTE

A power up lockout is indicated by a **Release Track** message that appears at the bottom of the corresponding Track Status Window. The lockout caused by the train shunt (EZ < 3) may be cleared by:

- accessing the Diagnostic Terminal Status Screen
- selecting the displayed message block within the affected Track Status Window

Table 7-23 continued

Display		Description	Cause	Remedy
Panel	**Diag**			
GLCK	**Power Up Lockout Error (Diag1018)**	EZ or Check EZ low after reboot	The EZ or Check EZ values are less than three after a power up. This could be caused by • a train shunting the tracks near the feedpoint • open receive or check wires	If a train is present, clear the lockout by selecting the Release Track icon on diagnostic terminal Status Screen. If no trains are present repair the check and/or receive wires as required.
GHWR	**Track Hardware Error (Diag1019)**	Track Hardware Error	This occurs when the Track Module detects that its hardware is not operating correctly	Replace the module
GCAL	**GCP Calibration Required (Diag1020)**	GCP Calibration Required	The Track Module is uncalibrated. A Track Module reverts to its uncalibrated state when the: • Track Module is replaced • MCF software is changed • Template is set to default or a new template is selected • Track Frequency is changed • Approach distance is changed • Compensation value is changed • Transmit level is changed • Directional (bi/uni) mode is changed	Access the appropriate Calibration Select Window and calibrate the GCP as described in Section 6.

Table 7-23 continued

Display		Description	Cause	Remedy
Panel	**Diag**			
GAPP	**GCP Approach Calibration Required (Diag1021)**	GCP Approach Calibration Required	Approach is uncalibrated An approach reverts to its uncalibrated state when the: • GCP is recalibrated • Track Module is replaced • Template is set to default or a new template is selected • Programmed approach distance is changed • MCF is changed	Access the appropriate GCP Calibration Window • If the computed approach distance is correct, select the **BYPASS** button • If the computed approach distance is known for this track from a previous calibration, enter the correct value by selecting the **EDIT** button. • If the computed approach distance is incorrect and is unknown, perform the approach calibration as described in Section 6.
GLIN	**GCP Linearization Required (Diag1022)**	GCP Linearization Calibration Required	Linearization is uncalibrated Linearization reverts to its uncalibrated state when the: • GCP is recalibrated • Track Module is replaced • Template is set to default or a new template is selected • Programmed approach distance is changed • MCF is changed	Go to the Setup Track Linearization Screen. • If the linearization value is correct, select the **BYPASS** button. • If the linearization value is known for this track from a previous calibration, enter the correct value by selecting the **EDIT** button. • If the linearization value is incorrect or not known perform a linearization calibration as described in Section 6.

Table 7-23 continued

Display		Description	Cause	Remedy
Panel	**Diag**			
GSLV	**GCP Slave Signal Error (Diag1023)**	Slaving Error	The Track Module is not receiving clock sync from the Primary Track Module. • The primary Track Module is normally the module in the Track 1 Slot.	If only one Track Module is reporting the error, replace that module. If all Track Modules are reporting the error, replace the primary Track Module (generally T1).
VOER	**OUT Correspondence Check Error (Diag1200)**	No Vital output voltage	A vital output is commanded to be on, but is producing no voltage. May be caused by: • Open or shorted output • Defective Track Module.	Check for an open or shorted output and repair as required. If the output is not open or shorted, replace the Track Module
IFRQ	**No Island Frequency Selected (Diag1300)**	No island frequency has been programmed	An Island Operation is requested but no island frequency is selected	Select an island frequency from the Program menu
ISTB	**Island Stabilizing (Diag1301)**	Island stabilizing after a power up	On startup the Track module initiates a 20 second timeout to allow the island output to stabilize	Wait
ITST	**Island Self Test Error (Diag1302)**	Variations in the island receive frequency	An interfering signal is causing large variations in the Island receive signal	Change island frequency
			Defective Track Module	Replace the Track Module
RECV	**Island Recovering (Diag1303)**	Island recovering after self test	The Track module initiates a 30-second recovery timeout after an island error has cleared.	Wait

Table 7-23 continued

Display		Description	Cause	Remedy
Panel	**Diag**			
IXMT	**Island Transmitter Error (Diag1304)**	Island cannot supply a constant current	All installations Track Module detects: • high resistance transmit track wire • open transmit track wire • high resistance or open track wire rail connection	Locate and repair defective wiring or connections
			Unidirectional installations Track Module also detects: • open termination • open joint coupler • open bond	Locate and repair open termination, joint coupler, or bond
ICAL	**Island Calibration Required (Diag1305)**	Island requires calibration	Calibration is required when the: • Track Module is replaced • MCF is changed • Template is set to default or a new template is selected • Island frequency is changed	Access the appropriate Calibration Select Window and calibrate the island as described in Section 6.

7.2.6 SSCCIIIi Module Diagnostics

Table 7-24 may be used as an aid in the diagnosis of Solid State Crossing Controller (SSCC) Module Problems.

Table 7-24. Diagnosing SSCC Module Problems

Diag Display	Description	Cause	Remedy
Crossing Bank Failure (Diag2001)	SSCC3I module lamp drive output failure	Lamp driver bank A has failed.	Replace the SSCCIIIi module
Lamp Neutral Wire Open (Diag2002)	The SSCCIIIi has detected open lamp neutral wire	Lamp neutral wire is open	Repair open neutral wire to lamps
Low Battery Warning (Diag2003)	SSCCIIIi detected low battery voltage	Battery voltage is below the programmed Low Battery Detection level. This may be caused by:	
		• Incorrect Low Battery Detection Level setting	Correct Low Battery Detection Level setting:
		• Defective battery charger operation	Perform battery charger maintenance
		• Defective Battery operation	Perform battery maintenance

NOTE

Where only LEDs lamps are used, a false lamp-neutral-wire-open condition may be detected when **Lamp Neutral Test** is set to **On** (see paragraph 5.7.1.1).

- To avoid a false error indication set the **Lamp Neutral Test** status entry for each active crossing controller to **Off**.

Table 7-24 concluded

Diag Display	Description	Cause	Remedy
Lamp Voltage Limited (Diag2005)	Module cannot supply the lamp voltage requested	Lamp voltages are set above the battery terminal voltage.	Reduce the lamp voltages to be less than the battery voltage
No Commu-nications (Diag2017)	No communication between Crossing Controller and CPU	SSCCIIIi Module in wrong slot	Move Module to appropriate slot.
		SSCCIIIi Module defective. Indicated by: • **POWER** light is off • **HEALTH** LED is off for 10 seconds and then on for 10 seconds (module continuously reboots). • **HEALTH** LED flash at fast rate (other modules function properly)	Replace SSCCIIIi Module
		CPU Module defective. • Track Module displays read **UNFG** • **HEALTH** LED's of all modules flash at fast rate	Replace CPU Module

NOTE

1. Effective with Revision D of the SSCCIIIi, **FLASH SYNC** is an isolated two-wire output.
   - If two Revision D or later SSCC IIIi units in the same chassis are operated by separate batteries, the FLASH SYNC returns are connected internally and no additional connection is required.
   - Revision D SSCC IIIi Modules can be identified by:
     - "D" located at end of Part Number / Bar Code tag.
     - Large metal bracket located on component side of module.
2. When using Revision C SSCC IIIi or earlier, or when external SSCC units are connected to a master SSCC IIIi and operated from a different battery, the following wiring must be provided for FLASH SYNC Return:
   - If two Revision C SSCCIIIi units in the same chassis are operated by separate batteries, the **N** pins of the SSCCIIIi power and lamp connectors must be wired together.
   - If an external SSCC IIIA, SSCC III PLUS, or SSCC IV is connected to a master SSCC IIIi:
     - If the SSCC IIIi is Revision C or earlier, the negative terminals of the master SSCC IIIi and external SSCC must be wired together.
     - If the SSCC IIIi is Revision D or later, the SSCC IIIi **FLASH SYNC** return (-) must be connected to **N** on the external SSCC.
3. The terminology for flash sync control differs between a GCP 4000 and an external SSCC device. The GCP 4000 terms Master and Slave SSCC, are called "Flash Sync Out" and "Flash Sync In" respectively in an external SSCC (Slave = Flash Sync In).

7.2.7 CPU Module Diagnostics

Table 7-25 may be used as an aid in the diagnosis of CPU Module Problems.

Table 7-25. Diagnosing CPU Module Problems

Display		Description	Cause	Remedy
Panel	**Diag**			
CRC	**MCF CRC incorrect (Diag3004)**	The MCF CRC is incorrect for the current MCF	MCF CRC entered is incorrect	Reload MCF CRC
			MCF is corrupt	Reload MCF
ADR	**ATCS Session address invalid (Diag3015)**	The radio Daxing neighbor ATCS address of is invalid.	Usually occurs when ATCS Site Address (SIN) is not entered correctly	Reenter ATCS Site Address (SIN)
UCFG	**VLP Unconfigured (Diag3018)**	VLP is uncon-figured and not communicating with I/O modules	Usually due to: • Incorrect MCF CRC • MCF not loaded • MCF not stored in ECD (ECD replaced) • No ATCS Site ID (SIN) entered for radio DAX application	Check other diagnostic message for exact cause.

7.2.8 Troubleshooting Track Problems

The following paragraphs describe how to find and correct common track problems.

7.2.8.1 Couplers

Couplers can be field tested for proper operation as described in procedure 7-2.

⚠ WARNING

DO NOT USE A NARROW BAND SHUNT TO REPLACE A DEFECTIVE COUPLER.

Procedure 7-2. INSULATED BYPASS COUPLER TESTS

Step 1 Connect a hardwire shunt on the crossing side of the joint coupler.

Step 2 Record the EZ value: _____

Step 3 Move the hardwire shunt to the termination side of the joint coupler.

Step 4 Record the EZ value: _____

Step 5 Remove the hardwire shunt.

Step 6 Determine the difference in the EZ values recorded in steps 2 and 4.

- If the coupler is a wideband shunt, and the difference in EZ is more than ± 2, the wideband shunt is defective.
- If the coupler is a TIJC (located in the outer half of the approach), and the EZ difference is more than ± 3, the TIJC may be mistuned or defective.

7.2.8.1.1 Rail Bonds

High resistance bonds can be located as described in procedure 7-3:

NOTE

EZ must be above 15 for the bond test to be used.

Procedure 7-3. RAIL BOND TESTS

Step 1 Record the EX value with no shunt: _____

Step 2 Place a hardwire shunt at the 50% point of the approach.

Step 3 Record the EX value: _____

Step 4 Note the difference in EX values recorded in steps 1 and 3.

- EX always increases as a shunt is placed closer to the crossing.
  - ♦ Whether the shunt is a train or hardwire, EX must increase!
- If the EX value recorded in step 3 is greater than the EX value in step 1, the bad bond is between the hardwire and the termination.
- If the EX value recorded in step 3 is lower than the EX value in step 1, the bad bond is between the hardwire and the crossing.

Step 5 Continue placing the hardwire shunt closer or farther away from the starting point based on the value noted in step 4.

- Where EX increases in value, the last bond passed is the defective bond.

7.2.8.2 Termination Shunts

Termination shunts can be treated as described in procedure 7-4.

Procedure 7-4. TERMINATION SHUNT TESTS

Step 1 Record the EZ value: _____

Step 2 Install a hardwire shunt across the termination.

Step 3 Record the change in EZ: _____

- If termination is hardwire, no EZ change should occur.
- If termination is wideband, an EZ change of no more than ± 2 should occur.
- If termination is NBS, a decrease in EZ of up to 30 can occur, depending upon frequency and approach length.
  - ♦ Lower frequencies and shorter approaches produce a greater change.
  - ♦ If an increase in EZ is noted, the NBS is defective.

7.2.9 Low EX

A Low EX condition exists when EX is below 39.

7.2.9.1 At new installations

If a low EX condition is occurring at a cutover of a new installation, check the following:

- Defective Bonds
- Defective insulated joint couplers
- Missing battery choke in approaches
- Defective gauge rods or switch rods
- Open termination shunt
- Improper application of other frequency NBS in the approaches.

7.2.9.2 At In-service Installations

When low EX occurs at an in-service crossing use procedure 7-5 to determine whether the Low EX Adjustment can safely be lowered below 39.

- Low EX condition commonly occurs at an in-service crossing when track condition are extremely wet and possibly salted.

⚠ WARNING

DO NOT LOWER THE LOW EX ADJUSTMENT BELOW 39 IF THERE IS NOT A 5 POINT DROP IN EZ.

Procedure 7-5. LOW EX QUALIFICATION TESTS

Step 1 With EX below 39, connect a hardwire shunt at the termination shunt of the longest approach.

Step 2 Record the EZ value: _____

Step 3 Move the hardwire shunt in to the 90% point of the approach.

Step 4 Record the EZ value: _____

- If the EZ value at the 90% point is at least 5 less than the EZ value at the termination shunt (step 2), the Low EX Adjustment can safely be lowered below 39, proceed to step 5.
- If the EZ values do not drop 5 points, the Low EX Adjustment can not be safely lowered below 39.
  - ♦ **Do not** continue.

Step 5 Select the **Program** button for the DT Status Screen.

- The **MAIN PROGRAM menu** displays

Step 6 Select **GCP programming** menu item.

- The **GCP: track 1** menu window displays.

Step 7 Select the **Next** button until the **GCP: track 1 MS Control** window displays.

Step 8	Select the displayed **Low EX Adjustment** entry value. The **GCP: track 1 MS Control Set Parameter** dialog window appears.
Step 9	Using the displayed keypad, enter a new EX value between 34 and 39. • The selected value displays in the **New Value** field.
Step 10	Select the **Update** button. • The display returns to the **GCP: track 1 MS Control Set Parameter** dialog window. • The new EX level appears as the **Low EX Adjustment** entry value.
Step 11	Select the **CLOSE** button. • The display returns to the DT Status Screen.

7.2.10 Troubleshooting Maintenance Call (MC) Light Problems

There are several operations in the 4000 GCP system that will turn-off the MAINT CALL (MC) light. This procedure assumes:

- The warning devices are not activated and modules are healthy, including SEAR IIi if used. (If system status bar is red, proceed with Troubleshooting Flowchart)
- No track is out-of-service
- MC operation is being placed in service for the first time and wiring must be checked.

The following procedure checks the most common items first. If the MAINT CALL light does not turn on after a step, proceed to the next step.

1. Observe LED 1 on CPU module (MCF Defined LED's, Figure 8, page 18), or **Maint Call** on **AND Detail** screen
   - ♦ If LED 1 is on, or Maint Call is Green, go to step 3.
   - ♦ If LED 1 is off, or Maint Call is Red, go to step 2.
2. Refer to the circuit plans for the location and if a Maintenance Call Repeater Input is used, verify that the MC Repeater input is on. Check input LED on corresponding module, or check View System IO on System Status Bar. (On the **7 ADVANCED programming** screen, select **Site Options**. If the **Ext Maint Call Input** is set to **Yes**, an input must be programmed on an input assignment screen to **Maint Call Rpt IP** and the input must be on.)
3. Determine that the MC light functions by testing the lamp circuit as follows:

a. Measure DC voltage between **B** (+ meter lead) and **MAINT CALL** (MC) out (- meter lead) on the green connector above the CPU.
   - If voltage is within 0.5 volts of B, then the lamp or lamp circuit is open and must be repaired.
   - If voltage is less than 1.0 volts, go to next step.

b. Measure between **N** (- meter lead) and **MC** (+ meter lead) on the green connector.
   - If voltage is within 0.5 volts of B, then the lamp circuit is okay, but the MC output is off.
     - If LED 1 is on, replace CPU module
     - If LED 1 is off, go to the next step

4. Battery voltage may be low:
   - If **Low Battery Enabled** is set to **ON** (on **11 SITE programming** screen)**,** verify that the voltage on the CPU battery connector is more than the **Low Battery Level** shown.
   - If **Low Battery Detection** is set to **Yes** (on **8 SSCC programming**, **SSCC: 1** screen), verify that the voltage on the SSCC 1 battery connector is more than the **Low Battery Level** shown.
   - If **Low Battery Detection** is set to **Yes** (on **8 SSCC programming**, **SSCC: 2** screen), verify that the voltage on the SSCC 2 battery connector is more than the **Low Battery Level** shown.
5. If a SEAR IIi is used it may monitor power off inputs (POK), external Battery Monitor or other SEAR IIi Application Program specific logic.
   a. Temporarily turning the SEAR off may isolate the MC problem:
      i. On the display, press **PROG**
      ii. Select **2 BASIC Configuration**
      iii. On the **SEAR Used** line, press the **Yes**
      iv. When 'New Value' updates to **No**, press **Update**
   b. If the MC light turns on, turn the SEAR IIi back on:
      i. Select **2 BASIC Configuration**
      ii. On the SEAR Used line, press the **No**
      iii. When New Value updates to **Yes**, press **Update**.

c. Refer to the circuit plans for the location and:
   i. Verify that the SEAR Site Setup is accurate.
   ii. Verify all POK inputs are on.
   iii. If used, verify that SEAR IIi Application Program MC related parameters are correct. (Refer to SEAR IIi Application Configuration Summary)

d. On the display, press the **SEAR** button (on PC with HyperTerminal follow similar steps), then:
   i. Select **MENU**
   ii. Press Down Arrow until **DIAG/MONITOR** is displayed, then press **ENTER.**
   iii. Press Down Arrow until **Network I/O** is displayed, then press **ENTER.**
   iv. Press Left or Right Arrow until **MODULE TO MONITOR?** displays **GCP4K**, then press **ENTER.**
      ✧ If **GCP4K COMM STATUS** is **Bad,** refer to the circuit plans for the location and verify the ATCS address of the GCP 4000 and the SEAR IIi.
         - If ATCS addresses are correct, replace CPU module.
      ✧ If **GCP4K COMM STATUS** is **Good**, replace the CPU module.

e. If the MC light stays off, turn SEAR IIi back on:
   i. Select **2 BASIC Configuration**
   ii. On the SEAR Used line, press the **No**
   iii. When New Value updates to **Yes**, press **Update**

6. If unit is redundant, transfer to opposite set of modules.
   a. If the MC lamp turns on, replace the initial CPU module.
   b. If the MC lamp stays off, call Safetran Technical Support.

⚠ WARNING

GATES WILL BEGIN TO LOWER IMMEDIATELY (WITHOUT GATE DELAY TIME) WHEN THE TRANSFER SWITCH IS USED TO SWAP BETWEEN HEALTHY UNITS. USE CAUTION WHEN TRANSFERRING CONTROL TO AVOID GATES HITTING VEHICLES OR PEDESTRIANS.

7.2.11 Troubleshooting Problems on PC Based DT

PC settings may affect the appearance of the DT display and DT operation on some PCs. If the display does not appear correct or drop down menus do not function correctly, check the following items:

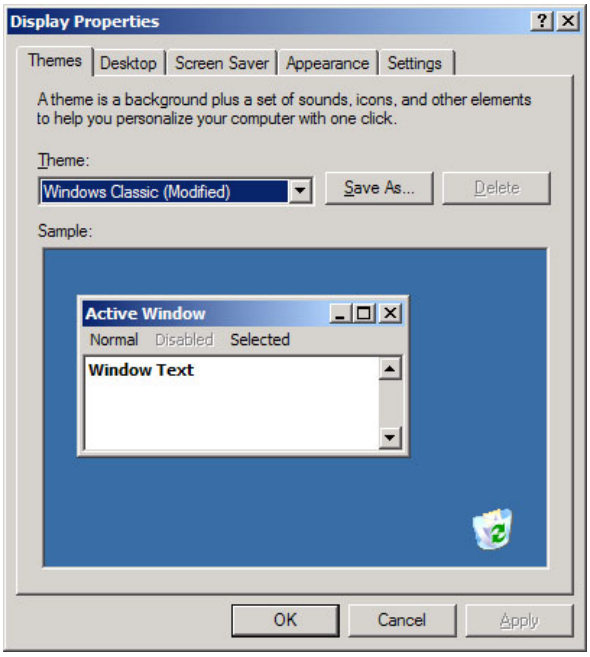
- Font is set to 'clear font'
- DPI is set to 'normal size (96 DPI)'
- Tahoma font properties are installed

7.2.11.1 To set display to 'clear font':

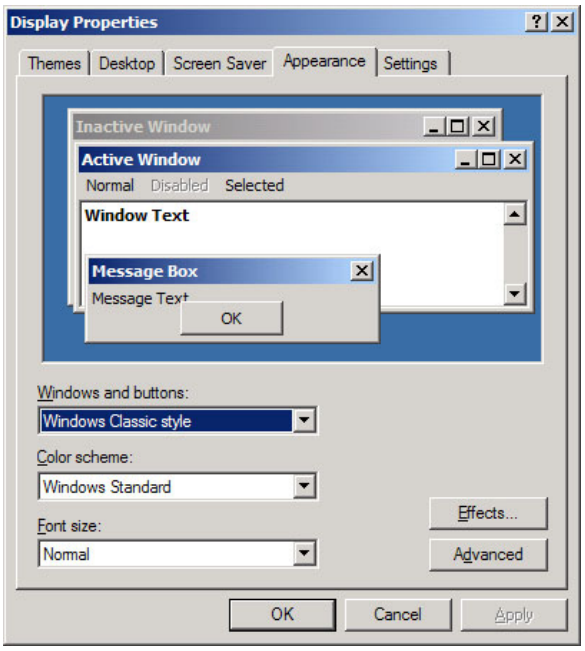
a. Place cursor on an open area of the Windows® background screen and right-click the mouse.

b. In the drop-down box select 'properties'.

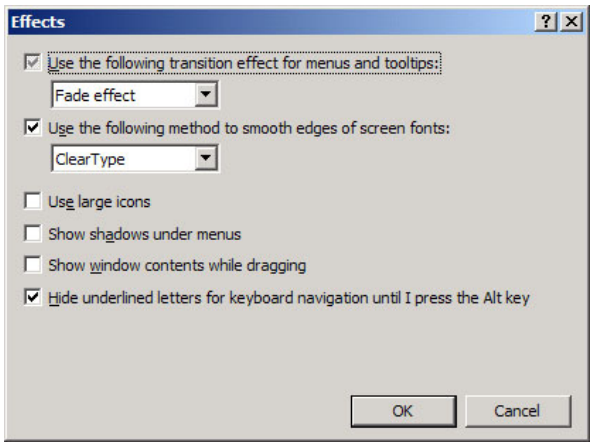
- A **Display Properties** window similar to the following (depends on Windows® version used) should appear.



c. Select the 'Appearance' tab. A screen similar to the following should appear.



d. Select the 'Effects' button. A screen similar to the following should appear.



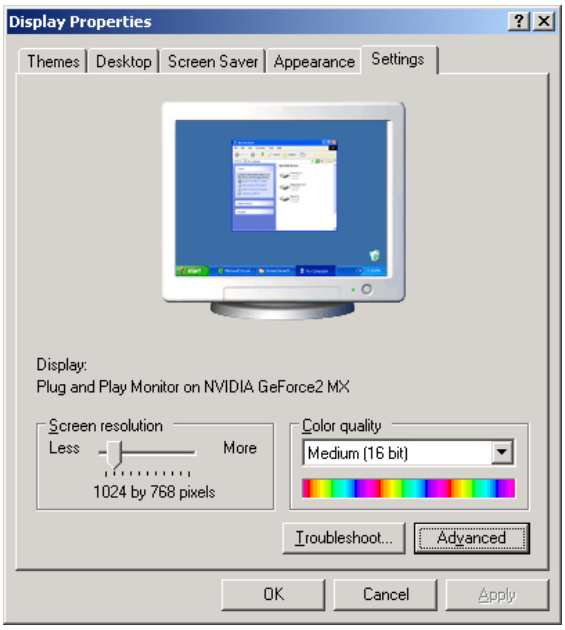
e. In the drop-down list below 'Use the following method to smooth edges of screen fonts', select 'Clear Type'.

- If the check box next to 'Use the following method to smooth edges of screen fonts' is not checked, click on this box to enable the drop-down list.

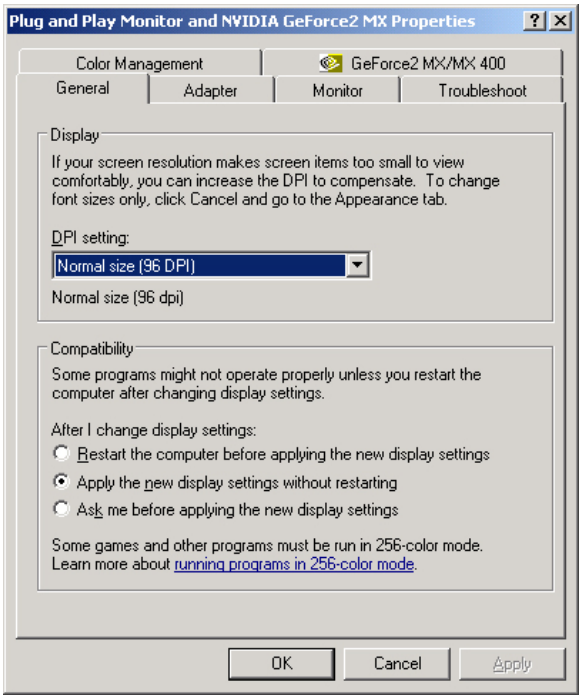
7.2.11.2 To set the DPI setting:

a. Open the **Display Properties** window as described in the previous paragraph.

b. Select the 'Settings' tab. A screen similar to the following should appear.



c. Select the 'Advanced' button. A screen similar to the following should appear.



d. In the 'DPI setting' drop-down list, select 'Normal size (96 DPI)'.

7.2.11.3 To install Tahoma font properties:

a. Select the Windows® **Start** button (lower left corner of monitor display area).
b. Select 'Control Panel' (earlier versions of Windows® require 'Settings' then 'Control Panel').
c. Select 'Fonts'.
d. On the Fonts tool bar, select 'View'.
e. From the View drop-down list, select 'Refresh'.

SECTION 8 – INTERNAL SOLID-STATE CROSSING CONTROLLER

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SECTION 8 - INTERNAL SOLID-STATE CROSSING CONTROLLER

8.1 GENERAL

The A80405 Solid-State Crossing Controller IIIi (SSCC IIIi), figure 8-1, is a plug-in module for the 4000 Grade Crossing Predictor (GCP).

- All multi-track 4000 GCP cases accommodate two A80405 modules.
- Each module provides:
  - ♦ up to 20-amperes of lamp drive
  - ♦ gate and bell control
- A80405 module Interface is through GCP front-panel connectors.
- The A80405 module generally operates from a separate battery than the GCP portion of the system

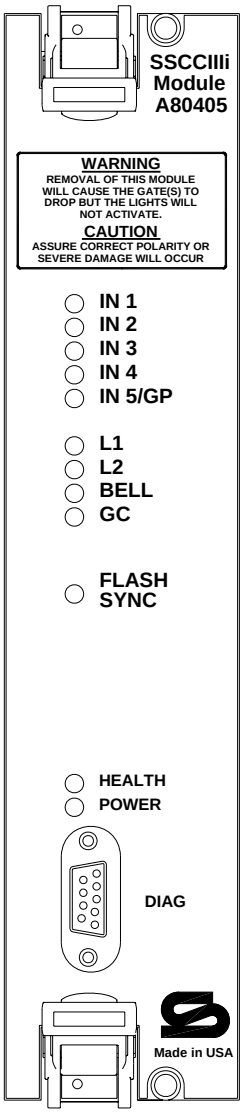

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Figure 8-1. A80405 Solid-State Crossing Controller IIIi

The SSCCIIIi modules are:

- integrated into the 4000 GCP system
  - ♦ Wiring between the GCP, the SSCC IIIi, and the SEAR IIi is eliminated.
- not redundant

8.2 UNIT OVERVIEW

The A80405 module:

- is programmed, calibrated, and tested from the Display module of the 4000 GCP
- is activated by internal logic from the 4000 GCP
- monitors gate position inputs from the crossing gate mechanism
- provides activation for the bell, lamps, and gates of a crossing warning system

8.2.1 Module Function Control

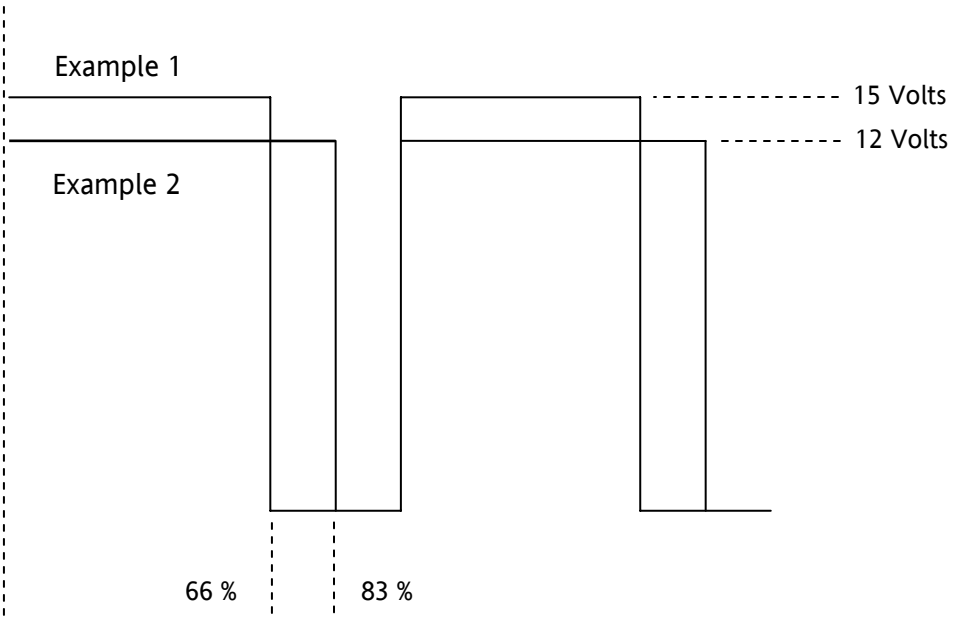
The following A80405 module functions may be programmed:

- lamp flash rate
- gate control delay
- low battery threshold indication
  - ♦ control maintenance call output
- test timer intervals
- crossing and lamp tests
- lamp flashing synchronization between the A80405 modules of multiple 4000 GCPs
- disabling of crossing bells while the gates are rising
- disabling of crossing bells while the gates are down
  - ♦ requires gate down inputs to be energized

8.2.2 Crossing Controller Features

The circuits of the A80405 incorporate the following features:

- heavy-duty solid-state switches
- regulated lamp voltage
  - ♦ user-programmable
  - ♦ minimizes lamp voltage dropping below acceptable limits when the AC power is interrupted for short periods
  - ♦ eliminates seasonal adjustment of lamp voltages when using temperature compensated battery chargers.
  - ♦ uses pulse width modulation regulation
    - The pulsed output frequency is approximately 500 Hz.
    - The peak voltage of the pulse is approximately 1 volt below the battery input voltage.
    - Depending on the voltage in, the pulse width is automatically varied to give a regulated output.
    - The following examples assume the desired output is 10 volts:
      - Example 1: 16 volts in, the pulse is 15 volts and on 66% of the cycle.
      - Example 2: 13 volts in, the pulse is 12 volts and on 83% of the cycle.



Pulse Width Modulation - Examples

NOTE

The regulated lamp drive is a pulse-width modulated voltage with an AC component and a DC component.

- A True RMS AC+DC meter is required to accurately read the pulse-modulated lamp voltage.
  - I.e., Fluke model 189
- Conventional multimeters may be used, however, the voltage reading will vary from the true rms value.
  - The variance is not a set percentage and is dependent on battery voltage.
  - A conversion chart cross-referencing several conventional meters is provided in paragraph 8.8.

8.2.3 Module Health

The CPU of the A80405 module provides an output that controls the HEALTH LED on the module front panel

- Yellow HEALTH LED reflects the health of the module:
  - Flashes at 1 Hz rate when module fully operational.
  - Flashes at 2 Hz rate when module not communicating with CPU module.
  - Flashes at 8 Hz rate when fault is detected within the module.

8.3 BATTERY SURGE PROTECTION AND POWER WIRING

Battery surge protection for the SSCC is shown in figure 8-2.

- Primary surge protection for SSCC modules provided on SSCC battery (see inside dotted line)
- Primary surge protection for I/O interconnect provided on lighting surge panels (see paragraph 8.3.1)
- Provide power wiring to A80405 SSCC IIIi modules:
  - via **B** and **N** contacts of the respective crossing controller connectors on 4000 GCP front panel.
  - using poly-jacketed #10 AWG wire (recommended) for DC power and return between battery surge protection and the 4000 GCP crossing controller connectors.
- Provide power wiring to the lighting surge panels:
  - using poly-jacketed #6 AWG wire (recommended) for DC power and return between the –1 lighting surge panel (A91170-1 or A91181-1) and the crossing gate battery posts.
  - using poly-jacketed #10 AWG wire (recommended) for DC power and return between the –1 lighting surge panel (A91170-1 or A91181-1) and the –2 lighting surge panel (A91170-2 or A91181-2).

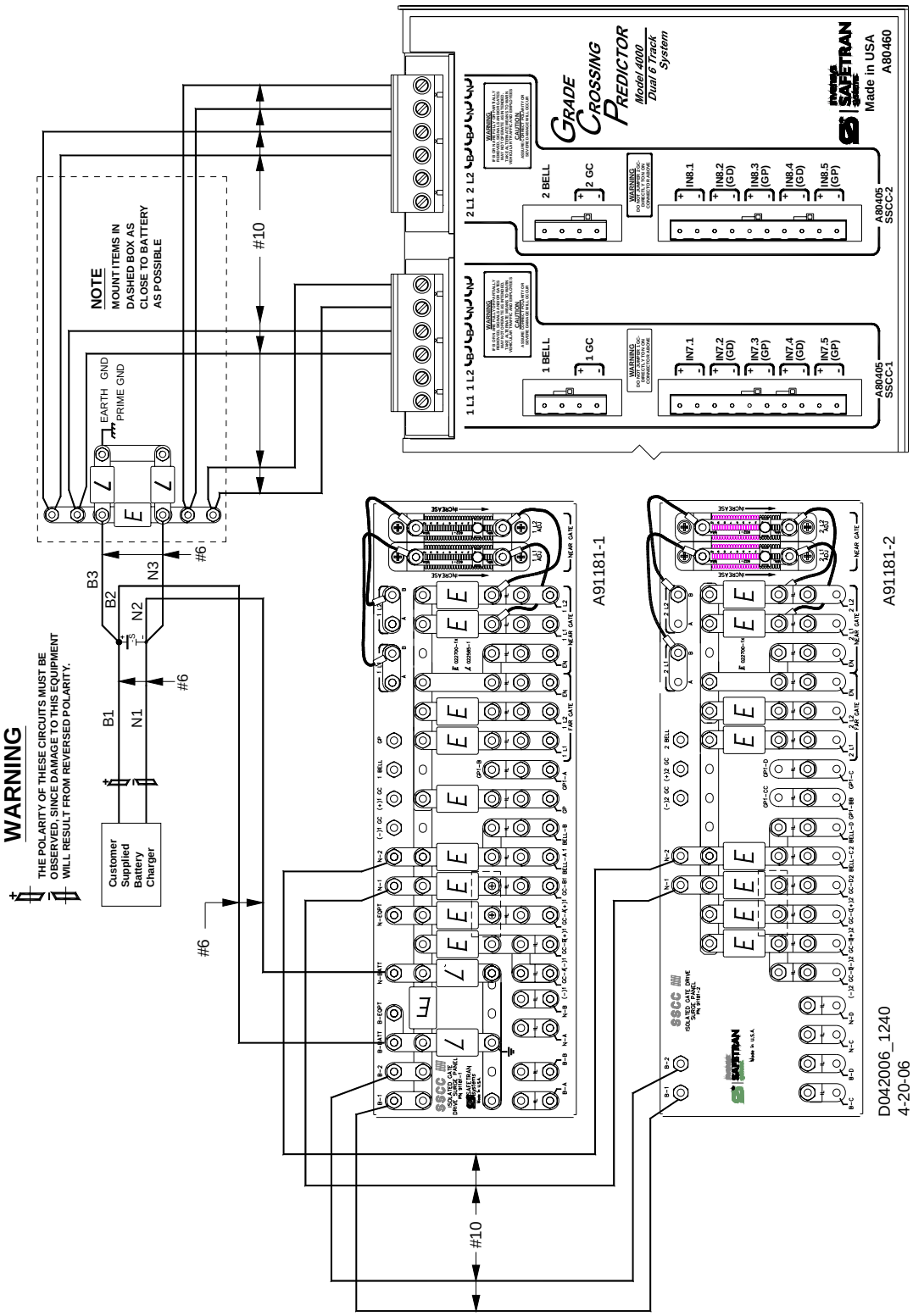


Figure 8-2. Surge & Power Connections to SSCC Modules & Lighting Surge Panels

8.3.1 Lighting Surge Panels

The A80405 modules use either of two SSCC III Lighting Surge Panel configurations to provide external I/O primary surge protection.

- A91170-1, -2 common return gate control, figure 8-3A and 8-3B
- A91181-1, -2 isolated gate control, figure 8-4A and 8-4B

Both Surge Panel configurations provide surge protection on all external I/O interconnects.

The SSCC III Lighting Surge Panels provide:

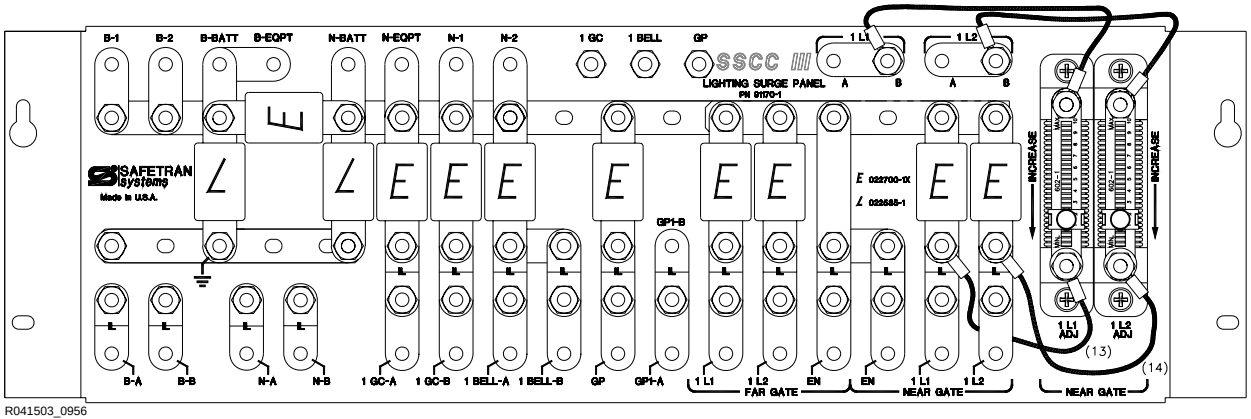
- arresters and equalizer for surge protection from transients on underground-cable battery voltage
- protection on all other I/O underground cable connections
- standard AREMA binding posts for connections to the flashing lights, gates, and bells
- insulated links in the underground cable connections
  - ♦ allows quick circuit isolation for testing and measurements without site cabling removal
- adjustable resistors in the **NEAR GATE** Lamp 1 (**1 L1**) and Lamp 2 (**1 L2**) circuits
  - ♦ provide compensation for different lengths of cabling to the crossing flashing lamps
  - ♦ compensate for unequal voltage drops between the two cables
- steering diodes for the Crossing Controller Gate Control output to provide isolation between the two crossing gate controls (see figure 8-5)

For common return gate control, a single A91170-1 panel (figure 8-3A) is used for up to 20-ampere operation and both an A91170-1 and an A91170-2 panel (figure 8-3B) are generally used for 21 to 40-ampere operation. Refer to figure 8-5A for typical common return gate control wiring.

For isolated gate control, a single A91181-1 panel (figure 8-4A) is used for 20-ampere operation and both an A91181-1 and an A91181-2 panel (figure 8-4B) are generally used for 21 to 40-ampere operation. Refer to figure 8-5B for typical isolated gate control wiring.

NOTE

For information on the selection and installation of the 91170-1 and 91181-1 SSCC III Lighting Surge Panels, refer to Section 3.



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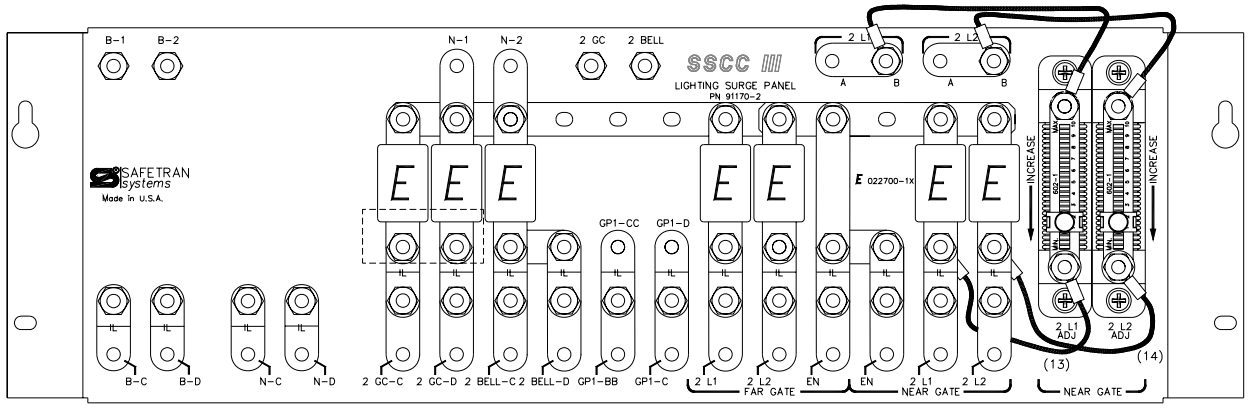
A

A91170-1



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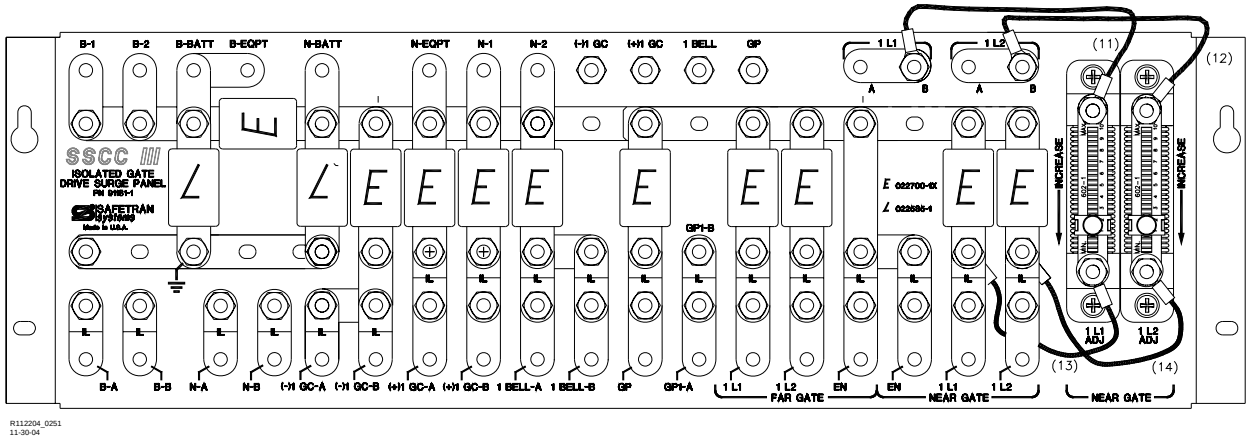
B

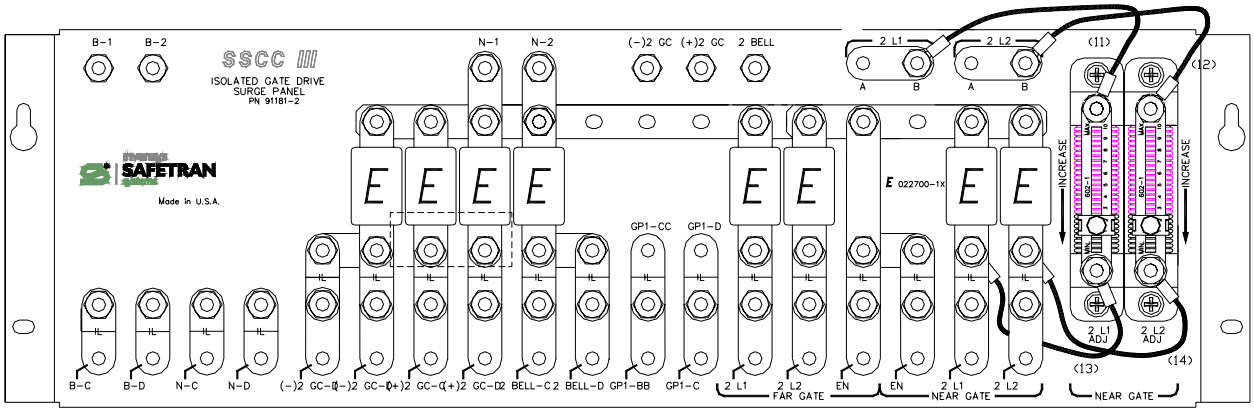
A91170-2

Figure 8-3. Common Return Lighting Surge Panels, A91170-1 & A91170-2



A

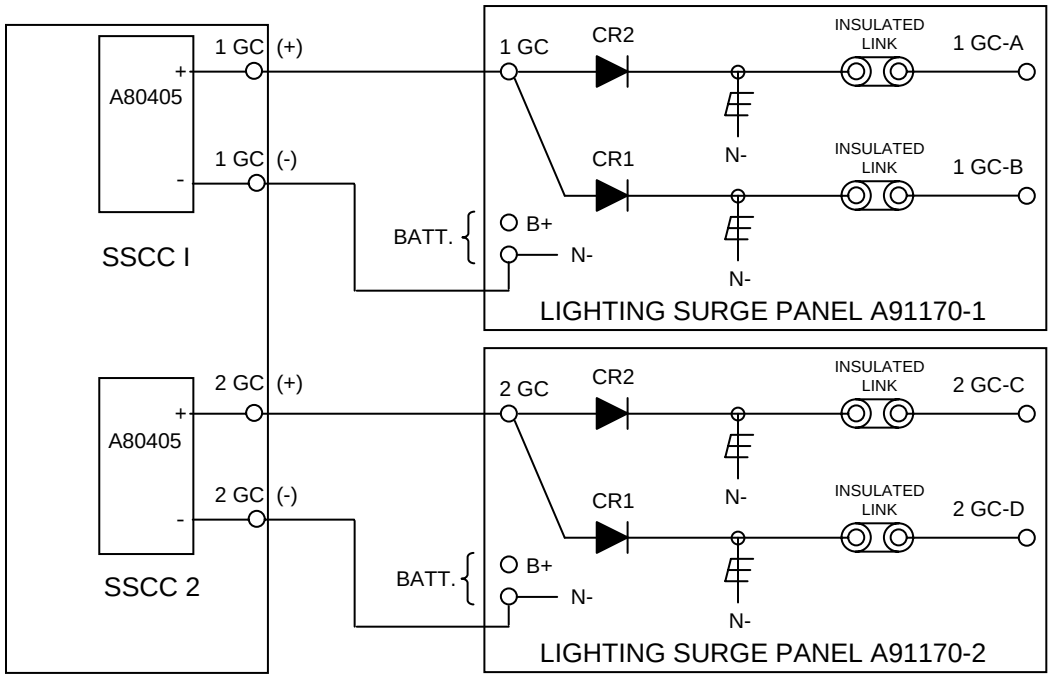
A91181-1



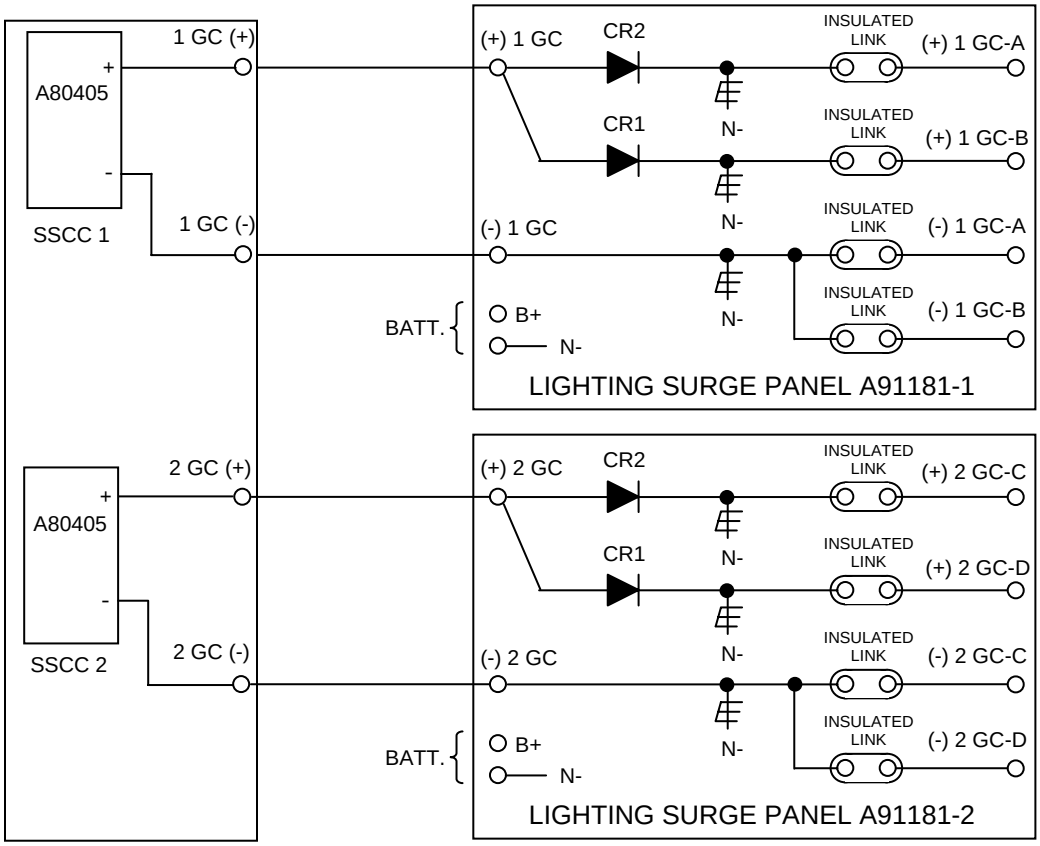
B

A91181-2

Figure 8-4. Isolated Return Lighting Surge Panels, A91181-1 & A91181-2



A: Typical Common Return Gate Control



B: Typical Isolated Gate Control

Figure 8-5. Typical Gate Control Options

8.4 CROSSING CONTROLLER OPERATION

The A80405 module provides drive for up to 20 amps of lamp current.

8.4.1 Failure Operation

The A80405 module continually performs self-diagnostic tests that result in complete on-line testing of module operation.

- If a critical failure is detected, the appropriate signal states are generated to immediately flash the crossing lamps and bring down the gates.

⚠ WARNING

1. **REMOVING INPUT POWER FROM THE A80405 MODULE CAUSES THE GATES TO DROP BUT THE LAMPS ARE NOT ACTIVATED.**
2. **IF B OR N ARE FULLY OR PARTIALLY REMOVED, SIGNALS AND/OR GATES MAY NOT OPERATE AS INTENDED. TAKE ALTERNATE MEANS TO WARN VEHICULAR TRAFFIC, PEDESTRIANS AND EMPLOYEES.**

8.4.2 A80405 Module Operating Parameters

System Reaction Time: Nominal 700 ms

Power-Up Time: 40 seconds maximum

Lamp Flash Rate: Can be programmed for 30 to 70 flashes per minute in 5 flashes-per-minute increments.

- 50 flashes per minute default

Lamp Duty Cycle: 50% each flashed lamp

Lamp Voltage Adjustment: Gate lamps are programmable, with regulated set points from 9.0 to 15.0 volts in 0.1 increments

- The lamp output voltage at the SSCC connector is limited to 1.5 volts under the battery voltage.
- Variable resistors on the Near Gate output of the Lighting Surge panel are provided for voltage drop compensation as required (see figures 8-7 and 8-8).

Test Modes:

Static Lamp & Bell Tests: Selected lamps lit steady.
All lamps flashing
Bell ON Steady

Activate Crossing: Crossing activates according to normal operation

Timed Lamp Test: Automatically delayed & timed.

Repeated Lamp Test: Timed lamp test repeated after twice the initial delay.

8.5 INSTALLATION

8.5.1 Crossing Controller Module Installation

Two non-redundant A80405 Solid-State Crossing Controller IIIi (SSCC IIIi) modules can be installed in the 4000 GCP as shown in figure 8-6.

- Crossing Controller lamp and bell circuit wiring includes:
  - ♦ Installation of wiring between the 4000 GCP Crossing Controller connectors and the SSCC III Lighting Surge Panels
  - ♦ Installation of underground wiring between the SSCC III Lighting Surge Panels and the crossing Mast Junction Boxes
  - ♦ Use of SSCC III Lighting Surge Panel(s)
    - Where one signal is controlled by each Controller Module, one surge panel (-1) may be used for both modules as shown in figure 8-7.

⚠ WARNING

WHEN ONE FLASHING LIGHT SIGNAL IS CONTROLLED BY EACH SSCC MODULE, A SINGLE SURGE PANEL MAY BE USED AS SHOWN IN FIGURE 8-7. JUMPER LINKS FROM A TO B MUST BE REMOVED IN TWO PLACES.

- Where two signals are controlled by a single Crossing Controller Module, one surge panel (-1) may be used as shown in figure 8-8

⚠ WARNING

WHEN TWO FLASHING LIGHT SIGNALS ARE CONTROLLED BY A SINGLE SSCC MODULE, A SINGLE SURGE PANEL MAY BE USED AS SHOWN IN FIGURE 8-8. JUMPER LINKS FROM A TO B MUST BE INSTALLED IN TWO PLACES.

- Where multiple signals are controlled by each Crossing Controller Module, an additional –2 surge panel is required and is wired and jumper links installed similar to figure 8-8, but connected to the second SSCC module connector.

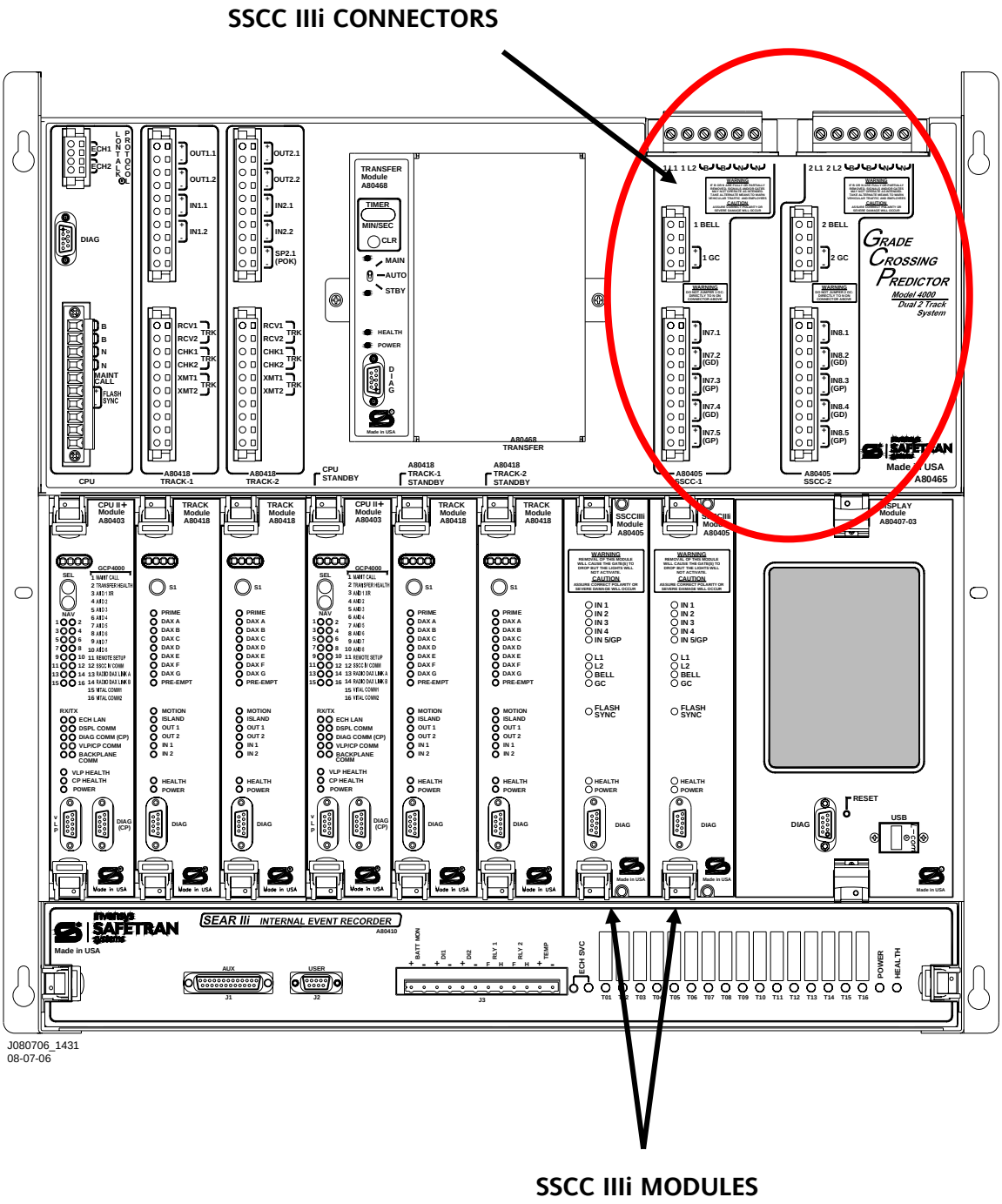


Figure 8-6 4000 GCP Crossing Controller Module and Connector Locations

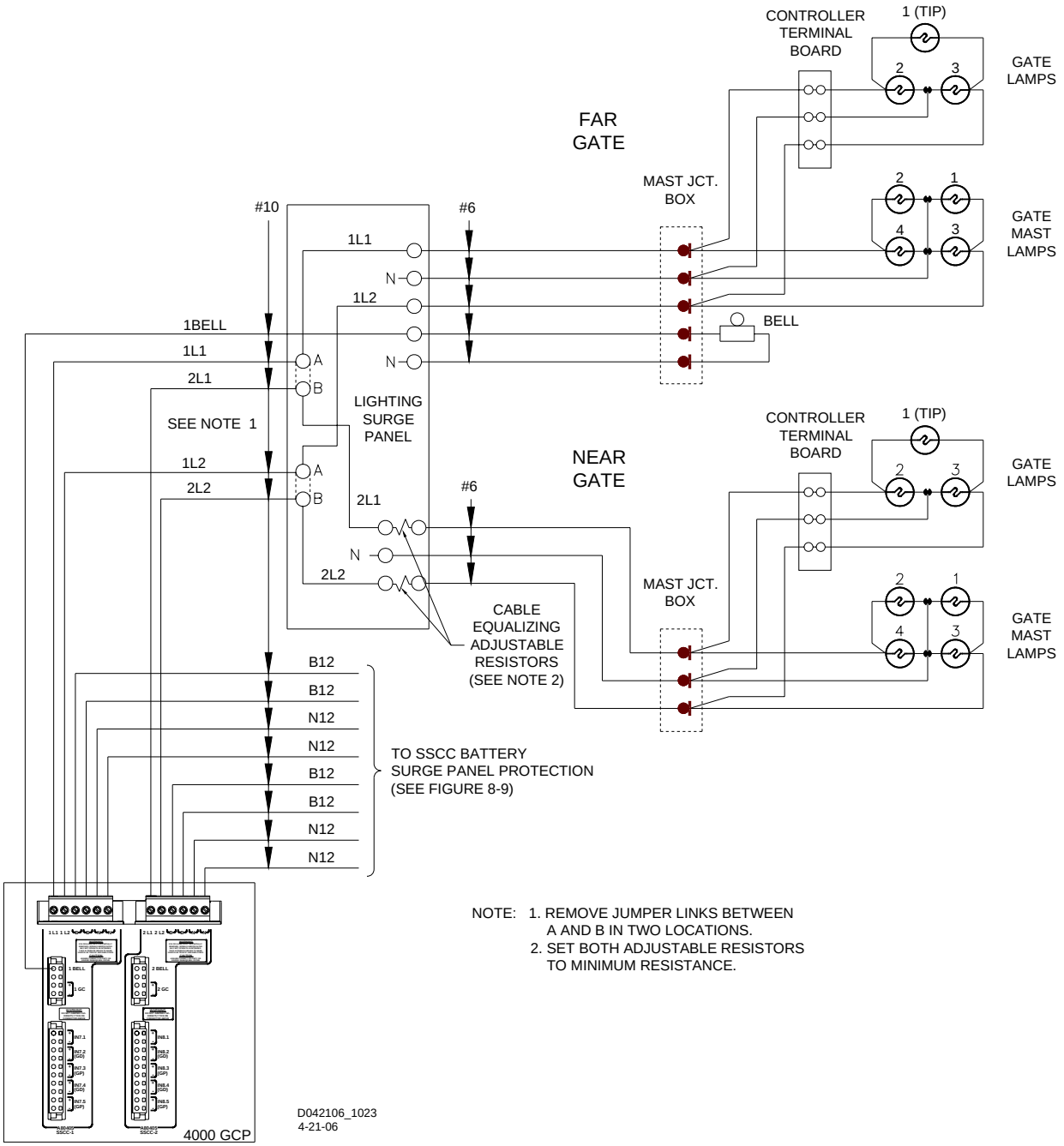


Figure 8-7 Two Crossing Controller Modules Controlling One Gate Each

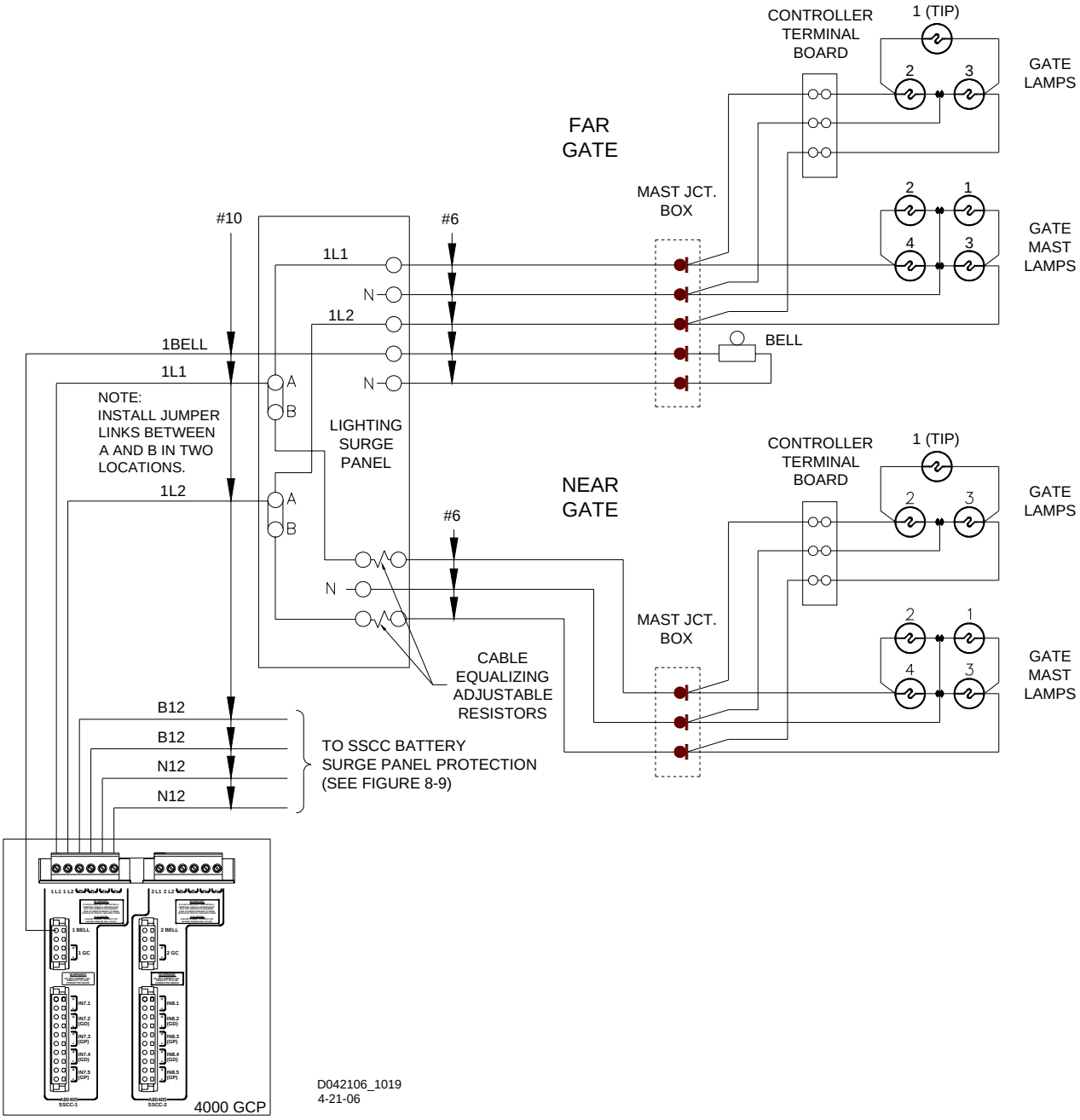


Figure 8-8 One Crossing Controller Module Controlling Two Gates

8.5.2 Crossing Controller Connectors

The 4000 GCP Crossing Controller connectors accommodate all wiring between the A80405 module(s) and the 91170 or 91181 SSCC III Lighting Surge Panel(s).

- Recommended crossing controller connector wire sizes are listed in table 8-1.
- Use of stranded wire is recommended

Table 8-1. Minimum Recommended Crossing Controller Wire Sizes

External Wiring Connector	Pin	Connector Type	Wire Size
SSCC-1	**1L1**	6-pin screw terminal	10AWG
	1L2	6-pin screw terminal	10AWG
	B	6-pin screw terminal	10AWG
	N	6-pin screw terminal	10AWG
	1BELL	4-pin cage clamp	16AWG
	+1GC	4-pin cage clamp	16AWG
	-1GC	4-pin cage clamp	16AWG
	+1IN7.1	4-pin cage clamp	16AWG
	-1IN7.1	10-pin cage clamp	16AWG
	+IN7.2 (GD)	10-pin cage clamp	16AWG
	-IN7.2 (GD)	10-pin cage clamp	16AWG
	+IN7.3 (GP)	10-pin cage clamp	16AWG
	-IN7.3 (GP)	10-pin cage clamp	16AWG
	+IN7.4 (GD)	10-pin cage clamp	16AWG
	-IN7.4 (GD)	10-pin cage clamp	16AWG
	+IN7.5 (GP)	10-pin cage clamp	16AWG
	-IN7.5 (GP)	10-pin cage clamp	16AWG
SSCC-2	**2L1**	6-pin screw terminal	10AWG
	2L2	6-pin screw terminal	10AWG
	B	6-pin screw terminal	10AWG
	N	6-pin screw terminal	10AWG
	2BELL	4-pin cage clamp	16AWG
	+2GC	4-pin cage clamp	16AWG
	-2GC	4-pin cage clamp	16AWG
	+IN8.1	4-pin cage clamp	16AWG
	-IN8.1	10-pin cage clamp	16AWG

Table 8-1 concluded

External Wiring Connector	Pin	Connector Type	Wire Size
SSCC-2	**+IN8.2 (GD)**	10-pin cage clamp	16AWG
	-IN8.2 (GD)	10-pin cage clamp	16AWG
	+IN8.3 (GP)	10-pin cage clamp	16AWG
	-IN8.3 (GP)	10-pin cage clamp	16AWG
	+IN8.4 (GD)	10-pin cage clamp	16AWG
	-IN8.4 (GD)	10-pin cage clamp	16AWG
	+IN8.5 (GP)	10-pin cage clamp	16AWG
	-IN8.5 (GP)	10-pin cage clamp	16AWG

⚠ CAUTION

1. CROSSING WIRING MUST CONFORM TO APPROVED RAILROAD SCHEMATICS.
2. WHEN INSTALLING B AND N PIN WIRES, OBSERVE CORRECT POLARITY OR SEVERE DAMAGE TO THE A80405 MODULE WILL OCCUR.
3. USE THE CORRECT SCREWDRIVER BLADE SIZE TO AVOID CONNECTOR DAMAGE. FOR WIRE PREPARATION AND INSERTION INSTRUCTIONS, REFER TO PARAGRAPHS 2.1.5 THROUGH 2.1.7.

8.5.3 Lamp and Bell Wiring to the Lighting Surge Panel

AREMA binding posts connect wiring to the Lighting Surge panel.

- Simplified Lighting Surge Panel Lamp and Bell wiring diagrams for typical crossings are shown in figures 8-7 and 8-8.
- A typical crossing lamp configuration is shown in figure 8-9.
- Recommended wire size for L1 and L2 between the Lighting Surge Panel and the 4000 SSCC power connector is number 10 AWG.
- Recommended wire size between the Lighting Surge Panel and the Mast Junction Box is number 6 AWG.
- The Lighting Surge Panel should be mounted as close as practical to the 4000 GCP.

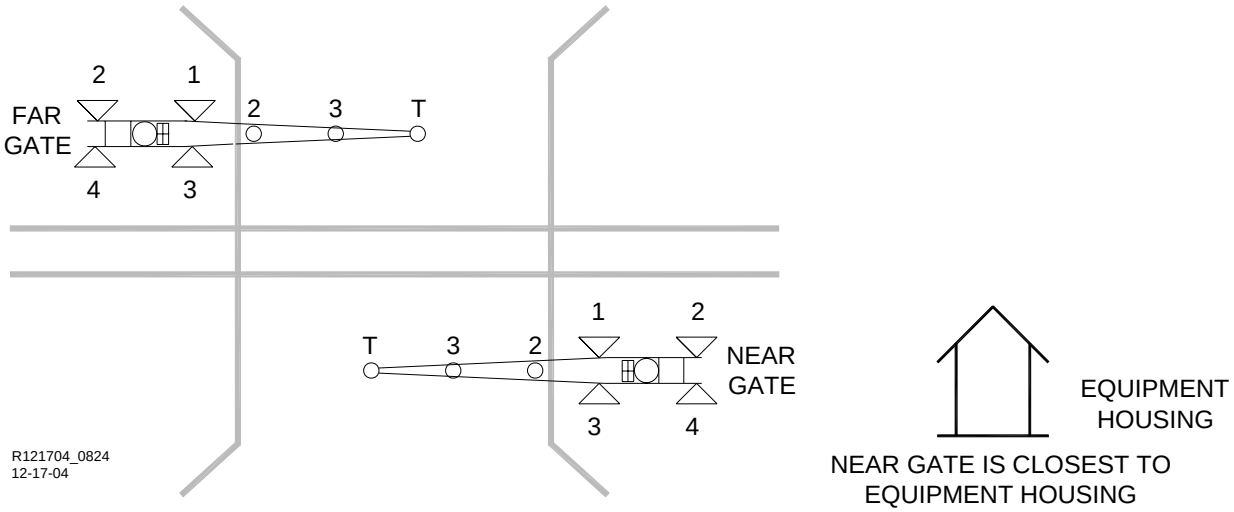


Figure 8-9 Typical Crossing Lamp Configuration

NOTE

For a crossing without gates, disable the GP input to the A80405 module by programming the:

- **Gates Used** to **NO**.

8.5.4 Lamp Wire Length Limitations

The maximum single wire length between the Lighting Surge Panel and the Mast Junction Box is determined by the:

- Gauge of the wire
- Total lamp current
- Type of battery used

8.5.5 Maximum Lamp Wire Length

The maximum recommended lamp wire length for a crossing is listed in table 8-2.

- Designated load current is based on 9.5 volts supplied to lamps.
- Generally, 18-watt bulbs draw 1.8 amps per each bulb lit at the same time and 25-watt bulbs draw 2.5 amps per each bulb lit at the same time.

NOTE

If a lamp wire between the surge Panel and the Mast Junction Box is too long, its resistance can prevent the full required voltage from being applied to the lamps.

- The effective resistance of a wire can be reduced and/or its maximum length increased by using two wires of the same gauge in parallel as indicated in table 8-2.
- The A80405 module maintains a constant lamp output voltage provided:
  - ✓ The battery voltage to the SSCC remains 1.5 volts higher than the lamp voltage measured at the SSCC L1 and L2 outputs.
  - ✓ The maximum lamp wire length is not exceeded

Table 8-2 Maximum Recommended Crossing Lamp Wire Length

Battery			WIRE LENGTH (feet)			
Load Current	Type	Cells	#9AWG	Dual #9AWG	#6AWG	Dual #6AWG
5.0 Amp	Pb	6	225	450	450	900
	NiCd	9	175	350	350	700
7.5 Amp	Pb	6	117	234	234	469
	Pb	7[1]	260	520	500	1000
	NiCd	10	200	400	400	800
	NiCd	11[1]	260	520	500	1000
10.0 Amp	Pb	6	88	176	175	350
	Pb	7[1]	213	426	375	750
	NiCd	10	150	300	300	600
	NiCd	11[1]	213	426	375	750

Pb = Lead acid
NiCd = Nickel-cadmium
Note 1: Do not exceed 16.5 volts on power terminals of controller.

8.5.6 Crossing Controller DC Power Connections

The A80405 modules receive power via the Lighting Surge panel and the **CROSSING CONTROLLER** connectors as shown in figure 8-10:

- Surge panel provides primary battery surge protection.
- Secondary surge protection provided by each A80405 module

Make power connections to each A80405 module via the **B** and **N** contacts of the respective **CROSSING CONTROLLER** connectors:

- Poly-jacketed 10AWG wire is recommended for DC power and return between the lighting surge panel and the 4000 GCP.
- Poly-jacketed 6AWG wire is recommended for DC power and return between the lighting surge panel and the crossing battery.

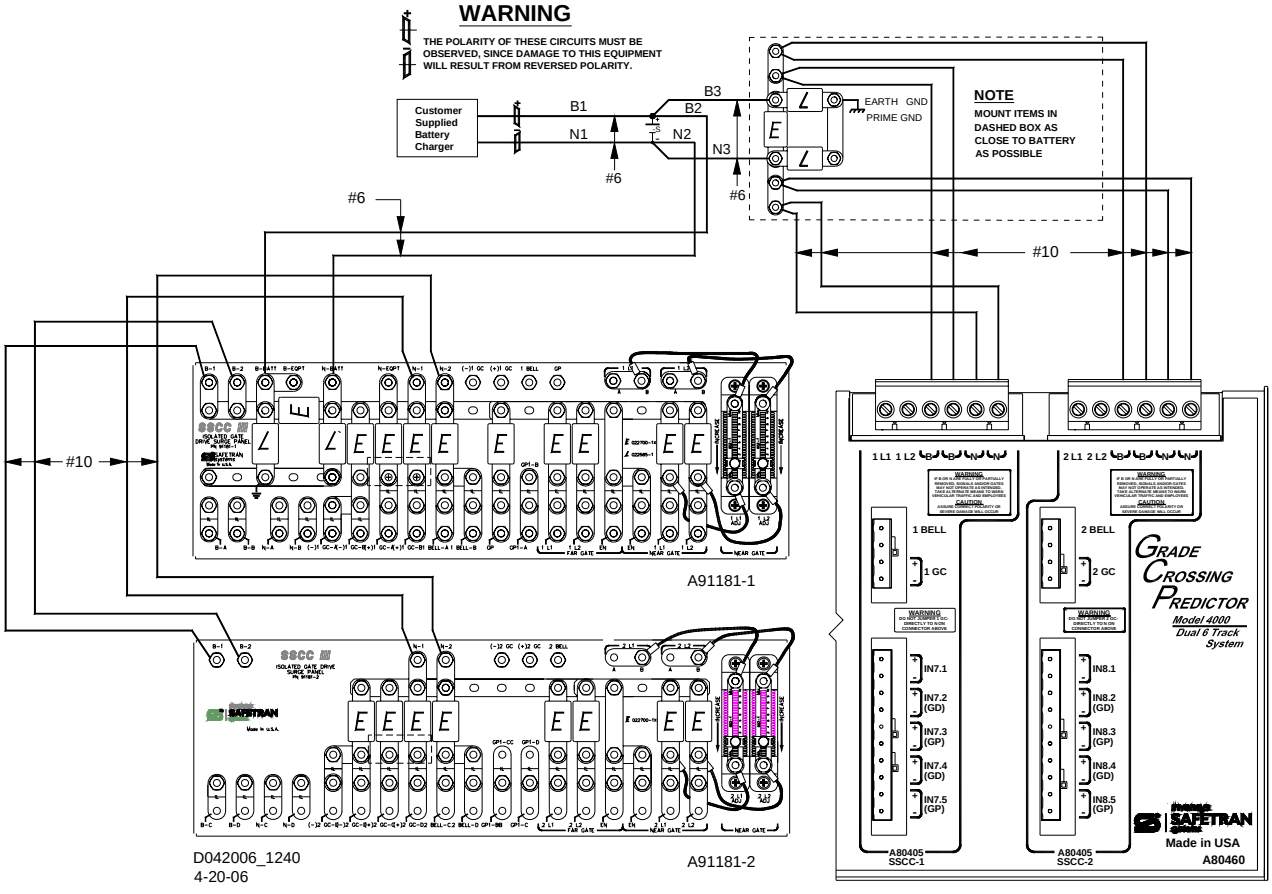


Figure 8-10 Typical Crossing Controller Module Battery Connections

⚠ WARNING

1. **USE CAUTION WHEN SETTING BATTERY VOLTAGE, ESPECIALLY WHEN USING TEMPERATURE COMPENSATED BATTERY CHARGERS:**
   - **EXCEEDING 16.5 VDC ON CROSSING CONTROLLER POWER TERMINALS MAY RESULT IN INTERMITTENT FALSE ACTIVATIONS.**
   - **EXCEEDING 18 VDC WILL RESULT IN CONTROLLER DAMAGE.**
2. **OBSERVE CORRECT POLARITY WHEN CONNECTING BATTERY POWER TO THE B AND N CONTACTS ON THE CROSSING CONTROLLER CONNECTOR(S).**
   - **INCORRECT POLARITY WILL RESULT IN SEVERE DAMAGE TO THE A80405 MODULE(S).**

8.5.7 Flash Sync Connections to External Controllers

The SSCC IIIi flash sync connection to an external SSCC is located on the CPU connector.

NOTE

1. Effective with Revision D of the SSCCIIIi, **FLASH SYNC** is an isolated two-wire output.
   - If two Revision D or later SSCC IIIi units in the same chassis are operated by separate batteries, the FLASH SYNC returns are connected internally and no additional connection is required.
   - Revision D SSCC IIIi Modules can be identified by:
     - "D" located at end of Part Number / Bar Code tag.
     - Large metal bracket located on component side of module.
2. When using Revision C SSCC IIIi or earlier, or when external SSCC units are connected to a master SSCC IIIi and operated from a different battery, the following wiring must be provided for FLASH SYNC Return:
   - If two Revision C SSCCIIIi units in the same chassis are operated by separate batteries, the **N** pins of the SSCCIIIi power and lamp connectors must be wired together.
   - If an external SSCC IIIA, SSCC III PLUS, or SSCC IV is connected to a master SSCC IIIi:
     - If the SSCC IIIi is Revision C or earlier, the negative terminals of the master SSCC IIIi and external SSCC must be wired together.
     - If the SSCC IIIi is Revision D or later, the SSCC IIIi **FLASH SYNC** return (-) must be connected to **N** on the external SSCC.
3. The terminology for flash sync control differs between a GCP 4000 and an external SSCC device. The GCP 4000 terms Master and Slave SSCC, are called "Flash Sync Out" and "Flash Sync In" respectively in an external SSCC (Slave = Flash Sync In).

8.6 CONFIGURATION SOFTWARE

Details on programming the SSCC IIIi for different 4000 GCP applications is provided in Section 5 - Application Programming Guidelines of the Model 4000 Application Guidelines manual, SIG-00-03-19.

NOTE

Where only LED lamps are used, a false lamp-neutral-wire-open condition may be detected when **Lamp Neutral Test** is set to **On** (see paragraph 5.7.1.1).

- To avoid a false error indication, set **Lamp Neutral Test** status entry for each active crossing controller to **Off**.

8.7 CONNECTING POWER AT INITIAL CUTOVER

Once the system has booted up, the SSCC IIIi module has internal short circuit protection for lamp, bell and gate control outputs. Therefore, at the initial cutover it is important to boot up the system prior to connecting external loads..

- After external wiring is complete, the connectors must be applied as instructed in the following CAUTION before applying power to the 4000 GCP SSCC IIIi module(s).

⚠ WARNING

DURING THE SSCC IIIi BOOT-UP PROCESS AND AFTER ALL WIRING IS CONNECTED:

- **THE CROSSING GATES WILL BE DOWN WITH CROSSING LAMPS FLASHING AND BELLS RINGING.**
- **A80405 MODULE(S) WILL NOT BE RESPONSIVE TO CROSSING CONTROL INPUT FROM THE 4000 GCP.**
- **TAKE ADEQUATE PRECAUTIONS TO WARN ANY PEDESTRIANS, PERSONNEL, TRAINS, AND VEHICLES IN THE AREA UNTIL PROPER SYSTEM OPERATION IS VERIFIED.**

⚠ CAUTION

THE WIRING AND CONNECTORS MUST BE APPLIED IN THE FOLLOWING SEQUENCE TO AVOID DAMAGE:

1. OPEN THE LAMP, GATE GC CONTROL, GP INPUTS, GD INPUTS AND BELL CIRCUITS AT THE SURGE PANEL(S).
2. VERIFY POLARITY ON POWER CONNECTOR(S).
3. CONNECT THE SCREW-LOCK POWER CONNECTOR FOR EACH SSCC IIIi MODULE AND LOCK BY TIGHTENING SCREWS.
4. WAIT APPROXIMATELY 40 SECONDS FOR SSCC IIIi MODULE(S) TO BOOT UP.
5. CONNECT THE GC/BELL AND GP/GD CAGE–CLAMP CONNECTORS FOR THE APPROPRIATE SSCC IIIi.
6. CLOSE THE LAMP, GATE CONTROL, GP/GD INPUTS AND BELL CIRCUITS ON THE SURGE PANEL(S).

8.8 MEASURING CROSSING LAMP VOLTAGE USING A CONVENTIONAL MULTIMETER

NOTE

The regulated lamp drive is a pulse-modulated voltage with an AC component and a DC component.

- A True RMS AC + DC meter is required to accurately read the pulse-modulated lamp voltage.
  - i.e., Fluke model 189
- Conventional multimeters may be used, however, the voltage reading will vary from the true rms value.
  - The variance is not a set percentage and is dependent on battery voltage.
  - A conversion chart cross-referencing several conventional meters is provided in table 8-3.
  - Lamp voltage measurements must be within 0.3 volt of the listed value.

Table 8-3 Multimeter Reading Variance From Actual Lamp Voltage

Battery Voltage	Regulated Lamp Drive Voltage Range	Measurement Below Actual Drive Voltage	
		Using Digital Multimeter (Fluke 87 or equivalent)	Using Analog Multimeter (TS111)
13.3	9.0 to 12.0	1.3 volts	0.6 volt
	>12.0	0.91 volt	0.42 volt
14.7	9.0 to 12.0	2.2 volts	1.1 volts
	>12.0	1.54 volts	0.77 volt
15.8	9.0 to 12.0	2.6 volts	2.0 volts
	>12.0	1.82 volts	1.4 volts

8.8.1 Meter Reading Conversion Examples

Following are two examples of how to measure the lamp voltages using a conventional meter.

- In both examples the:
  - ♦ battery bank voltage is 14.7 volts
  - ♦ multimeters are set to read DC

8.8.1.1 Lamp Voltage Measurement Example 1

When setting crossing lamp voltages to 9.5 volts, the conventional meter reading is determined by subtracting the meter variance given in Table 8-3 from the desired lamp voltage.

- When using a digital multimeter (e.g. Fluke 87) the:

desired lamp voltage =		9.5
meter variance for 14.7 volt battery =	-	2.2
meter reading =		**7.3**

- When using an analog multimeter (e.g. TS111) the:

desired lamp voltage =		9.5
meter variance for 14.7 volt battery =	-	1.1
meter reading =		**8.4**

8.8.1.2 Lamp Voltage Measurement Example 2

In this example, it is desired to check that lamp voltage is greater than 8.5 volts and the battery voltage is 13.3 volts.

When verifying that the lamp voltages are greater than 8.5 volts DC, the conventional meter reading is determined by subtracting the meter variance given in Table 8-3 from the minimum lamp voltage threshold.

- When using a digital multimeter (e.g. Fluke 87) the:

minimum lamp voltage threshold =		8.5
meter variance for 13.3 volt battery =	-	1.3
minimum meter reading =		**7.2**

- When using an analog multimeter (e.g. TS111) the:

minimum lamp voltage threshold =		8.5
meter variance for 13.3 volt battery =	-	0.6
minimum meter reading =		**7.9**

8.8.2 Lamp Battery Capacity Testing

Battery capacity is tested with AC power turned off.

- Lamp voltages must be greater than 8.5 volts DC.

When verifying that the lamp voltages are greater than 8.5 volts DC, the conventional meter reading is determined by subtracting the meter variance given in Table 8-3 from the minimum lamp voltage threshold.

- When using a digital multimeter (e.g. Fluke 87) the:

minimum lamp voltage threshold =		8.5
meter variance for 14.7 volt battery =	-	2.2
minimum meter reading =		**6.3**

- When using an analog multimeter (e.g. TS111) the:

minimum lamp voltage threshold =		8.5
meter variance for 14.7 volt battery =	-	1.1
minimum meter reading =		**7.4**

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SECTION 9 – INTERNAL EVENT RECORDER

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SECTION 9 - INTERNAL EVENT RECORDER

9.1 INTRODUCTION

The Safetran Internal Event Recorder (SEAR IIi) is a non-vital module of the 4000 GCP. This module:

- provides continuous real-time status and event recording of the 4000 GCP and the grade crossings monitored by the GCP
  - ♦ receives crossing events via 4000 GCP internal bus
  - ♦ receives and transmits data via CPU Lontalk® Protocol
- has a standard memory capacity of 180,000 stored events
  - ♦ memory may be expanded to 390,000 stored events
- monitors and records:
  - ♦ two user-defined digital inputs on the front panel
  - ♦ 61 channels on the backplane
  - ♦ temperature
  - ♦ battery voltage
- provides the heel and front dry contacts of two internal non-vital relays for external applications
- provides 6 RTU outputs

⚠ WARNING

THE SEAR IIi IS A NON-VITAL MODULE. DO NOT USE FOR VITAL APPLICATIONS.

9.1.1 Recorded Data Access

Recorded information and monitored states can be accessed:

- internally from the 4000 GCP Display Module
- externally via the front panel serial connectors

9.1.2 External Communication

SEAR IIi may communicate with external equipment. via:

- the GCP **LONTALK® PROTOCOL** LAN connector
  - ♦ establishes own LAN node identification
  - ♦ employs ATCS Specification 200 nested within Lontalk® Protocol
- front panel serial ports
  - ♦ ATCS MCP radio with RS232 port
  - ♦ spread-spectrum radio (SSR)
  - ♦ telephone dial-up modem
  - ♦ serial printer
  - ♦ computer

⚠ CAUTION

THE 4000 GCP AND ALL DEVICES CONNECTED TO THE LAN SHOULD BE CONTAINED ENTIRELY WITHIN THE SAME SIGNAL CASE OR BUNGALOW.

NOTE

Additional LAN protocols may be accommodated.

➢ For information contact Safetran Systems Applications Engineering.

9.1.3 Site Configuration

The SEAR IIi is fully configurable for each installation site. Configuration is accomplished using:

- the SEAR IIi Keypad available on the 4000 GCP Display Module
- a computer running any standard terminal emulation program such as HyperTerminal

SEAR configuration includes selection of:

- site information
  - ♦ ATCS identification number
  - ♦ local time
  - ♦ location
    - ▪ DOT Crossing Number
    - ▪ milepost number
    - ▪ site name
    - ▪ site type
- office ATCS address
- communication data
- input activation and selection

9.1.3.1 ATCS Address

The ATCS address follows a railroad industry method of identifying specific locations and equipment at that location. In the address 7.RRR.LLL.GGG.99.01:

- RRR is the railroad number
- LLL is the line number
- GGG is the group number, which generally is the location
- 99 is a sub-node at the location, and
- the 01 is the device number

NOTE

The SEAR IIi is always subnode 99 and device 01. The 4000 GCP ATCS address must always be the same 7RRRLLLGGG as the SEAR IIi. Unless specified otherwise the GCP subnode number is 16. The GCP device number is not user selected. To set the 4000 GCP ATCS address see paragraph 5.2.3.10, **ATCS Site ID Entry**, in Section 5.

If the location is not equipped with external communications, the industry method does not have to be used. Then the SEAR IIi default address 7.620.100.100.99.01 and GCP 4000 default address 7.620.100.100.16 may be used.

9.1.4 Application Programming

SEAR IIi application programming is performed using a computer running any standard text editor.

SEAR IIi application programming:

- implements and controls the detection, processing, and recording of GCP track circuit events and processes
- sets parameters for alarm initiation and recording
- is performed by Safetran personnel using a proprietary programming language

9.2 PHYSICAL DESCRIPTION

The SEAR IIi module, figure 9-1, may be installed in the bottom bay of the following 4000 GCPs:

- 80400 Dual Four Track
- 80440 Single Five Track
- 80460 Dual Six Track
- 80465 Dual Two Track

9.2.1 User Interface Connectors

To accommodate recording/monitoring applications, the SEAR IIi provides two external ports:

- **AUX J1**
  - ♦ used for radio, telephone dial-up modem, or other communications devices
    - RS232 standard interface
    - 25-pin female connector
- **USER J2**
  - ♦ 6 RTU outputs
  - ♦ used for local laptop computer or standard serial printer connections
    - RS232 standard interface
    - 9-pin female connector

9.2.2 External Function Interface Connector

A 12-pin male cage clamp connector provides:

- Isolated battery monitor input
  - ♦ one positive and one negative terminal
  - ♦ used typically for monitoring voltage of DC battery
- two isolated digital inputs
  - ♦ one positive and one negative terminal per input
  - ♦ may be used to monitor signals from 0 to 120V AC/DC
- two isolated-contact relay outputs
  - ♦ one heel and one front terminal per output
  - ♦ typically used for non-vital applications to control relays and outside indicator lamps
- Isolated temperature probe monitor input
  - ♦ one positive and one negative terminal
  - ♦ used typically to monitor DC battery temperature

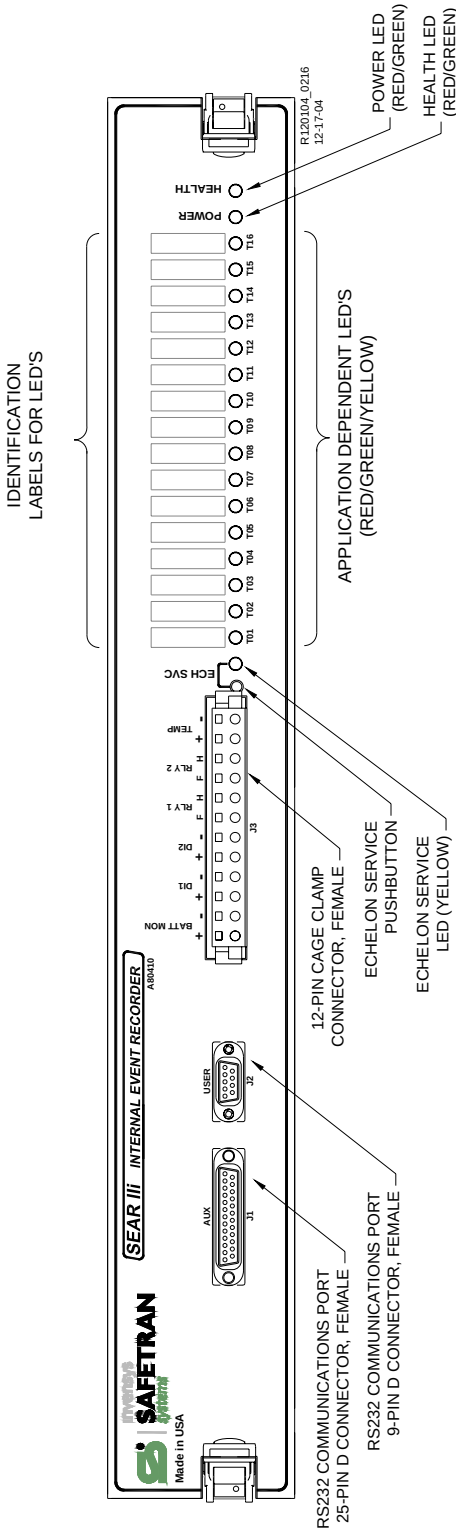

Figure 9-1. Internal Event Recorder Front Panel

9.2.3 Status LED's

19 front-panel LED's display LAN, SEAR IIi and event status:

- **ECH SCV** LED flashes yellow until SEAR IIi is initialized
- **POWER** LED lights green while power is applied
- **HEALTH** LED
  - ♦ Flashes green if backup battery output is within acceptable voltage range.
  - ♦ Flashes red if backup battery is below minimum acceptable voltage.
  - ♦ Off while SEAR IIi is inoperative.
  - ♦ Flashes yellow while compiling.
- 16 application dependent event LEDs (**T01 – T16**):
  - ♦ Light when programmed event occurs
    - ▪ Light red, green, or yellow
    - ▪ Event color predetermined by program
  - ♦ Event label area provided above each LED

9.3 OPERATION

Operational control of the SEAR IIi is maintained by an internal microprocessor.

- The executive software and programming instructions are stored in flash memory.

9.3.1 Event Memory

Events are stored in battery-backed SRAM (Static Random Access Memory).

- The event memory capacity in the standard SEAR IIi configuration is 180,000 events.
- With the memory expansion option, the memory capacity is 390,000 events.

9.3.2 Real Time Clock

An internal real-time clock maintains SEAR IIi time and date.

- SEAR IIi Time and date are normally set using the SEAR IIi keypad available on the 4000 GCP Display Module
  - ♦ may also be set by means of a computer connected to the USER port
  - ♦ clock automatically adjusts for leap years
  - ♦ automatic daylight savings adjustments are under user control
- The time and date is used to timestamp events in the Event Log.
- internal back-up battery accurately maintains time and date in event of power failure

NOTE

The internal memory and the real-time clock contain random data when the unit is powered up for the first time in the field.

➢ Time/Date adjustments should be performed immediately following the initial power-up sequence.

9.3.3 Internal Battery

An internal lithium battery maintains power to the SRAM and real-time clock when power is removed from the unit.

- Under normal circumstances, the memory contents will be kept for a minimum of 3 years without power applied to the recorder.

NOTE

1. The SEAR IIi uses a standard 3.6 V AA-size lithium battery.
2. SEAR IIi module is shipped from the factory with the lithium battery electronically disconnected from the circuit.
   - ➢ Although the SEAR IIi comes with two battery holders only one holder contains a battery.
   - ➢ The battery is automatically connected when the 4000 GCP is first powered up in the field.
3. When the internal lithium battery voltage drops below a predetermined level:
   - ➢ the **HEALTH** LED flashes red
   - ➢ a low-battery warning alarm is issued
     - ✧ At least 3 months of normal battery-backed operation may be expected after initial detection of the battery-low condition.
   - ➢ an event is recorded

⚠ CAUTION

TO PREVENT LOSS OF POWER TO THE MEMORY AND REAL-TIME CLOCK DURING BATTERY REPLACEMENT, A NEW BATTERY SHOULD BE INSERTED INTO THE EMPTY HOLDER BEFORE REMOVING THE OLD BATTERY.

9.3.3.1 Battery Replacement

Refer to the battery replacement procedure on the following page to replace the Lithium battery in the SEAR IIi.

Procedure 9-1. LITHIUM BATTERY REPLACEMENT	
Step 1	Use the ejector clips at each end of the SEAR IIi front panel to release the PC board from the 4000 GCP case assembly connectors.
Step 2	Pull the SEAR IIi assembly far enough out of the 4000 GCP case to expose the battery (see figure 9-2 below).
Step 3	Install a new battery in the spare battery clip (observe proper polarity).
Step 4	Remove the old battery from the other battery clip.
Step 5	Reinstall the SEAR IIi assembly in the 4000 GCP case. Make sure connectors are properly seated.
Step 6	Return the ejector clips to the locked position.

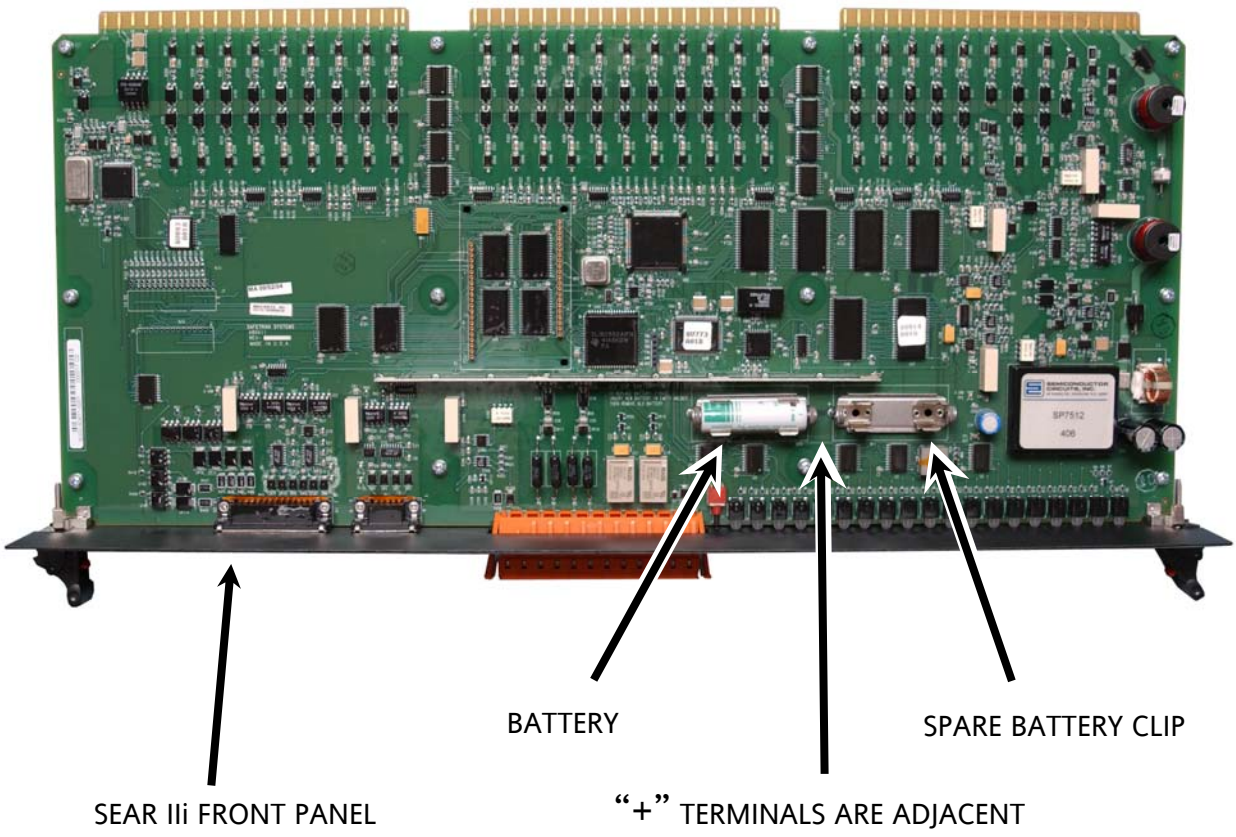

Figure 9-2. Battery Location on SEAR IIi

9.3.4 Digital Inputs

The two digital inputs may be used to monitor signals up to 120V DC/AC.
Each input:
is independently opto-isolated
energizes (turns on) when the input voltage exceeds 6V DC

9.3.5 Relay Outputs

The two sets of relay terminals provide independently isolated front (**F**) and heel (**H**) dry contacts.

- Contacts are rated for 5A at 30VDC or 120VAC.

9.3.6 Data Ports

SEAR IIi data may be accessed via the front panel serial port connectors:

- A telephone dial-up modem or a radio connected to the **AUX J1** port may be used to remotely access:
  - Inputs
  - outputs
  - diagnostics
  - event logs
  - configuration menu
- Serial printers and computers connected to **USER J2** port may be used to:
  - access data for printout and/or display
  - upload executive and application programs

NOTE

For modem applications the Safetran DC-powered A53413 14.4K Mighty Modem is recommended for use with the SEAR IIi.

- For information on the A53413 Modem, refer to Safetran Document, COM-00-97-09.

For radio applications the A53325 Safetran Spread Spectrum Ethernet Radio (SSER) is recommended for use with the SEAR IIi.

- For information on Safetran SSERs, refer to Safetran Document, COM-00-05-05.

9.4 SEAR IIi STARTUP

SEAR IIi startup occurs when power is applied to the 4000 GCP. Startup sequentially enables:

- SEAR IIi boot monitor operation
  - ♦ verifies data bus
  - ♦ verifies address bus
  - ♦ validates executive CRC
- download of new executive software
- access to SEAR IIi debugger function
- start of SEAR IIi executive software

9.4.1 Boot Monitor Screen

The boot monitor screen, figure 9-3:

- displays the boot operational sequence
- may be accessed as described in procedure 9-2

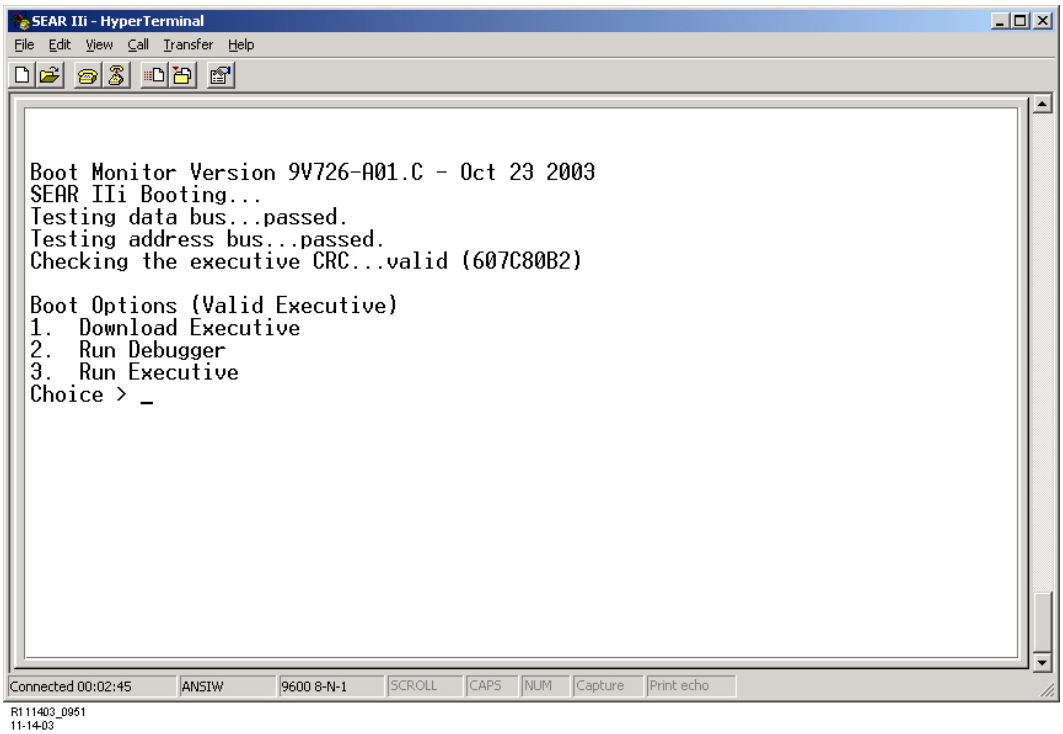

Figure 9-3. SEAR IIi Boot Monitor Screen

NOTE

The SEAR IIi **USER J2** serial port and the computer COMM port settings must match in order to communicate.

➢ Default settings: **9600, 8, N, 1**

Procedure 9-2. BOOT MONITOR SCREEN ACCESS

Step 1 Connect a standard nine-pin, RS-232 serial cable between the SEAR IIi **USER J2** serial port (DB9 male) and the computer serial COMM port (DB9 female).

Step 2 Configure the terminal emulation software to communicate with the SEAR IIi.

Step 3 Cycle power to the 4000 GCP.

- The boot monitor screen, figure 9-3, displays.
- After 5 seconds the following message is added to the display:
  Boot Monitor complete. Running SEAR IIi Executive.

NOTE

HyperTerminal or any other available terminal emulation software may be used.

- HyperTerminal is included on most computers with a standard Windows® 9x/NT/2000/XP installation.
- The SEAR IIi uses ANSI terminal emulation with line wrap turned off.

9.4.2 Upgrading The Executive Software

Upgrading the Executive software can only be performed from the Boot Monitor Screen.

- To download new Executive software, follow Procedure 9-3.

NOTE

1. Downloading a new Executive must be started within 5 seconds after the **Choice >** prompt is displayed by the initial Boot Monitor Screen.
2. Prior to initiation of Procedure 9-3, make sure that the new Executive is ready for download.
   - Only 1 minute is allowed to initiate the download after **Download Executive** selection.
   - When using the HyperTerminal, file download is initiated from the **Send File** item of the **Transfer** drop-down menu.

Procedure 9-3. UPGRADING THE EXECUTIVE SOFTWARE

Step 1 Connect a standard nine-pin, RS-232 serial cable between the SEAR IIi **USER J2** serial port (DB9 male) and the computer serial COMM port (DB9 female).

Step 2 Configure the terminal emulation software to communicate with the SEAR IIi.

Step 3 Cycle power to the 4000 GCP or remove and re-insert the SEAR IIi.

- The Boot Monitor Screen, figure 9-3, displays.

Step 4 At the **Choice >** prompt select **1** (within 5 seconds).

- The terminal screen displays:
  Waiting for executive download...

Step 5 Using the terminal emulator Transfer command, initiate download of the new Executive binary file.

- A typical transfer window using the Zmodem protocol is shown in figure 9-4.
- After the Executive software is downloaded and stored in the SEAR flash memory, the boot options are again displayed.
  - ♦ A typical HyperTerminal screen display is shown in figure 9-5.

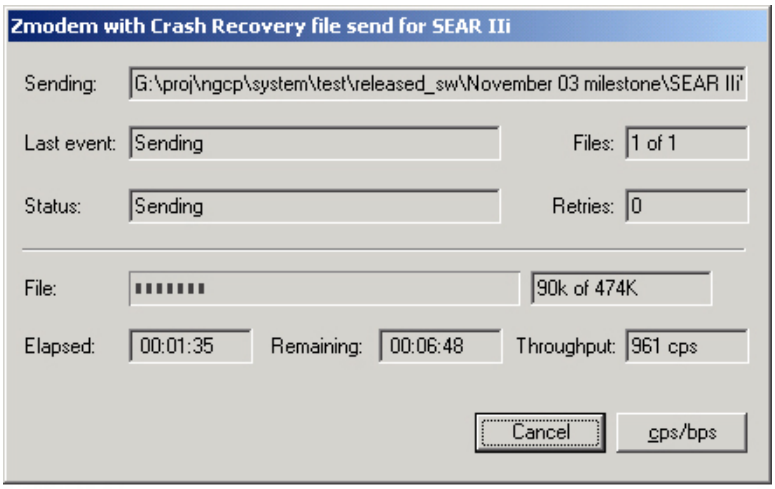

Figure 9-4. Zmodem Transfer Window

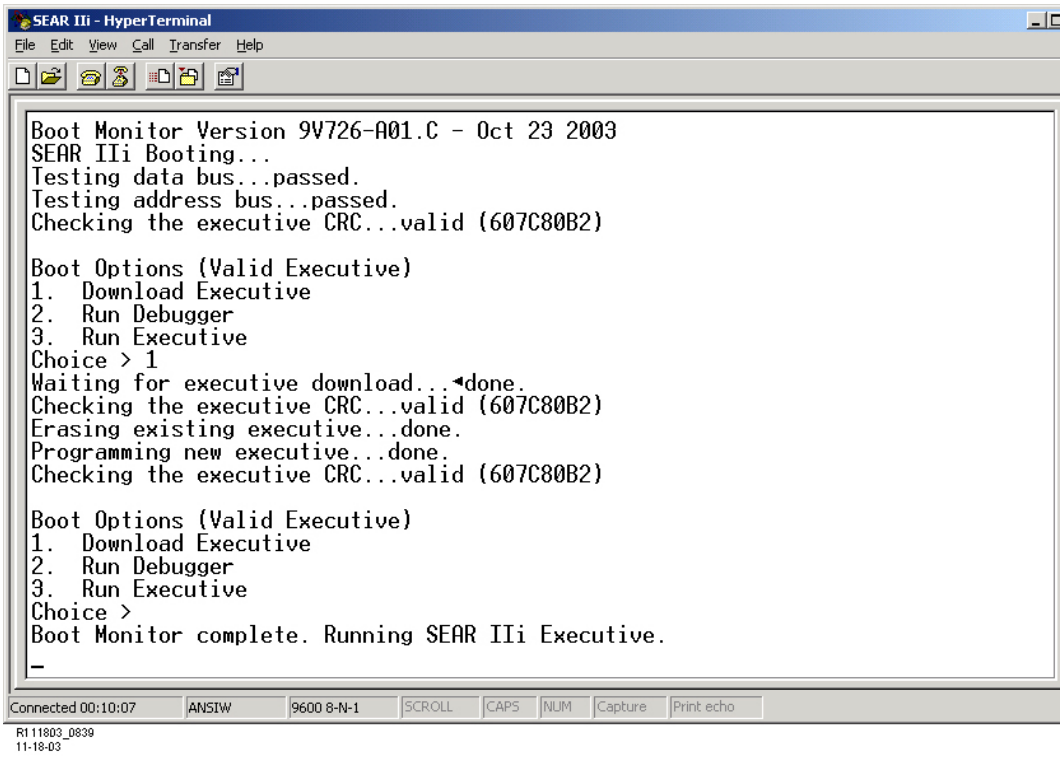

Figure 9-5. SEAR IIi Executive Software Download Screen (HyperTerminal)

9.5 TERMINAL INTERFACE

The Terminal Interface provides computer access to the SEAR IIi configuration function menu.

9.5.1 Terminal Interface Main Menu

The Terminal Interface Main Menu, figure 9-6:

- provides a menu item for each SEAR IIi configuration option
- displays when **Ctrl+L** is pressed from the Boot Monitor Screen, figure 9-3

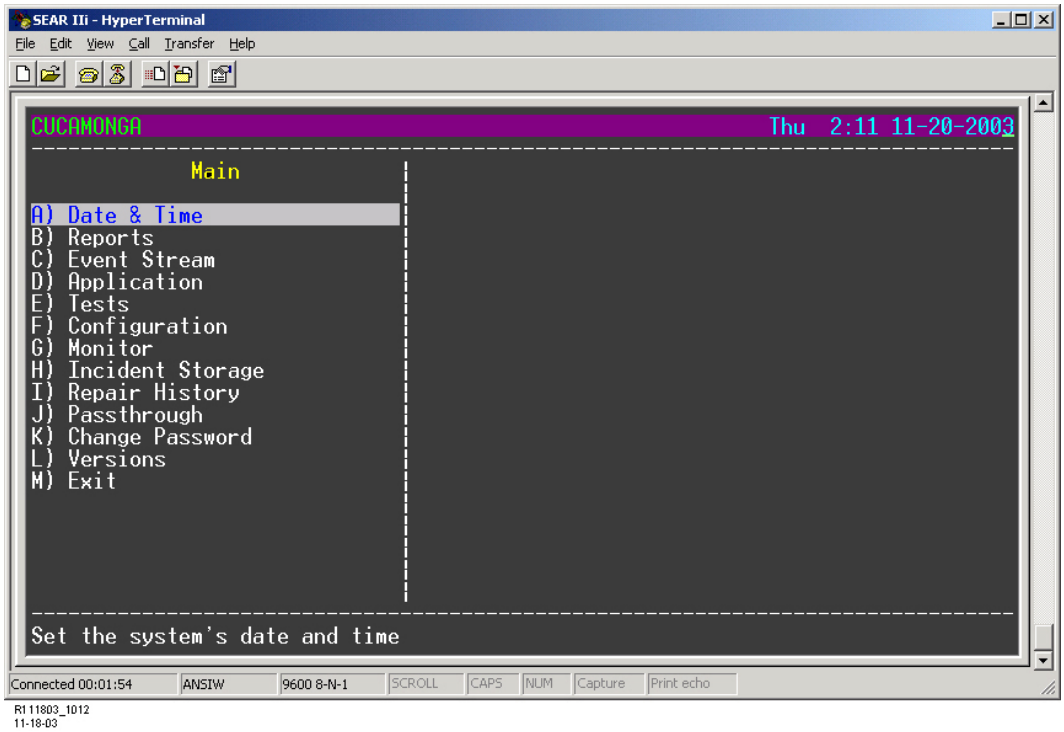

Figure 9-6. SEAR IIi Terminal Interface Main Menu

9.5.1.1 Menu Navigation

Menu navigation is implemented as follows:

- Menu items allow navigation to other menus and/or data edit fields.
  - ♦ Menu items may be selected by:
    - highlighting an entry using the up or down arrows and pressing **Enter**
    - entering the letter designation to the left of the entry
- Submenu titles bracketed by arrows (<- title ->) indicate that corresponding data edit fields may be sequentially accessed using the right or left arrows.
- Pressing the **Esc** key exits the current screen and returns the display to the previous screen.
- Pressing **Ctrl + X** exits the terminal session.
- Pressing **Ctrl + L** starts or restarts the terminal session.
- Pressing **Ctrl + R** refreshes the current terminal screen.
- Position arrows (←, →, ↑, and ↓) may be used to:
  - ♦ highlight items within a menu
  - ♦ move the cursor through a data field
    - deletes each selected text entry position
  - ♦ change the entry field to another preset value

NOTE

1. If no action is performed on the terminal interface for more than 10 minutes, the session is automatically terminated.
2. If data is changed and no further action is performed for 10 minutes, a prompt is displayed requesting that the changes be saved.
   - ➢ If no response is initiated for an additional 10 minutes, all changes are discarded.
     - ❖ the prior configuration remains in effect

9.5.1.2 Entering Terminal Data

The Terminal Interface Menu data field types:

- data field
  - ♦ Selected data field is identified by brackets **[ ]**
  - ♦ Data field(s) are changed by:
    - ▪ pressing left arrow (←) key to clear each successive data field
    - ▪ entering new data from keyboard
  - ♦ Data field accepted by pressing **Enter**
- list field
  - ♦ Selected list field is identified by brackets **[ ]** followed by **^v** symbols
  - ♦ Arrows (←, →, ↑, and ↓) are used to make selection
  - ♦ List field accepted by pressing **Enter**

9.5.2 Menu Structure

The Main menu provides access to additional menus as shown in figure 9-7.

- These menus are described in table 9-1.

Table 9-1. SEAR IIi Menu Items

Main Menu	Sub Menus		Function
	Level 1	Level 2	
A) Date & Time			Sets SEAR date and time
B) Reports	**A) Standard Report**		Displays standard format event report
	B) Field Report		Displays each event with the current state of all digital inputs displayed on the same line.
	C) Configuration Report		Displays SEAR configuration data
	D) Incident Report		Displays report of all saved GCP incidents
	E) Repair History Report		Displays a GCP repair history report
	F) Application Report		Displays a report of application message activity
	G) Exit		Returns display to **Main** menu
C) Event Stream			Displays events as they occur in real time
D) Application	**A) Download to SEAR**		Downloads new CDL program
	B) Upload from SEAR		Uploads CDL , LLW, and LLB, program text
	C) Compiler Log		Lists CDL compiler messages
	D) Exit		Returns display to **Main** menu

NOTE

CDL = Control Descriptor Language
LLW = Ladder Logic Instruction
LLB = Ladder Logic Labels

Table 9-1 continued

Main Menu	Sub Menus		Function
	Level 1	Level 2	
E) Tests	**A) View Results**		Displays results for user, auto-mated, and manual tests
	B) Manual entry		Allows manual test results to be manually entered
	C) Force test		Forces a user test of automated inspection to run
	D) Save Tests		Saves user defined tests
	F) Exit		Returns display to **Main** menu
F) Configuration	**A) Site Information**		Allows SEAR site specific information to be edited
	B) Communication		Allows communication settings between SEAR and office to be edited
	C) Serial Port	**A) Edit**	Allows editing of SEAR serial port settings
		B) Exit	Returns display to level 1 sub menu
	D) Digital Inputs	**A) Edit**	Allows editing of SEAR digital input settings
		B) Exit	Returns display to level 1 sub menu
	E) Battery Inputs	**A) Edit**	Allows SEAR supply voltage to be monitored
		B) Exit	Returns display to level 1 sub menu
	F) Relay Outputs	**A) Edit**	Allows selected relay output settings to be monitored
		B) Exit	Returns display to level 1 sub menu
	G) Test LEDs	**A) Edit**	Allows displayed test LED settings to be edited
		B) Exit	Returns display to **Test LEDs** menu entry
	H) LED Mode		Allows LED display mode to be changed
	I) Modules	**A) Add Module**	Add a module to the LAN network
		B) Change Module	Change the LAN network settings of a module
		C) Replace Module	Replace a LAN network module
		D) Remove Module	Remove a module from LAN network
		E) Identify Module	Identify a module on LAN network
		F) Exit	Returns display to the **Configuration** menu
	J) Restore Defaults		Returns all settings to factory default
	K) Save Changes		Saves configuration settings
	L) Exit (no save)		Returns the display to the **Main** menu without saving changes
G) Monitor	**A) Onboard I/O**		View SEAR I/O status in real time
	B) Onboard LED's		View SEAR LED status in real time
	C) Exit		Returns display to **Main** menu

Table 9-1 continued

Main Menu	Sub Menus		Function
	Level 1	Level 2	
H) Incident Storage	**A) View**		View a previously saved incident report
	B) Save		Save an incident report
	C) Delete		Delete an incident report
	D) Exit		Returns display to the **Main** menu
I) Repair History	**A) View**		View the repair history
	B) Add		Add a manual repair entry
	C) Exit		Returns display to the **Main** menu
J) Passthrough			Passthrough to another port
K) Change Password			Change one of the passwords
L) Version			View a software version number
M) Exit			Exit the **Main** menu

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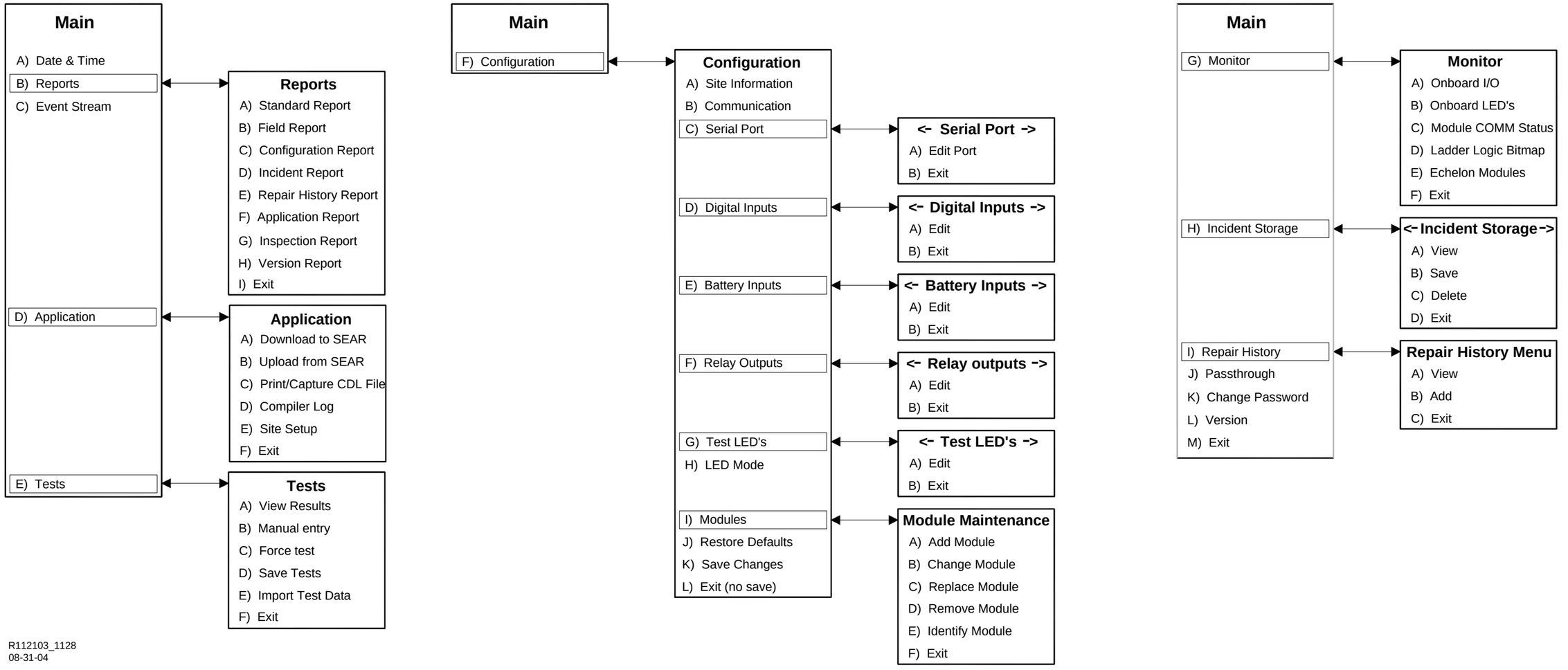

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Figure 9-7. Terminal Interface Menu Structure

9.6 SEAR IIi DOWNLOADS

The information in the SEAR IIi can be viewed in two ways:

- Information on the display
- Download SEAR IIi information to a PC

The following paragraphs explain both methods.

9.6.1 Viewing SEAR IIi Information on Display

The SEAR button is on the top row of the track status screen. (Figure 9-8)

Figure 9-8. Track Status Screen SEAR Button

When SEAR is selected, a SEAR screen is displayed, as shown in Figure 9-9).

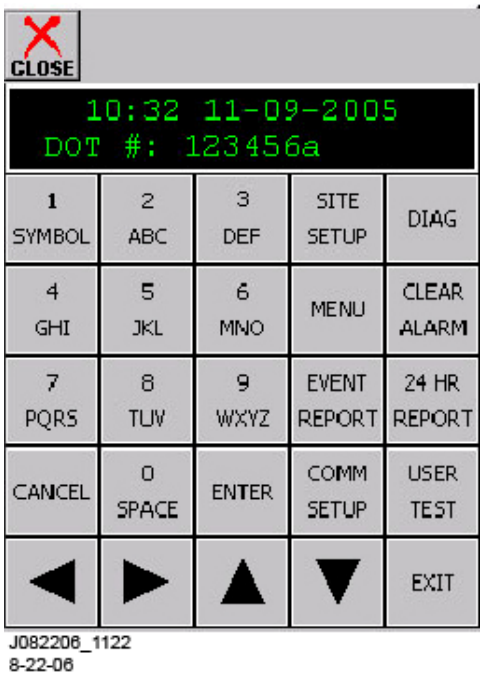


Figure 9-9. SEAR Opening Screen

From the MENU screen the MAIN MENU can be accessed. (Figure 9-10).

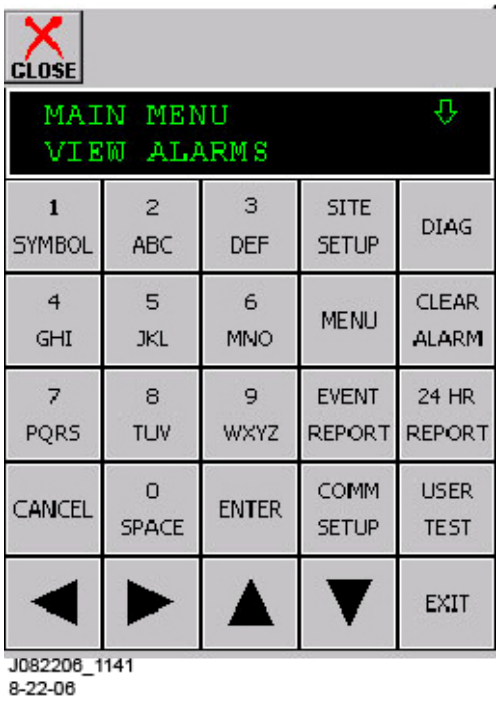


Figure 9-10. SEAR Main Menu Screen

The options on the MAIN MENU are:

- VIEW ALARMS
- DATE/TIME
- SITE SETUP
- REPORTS
- EVENT STREAM
- TESTS
- CONFIGURATION
- DIAG/MONITOR
- INCIDENT STORAGE
- REPAIR HISTORY
- CHANGE PASSWORD
- FACTORY TEST
- VERSIONS
- EXIT

Most frequently, REPORTS will be useful for maintenance.

Event reports are displayed for a range of time, one line at a time. (Figure 9-11)

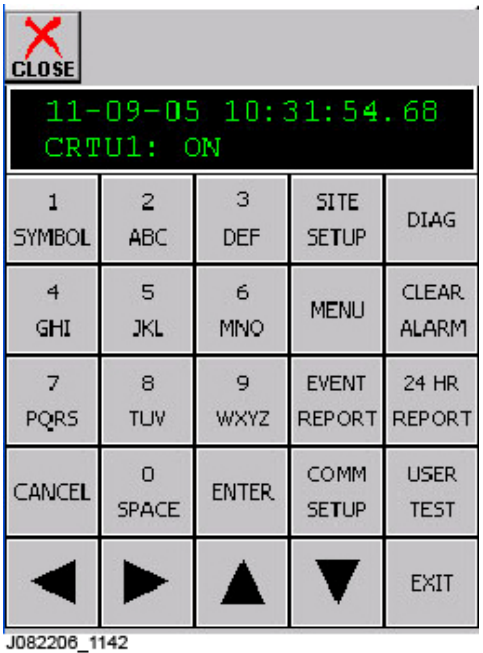


Figure 9-11. Event Report Example Line

The EVENT STREAM displays events as they occur in real time. A more efficient method of viewing SEAR IIi information is on a PC.

9.6.2 Downloading SEAR IIi Information to a PC

The SEAR IIi computer interface may be accessed with terminal emulation software such as HyperTerminal, which is included on most computers with a standard Windows® installation. It generally can be found by selecting START/ Programs/ Accessories/ Communications/ HyperTerminal.

The SEAR II I USER J2 serial port and the computer COMM port settings must match in order to communicate. The default SEAR IIi settings are:

- 9600 baud
- 8 data bits
- No parity bits
- 1 stop bit

It recommenced that the baud rate be increased to 57600. The COMM port settings are changed in the HyperTerminal program by selecting FILE then PROPERTIES. In the properties window select CONFIGURE. The next window is PORT SETTINGS. Set the port settings as desired and select OK until it returns to the HyperTerminal screen.

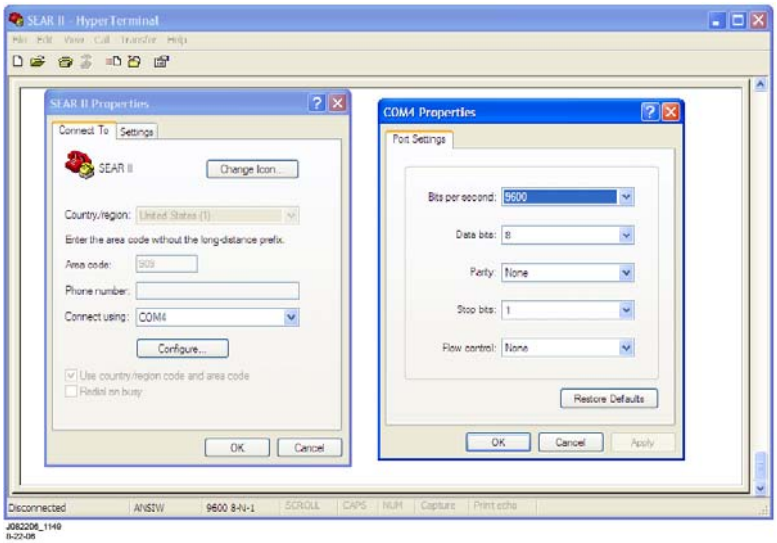


Figure 9-12. Comm Port Settings

Once HyperTerminal is running, enter **CTRL L** on the computer to initiate the communication session with the SEAR IIi. The following screen will be displayed.

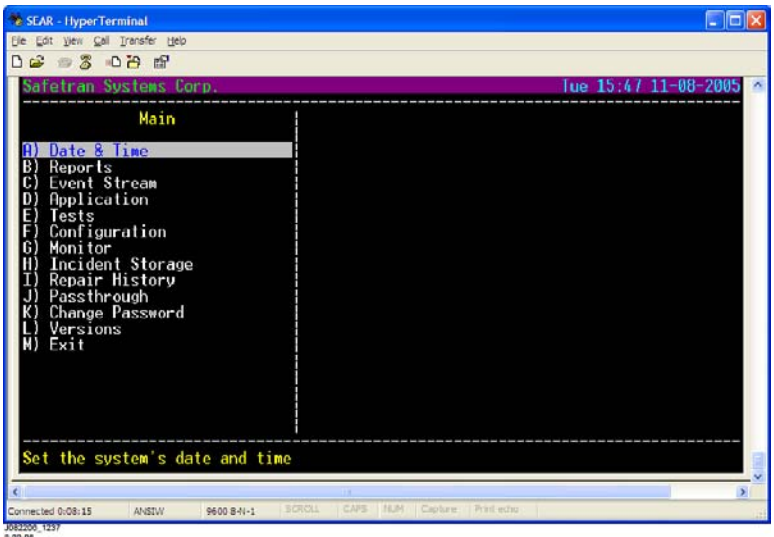


Figure 9-13. SEAR IIi Main Menu on HyperTerminal

The options are selected by entering the option's letter, or using the keyboard ARROW keys and ENTER. Enter B for Reports, etc. The Reports screen appears as shown in Figure 9-14.

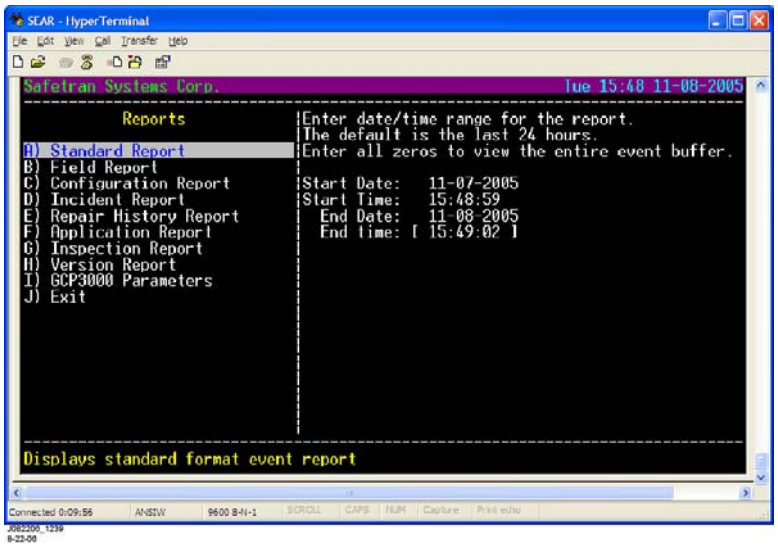


Figure 9-14. SEAR IIi Reports Screen

The default time range is the previous 24 hours. The date and time range may be changed as each item is selected. The Start Date appears first. The date may be changed by moving the cursor over the entry that is to be changed and typing over. Hit ENTER to move to the Start Time, and so on. After the End Time is entered, a Format option to view On Screen or Print/Capture is displayed. The options can be switched by the UP or DOWN ARROW keys, then pressing ENTER.

The report is a complete list of all GCP 4000 activity during that period. (See Figure 9-15).

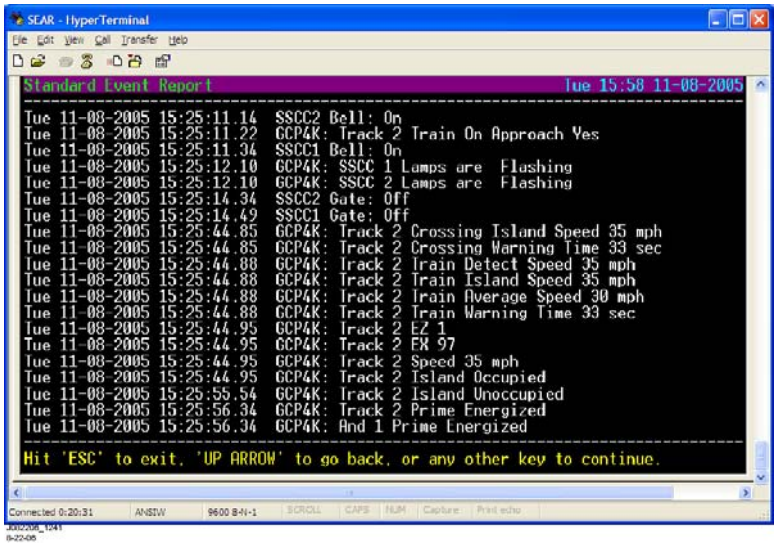


Figure 9-15. Example Report Screen

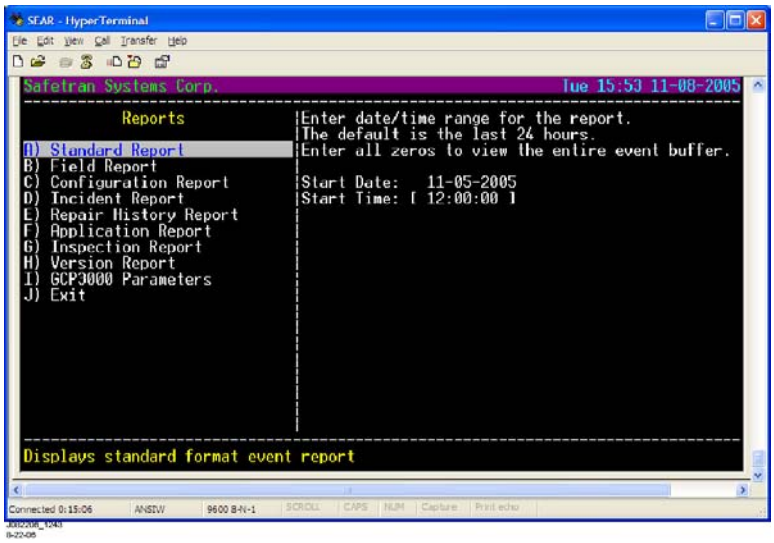


Figure 9-16. Report Selection

Capturing reports on the computer allows retrieval at a later date. Figure 9-17 is an example of the PRINT/CAPTURE option.

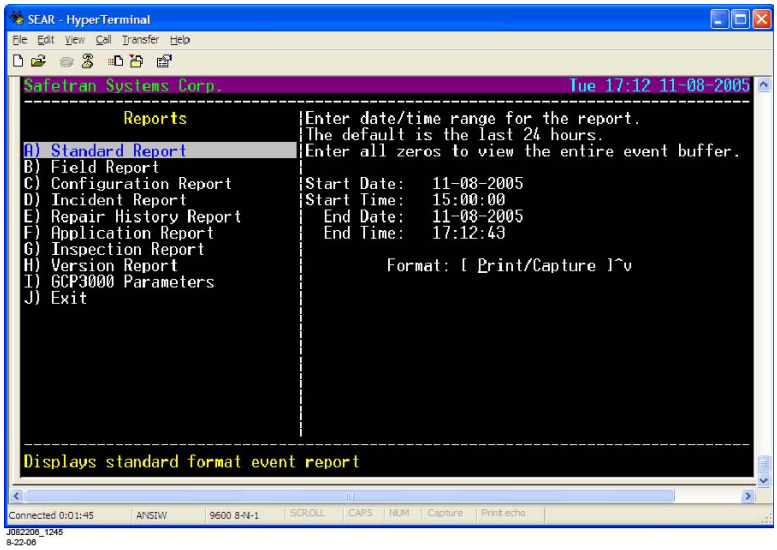


Figure 9-17. Print/Capture Option

Use the ARROW key to switch (toggle) from On Screen to PRINT/CAPTURE, then hit ENTER. The next screen requires enabling text capture BEFORE proceeding.

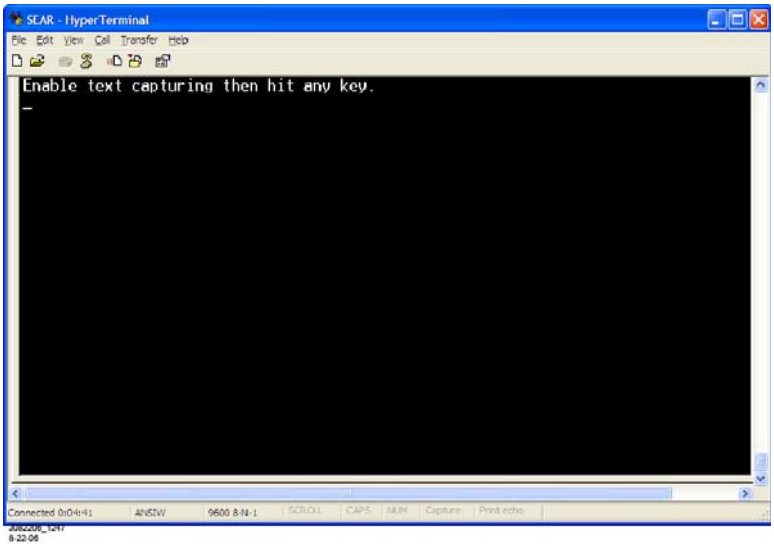


Figure 9-18. Text Capture Message

Select TRANSFER on the menu bar, then select CAPTURE TEXT.
A standard dialog box appears that allows the user to choose the location the file will be saved to. (Figure 9-19)

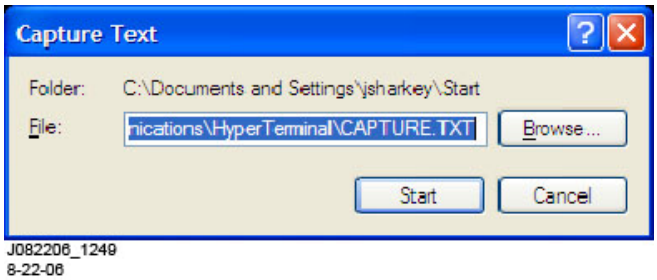


Figure 9-19. Capture Text Dialog Box

Then press START and any other key. The text file of the report will be saved in the specified location.

9.6.3 Configuration Report

The CONFIGURATION REPORT is useful for storing all the parameters entered into the SEAR IIi. A portion of the text file is shown below.

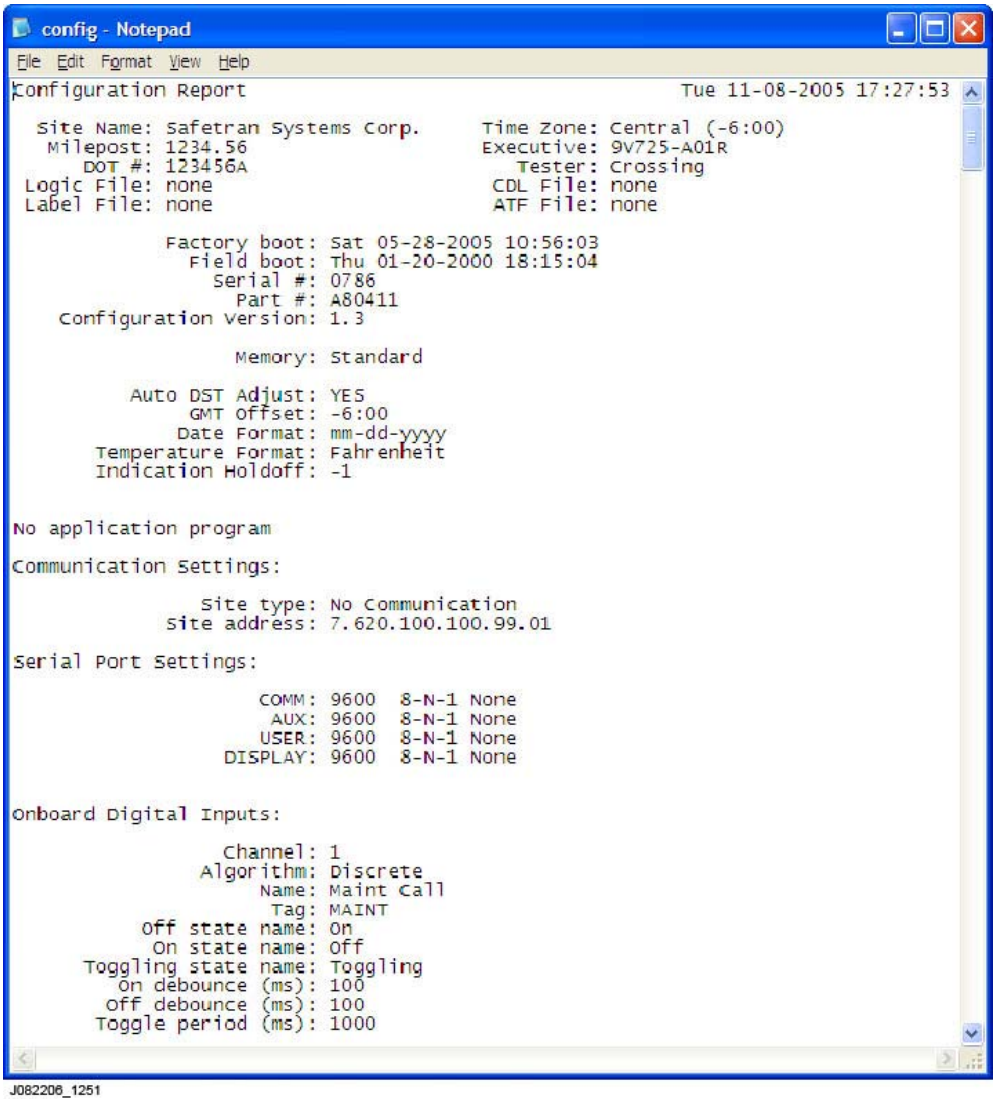


Figure 9-20. Configuration Report Sample Text File

9.6.4 Incident Storage

INCIDENT STORAGE is an important feature in the SEAR IIi. The SEAR IIi is capable of storing a range of events after an incident in a file that can be securely stored. Each line of data in the file is identified by a security code that validates that the data has not changed.

Select INCIDENT STORAGE on the main menu.

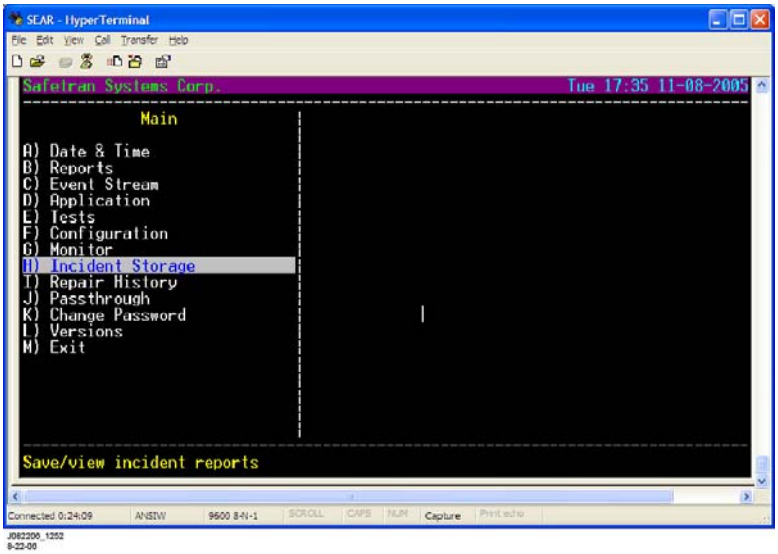


Figure 9-21. Incident Storage Menu Selection

To save an incident, select SAVE and ENTER.

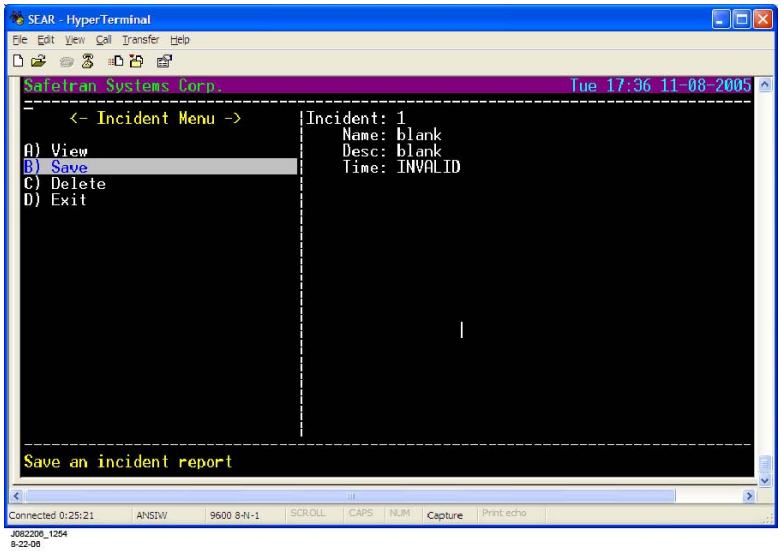


Figure 9-22. Incident Save Selection

Fill in the requested information.

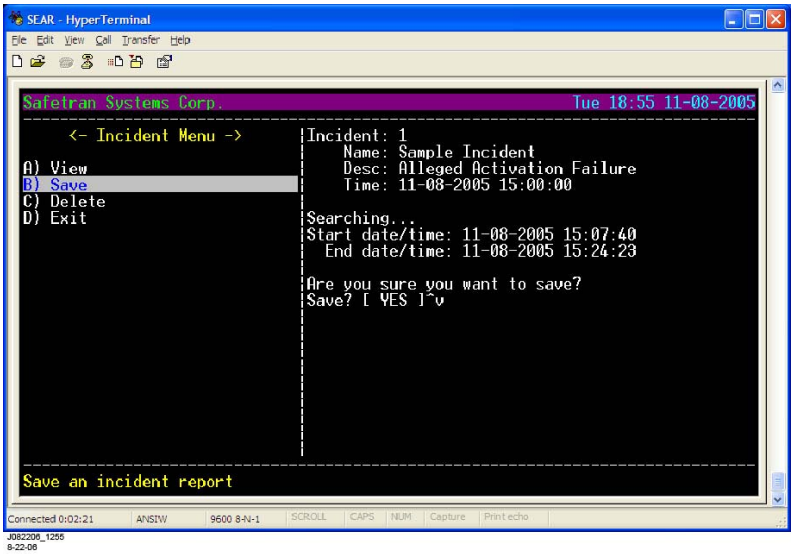


Figure 9-23. Incident File Information Screen

The Incident will be saved in the SEAR IIi and can be captured and saved on a computer. The report can be displayed by selecting the VIEW option. (Figure 9-24)

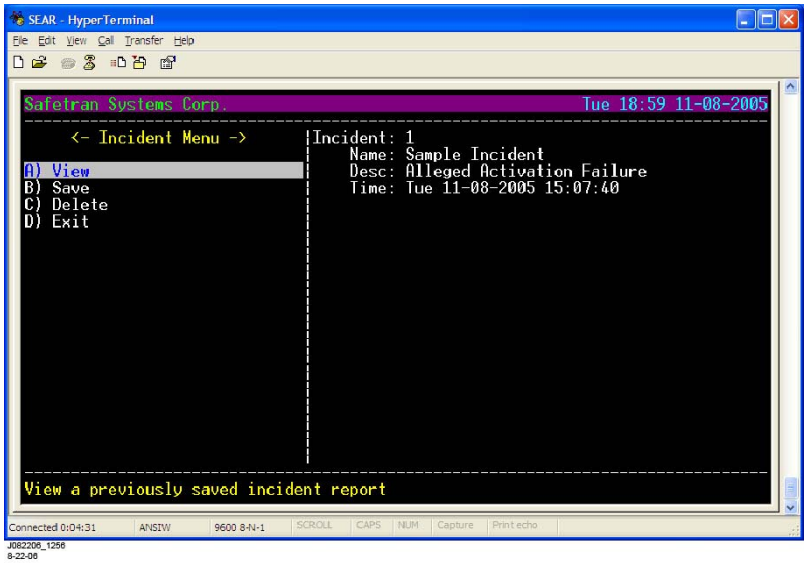


Figure 9-24. Viewing the Saved Incident Report

An example of the report is shown in Figure 9-25.

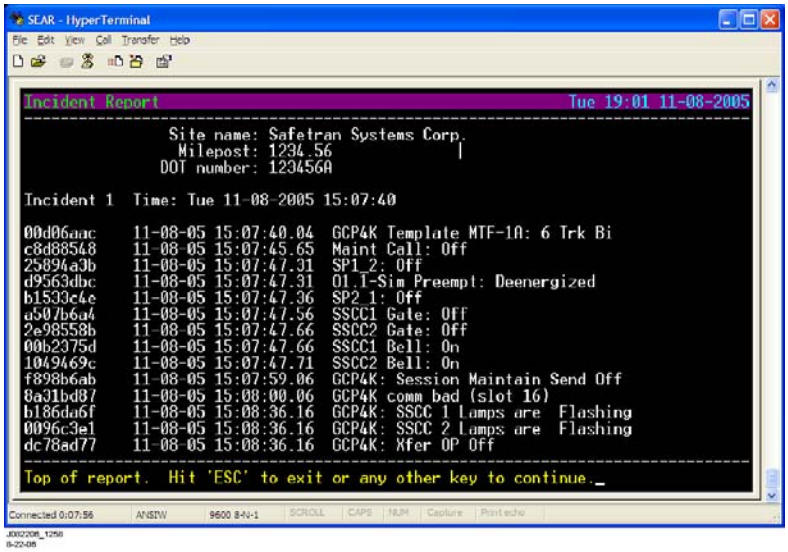


Figure 9-25. Example of Viewing a Saved Incident Report

The remainder of the selections on the main menu can be selected, viewed, or captured in the same manner. Similarly, the selections can be selected and displayed on the display module. To end the HyperTerminal session select EXIT.

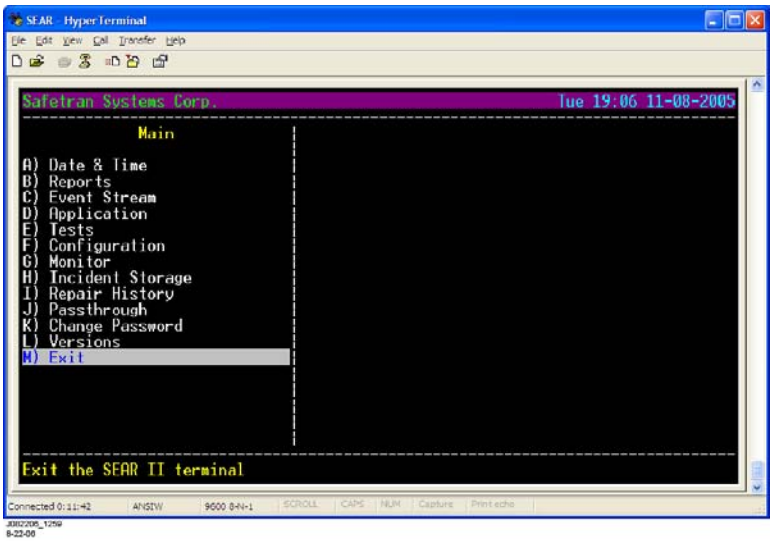


Figure 9-26. Ending the HyperTerminal Session

NOTE

An incident can be named, described, stored using the Display Module for later retrieval to a computer. If in doubt, store the incident.

9.7 SEAR IIi INTERFACE

Selecting the SEAR button at the top of the 4000 GCP Status Screen brings up the SEAR interface, Figure 9-27.

- The interface may also be accessed by selecting the **Site Setup** item from the **SEAR** or the **TEMPLATE: SEAR** windows.

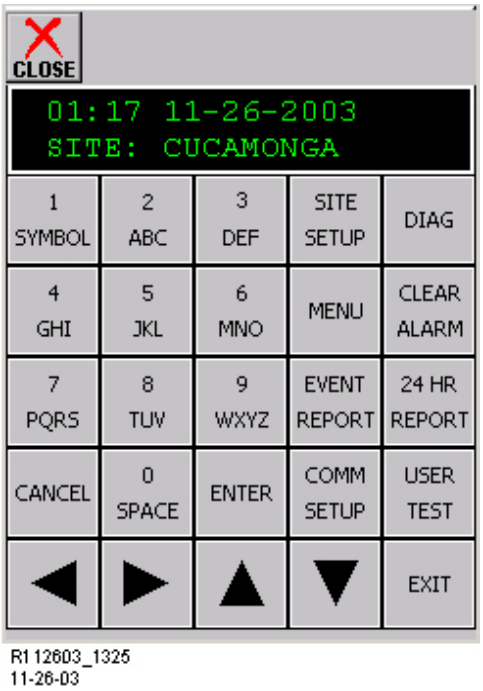


Figure 9-27. SEAR IIi Interface

NOTE

The SEAR interface may be accessed only from the A80407 Display Module Diagnostic Terminal.

The SEAR IIi interface consists of:

- 2-line function screen
  - ♦ 20-characters per line
  - ♦ displays configuration and menu data
- 25-key, touch-screen keypad
  - ♦ may be used to enter:
    - ▪ text and numbers
    - ▪ special functions commands
    - ▪ menu selection commands
    - ▪ menu navigation commands

9.7.1 Function Screen Top-Level Display

The top level of the function screen display is the initial/default display mode of the SEAR IIi. This display consists of a:

- fixed top line
  - ♦ displays time and date
- scrolling second line
  - ♦ displays sequential system information
    - ▪ site identification
    - ▪ milepost designation
    - ▪ Department of Transportation (DOT) number
    - ▪ Event storage data
    - ▪ ratio of stored events to event storage capacity
    - ▪ optional application program messages

NOTE

If there is no keypad activity for 5 minutes while a lower menu level is displayed, the display will automatically return to the top level.

9.7.2 SEAR IIi Interface Menu Access

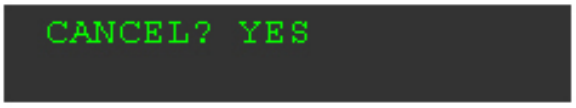
Interface menus are accessed via the keypad.

9.7.2.1 Interface Menu Navigation

Navigation between items of the SEAR IIi interface menus is accomplished using the keypad direction keys (◄►▲▼).

- Menu item selection and parameter acceptance is accomplished using the **ENTER** key
- To return to the top-level display from any other menu level initiate the following key sequence:
  - ♦ press the **CANCEL** key
    - ▪ the following prompt displays:

  - ♦ press a direction key
    - ▪ the prompt changes as follows:



  - ♦ press the **ENTER** key
    - ▪ top level function screen displays
- To exit the current menu item without changing the existing setting press the **EXIT** key

9.7.2.2 Interface Menu Data Entry

The keypad number/letter keys are used to enter menu numeric and text values.

- The left (◄) and right (►) direction keys are used to move through a text or number string.
- The up (▲) and down (▼) keys are used to modify the character above the cursor.

When entering data in an alphanumeric field, successive pressing of a number key produces a string of the characters represented by that key.

  - ♦ Example: pressing the **2 ABC** key in succession produces a repeating sequence of **2**, **A**, **B**, **C**, **a**, **b**, **c**
    - numeric fields will display only numbers
    - text fields will display only alpha characters
  - ♦ After a character is changed and the number keys remain inactive for 1 second, the cursor moves to the next character position.
- Option fields allow a value to be selected from a list of options.
  - ♦ Indicated by a flashing block cursor over the first character of the field.
  - ♦ Option fields are navigated using the direction keys
    - The up (▲) and down (▼) keys are used scroll through the options list
    - The left (◄) and right (►) keys may be used to move through the list eleven items at a time.
- The **ENTER** key is used to
  - ♦ accept: changes and temporarily store the changes in memory as they are made
  - ♦ accept and permanently store interface menu changes
    - acceptance initiated by the user in response to menu prompt

9.7.2.3 Interface Menu Shortcut Keys

Eight Shortcut keys allow direct access to specific menu options:

- **SITE SETUP** key **–** opens the **SITE SETUP** submenu (see Figure 9-28, sheet 2)
- **DIAG** key – opens the **DIAG/MONITOR** submenu (see Figure 9-28, sheet 1)

- **MENU** key – opens the **MAIN MENU**
- **CLEAR ALARM** key – clears an alarm condition from the report
  - ♦ alarm parameters are set by the application program
- **EVENT REPORT** key – opens the **STARTING TIME** function screen of the **EVENT REPORT** submenu (see Figure 9-28, sheet 1)
  - ♦ Submenu provides access to user specified event reports
- **24 HR REPORT** key – displays all event reports for the previous 24-hour period
- **COMM SETUP** key – opens the **SITE TYPE** function screen of the Communications submenu (see Figure 9-28, sheet 8)
- **USER TEST –** displays and/or initiates program defined tests.

9.7.3 Interface Menu Structure

The Interface menu structure is shown in Figure 9-28.

9.7.3.1 SITE SETUP Key

Activating the **SITE SETUP** key provides accesses to the Site Setup menu (see Figure 9-28, sheet 1).

- This menu:
  - ♦ Is described in table 9-2
  - ♦ may be accessed from the Main menu (see Figure 9-28, sheet 6)

Table 9-2. Site Setup Menu

Screens			Function/ Description
Level 1	**Level 2**	**Level 3**	
DATE/TIME			SEAR date and time
AUTOMATIC DST ADJUSTMENT?			Automatic daylight saving time (DST) option
TIME ZONE?			Site time zone selection
SITE NAME?			Site name designation
MILE POST?			Site mile post designation
DOT #?			Department of Transportation crossing number assigned to site
SITE TYPE?			Site type list: • **No Communication** • **Bullhorn/Mod-Bus** • **Dial-up** • **Node** • **Collector** • **CDS-902X**

Table 9-2 continued

Screens			Function/ Description
Level 1	**Level 2**	**Level 3**	
USER PORT BAUD?			USER port baud list: • **57600** • **38400** • **19200** • **9600** • **4800** • **2400** • **1200** • **600**
USER PORT DATA BITS?			USER port data bits selection • **7** • **8**
USER PORT PARITY?			USER port party set list: • **None** • **Odd** • **Even**
USER PORT STOP BITS?			USER port stop bits selection • **1** • **2**
USER PORT FLOW CTRL?			USER port flow control list: • **None** • **Hardware** • **Radio**
AUX POART BAUD?			AUX port baud list: • **57600** • **38400** • **19200** • **9600** • **4800** • **2400** • **1200** • **600**
AUX PORT DATA BITS?			AUX port data bits selection
AUX PORT PARITY?			AUX port party set list: • **None** • **Odd** • **Even**
AUX PORT STOP BITS?			AUX port stop bits selection
AUX PORT FLOW CTRL?			AUX port flow control list: • **None** • **Hardware** • **Radio**

Table 9-2 continued

Screens			Function/ Description
Level 1	**Level 2**	**Level 3**	
COMM PORT BAUD?			COMM port baud list: • **57600** • **38400** • **19200** • **9600** • **4800** • **2400** • **1200** • **600**
COMM PORT DATA BITS?			COMM port data bits selection
COMM PORT PARITY?			COMM port party set list: • **None** (default) • **Odd** • **Even**
COMM PORT STOP BITS?			COMM port stop bits selection
COMM PORT FLOW CTRL?			COMM port flow control list: • **None** • **Hardware** • **Radio**
EDIT DIGITAL INPUTS?			Digital input edit options: • **NO** (default) • **YES** Sixty-three digital inputs may be sequentially edited when **YES** is selected from the edit option list. Selecting **NO** advances the menu screen to **EDIT BATTERIES?**
	INPUT ALGRTHM?		Digital input algorithm list: • **Discrete** (default) • **TSS** (trackside sensor) • **GFT** (Ground Fault Tester) Entry for each digital input algorithm sequentially displays when **YES** is selected from the edit option list
	INPUT TAGS?		Digital input tags edit function list: • **Default** • **Manual Entry** Optional name that may be listed by the application program. Entry for each digital input tag option may be sequentially displayed when **YES** is selected from the corresponding input tags edit function list
	INPUT TAGS?	**TAG?**	Edit digital input tag assignment Entry for each digital input displays only when **Manual Entry** is selected from the corresponding digital input tags edit function list

Table 9-2 continued

Screens			Function/ Description
Level 1	**Level 2**	**Level 3**	
EDIT DIGITAL INPUTS?	**INPUT TAGS?**	**FULL NAME?**	Edit digital input name assignment, for example: • Default: **Maint Call** Entry for each digital input name displays only when **Manual Entry** is selected from the corresponding digital input tags edit function list
		OFF LABEL?	Edit digital input OFF label assignment • Default: **Off** Entry for each digital input **Off** label displays only when **Manual Entry** is selected from the corresponding digital input tags edit function list
		ON LABEL?	Edit digital input ON label assignment • Default: **On** Entry for each digital input **On** label displays only when **Manual Entry** is selected from the corresponding digital input tags edit function list
		TOGGLE LABEL?	Edit digital input TOGGLE label assignment • Default: **Toggling** Entry for each digital input Toggle label displays only when **Manual Entry** is selected from corresponding digital input tags edit function list
EDIT BATTERIES?			Battery edit options: • **NO** (default) • **YES** Five batteries may be sequentially edited when **YES** is selected from the battery edit option list Selecting **NO** advances the menu display to **EDIT RELAYS?**
	BATTERY TAG?		Battery tags edit function list: • **Default** • **Manual Entry** Entry for each battery may be sequentially displayed when **YES** is selected from the battery edit option list
		TAG?	Edit battery tag assignment Entry for each battery displays only when **Manual Entry** is selected from the corresponding battery tags edit function list
		FULL NAME?	Edit battery name assignment Entry for each battery displays only when **Manual Entry** is selected from the corresponding battery tags edit function list

Table 9-2 continued

Screens			Function/ Description
Level 1	**Level 2**	**Level 3**	
EDIT RELAYS?			Relay edit options: • **NO** (default) • **YES** Sixteen relays may be sequentially edited when **YES** is selected from the relay edit option edit function list Selecting **NO** advances the menu display to **EDIT TEST LEDS?**
	RELAY TAGS?		Relay tags edit function list: • **Default** • **Manual Entry** Entry for each relay Tag may be sequentially displayed when **YES** is selected from the corresponding relay tags edit option list
		TAG?	Edit relay tag assignment name Entry for each relay displays only when **Manual Entry** is selected from the corresponding relay tags edit function list
		FULL NAME?	Edit input name assignment Entry for each relay displays only when **Manual Entry** is selected from the corresponding relay tags edit function list
		OFF LABEL?	Edit relay OFF label assignment • Default: **Open** Entry for each relay displays only when **Manual Entry** is selected from the corresponding relay tags edit function list
		ON LABEL?	Edit relay ON label assignment • Default: **Closed** Entry for each relay displays only when **Manual Entry** is selected from the corresponding relay tags edit function list
		TOGGLE LABEL?	Edit relay TOGGLE label assignment • Default: **Toggling** Entry for each relay displays only when **Manual Entry** is selected from the corresponding relay tags edit function list
		PULSE LABEL?	Edit relay PULSE label assignment • Default: **Pulse** Entry for each relay displays only when **Manual Entry** is selected from the corresponding relay tags edit function list
EDIT TEST LEDS?			LED edit options: • **NO** (default) • **YES** Sixteen LED's may be sequentially edited when **YES** is selected from the LED edit option list Selecting **NO** advances the menu display to **EDIT MODULES?**

Table 9-2 continued

Screens			Function/ Description
Level 1	**Level 2**	**Level 3**	
EDIT TEST LEDS?	**TEST LED TAGS?**		LED tags edit function list: • **Default** • **Manual Entry** Entry for each LED TAG may be sequentially displayed when **YES** is selected from the corresponding edit option list
		TAG?	Edit LED Tag assignment name Entry for each LED Tag displays only when **Manual Entry** is selected from the corresponding test LED tags edit function list
		FULL NAME?	Edit input name assignment Entry for each LED displays only when **Manual Entry** is selected from the corresponding LED tags edit function list
		OFF LABEL?	Edit relay Off label assignment • Default: **Off** Entry for each LED displays only when **Manual Entry** is selected from the corresponding LED tags edit function list
		RED LABEL?	Edit LED red label assignment • Default: **Red** Entry for each LED displays only when **Manual Entry** is selected from the corresponding LED tags edit function list
		GREEN LABEL?	Edit LED green label assignment • Default: **Green** Entry for each LED displays only when **Manual Entry** is selected from the corresponding LED tags edit function list
		YELLOW LABEL?	Edit LED yellow label assignment • Default: **Yellow** Entry for each LED displays only when **Manual Entry** is selected from the corresponding LED tags edit function list
		RED SLOW LABEL?	Edit LED red label assignment • Default: **Red slow** Entry for each LED displays only when **Manual Entry** is selected from the corresponding LED tags edit function list
		GRN SLOW LABEL?	Edit LED green slow label assignment • Default: **Grn slow** Entry for each LED displays only when **Manual Entry** is selected from the corresponding LED tags edit function list
		YLW SLOW LABEL?	Edit LED yellow slow label assignment • Default: **Ylw slow** Entry for each LED displays only when **Manual Entry** is selected from the corresponding LED tags edit function list

Table 9-2 continued

Screens			Function/ Description
Level 1	**Level 2**	**Level 3**	
EDIT TEST LEDS?	**TEST LED TAGS?**	**RED FAST LABEL?**	Edit LED red label assignment • Default: **Red fast** Entry for each LED displays only when **Manual Entry** is selected from the corresponding LED tags edit function list
		GRN FAST LABEL?	Edit LED green fast label assignment • Default: **Grn fast** Entry for each LED displays only when **Manual Entry** is selected from the corresponding LED tags edit function list
		YLW FAST LABEL?	Edit LED yellow FAST label assignment • Default: **Ylw fast** Entry for each LED displays only when **Manual Entry** is selected from the corresponding LED tags edit function list
EDIT MODULES?			Module edit options: • **NO** (default) • **YES** Selecting **YES** brings up the **MODULE MENU** screen. Six edit functions may be sequentially accessed from this screen: • **ADD MODULE** • **CHANGE MODULE** • **REPLACE MODULE** • **REMOVE MODULE** • **IDENTIFY MODULE** • **FACTORY CAL iLOD** Selecting **NO** initiates a **SAVING CONFIGURATION** display followed by a user interactive setup routine. At the completion of the routine, **SITE SETUP COMPLETE** displays briefly before returning the Function Screen to the Top Level Display.
	MODULE MENU ADD MODULE		Allows modules to be installed on the 4000 GCP Echelon network
		MODULE TYPE	Module type list: • **Digital I/O (default)** • **Analog Input** • **iLOD** • **GCP 4000** • **SSCC** • **GCP 3000** • **VHF Comm** • **Spread Spec** • **MCM** • **Not configured**
		MODULE NAME	Allows a name to be assigned to the added module • Default: **DIO1**

Table 9-2 continued

Screens			Function/ Description
Level 1	**Level 2**	**Level 3**	
EDIT MODULES?	**MODULE MENU ADD MODULE**	**EDIT INPUT NAMES (applies to Digital I/O Module, 80258)**	Input name edit options: • **NO** (default) • **YES** Input names may be chosen and edited when **YES** is selected from the edit option list Selecting **NO** advances the menu display to **EDIT OUTPUT NAMES?** menu item
		INPUT TO EDIT? **(applies to Digital I/O Module, 80258)**	Input name selection list: • **01: N1 DI01** thru • **24: N1 DI24** Entry for each input may be sequentially accessed when **Yes** is selected from the Input name edit options list
		INPUT (Name) Tags? **(applies to Digital I/O Module, 80258)**	Input tags edit function list: • **Default** • **Manual Entry** Entry displays only when **Yes** is selected from the Input name edit options list
		TAG? **(applies to Digital I/O Module, 80258)**	Edit input tag assignment name Entry for each input displays only when **Manual Entry** is selected from the input tags edit function list
		FULL NAME? **(applies to Digital I/O Module, 80258)**	Edit input name assignment Entry for each input displays only when **Manual Entry** is selected from the input tags edit function list
		OFF LABEL? **(applies to Digital I/O Module, 80258)**	Edit input OFF label assignment • Default: **OFF** Entry for each input displays only when **Manual Entry** is selected from the input tags edit function list
		ON LABEL? **(applies to Digital I/O Module, 80258)**	Edit input ON label assignment • Default: **On** Entry for each input displays only when **Manual Entry** is selected from the input tags edit function list

Table 9-2 continued

Screens			Function/ Description
Level 1	**Level 2**	**Level 3**	
EDIT MODULES?	**MODULE MENU ADD MODULE**	**EDIT OUTPUT NAMES (applies to Digital I/O Module, 80258)**	Output name edit options: • **NO** (default) • **YES** Output names may be chosen and edited when **YES** is selected from the edit option list Selecting **NO** initiates a **SAVING CONFIGURATION** display followed by a user interactive setup routine. At completion of routine, **SITE SETUP COMPLETE** displays briefly before returning the Function Screen to the Top Level Display.
		OUTPUT TO EDIT? (applies to Digital I/O Module, 80258)	Output name selection list: • **01: N1 DI01** • **02: N1 DI02** • **03: N1 DIO3** • **04: N1 DI04** • **Exit** Entry for each output may be sequentially accessed when **Yes** is selected from the Output name edit options list
		OUTPUT (Number) Tags? (applies to Digital I/O Module, 80258)	Output tags edit function list: • **Default** • **Manual Entry** Entry displays only when **Yes** is selected from the Output name edit options list
		TAG? (applies to Digital I/O Module, 80258)	Edit Output tag assignment name Entry for each input displays only when **Manual Entry** is selected from the Output Tags edit function list
		FULL NAME? (applies to Digital I/O Module, 80258)	Edit Output name assignment Entry for each input displays only when **Manual Entry** is selected from the Output Tags edit function list
		OFF LABEL? (applies to Digital I/O Module, 80258)	Edit Output OFF label assignment • Default: **OFF** Entry for each output displays only when **Manual Entry** is selected from the Output Tags edit function list
		ON LABEL? (applies to Digital I/O Module, 80258)	Edit Output ON label assignment • Default: **On** Entry for each output displays only when **Manual Entry** is selected from the Output Tags edit function list
	MODULE MENU CHANGE MODULE		Allows the input and/or output name of a module installed on the 4000 GCP Echelon network to be changed.

Table 9-2 continued

Screens			Function/ Description
Level 1	**Level 2**	**Level 3**	
EDIT MODULES?	**MODULE MENU CHANGE MODULE**	**MODULE TO CHANGE (applies to Digital I/O Module, 80258)**	Module list: • **DI01** • **DI02** • **DI03** • **DI04** • **DI05** • **DI06** • **Exit**
		MODULE NAME	Allows an existing module name to be selected • Default: **DIO1**
		EDIT INPUT	Input name edit options: • **NO** (default) • **YES** Input names may be chosen and edited when **YES** is selected from the edit option list Selecting **NO** advances the menu display to **EDIT OUTPUT NAMES?** Menu item
		INPUT TO EDIT?	Input name selection list: • **01: N1 DI01** thru • **24: N1 DI24** Entry for each input may be sequentially accessed when **Yes** is selected from the Input name edit options list
		I**NPUT 01 thru 24 Tags?**	Input tags edit function list: • **Default** • **Manual Entry** Entry displays only when **Yes** is selected from the Input name edit options list
		TAG? (applies to Digital I/O Module, 80258)	Edit input tag assignment name Entry for each input displays only when **Manual Entry** is selected from the input tags edit function list
		FULL NAME? (applies to Digital I/O Module, 80258)	Edit input name assignment Entry for each input displays only when **Manual Entry** is selected from the input tags edit function list
		OFF LABEL? (applies to Digital I/O Module, 80258)	Edit input OFF label assignment • Default: **OFF** Entry for each input displays only when **Manual Entry** is selected from the input tags edit function list
		ON LABEL? (applies to Digital I/O Module, 80258)	Edit input ON label assignment • Default: **On** Entry for each input displays only when **Manual Entry** is selected from the input tags edit function list

Table 9-2 continued

Screens			Function/ Description
Level 1	**Level 2**	**Level 3**	
EDIT MODULES?	**MODULE MENU CHANGE MODULE**	**EDIT OUTPUT NAMES (applies to Digital I/O Module, 80258)**	Output name edit options: • **NO** (default) • **YES** Output names may be chosen and edited when **YES** is selected from the edit option list Selecting **NO** returns the display to the **MODULE MENU CHANGE MODULE** screen.
		OUTPUT TO EDIT? (applies to Digital I/O Module, 80258)	Output name selection list: • **01: N1 DI01** • **02: N1 DI02** • **03: N1 DIO3** • **04: N1 DI04** • **Exit** Entry for each output may be sequentially accessed when **Yes** is selected from the Output name edit options list
		OUTPUT (number) Tags? (applies to Digital I/O Module, 80258)	Output tags edit function list: • **Default** • **Manual Entry** Entry displays only when **Yes** is selected from the Output name edit options list
		TAG? **(applies to Digital I/O Module, 80258)**	Edit Output tag assignment name Entry for each input displays only when **Manual Entry** is selected from the Output Tags edit function list
		FULL NAME? (applies to Digital I/O Module, 80258)	Edit Output name assignment Entry for each input displays only when **Manual Entry** is selected from the Output Tags edit function list
		OFF LABEL? **(applies to Digital I/O Module, 80258)**	Edit Output OFF label assignment • Default: **OFF** Entry for each output displays only when **Manual Entry** is selected from the Output Tags edit function list
		ON LABEL? **(applies to Digital I/O Module, 80258)**	Edit Output ON label assignment • Default: **On** Entry for each output displays only when **Manual Entry** is selected from the Output Tags edit function list
EDIT MODULES?	**MODULE MENU REPLACE MODULE**		Allows a module installed on the 4000 GCP Echelon network to be replaced. Selecting **EXIT** from this screen initiates a **SAVING CONFIGURATION** display followed by a user interactive setup routine.

Table 9-2 continued

Screens			Function/ Description
Level 1	**Level 2**	**Level 3**	
EDIT MODULES?	**MODULE MENU REPLACE MODULE**	**MODULE TO REPLACE (dependent on modules installed)**	Module list: • **DI01** • **DI02** • **DI03** • **DI04** • **DI05** • **DI06** • **Exit**
	MODULE MENU RE-INSTALL MODULE		Allows a module to be re-installed on the 4000 GCP Echelon network . Selecting **EXIT** from this screen initiates a **SAVING CONFIGURATION** display followed by a user interactive setup routine.
		MODULE TO RE-INSTALL	Module list: • **DI01** • **DI02** • **DI03** • **DI04** • **DI05** • **DI06** • **Exit**
	MODULE MENU REMOVE MODULE		Allows a module installed on the 4000 GCP Echelon network to be removed. Selecting **EXIT** from this screen initiates a **SAVING CONFIGURATION** display followed by a user interactive setup routine.
		MODULE TO REMOVE	Module list: • **DI01** • **DI02** • **DI03** • **DI04** • **DI05** • **DI06** • **none7** • **Exit**
		REMOVE (Module)	Remove module options: • **NO** (default) • **YES** Selected module is removed from the 4000 GCP Echelon network when **YES** is selected. Selecting **NO** returns the display to the **MODULE MENU REMOVE MODULE** screen.
	MODULE MENU IDENTIFY MODULE		Allows the name and type of an installed module to be identified by the 4000 GCP Echelon network. Selecting **EXIT** from this screen initiates a **SAVING CONFIGURATION** display followed by a user interactive setup routine.

Table 9-2 continued

Screens			Function/ Description
Level 1	**Level 2**	**Level 3**	
EDIT MODULES?	**MODULE MENU IDENTIFY MODULE**		Allows a module installed on the 4000 GCP Echelon network to be removed. Selecting **EXIT** from this screen initiates a **SAVING CONFIGURATION** display followed by a user interactive setup routine.
	MODULE MENU FACTORY CAL ILOD		For Safetran Factory use only. Selecting **EXIT** from this screen initiates a **SAVING CONFIGURATION** display followed by a user interactive setup routine.

9.7.3.2 MENU Key

Activating the **MENU** key provides accesses to the Main Menu (see Figure 9-28, sheet 6).

- This menu:
  - Is described in table 9-3
  - may be accessed directly from the Top Level Display by selecting the **ENTER** key.

Table 9-3. Main Menu

Screens			Function/ Description
Level 1	**Level 2**	**Level 3**	
MAIN MENU VIEW ALARMS			Alarm incident display
MAIN MENU DATE & TIME	**DATE/TIME**		SEAR date and time
	AUTOMATIC DST ADJUSTMENT?		Automatic daylight saving time (DST) option
	TIME ZONE?		Site time zone selection
	SAVE NEW DATE/TIME?		Option to save date and time changes
	SAVING DATE TIME		Automatic date/time save. Occurs when response to SAVE prompt is YES. Bypassed when response is NO.
MAIN MENU SITE SETUP	**SITE SETUP MENU ALL SETUP**		Provides access to **SITE SETUP** key menu, table 9-2.
	SITE SETUP MENU BATTERY CALIBRATION		Provides access to battery calibration sequence.
	SITE SETUP MENU LAMP CALIBRATION		Provides access to monitored lamp calibration sequence.
	SITE SETUP MENU EXIT		Returns display to **MAIN MENU SITE SETUP** screen.

Table 9-3 continued

Screens			Function/ Description
Level 1	**Level 2**	**Level 3**	
MAIN MENU REPORTS	**REPORT MENU EVENT REPORTS**		Provides access to **EVENT REPORT** Key menu, table 9-4.
	REPORT MENU CONFIGURATION REPORT	**User modem:**	User modem designation
		DISPLAY: Flow Control:	DISPLAY port flow control designation
		Digital Input 01 thru 63 Algorithm:	Digital input algorithm assignments
		Name:	Descriptive input name
		Tag:	Digital input identifier
		Off name:	Digital input OFF name
		On name:	Digital input on name
		Toggling name:	Digital input toggling name
		Unknown name:	Digital input name when state is unknown
		On debounce:	Specifies the number of milliseconds that an input must be energized to be designated as ON
		Off debounce:	Specifies the number of milliseconds that an input must be de-energized to be designated as OFF
		Toggle period:	Specifies the toggling interval in milliseconds An input changing state four or more times during this period is determined to be TOGGLING
		Relay 01 thru 06 name:	Descriptive relay name
		Tag:	Relay identifier
		Off name:	Relay OFF name
		On name:	Relay on name
		Toggling name:	Relay toggling name
		Pulsing name:	Relay pulsing name
		On pulse time:	Specifies the duration of an ON pulse in seconds
		Off Pulse time:	Specifies the duration of an OFF pulse in seconds
		Toggle Period:	Specifies the time required to cycle the relay output from OFF to ON and back to OFF
		Duty cycle:	Specifies the percentage of time that the relay is in the ON state while toggling
		Battery 01 thru 05 Name:	Descriptive battery name
		Tag:	Battery identifier
		Sample period:	Battery voltage sample interval in milliseconds
		Resolution:	Specifies the change in voltage or temperature (Fahrenheit °) required to cause an event to be logged

Table 9-3 continued

Screens			Function/ Description
Level 1	**Level 2**	**Level 3**	
MAIN MENU REPORTS	**REPORT MENU CONFIGURATION REPORT**	**Average:**	Designates the average number of samples per sample period
		Test LED 01 thru 16 Name:	Descriptive LED name
		Tag:	LED identifier
		Red name:	Red LED name
		Green name:	Green LED name
		Yellow name:	Yellow LED name
		Red flashing slow name:	Slow flashing red LED name
		Green flashing slow name:	Slow flashing green LED name
		Yellow flashing slow name:	Slow flashing yellow LED name
		Red flashing fast name:	Fast flashing red LED name
		Green flashing fast name:	Fast flashing green LED name
		Yellow flashing fast name:	Fast flashing yellow LED name
		Module name: DI01 thru DI06	Descriptive name of modules networked via the LAN
		Module type:	Designates the type of module networked
		Neuron ID:	Designates the module neuron ID
		Software Version:	Designates the module software version
		Module Input 1 thru 24 Name	Designates the name assigned to each module input
		Tag:	Designates the tag assigned to each module input
		Off state name:	Designates the name assigned to each module input OFF state
		On state name:	Designates the name assigned to each module input on state
		Module output 1 thru 4 Name:	Designates the name assigned to each module output
		Off state name:	Designates the name assigned to each module output OFF state
		On state name:	Designates the name assigned to each module output on state
	REPORT MENU INCIDENT REPORT	**VIEW ENTRY SLOT 1 thru SLOT 5**	Selects incident entry to be viewed
		Site:	Designates incident site
		Milepost DOT #:	Designates milepost and DOT number of incident site

Table 9-3 continued

Screens			Function/ Description
Level 1	**Level 2**	**Level 3**	
MAIN MENU REPORTS	**REPORT MENU INCIDENT REPORT**	**Incident Time:**	Designates time of incident
		Incident(s) Report	Sequential list of incident reports
	REPORT MENU REPAIR HISTORY	**ENTRIES TO VIEW?**	Selects entries to be viewed
		Site:	Designates repair site
		Milepost DOT #:	Designates repair site DOT number
		Part #:	Designates part number of item repaired
		Serial #:	Designates serial number of item repaired
		Latest Exec:	Designates the executive soft-ware of the item repaired
		Latest App:	Designates the application software of the item repaired
		Repair Time:	Designates time of repair
		Repair(s) Report	Sequential list of repair reports
	REPORT MENU EXIT		Returns screen to MAIN MENU REPORTS
MAIN MENU EVENT STREAM			Displays events as they are entered into log
MAIN MENU TESTS			Displays user defined tests
MAIN MENU CONFIGURATION	**CONFIGURATION SITE INFO**	**SITE NAME?**	Site name selection
		MILEPOST?	Site mile post selection
		DOT #	Enter Department of Transportation crossing number selection
	CONFIGURATION DIGITAL INPUTS	**INPUT TO EDIT?**	Selection of one of 63 digital inputs
		INPUT (Number) ALGRTHM?	Select digital input algorithm: • **Discrete** (default) • **TSS** (trackside sensor) • **GFT** (Ground Fault Tester)
		INPUT (Number) TAGS?	Designates the tag assigned to the selected digital input
		ON DE-BOUNCE (MS)?	Sets the number of milliseconds that an input must be energized to be designated as ON • Default: 100 ms • Range: 0 to 99999 ms
		OFF DE-BOUNCE (MS)?	Sets the number of milliseconds that an input must be de-energized to be designated as OFF • Default: 100 ms • Range: 0 to 99999 ms

Table 9-3 continued

Screens			Function/ Description
Level 1	**Level 2**	**Level 3**	
MAIN MENU CONFIGURATION	**CONFIGURATION DIGITAL INPUTS**	**TOGGLE PERIOD (MS)?**	Sets the toggling interval in milliseconds • An input changing state four or more times during set period is determined to be TOGGLING • Default: 1000 ms • Range: 0 to 99999 ms
	CONFIGURATION BATTERY INPUTS	**BATTERY TO EDIT**	Battery list: • **01: VBN** (default) • **02: SSCC1** • **03: SSCC2** • **04: Int. Temp** • **05: Ext. Temp**
		BATTERY (number) TAGS?	Battery (type) tag list: • **Default** • **Manual Entry**
		TAG? (type)	Battery (type) tag Entry displays only when **Manual Entry** is selected from battery (type) tag list
		FULL NAME?	Battery type) name Entry displays only when **Manual Entry** is selected from battery (number) tag list
		(Battery Type) SAMPLE PERIOD (MS)?	Set battery voltage or temperature sample period. • Default: 100 ms • Range: 0 to 99999 ms
		(Battery Type) RESOLUTION (V)?	Sets the change in voltage or temperature (degrees Fahrenheit) required to initiate event log entry • Default: 100 • Range: 0 to 99999
MAIN MENU CONFIGURATION		**(Battery Type) AVERAGE SAMPLES?**	Sets the number of consecutive 10 ms samples to average to determine battery voltage • **32 samples** (default) • **16 samples** • **8 samples** • **4 samples** • **2 samples** • **no averaging**
	CONFIGURATION RELAY OUTPUTS	**RELAY TO EDIT**	Relay list: • **01: RTU1** (default) • **02: RTU2** • **03: RTU3** • **04: RTU4** • **05: RLY1** • **06: RLY2**
		RELAY (Number) TAGS?	Relay (number) tag list: • **Default** • Manual Entry

Table 9-3 continued

Screens			Function/ Description
Level 1	**Level 2**	**Level 3**	
MAIN MENU CONFIGURATION	**CONFIGURATION RELAY OUTPUTS**	**TAG?**	Relay (type) tag Entry displays only when **Manual Entry** is selected from relay tag list
		FULL NAME?	Relay (number) name Entry displays only when **Manual Entry** is selected from relay tag list
		OFF LABEL?	Relay (number) OFF label Entry displays only when **Manual Entry** is selected from relay tag list
		ON LABEL?	Relay (number) ON label Entry displays only when **Manual Entry** is selected from relay tag list
		TOGGLE LABEL?	Relay (number) toggle label. Entry displays only when **Manual Entry** is selected from relay 1 tag list
		PULSE LABEL?	Relay (number) pulse label. Entry displays only when **Manual Entry** is selected from relay 1 tag list
		ON PULSE TIME (S)?	Sets the relay ON pulse time (in seconds) • Default: 1 sec. • Range: 0 to 9999 sec.
		OFF PULSE TIME (S)?	Sets the relay OFF pulse time (in seconds) • Default: 1 sec. • Range: 0 to 9999 sec.
		TOGGLE PERIOD (S)?	Sets the interval between relay toggle cycles in seconds • Toggle cycle: a relay state change from ON to OFF to ON • Default: 1 sec. • Range: 0 to 9999 sec.
		DUTY CYCLE (%)?	Sets the percentage of time that the relay is in the ON state during a toggle cycle • Default: 50% • Range: 0 to 99%
	CONFIGURATION TEST LED'S	**LED TO EDIT**	LED list: • **01: T1** (default) **thru 16: T16**
		TEST LED TAGS?	LED (number) tag list: • **Default** • **Manual Entry**
		TAG?	LED (number) tags TAG entries display only when **Manual Entry** is selected from the **LED TAGS** list
		FULL NAME?	LED name Full Name entries display only when **Manual Entry** is selected from the **LED TAGS** list

Table 9-3 continued

Screens			Function/ Description
Level 1	**Level 2**	**Level 3**	
MAIN MENU CONFIGURATION	**CONFIGURATION TEST LED'S**	**OFF LABEL?**	LED OFF label Entry displays only when **Manual Entry** is selected from the **LED TAGS** list
		RED LABEL?	LED Red label Entry displays only when **Manual Entry** is selected from the **LED TAGS** list
		GREEN LABEL?	LED Green label Entry displays only when **Manual Entry** is selected from the **LED TAGS** list
		YELLOW LABEL?	LED Yellow label Entry displays only when **Manual Entry** is selected from the **LED TAGS** list
		RED SLOW LABEL?	LED Red Slow label Entry displays only when **Manual Entry** is selected from the **LED TAGS** list
		GRN SLOW LABEL?	LED Green Slow label Entry displays only when **Manual Entry** is selected from the **LED TAGS** list
		YLW SLOW LABEL?	LED Yellow Slow label Entry displays only when **Manual Entry** is selected from the **LED TAGS** list
		GRN FAST LABEL?	LED Green Fast label Entry displays only when **Manual Entry** is selected from the **LED TAGS** list
		YLW FAST LABEL?	LED Yellow Fast label Entry displays only when **Manual Entry** is selected from the **LED TAGS** list
	CONFIGURATION LED MODE	**LED MODE? DIGITAL TRACK**	Track circuit monitor function
		LED MODE? APP CONTROL	Application programming monitor function
	CONFIGURATION SERIAL PORTS	**EDIT PORT? COMM**	**COMM PORT BAUD?** List: • **57600** • **38400** • **9600** (default) • **4800** • **2400** • **1200** • **600**
			COMM PORT DATA BITS? List: • **0** thru **9** • Default: **8**

Table 9-3 continued

Screens			Function/ Description
Level 1	**Level 2**	**Level 3**	
MAIN MENU CONFIGURATION	**CONFIGURATION SERIAL PORTS**		**COMM PORT PARITY?** List: • **None** (default) • **Odd** • **Even**
			COMM PORT STOP BITS? List: • **0** thru **9** • Default: **1**
			COMM PORT FLOW CONTROL? List: • **None** (default) • **Hardware** • **Radio**
		EDIT PORT? AUX	Same as COMM Port
		EDIT PORT? USER	Same as COMM Port
	CONFIGURATION MODULES	**MODULE MENU ADD MODULE**	Same as **EDIT MODULES?** screen of Site Setup menu. • See Table 9-2.
	CONFIGURATION RESTORE DEFAULTS	**LOOSE ALL SETTINGS AND RESTORE DEFAULTS?**	Allows the: • current settings to be cleared • all screens to be returned to their default settings
	CONFIGURATION SAVE CHANGES		Allows configuration changes to be saved.
MAIN MENU DIAG/MONITOR			Provides access to **DIAG** Key menu. See table 9-5.
MAIN MENU INCIDENT STORAGE	**INCIDENT STORAGE VIEW**	**VIEW ENTRY (SLOT 1 thru 5)**	Allows sequential access to each of five incident reports.
	INCIDENT STORAGE SAVE	**SAVE ENTRY (SLOT 1 thru 5)**	Allows incidents to be saved in one of five sequentially accessible slots. Supervisor password is required to initiate the save operation.
	INCIDENT STORAGE DELETE	**DELETE ENTRY (SLOT 1 thru 5)**	Allows incidents to be deleted from one of five sequentially accessible slots. Supervisor password is required to initiate the delete operation.

Table 9-3 continued

Screens			Function/ Description
Level 1	**Level 2**	**Level 3**	
MAIN MENU REPAIR HISTORY	**REPAIR HISTORY VIEW**	**ENTRIES TO VIEW**	Allows repair history entries to be viewed for the following selectable parameters: • **All** • **Init** • **Exec S/W** • **UDT S/W** • **APP S/W** • **Factory** • **Module** • **RTC** • **Manual**
	REPAIR HISTORY ADD	**REPAIR ENTRY**	Allows an entry to be made to the repair log
MAIN MENU CHANGE PASSWORD	**WHICH PASSWORD?**		Allows current password to be changed. Three passwords may be changed: • Maintenance • Supervisor • Safetran personnel To change a password both the old and new passwords must be entered.
MAIN MENU FACTORY TEST			Reserved for Safetran factory tests.
MAIN MENU VERSIONS			Alternately displays the current executive and application software version.

9.7.3.3 EVENT REPORT Key

The Interface menu screens that may be accessed by activating the **EVENT REPORT** key are:

- shown in Figure 9-28, sheet 6
- described in Table 9-4

Table 9-4. EVENT REPORT Key Menu

Screens			Function/ Description
Level 1	**Level 2**	**Level 3**	
STARTING TIME			Report start time
STARTING DATE			Report start date
ENDING TIME			Report ending time
ENDING DATE			Report ending date
Event(s)			Sequential list of events

9.7.3.4 COMM Setup Key

The Interface menu screens that may be accessed by activating the **COMM SETUP** key are:

- shown in Figure 9-28, sheet 12
- described in Table 9-5

Table 9-5. COMM SETUP Key Menu

Screens			Function/ Description
Level 1	**Level 2**	**Level 3**	
SITE TYPE?			Site type list: • **No Communication** • **Bullhorn/Mod-Bus** • **Dial-up** • **Node** • **Collector** • **CDS-902X**
USER PORT BAUD?			USER port baud list: • **57600** • **38400** • **19200** • **9600** • **4800** • **2400** • **1200** • **600**
USER PORT DATA BITS?			USER port data bits selection
USER PORT PARITY?			USER port party set list: • **None** • **Odd** • **Even**
USER PORT STOP BITS?			USER port stop bits selection
USER PORT FLOW CONTROL?			USER port flow control list: • **None** • **Hardware** • **Radio**
AUX PORT BAUD?			AUX port baud list: • **57600** • **38400** • **19200** • **9600** • **4800** • **2400** • **1200** • **600**
AUX PORT DATA BITS?			AUX port data bits selection
AUX PORT PARITY?			AUX port party set list: • **None** • **Odd** • **Even**

Table 9-5 continued

Screens			Function/ Description
Level 1	**Level 2**	**Level 3**	
AUX PORT STOP BITS?			AUX port stop bits selection
AUX PORT FLOW CONTROL?			AUX port flow control list: • **None** • **Hardware** • **Radio**
COMM PORT BAUD?			COMM port baud list: • **57600** • **38400** • **19200** • **9600** • **4800** • **2400** • **1200** • **600**
COMM PORT DATA BITS?			COMM port data bits selection
COMM PORT PARITY?			COMM port party set list: • **None** (default) • **Odd** • **Even**
COMM PORT STOP BITS?			COMM port stop bits selection
COMM PORT FLOW CONTROL?			COMM port flow control list: • **None** • **Hardware** • **Radio**

9.7.3.5 DIAG Key

The Interface menu screens that may be accessed by activating the **DIAG** key are:

- shown in Figure 9-28, sheet 12
- described in Table 9-6

Table 9-6. DIAG Key Menu

Screens			Function/ Description
Level 1	**Level 2**	**Level 3**	
DIAG/MONITOR DIGITAL INPUTS	**VIEW MODE?**		Digital input monitor function list: • **ALL INPUTS** • **SINGLE INPUT** When **ALL INPUTS** is selected, the binary states of the digital inputs may be serially displayed. When **SINGLE INPUT** is selected the state of each digital input may be individually displayed.

Table 9-6 continued

Screens			Function/ Description
Level 1	**Level 2**	**Level 3**	
DIAG/MONITOR BATTERIES	**BATTERY?**		Battery input monitor function list: • **VBN** • **SSCC1** • **SSCC2** • **Int. Temp** • **Ext. Temp** • **BATT MON** A value displays for each selected item.
DIAG/MONITOR RELAYS	**RELAY?**		Relay monitor list: • **RTU1** • **RTU2** • **RTU3** • **Int. Temp** • **Ext. Temp** • **BATT MON** Operational parameters display for each selected item.
DIAG/MONITOR NETWORK I/O	**MODULE TO MONITOR?**		Module monitor list: • **DI01** • **DI02** • **DI03** • **DI04** • **DI05** • **DI06** • **EXIT** View Mode screens display for each selected module.
		VIEW MODE? INPUTS 1-12	Displays the binary state of inputs 1 thru 12 for the selected module.
		VIEW MODE? INPUTS 13-24	Displays the binary state of inputs 13 thru 24 for the selected module.
		VIEW MODE? SINGLE INPUT	Displays the binary state of selected module input.
	MODULE TO MONITOR?	**VIEW MODE? ALL OUTPUTS**	Displays the binary state of all 4 outputs.
		VIEW MODE? SINGLE OUTPUT	Displays the binary state of a selected output.
		VIEW MODE? COMM STATUS	Displays the communication status of the selected module.
DIAG/MONITOR FIELD COMM			Displays the SEAR field communications **TX** and **RX** status.

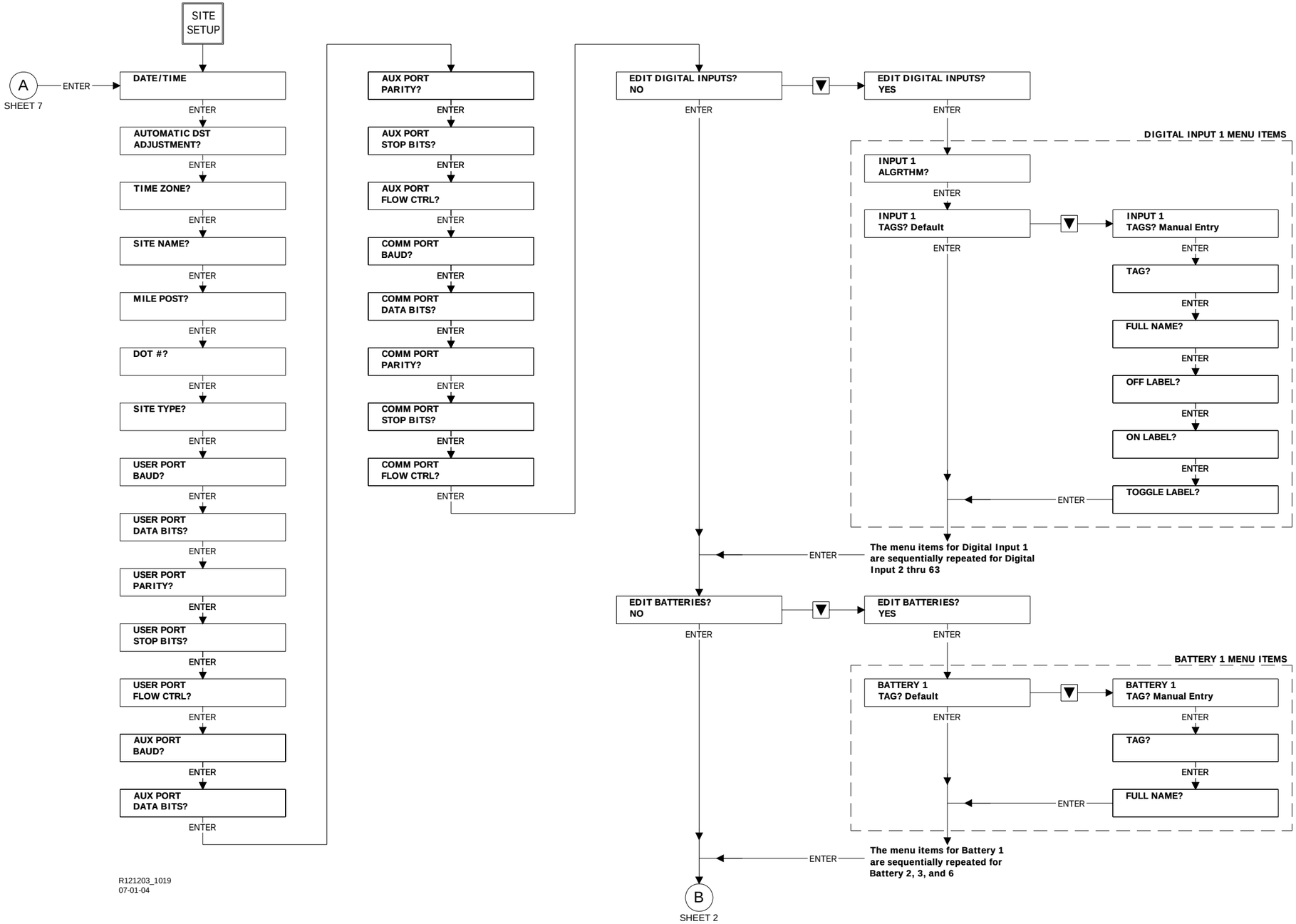


Figure 9-28. Interface Menu Structure, Sheet 1 of 12

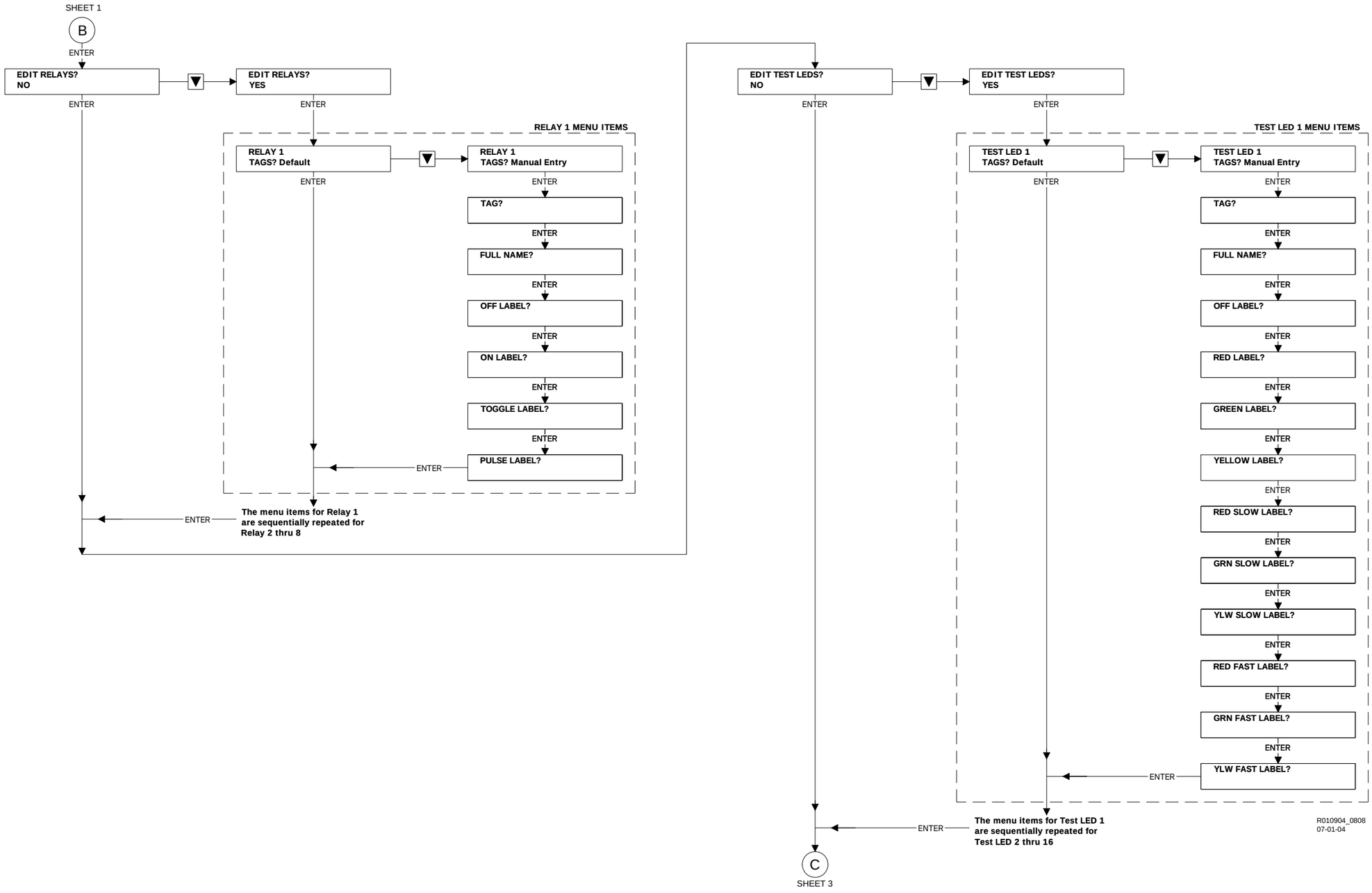


Figure 9-28. Interface Menu Structure, Sheet 2 of 12

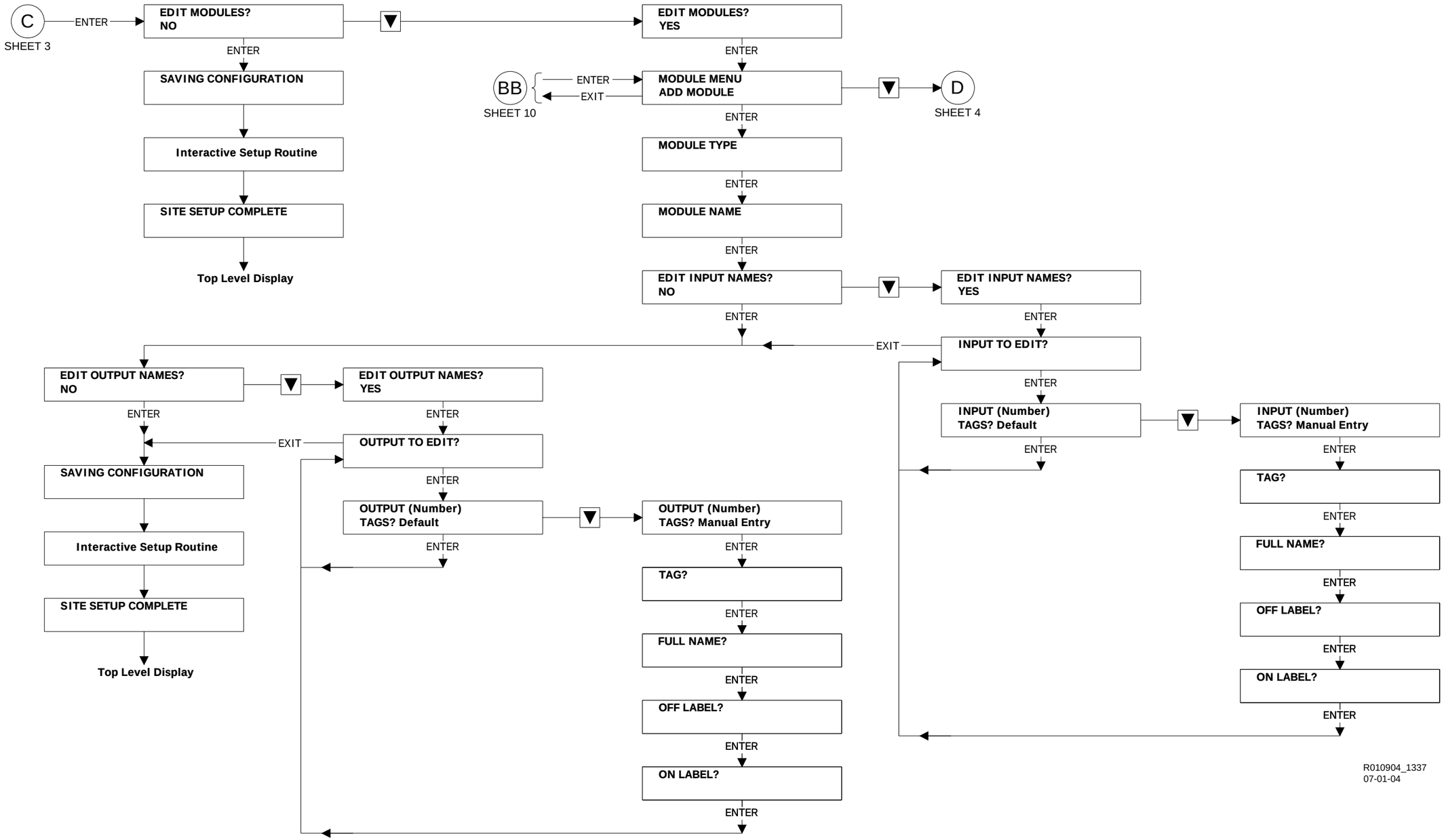


Figure 9-28. **Interface Menu Structure, Sheet 3 of 12**

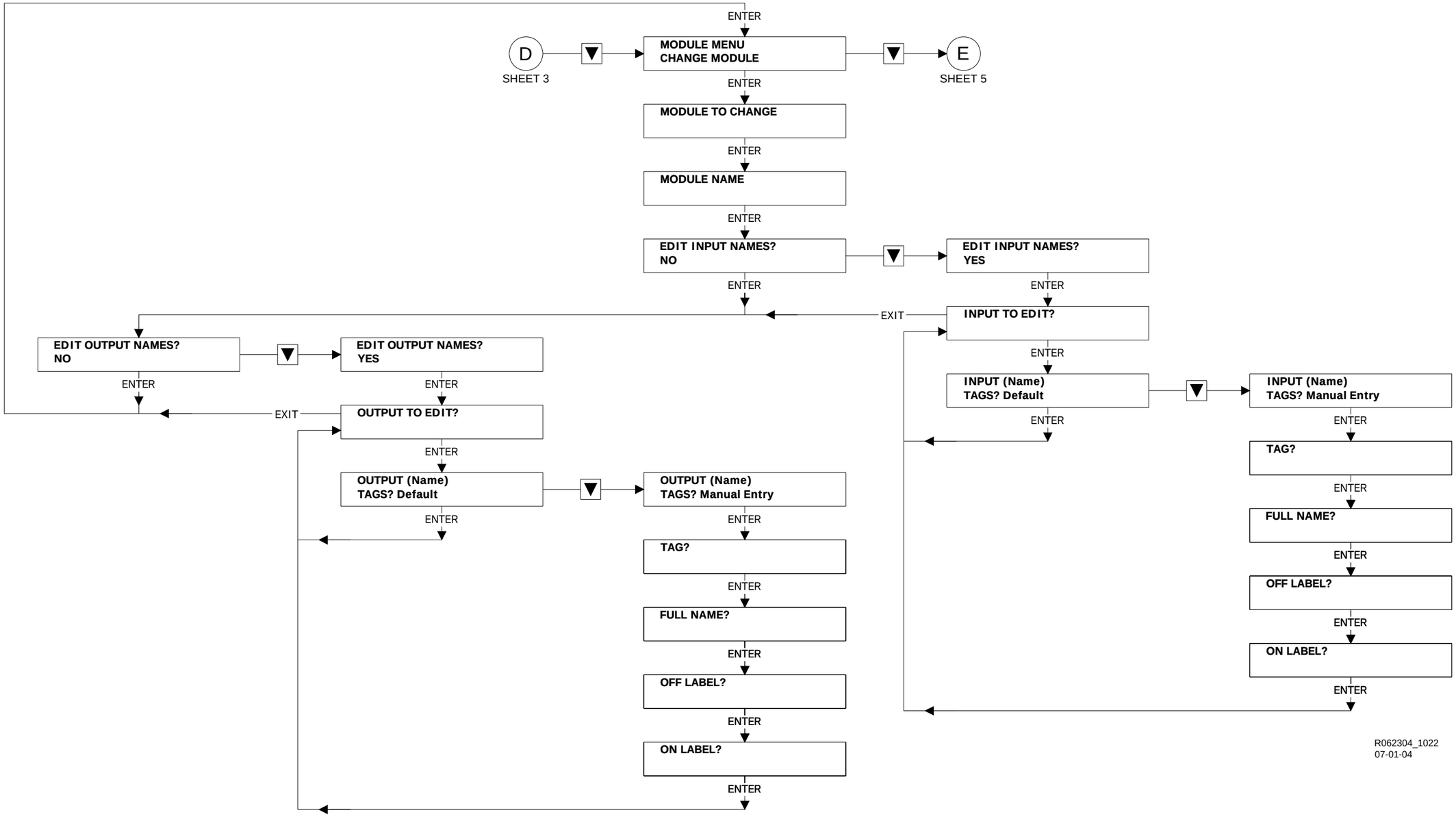


Figure 9-28. **Interface Menu Structure, Sheet 4 of 12**

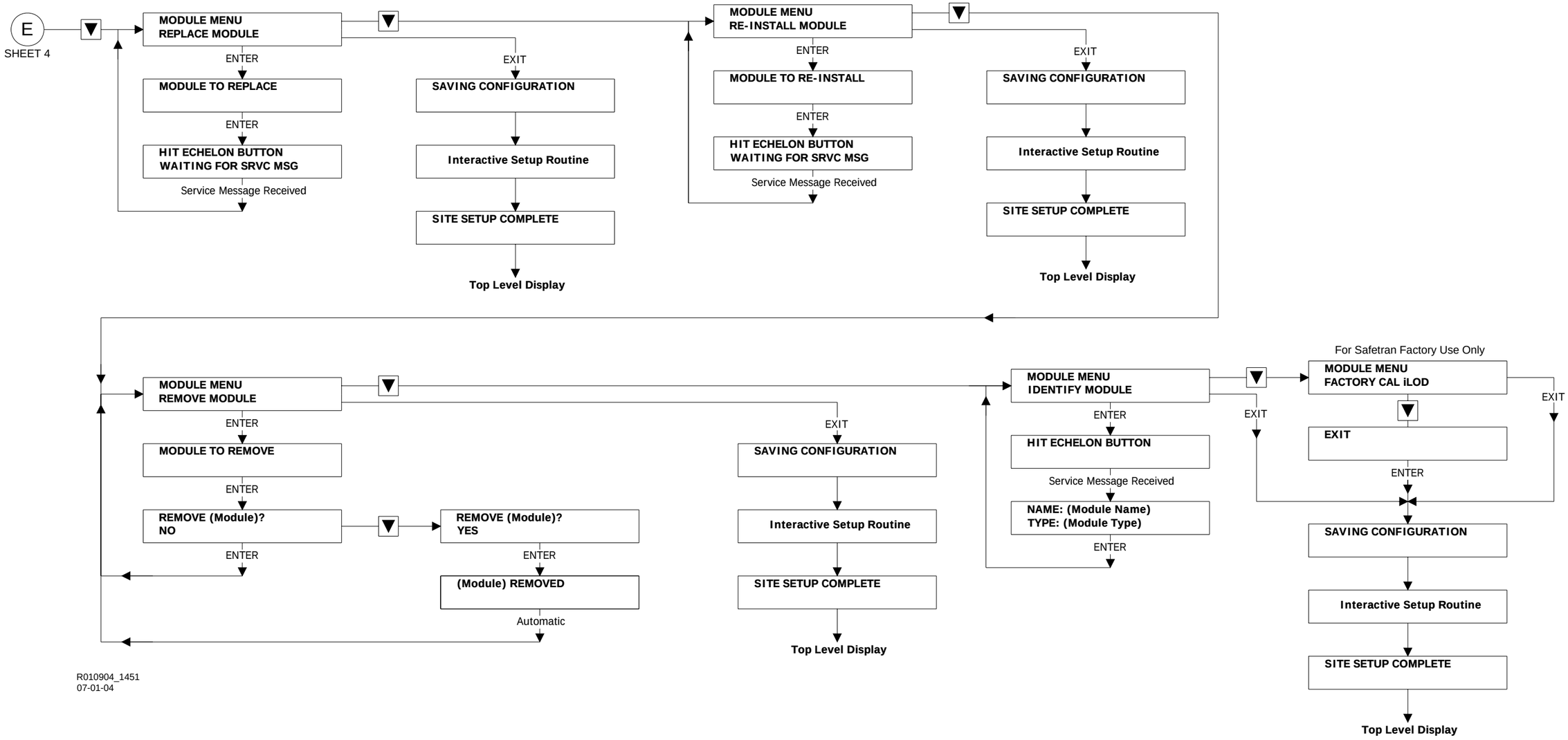


Figure 9-28. **Interface Menu Structure, Sheet 5 of 12**

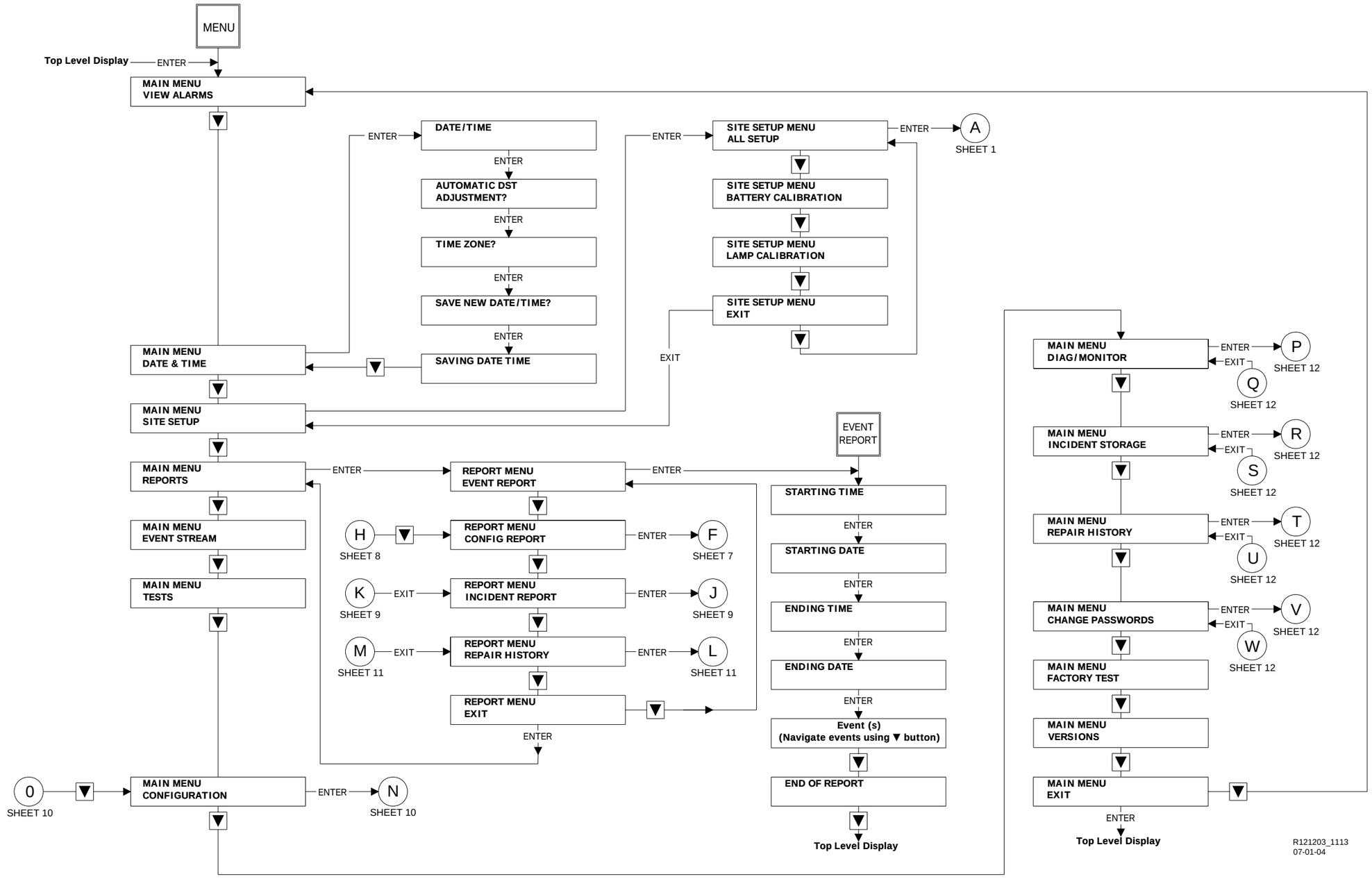


Figure 9-28. **Interface Menu Structure, Sheet 6 of 12**

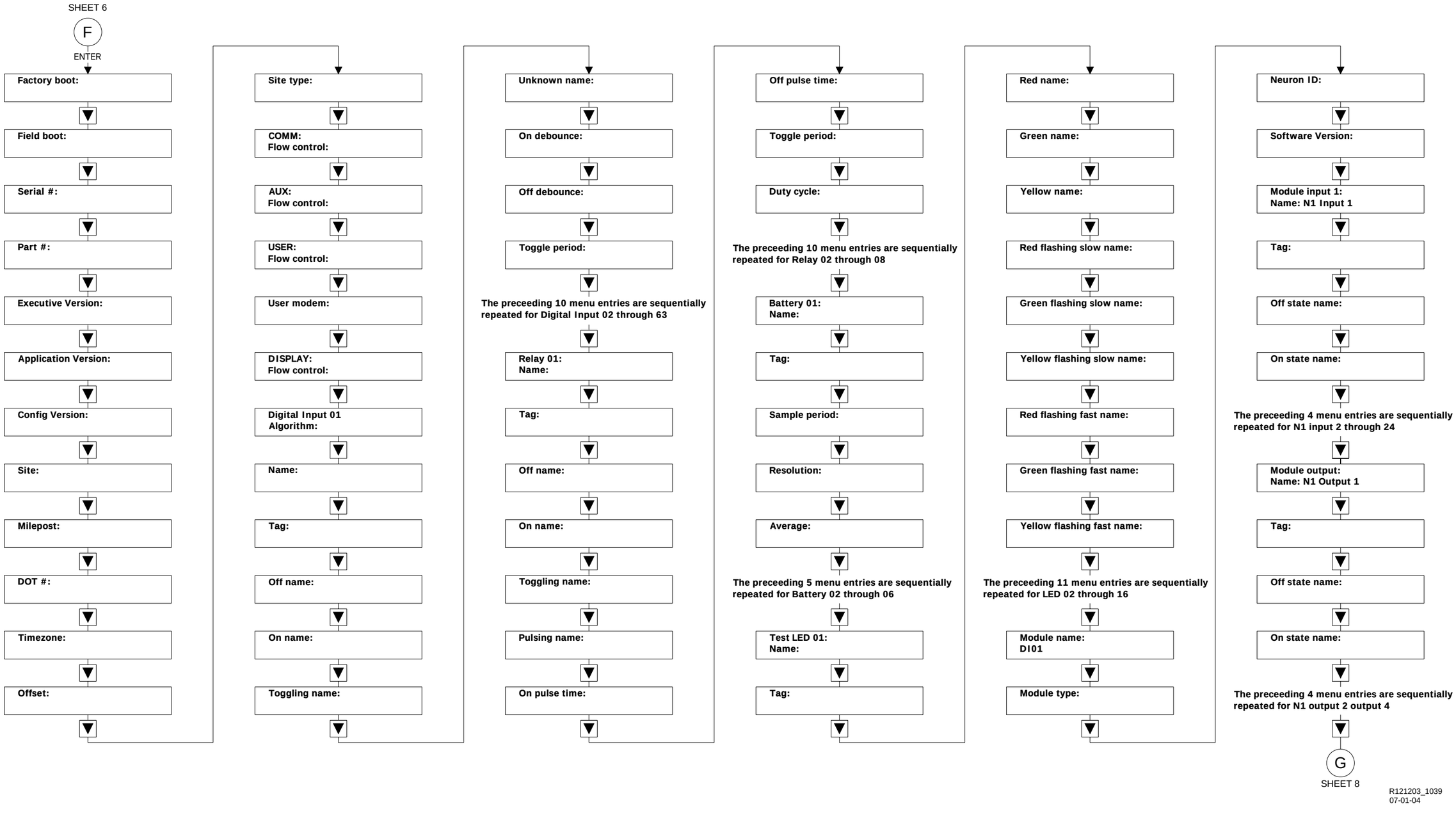


Figure 9-28. **Interface Menu Structure, Sheet 7 of 12**

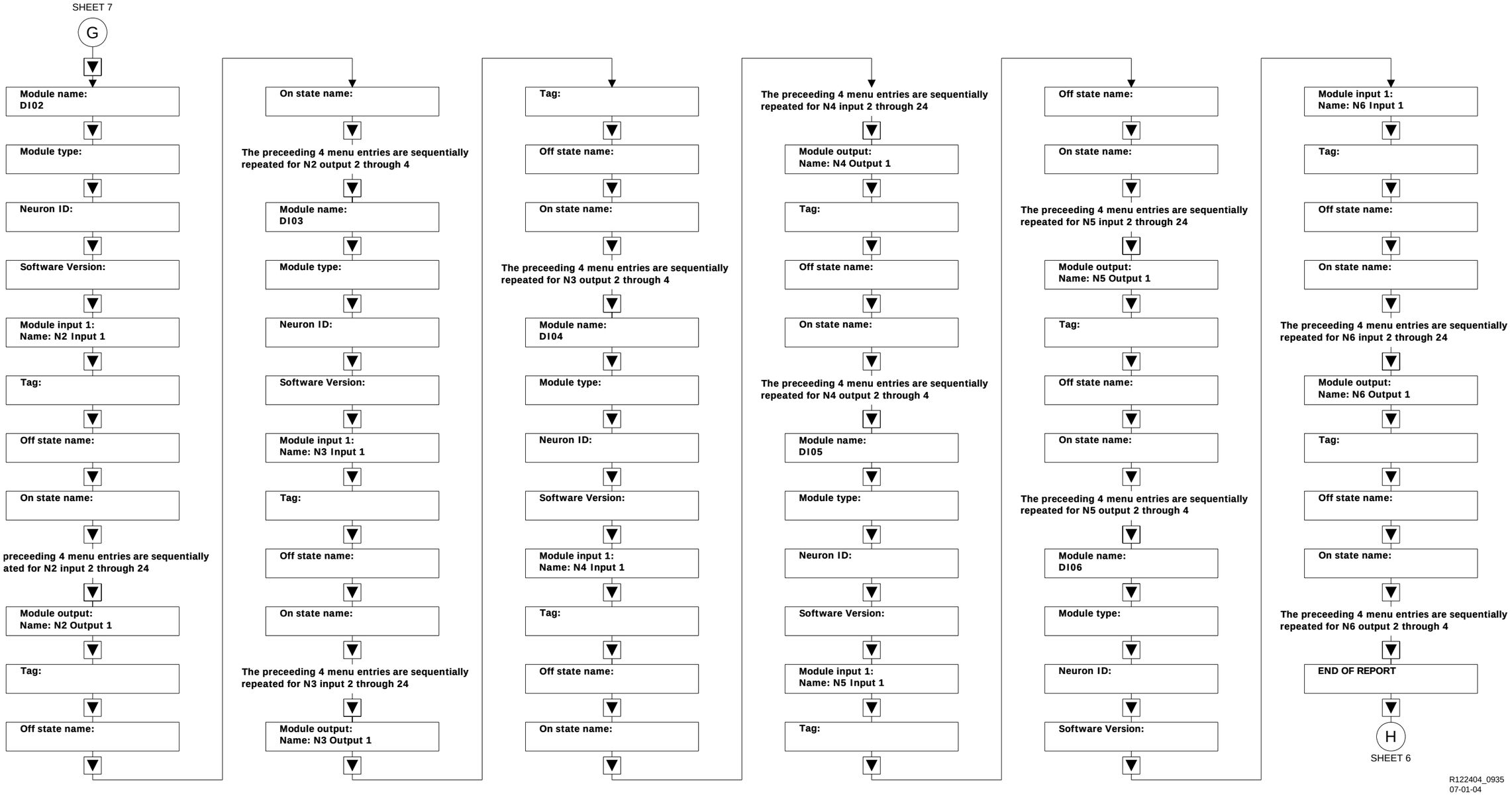


Figure 9-28. **Interface Menu Structure, Sheet 8 of 12**

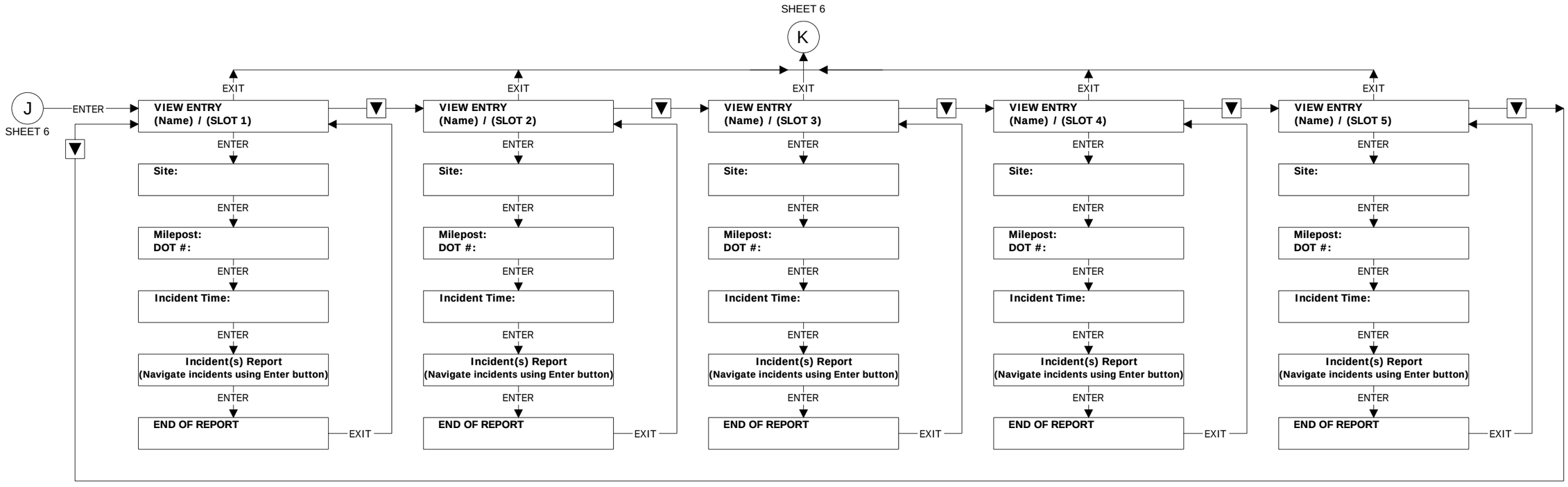


Figure 9-28. **Interface Menu Structure, Sheet 9 of 12**

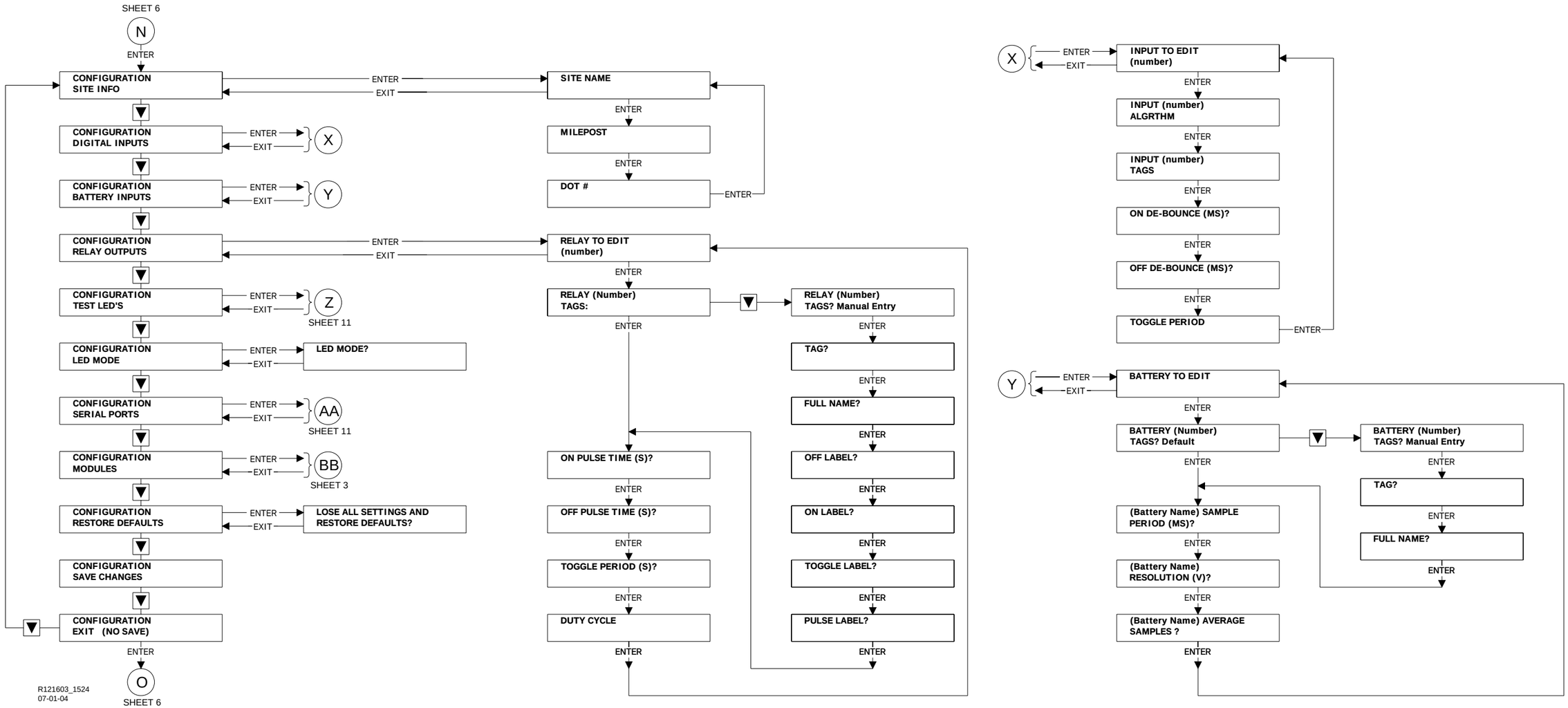
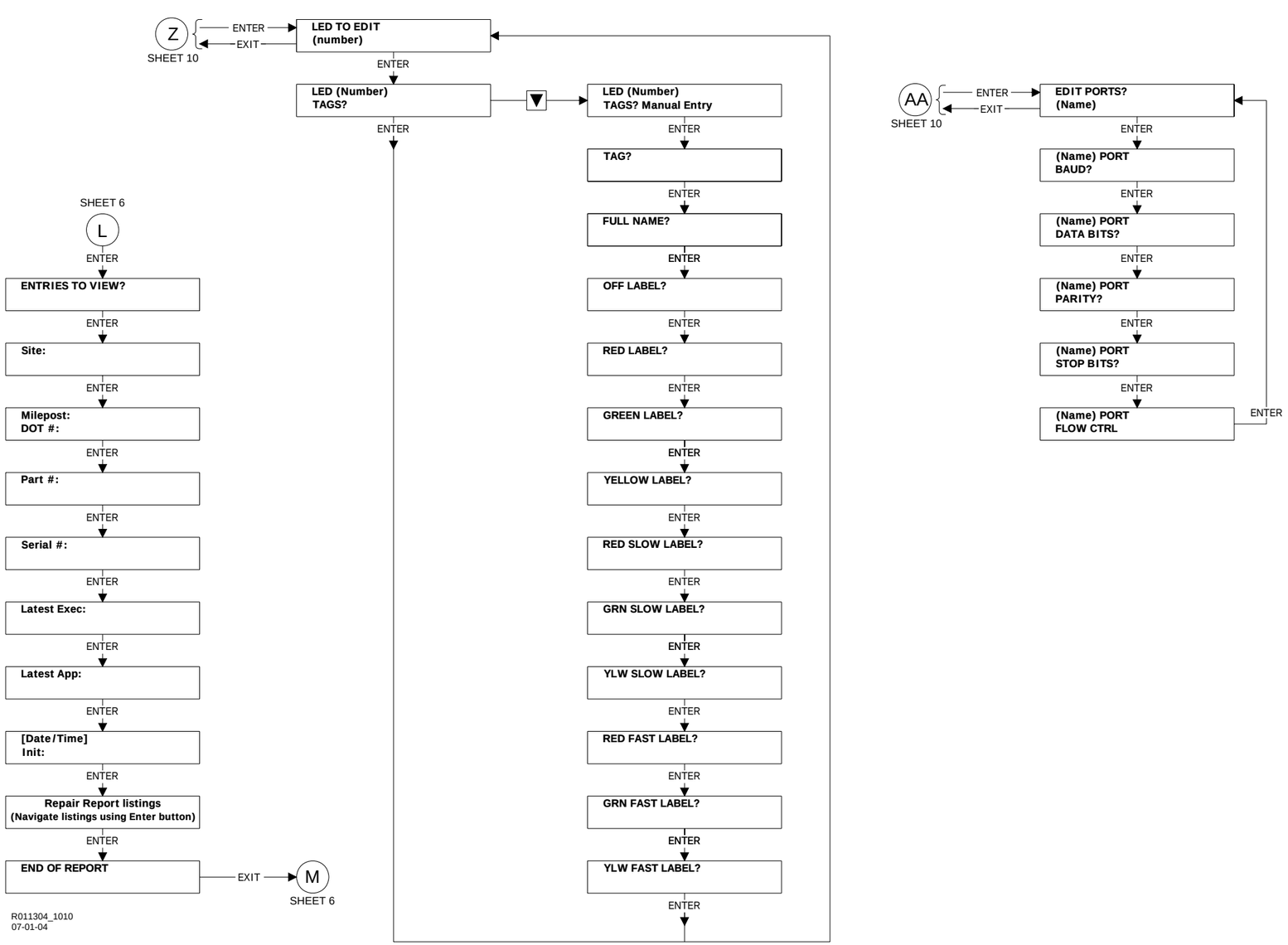


Figure 9-28. **Interface Menu Structure, Sheet 10 of 12**



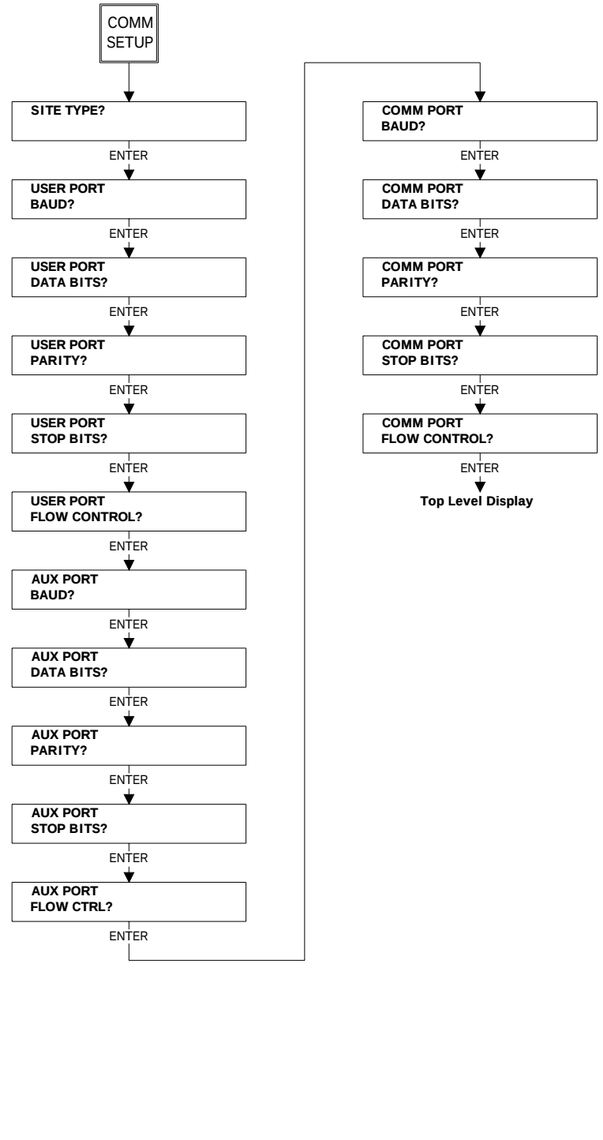


Figure 9-28. **Interface Menu Structure, Sheet 11 of 12**

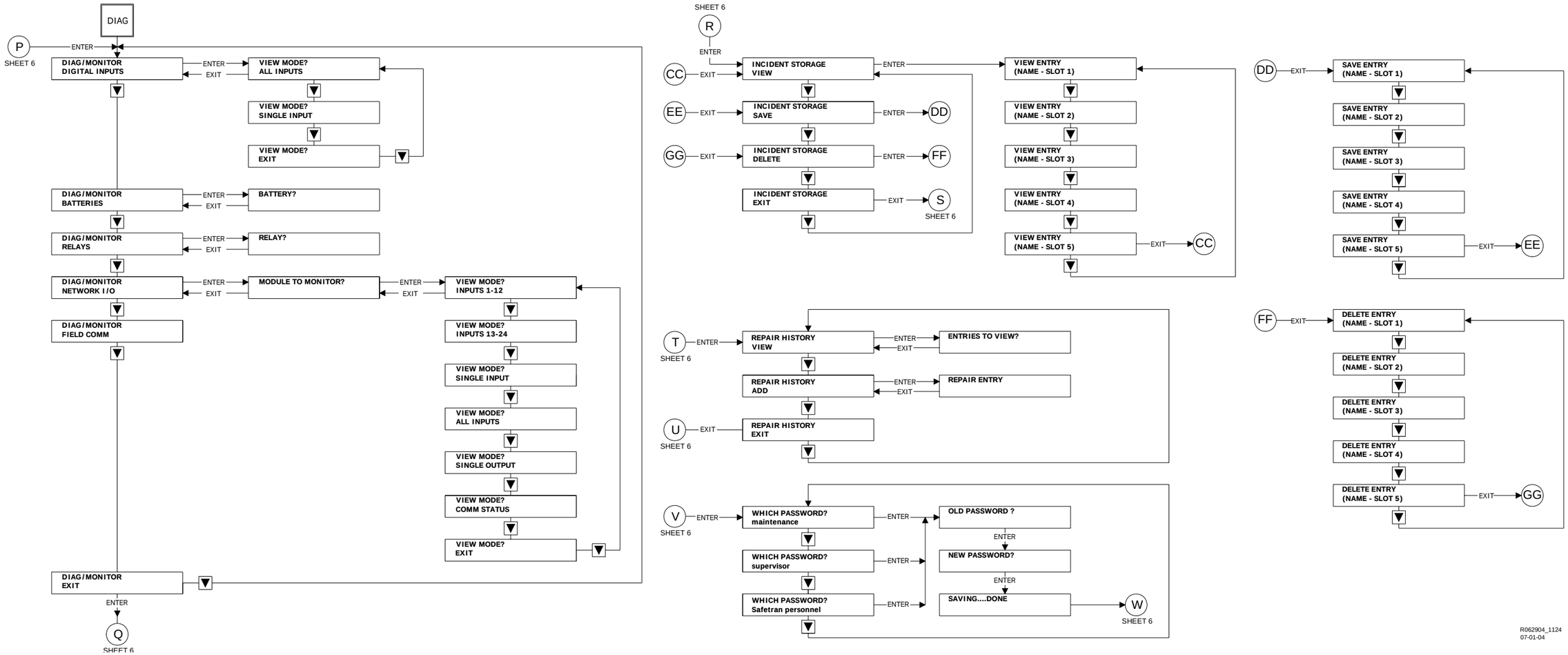


Figure 9-28. **Interface Menu Structure, Sheet 12 of 12**

SECTION 10 – GCP 4000 SYSTEM CUTOVER TEST PROCEDURE AND CHECK-OFF SHEET

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SECTION 10 - GCP 4000 SYSTEM CUTOVER TEST PROCEDURE AND CHECK-OFF SHEET

10.1 INTRODUCTION

The cutover test procedure should be used when initially installing, modifying, or after disarrangement of a GCP 4000 system and includes the SEAR IIi and SEAR IIi appliances (i.e., Mini Track Side Sensors, MTSS, Intelligent Light Out Detectors, iLODS, VHF Communicators, Ground Fault Tester, GFT, etc.) This procedure consolidates information from the various sections of the *Reference Manual- Grade Crossing Predictor Model 4000*. For more detailed information refer to

- Section 5 – Programming and Main Menu Description
- Section 6 – GCP Calibration & System Operational Checks;
- Section 8 - Internal Solid State Crossing Controller
- Section 9 - Internal Event Recorder.

This procedure does not supersede procedures of the maintaining railroad. This procedure is designed to supplement railroad procedures. In case of conflicts between procedures, the most restrictive procedure should govern.

Results of the tests may be documented on the GCP 4000 Test Procedure Form, which is located at the end of this section.

Unless otherwise noted, the term ‘activate crossing’ means activating the flashing light signals and gates by de-energizing an AND 1 XR Enable input. Do not use an Emergency Activation input unless instructed to do so.

10.1.1 EQUIPMENT NEEDED:

- Hardwire test shunt
- 0.06 ohm test shunt
- Stop watch
- GCP 4000 Display Module, or PC with Diagnostic Terminal, DT, software.
- PC with HyperTerminal software may be needed for SEAR IIi and communication setup
- Volt meter
  - ♦ Fluke 187 or equivalent with a True RMS AC + DC scale (preferred), or
  - ♦ Conventional volt-meter (requires use of conversion chart, refer to section 8.8)

NOTE

It is not necessary to remove power from the GCP case before installing or removing modules. If possible, disconnect lamp load before removing or inserting SSCC IIIi modules.

10.1.2 CIRCUIT AND PROGRAMMING VERIFICATION

Verify the GCP 4000 modules shown on the circuit plans are properly inserted and secured into their appropriate slots (main/standby).

WARNING

- **THE SSCC IIIi MODULES SHALL BE SECURED WITH THE BUILT IN SCREW FASTENERS.**
- **REMOVAL OF A SSCC IIIi WILL CAUSE THE GATES TO DESCEND IMMEDIATELY (WITHOUT GATE DELAY) AND THE LIGHTS WILL NOT ACTIVATE.**

Step 1

- Remove all connectors (green screw type and orange cage-clamp) to the GCP 4000.
  - ♦ Close battery buss to 4000 system case.
  - ♦ Verify the voltage and polarity of the B and N wiring to the GREEN plug connectors for the GCP and SSCC.
  - ♦ Insert only the GREEN power plug connector above the CPU module and verify programming after system boots.
    - ■ If used, set the GCP 4000 Transfer Timer Module 80406 or Transfer Timer Assembly 80486 timer transfer switch to MAIN.

- Review the program in the GCP 4000 by selecting the PROG button on the GCP 4000 DT menu bar. Verify the programming per the text document in the circuit plans. Field measured parameters (approach, DAX offset and island distances) are added at this time.
- If used, verify that the ATCS (SIN) number is per the circuit plan.
- If used verify the office configuration check number is per the circuit plan.

NOTE

The main and standby modules do not require independent programming. Both sets of modules sets operate from the same stored application program.

- If used, verify the Echelon LAN wiring and termination is in place.

Step 2

Before connecting power to other GCP connectors, verify wiring to GCP 4000 system, case wiring, wiring to surge panels, track, warning devices, and cable circuits to other locations.

a) Connect track cable at house termination points.
b) Connect other cable circuits at house termination points.

⚠ WARNING

DURING THE SSCC IIIi BOOT-UP PROCESS AND AFTER ALL WIRING IS CONNECTED:

- **THE CROSSING GATES WILL BE DOWN WITH CROSSING LAMPS FLASHING AND BELLS RINGING.**
- **A80405 MODULE(S) WILL NOT BE RESPONSIVE TO CROSSING CONTROL INPUT FROM THE 4000 GCP.**
- **TAKE ADEQUATE PRECAUTIONS TO WARN ANY PEDESTRIANS, PERSONNEL, TRAINS, AND VEHICLES IN THE AREA UNTIL PROPER SYSTEM OPERATION IS VERIFIED.**

⚠ CAUTION

THE SSCC IIIi MODULE HAS ACTIVE INTERNAL SHORT CIRCUIT PROTECTION FOR LAMP, BELL AND GATE CONTROL OUTPUTS THAT IS EFFECTIVE ONLY AFTER THE SSCC IIIi HAS BOOTED UP. THEREFORE, AT THE INITIAL CUTOVER IT IS IMPORTANT TO BOOT UP THE SYSTEM PRIOR TO CONNECTING EXTERNAL LOADS. SEE CONNECTION SEQUENCE BELOW IN STEP 3.

DO NOT INSERT THE GCP 4000 SSCC IIIi GREEN CONNECTORS FOR: B, N, L1, L2, GC'S, BELLS, AND INPUTS.

NOTE

Once the SSCC IIIi module has booted up (Health LED flashing at 1 Hz), the SSCC IIIi module has internal short circuit protection for lamp, bell and gate control outputs. Therefore, at the initial cutover it is important to boot up the system prior to connecting external loads.

Step 3

a) The SSCC IIIi connectors and wiring to loads must be applied in the following sequence to avoid damage:
   i) Open the lamp, gate GC control, GP inputs, GD inputs and bell circuits at the surge panel(s).
   ii) Verify battery polarity on GREEN power plugs and ORANGE input plug connector(s).
   iii) Connect the screw-lock power connector for each SSCC IIIi module and lock by tightening screws.
   iv) Wait approximately 40 seconds for SSCC IIIi module(s) to boot up.
   v) Connect the GC/bell and GP/GD ORANGE Input cage–clamp plug connectors to the appropriate SSCC IIIi.
      (1) Close the lamp, gate control, GP/GD inputs and bell circuits on the surge panel(s).
      (2) Connect warning device wiring and cables at house termination points.

b) Connect all other connectors to GCP 4000 system.

c) Connect all other electronic equipment to the battery busses.

10.2 GCP MAIN MODULES CALIBRATION

When possible, all GCP Calibration procedures should be done when ballast is dry. If calibration is done when ballast is wet, recalibration may be required later when the ballast is dry.

NOTE

An empty, red check box displays within the CAL button of each track parameter requiring calibration.

Procedure 10-1. GCP CALIBRATION

Step 1 If transfer module A80406 or A80468 is present set the transfer switch to **MAIN**.

Step 2 Go to the Main Menu and select the **SETUP** button at the top of the display.

Step 3 From the menu that appears, select the track to calibrate (see Figure 10-1).

- Only enabled tracks appear on the menu.

Step 4 Select the **GCP CAL** button.

- The **GCP Calibration** Window appears, as shown in Figure 10-2A.
  - The current **EZ** and **EX** values appear.
  - If calibration is required**, Calibration Req.** appears below the **EZ** and **EX** values.

Step 5 Select the **START** button.

- The **START** button deactivates (grays out).
- The display shows an **Initiating** then an **In Progress** message during the calibration.
- The track module requires about 15 seconds to calibrate.
- If calibration is successful
  - The **Calibration Select** Window, Figure 10-2B, appears.
    - EZ should be 98 to 102 and the **GCP CAL** button has a green check in the box.
- If calibration is not successful, the display shows a **Failed** message.
  - Refer to Section 7 for troubleshooting procedures.

Step 6 To record the date and time stamped reason for the recalibration and store it in the Maintenance log, select the **GCP CAL** button and then the **ADD LOG ENTRY** button.

- Type any notes on the reason for recalibration and select **OK** to save the entry.
- The **Log Entry** Window closes and the display returns to the **GCP Calibration** Window, Figure 10-2A.
- Select the **CAL SELECT** button.
  - The display changes to **Calibration Select** Window, Figure 10-2B.

This completes the GCP Calibration. Proceed to paragraph 10.3, **Approach Distance and Linearization Calibration.**

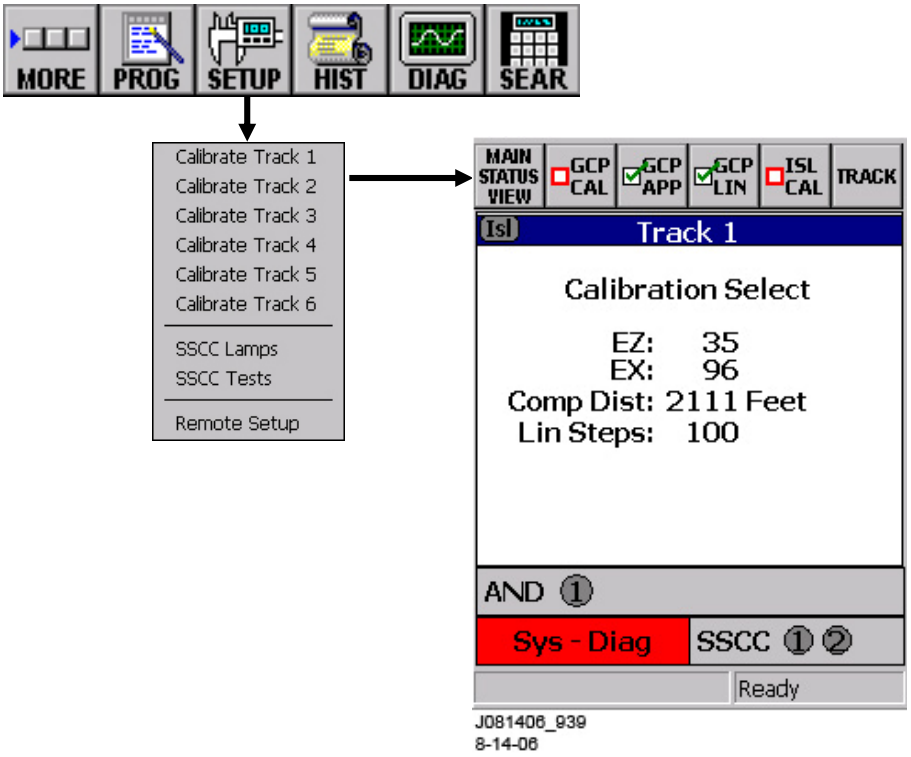

Figure 10-1. Opening the Calibration Window

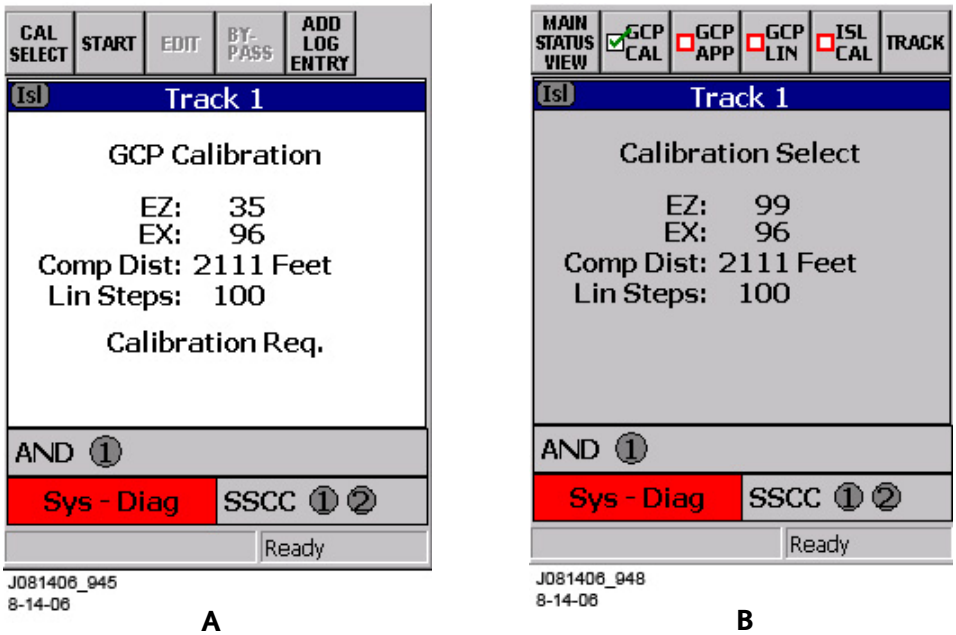

Figure 10-2. GCP Calibration Windows Before and After GCP Calibration

10.3 APPROACH DISTANCE AND LINEARIZATION CALIBRATION

NOTE

1. The setup for approach distance and setup for linearization procedures are combined into a single procedure to simplify track-shunting requirements.
   a. The combined procedure calculates a modified approach distance based on actual approach distance (distance to the termination shunt from the crossing track wires) plus the electrical characteristics of the termination shunt and any simulated track impedance placed in series with the shunt.
   b. This procedure is essential to improving warning time accuracy, especially for DAX and prime prediction offset circuits.
2. The linearization procedure compensates for lumped loads in the 4000 GCP approach that can affect the linearity of EZ over the length of the approach as a train approaches the crossing. The linearization is essential to improving warning time accuracy.
3. The types of loads that can affect the linearity of the approach circuit include:
   a. Narrow-band shunts of other frequencies in the 4000 GCP approach circuits, which may occur when other GCP approaches overlap the GCP approach circuit.
   b. Other track equipment in the 4000 GCP approaches such as audio frequency overlay track circuits, coded track circuits, etc.
   c. Missing or incorrect track battery chokes.

⚠ WARNING

1. **THE APPROACH AND LINEARIZATION PROCEDURES REQUIRE THE RECORDING OF THE COMPUTED APPROACH DISTANCES IN FEET (NOT THE EZ VALUE).**
2. **WHEN EDITING THE COMPUTED APPROACH DISTANCES, ENTER THE VALUE IN FEET (NOT THE EZ VALUE).**
3. **FAILURE TO ENTER DISTANCES IN FEET MAY RESULT IN SHORTER WARNING TIMES THAN INTENDED.**

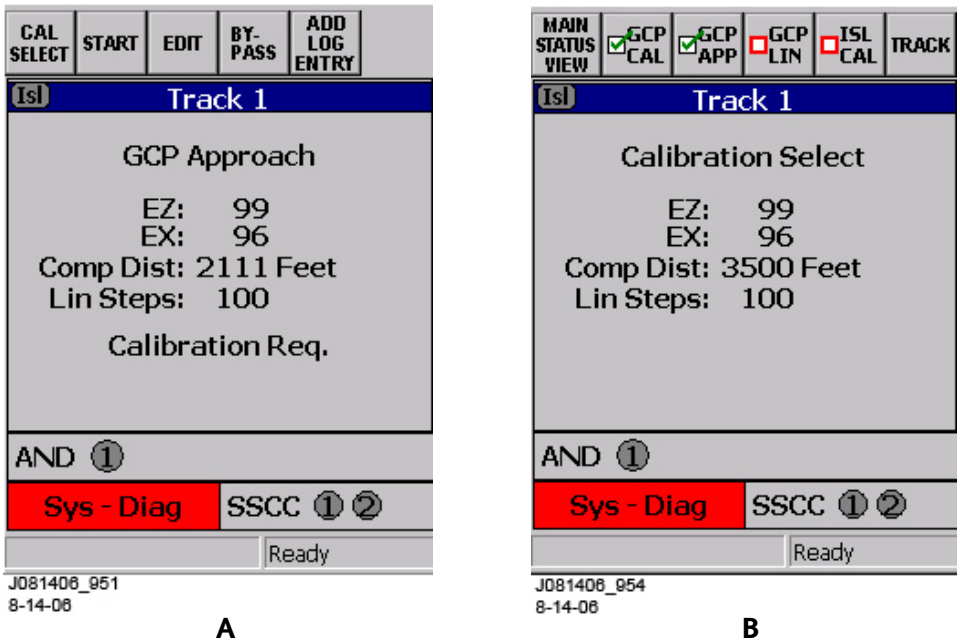

Figure 10-3. GCP Approach Calibration Window Before and After Approach Calibration

Procedure 10-2. APPROACH AND LINEARIZATION CALIBRATION	
Step 1	Record the EZ and EX values for the track (before installing hardwire shunt) in the **Step 1** column (**Calibrated Values**) on the CALIBRATION VALUES HISTORY FORM (Pages 10-17 and 10-18). Then, temporarily place a hardwire shunt across the termination shunt. • For bidirectional installations, use the termination shunt farthest from the crossing.
Step 2	Record the EZ and EX values for the track in the **First Approach**, **Step 2** column on the CALIBRATION VALUES HISTORY FORM (Pages 10-17 and 10-18).
Step 3	Select the **GCP APP** button. • The **GCP Approach** Window, Figure 10-3A, appears.
Step 4	Select the **START** button. • **START** button deactivates (grays out). • Display shows an **Initiating** then an **In Progress** message during calibration. • If calibration is successful: ♦ **Calibration Select** window, Figure 10-3B, appears. ♦ Computed approach distance (**Comp Dist**) appears. ♦ **GCP APP** button has a green check in the box. • If calibration is not successful, the display shows a Failed message. ♦ Refer to Section 7 for troubleshooting procedures.

⚠ WARNING

1. **THE APPROACH AND LINEARIZATION PROCEDURES REQUIRE THE RECORDING OF THE COMPUTED APPROACH DISTANCES IN FEET (NOT THE EZ VALUE).**
2. **WHEN EDITING THE COMPUTED APPROACH DISTANCES, ENTER THE VALUE IN FEET (NOT THE EZ VALUE).**
3. **FAILURE TO ENTER DISTANCES IN FEET MAY RESULT IN SHORTER WARNING TIMES THAN INTENDED.**

Procedure 10-2. APPROACH AND LINEARIZATION CALIBRATION - *continued*

Step 5	Record the computed approach distance in feet for the track in the **First Approach**, **Step 5** column (**Comp Dist**) on CALIBRATION VALUES HISTORY FORM (Pages 10-17 and 10-18).
Step 6	Accurately (within 1%) locate the midpoint of the longest approach and move the hardwire shunt to that point on the rails. Refer to Figure 10-4.
Step 7	Select the **GCP LIN** button. The **GCP Linearization** Window, Figure 10-5A, appears.
Step 8	Select the **START** button. • **START** button deactivates (grays out). • Display shows an **Initiating** then an **In Progress** message during calibration. • If calibration is successful: ♦ **Calibration Select** window, Figure 10-5B, appears. ♦ **GCP LIN** button has a green check in the box. • If calibration is not successful, the display shows a **Failed** message. ♦ Refer to Section 7 for troubleshooting procedures.
Step 9	Record the linearization step value for the track in the **First Approach**, **Step 9** column (**Lin Steps**) on the CALIBRATION VALUES HISTORY FORM (Pages10-17 and 10-18). • value between 68 and 132.
Step 10	**Verify** that the computed approach distance in feet (**Comp Dist**, **Step 5**) and the linearization steps (**Lin Steps**, **Step 9**) values recorded on the CALIBRATION VALUES HISTORY FORM are the same as the values displayed on the **Calibration Select** window, Figure 10-5B.
Step 11	Remove the hardwire shunt from the track.

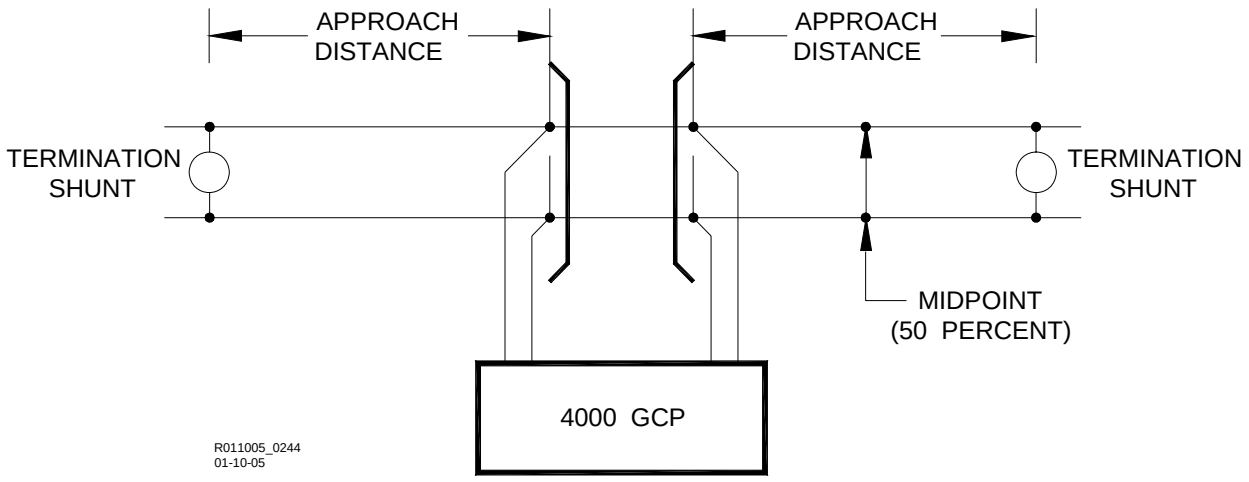

Figure 10-4. Midpoint Location

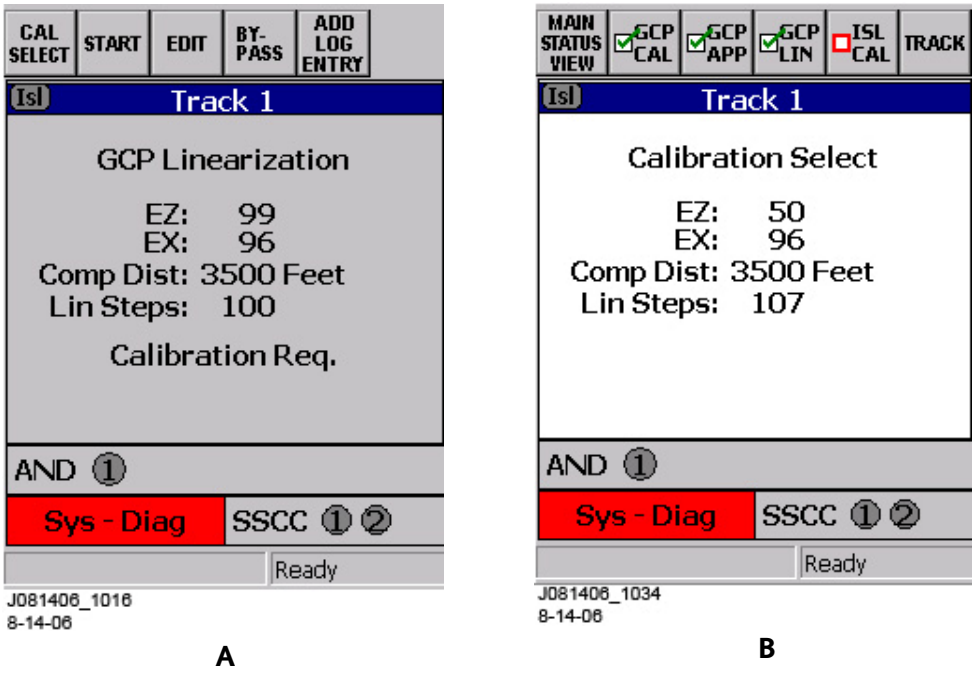

Figure 10-5. GCP Linearization Window Before and After GCP Linearization

Procedure 10-2. APPROACH AND LINEARIZATION CALIBRATION - *continued*

Step 12
- If the approach is unidirectional or simulated bidirectional, go to step 31.
- If the track is bidirectional and the measured distance to the other termination shunt is within 10 % of the distance of the first approach, go to step 13.
- Otherwise, if the distance is clearly shorter, go to step 31.

Step 13 Temporarily place a hardwire shunt across the termination shunt of the other approach.

Step 14 Record the EZ and EX values for the track in the **Second Approach**, **Step 14** column on the CALIBRATION VALUES HISTORY FORM (Pages 10-17 and 10-18).

Step 15 Select the **GCP APP** button.
- The **GCP Approach** Window, Figure 10-3A, appears.

Step 16 Select the **START** button.
- **START** button deactivates (grays out).
- Display shows an **Initiating** then an **In Progress** message during calibration.
- If calibration is successful:
  - **Calibration Select** window, Figure 10-3B, appears.
  - Computed approach distance (**Comp Dist**) appears.
  - **GCP APP** button has a green check in the box.
- If calibration is not successful, the display shows a **Failed** message.
  - Refer to Section 7 for troubleshooting procedures.

Step 17 Record the computed approach distance in feet for the track in the **Second Approach, Step 17** column (**Comp Dist**) on the CALIBRATION VALUES HISTORY FORM (Pages 10-17 and 10-18).

Step 18 Accurately (within 1%) locate the midpoint of this approach and move the hardwire shunt to that point on the rails. Refer to Figure 10-4.

Step 19 Select the **GCP LIN** button. The **GCP Linearization** Window, Figure 10-5A, appears.

Step 20 Select the **START** button.
- **START** button deactivates (grays out).
- Display shows an **Initiating** then an **In Progress** message during calibration.
- If calibration is successful:
  - **Calibration Select** window, Figure 10-5B, appears.
  - **GCP LIN** button has a green check in the box.
- If calibration is not successful, the display shows a **Failed** message.
  - Refer to Section 7 for troubleshooting procedures.

Procedure 10-2. APPROACH AND LINEARIZATION CALIBRATION - *concluded*

Step 21 Record the linearization (**Lin Steps**) for the track in the **Second Approach, Step 21** column (**Lin Steps**) on the CALIBRATION VALUES HISTORY FORM (Pages 10-17 and 10-18).

- Value between 68 and 132.

Verify that the computed approach distance in feet (**Comp Dist**, step 17) and the linearization steps (**Lin Steps**, step 21) values recorded are the same as the values displayed on the **Calibration Select** window, Figure 10-5B.

Step 22 Remove the hardwire shunt from the track.

Step 23

- If the Lin Steps value for the second approach, step 21, is greater than or the same as the Lin Steps value recorded for the first approach, step 9, go to step 31.
- If the Lin Steps value for the second approach, step 21, is less than the value recorded for the first approach, step 9, go to step 24.

Step 24 Select the **GCP LIN** button.
The **GCP Linearization** Window, Figure 10-5A, appears.

Step 25 Select the **EDIT** button.

- The **Linearization Steps** dialog box, Figure 10-6, appears.

Step 26 Enter the Linearization Step Value (Lin Steps) recorded for the first approach, step 9, (see CALIBRATION VALUES HISTORY FORM (Pages 10-17 and 10-18) into the **New Value field** using the keypad numbers and select **UPDATE**.

- The **Calibration Select** Window, Figure 10-5B, appears.

Step 27 Select the **GCP APP** button.

- The **GCP Approach** Window, Figure 10-3A, appears.

Step 28 Select the **EDIT** button.
The **Computed Approach Distance** dialog box appears.

Step 29 Enter the computed approach distance (**Comp Dist**) value (in feet) recorded for the first approach, step 5, into the **New Value field** using the keypad numbers and select **UPDATE**.

- The **Calibration Select** Window, Figure 10-5B, appears.

Step 30 **Verify** that the computed approach distance (**Comp Dist**, step 5) and the linearization steps (**Lin Steps**, step 9) values recorded on the CALIBRATION VALUES HISTORY FORM for the first approach are the same as those displayed on the **Calibration Select** window, Figure 10-5B.

Step 31 To record the reason for the Calibration and store it in the Maintenance log, select the **GCP LIN** button and then the **ADD LOG ENTRY** button.

- Type any notes about the calibration and select **OK** to save the entry.

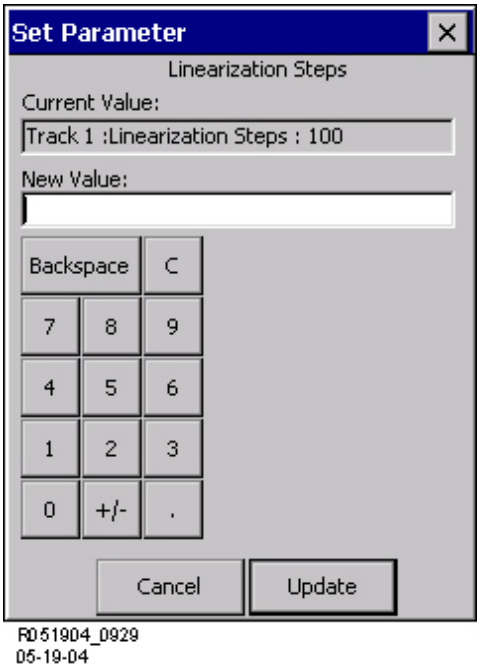

Figure 10-6. Linearization Steps, Dialog Box

This completes Approach and Linearization Calibration. Proceed to paragraph 10.4 for Island calibration. If an island is not present, select **MAIN STATUS VIEW** button, then:

- if a **Standby** set of modules is present, go to paragraph 10.5, **STANDBY MODULES CALIBRATION**.
- if a **Standby** set of modules is not present, go to paragraph 10.6, **LAMP VOLTAGE ADJUSTMENT**.
- if an **SSCC Module** is not present, go to paragraph 10.8, **GCP OPERATIONAL CHECKS**

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1	CALIBRATION VALUES HISTORY FORM (APPROACH AND LINEARIZATION CALIBRATION)

GCP #: _____

Date of Calibration: _____ Name: _____

Location Information: _____

CALIBRATION VALUES HISTORY

	Calibrated Values (Step 1)		First Approach E/W ( ) N/S				Second Approach E/W ( ) N/S			
			Hardwire Across Term. Shunt (Step 2)		Computed Approach Distance (Comp Dist) (Step 5)	Linearization Step Value (Lin Steps) (Step 9)	Hardwire Across Term. Shunt (Step 14)		Computed Approach Distance (Comp Dist) (Step 17)	Linearization Step Value (Lin Steps) (Step 21)
	EZ	EX	EZ	EX			EZ	EX		
Track 1										
Track 2										
Track 3										
Track 4										
Track 5										
Track 6										

2	CALIBRATION VALUES HISTORY FORM (APPROACH AND LINEARIZATION CALIBRATION)

GCP #: _____

Date of Calibration: _____ Name: _____

Location Information: _____

CALIBRATION VALUES HISTORY

	Calibrated Values (Step 1)		First Approach E/W ( ) N/S				Second Approach E/W ( ) N/S			
			Hardwire Across Term. Shunt (Step 2)		Computed Approach Distance (Comp Dist) (Step 5)	Linearization Step Value (Lin Steps) (Step 9)	Hardwire Across Term. Shunt (Step 14)		Computed Approach Distance (Comp Dist) (Step 17)	Linearization Step Value (Lin Steps) (Step 21)
	EZ	EX	EZ	EX			EZ	EX		
Track 1										
Track 2										
Track 3										
Track 4										
Track 5										
Track 6										

3	CALIBRATION VALUES HISTORY FORM (APPROACH AND LINEARIZATION CALIBRATION)

GCP #: _____

Date of Calibration: _____ Name: _____

Location Information: _____

CALIBRATION VALUES HISTORY

	Calibrated Values (Step 1)		First Approach E/W ( ) N/S				Second Approach E/W ( ) N/S			
			Hardwire Across Term. Shunt (Step 2)		Computed Approach Distance (Comp Dist) (Step 5)	Linearization Step Value (Lin Steps) (Step 9)	Hardwire Across Term. Shunt (Step 14)		Computed Approach Distance (Comp Dist) (Step 17)	Linearization Step Value (Lin Steps) (Step 21)
	EZ	EX	EZ	EX			EZ	EX		
Track 1										
Track 2										
Track 3										
Track 4										
Track 5										
Track 6										

4	CALIBRATION VALUES HISTORY FORM (APPROACH AND LINEARIZATION CALIBRATION)

GCP #: _____

Date of Calibration: _____ Name: _____

Location Information: _____

CALIBRATION VALUES HISTORY

	Calibrated Values (Step 1)		First Approach E/W ( ) N/S				Second Approach E/W ( ) N/S			
			Hardwire Across Term. Shunt (Step 2)		Computed Approach Distance (Comp Dist) (Step 5)	Linearization Step Value (Lin Steps) (Step 9)	Hardwire Across Term. Shunt (Step 14)		Computed Approach Distance (Comp Dist) (Step 17)	Linearization Step Value (Lin Steps) (Step 21)
	EZ	EX	EZ	EX			EZ	EX		
Track 1										
Track 2										
Track 3										
Track 4										
Track 5										
Track 6										

10.4 ISLAND CALIBRATION

Procedure 10-3. ISLAND CALIBRATION

Step 1 If an Island circuit is used, select the **ISL CAL** button. If not used, select **MAIN STATUS VIEW** button and then go to step 5.

- The **ISLAND CALIBRATION** Window, Figure 10-7A, appears.

Step 2 Temporarily install a hardwire shunt beyond the island receiver rail connections at the appropriate distance specified below the **Calibration Req. message**.

- The shunt distances for all island frequencies are provided in table 10-1.

Step 3 Select the **START** button.

- The **START** button deactivates (grays out).
- The display shows an **Initiating** then an **In Progress** message during the calibration.
- If calibration is successful:
  - The **Calibration Select** window, Figure 10-7B, appears.
  - The **ISL CAL** button has a green check in the box.
- If calibration is not successful, the display shows a **Failed** message.
  - Refer to Section 7 for troubleshooting procedures.

Step 4 Verify that the island LED on the Main Status menu is off and remove the hardwire shunt. The island LED is now on.

Step 5 Repeat all GCP, approach, linearization and island calibration steps in this section for each remaining MAIN side Track Module installed.

Step 6 Temporarily install a 0.06 ohm shunt inside the island receiver connections.

- Verify by observing the ISLAND LED on the Track Module that the Island Circuit detected the shunt (LED goes out).
- Remove the 0.06 ohm shunt.
- Verify Island Pickup Delay Interval by the observing the flashing ISLAND LED on the Track Module. (Delay interval ended when LED is on steady.

- When GCP, approach, linearization and island calibration are complete for each remaining MAIN side Track Module installed, do one of the following:
  - If a **Standby** set of modules is present, go to paragraph 10.5, **STANDBY MODULES CALIBRATION**.
  - If a **Standby** set of modules is not present, go to paragraph 10.6, **LAMP VOLTAGE ADJUSTMENT**.
  - If an **SSCC Module** is not present, go to paragraph 10.8, **GCP OPERATIONAL CHECKS**.

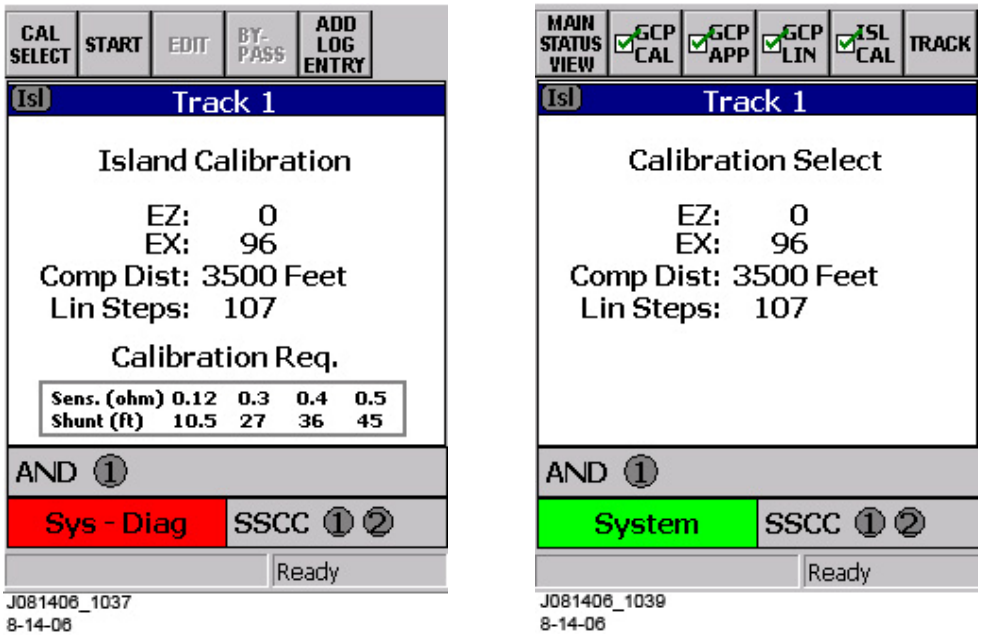


Figure 10-7. Island Calibration Window Before and After Island Linearization

Table 10-1. Island Shunt Distance

Island Frequency (kHz)	Shunt Distance (Feet)			
	0.12 ohm Sensitivity	0.3 ohm Sensitivity	0.4 ohm Sensitivity	0.5 ohm Sensitivity
2.14	20	50	67	84
2.63	17	43	58	72
3.24	13	33	44	55
4.0	10.5	27	36	45
4.9	9.0	23	31	39
5.9	7.5	19	26	32
7.1	6.5	17	23	29
8.3	6.0	15	20	25
10.0	5.0	13	18	22
11.5	4.5	12	16	20
13.2	4.0	10	14	17
15.2	3.5	9	12	15
17.5	3.0	8	11	14
20.2	3.0	8	11	14

10.5 STANDBY MODULES CALIBRATION

⚠ CAUTION

GATES WILL BEGIN TO LOWER IMMEDIATELY (WITHOUT GATE DELAY TIME) WHEN THE TRANSFER SWITCH IS USED TO SWAP BETWEEN HEALTHY UNITS. USE CAUTION WHEN TRANSFERRING CONTROL TO AVOID GATES HITTING VEHICLES OR PEDESTRIANS

NOTE

Under normal conditions in the AUTO Transfer mode, gate delay time will run when the gates initially operate. If the trouble continues, the gates will already be lowered when the Transfer Module later swaps units.

Procedure 10-4. STANDBY MODULES CALIBRATION

Step 1 On Transfer module A80406 (A80468), set the transfer switch to **STBY**.

Step 2 Go to the main Status menu and select the **SETUP** button at the top of the display.

Step 3 From the menu that appears, select the track to calibrate (see Figure 10-1).
- Only enabled tracks appear on the menu.

Step 4 Select the **GCP CAL** button.
- The **GCP Calibration** Window appears, as shown in Figure 10-2A.
  - The current **EZ** and **EX** values appear.
  - If calibration is required**, Calibration Req.** appears below the **EZ** and **EX** values.

Step 5 Select the **START** button.
- The **START** button deactivates (grays out).
- The display shows an **Initiating** then an **In Progress** message during the calibration.
- The track module requires about 15 seconds to calibrate.
- If calibration is successful:
  - The **Calibration Select** window, Figure 10-2B, appears.
  - EZ should be 98 to 102 and the **GCP CAL** button has a green check in the box.
- If calibration is not successful, the display shows a Failed message.
  - Refer to Section 7 for troubleshooting procedures.

Procedure 10-4. STANDBY MODULES CALIBRATION - *concluded*

Step 6 Select the **GCP APP** button.

- The **GCP Approach** Window, Figure 10-3A, appears.
  - ♦ The computed approach distance (**Comp Dist)** appears.
    - ▪ This is the value calculated on the MAIN side in Procedure 10-2.
    - ▪ **Calibration Req.** appears at the bottom of the window.

Step 7 Select the BYPASS button.

- The computed approach distance is accepted as correct and the GCP APP button shows a green check in the box.

Step 8 Select the GCP LIN button.

- The GCP Linearization Window displays.
  - ♦ The current value for Linearization Steps displays.
  - ♦ This is the value calculated on the MAIN side in Procedure 10-2.

Step 9 Select the BYPASS button.

- The Linearization steps value is accepted as correct and the GCP LIN button shows a green check in the box.

Step 10 If an internal Island circuit is used, select the ISL CAL button. If not used, go to step 14.

- The ISLAND CALIBRATION Window appears.

Step 11 Temporarily install a hardwire shunt beyond the island receiver rail connections. at the appropriate distance specified below the Calibration Req. message.

- The shunt distances for all island frequencies are shown in Table 10-1.

Step 12 Select the START button.

- START button deactivates (grays out).
- Display shows an Initiating then an In Progress message during calibration.
- If calibration is successful:
  - ♦ The Calibration Select window appears.
  - ♦ The ISL CAL button has a green check in the box.
- If calibration is not successful the display shows a Failed message.
  - ♦ Refer to Section 7 for troubleshooting procedures.

Step 13 Verify the island LED is out and remove the hardwire shunt. Island LED is now on.

Step 14 Repeat steps 1 through 13 for each remaining standby-side Track Module installed.

10.5.1 CALIBRATION COMPLETION

At the completion of the successful GCP calibration, set the Transfer switch on the transfer module to the **MAIN** and then to the **AUTO** position.

- This completes the Standby Modules Calibration. Do one of the following:
  - ♦ If an **SSCC Module** is present, go to paragraph 10.6, **LAMP VOLTAGE ADJUSTMENT**.
  - ♦ If an **SSCC Module** is not present, go to paragraph 10.8, **GCP OPERATIONAL CHECKS**.

10.6 LAMP VOLTAGE ADJUSTMENT

NOTE

- Before performing the lamp voltage adjustment procedure, the crossing controllers must be inactive; i.e. gates up, lamps off, and bell off.
  - ♦ Lamp voltage EDIT button is “grayed out” (disabled) when lamps are flashing.
- If a train approaches during lamp adjustment, the crossing controllers will activate and the lamps will flash.
- The regulated output is a pulse-width modulated output that produces a square wave. A meter with a “True RMS AC + DC” scale is required to accurately measure the voltage. Section 8, paragraph 8.8 includes a conversion chart for measuring voltages with a conventional meter.
- When “far gate” lamps and “near gate” lamps are driven from the same output, first adjust the lamp voltage on the far gate. Then adjust the lamp voltage on the near gate using adjustment resistors.

WARNING

TO BE ACCURATE, LAMP VOLTAGES MUST BE MEASURED AT THE LAMP. THE VOLTAGE ON THE DISPLAY IS THE VOLTAGE AT THE SSCC CONNECTOR. INACCURATE MEASUREMENTS MAY RESULT IN DIM LAMPS OR EARLY LAMP FAILURE.

NOTE

The lamp output voltage is displayed in decivolts (dV), tenths of a volt.

- One dV = 0.1 volt
- Lamp adjustment range: 90 dV (9.0 V) to 150 dV (15.0 V)

Procedure 10-5. LAMP VOLTAGE ADJUSTMENT

Step 1 Select the **Setup** button on the Main Status Menu from the DT Function Buttons (see Figure 10-8)

- The Track Setup Menu appears

Step 2 Select the **SSCC Lamps** entry of the Track Setup Menu

- The Lamp Setup window, Figure 10-9, appears

Step 3

- Select the **Slot 8 SSCC3I** tab at the bottom of the window.

Step 4 Select the **Edit** button to the right of the **Lamp 1 Voltage** field.

- The **Lamp 1 Voltage** field highlights.
- The corresponding lamp output is turned on steady.

Step 5 Set the **Lamp 1 Voltage** field to the output voltage required to set the correct voltage at the lamps.

- Select either the Fine or Coarse adjustment radio button.
  - **Fine** changes the voltage in 1 dV (0.1 V) steps
  - **Coarse** changes the voltage in 5 dV (0.5 V) steps
- Increment the voltage display using the **+** or **–** buttons to the right of the Lamp Voltage 1 field.
- Measure voltage at the actual lamps using the correct meter (see Section 8).

Step 6 When the meter displays the correct voltage, select the **Enter** button at the bottom of the keypad.

- The **Lamp 1 Voltage** field deactivates.
- The new voltage value is saved.
- The corresponding lamp output is turned off.

Step 7 Select the **Edit** button to right of the **Lamp 2 Voltage** field.

- The **Lamp 2 Voltage** field highlights.
- The corresponding lamp output is turned on.

Step 8 Set the **Lamp 2 Voltage** field to the output voltage required to set the correct voltage at the lamps.

- Select either the Fine or Coarse adjustment radio button.
- Increment the voltage display using the **+** or **–** buttons to the right of the Lamp Voltage 2 field.
- Measure the voltage at the actual lamps using the correct meter (see Section 8).

Step 9 When your meter reads the correct voltage, select the **Enter** button at the bottom of the keypad.

- The **Lamp 2 Voltage** field deactivates.
- The new voltage value is saved.
- The corresponding lamp output is turned off.

Procedure 10-5 LAMP VOLTAGE ADJUSTMENT - *concluded*	
Step 10	Select the **Slot 9 SSCC3I** tab at the bottom of the window.
Step 11	Repeat steps 4 through 9 for the second SSCC IIIi module.

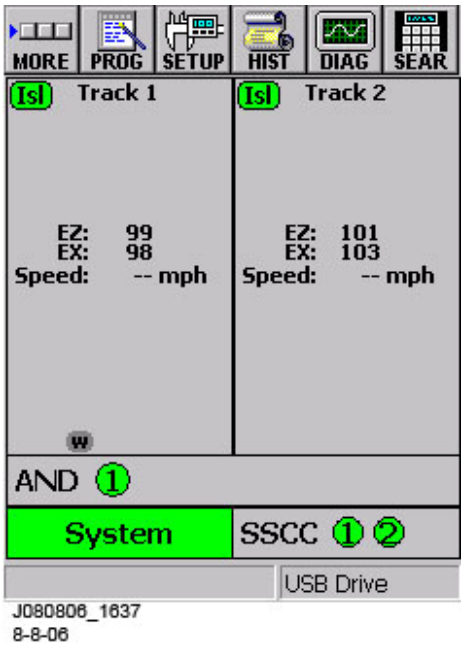


Figure 10-8. Setup Button Location

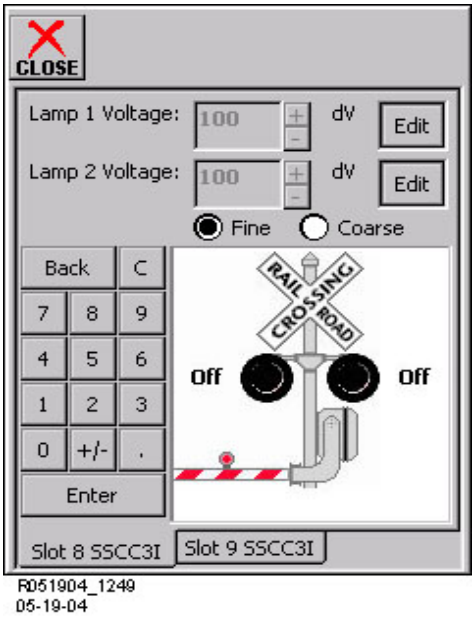


Figure 10-9. Lamp Setup Window

This completes the SSCC Lamp Voltage Adjustment.. Go to paragraph 10.7, **SSCC OPERATIONAL TESTS**.

10.7 SSCC OPERATIONAL TESTS

After the GCP and SSCC system has been programmed, GCP calibrated and the lamp voltages have been adjusted, tests must be performed to verify the operation of the SSCC prior to placing the system in service. In addition to the operational tests required by the maintaining railroad, the SSCC operation should be further tested and verified as described in Procedure 10-6.

⚠ WARNING

AFTER INITIAL PROGRAMMING OR PROGRAMMING CHANGES, TESTS MUST BE PERFORMED TO VERIFY PROPER OPERATION OF THE SSCC PRIOR TO PLACING THE SYSTEM IN SERVICE.

NOTE

While in Test Mode, if a train approaches (XR input logic de-energizes), the test is cancelled and the crossing activates normally. When the train departs, the system remains in normal operation.

NOTE

If advance preemption is used, the preemption output and warning devices will operate as follows for the indicated method of activation:

- For a train move:
  - Pre-emption Output de-energizes at the pre-empt warning time.
  - Activation of the warning devices will be delayed until the Advance Pre-empt Timer times out, or the Prime Warning time is reached.
- Advance Pre-empt Input de-energized:
  - Pre-emption Output de-energizes
  - Activation of the warning devices will be delayed until the Advance Pre-empt Timer times out.
- AND 1 Enable Input de-energized:
  - Pre-emption Output de-energizes
  - Activation of the warning devices occurs simultaneously (no advance pre-empt time).
- "Test the Crossing" Test Mode;
  - Pre-emption Output de-energizes
  - Activation of the warning devices occurs simultaneously (no advance pre-empt time).

Procedure 10-6. SSCC OPERATIONAL TESTS	
Step 1	Verify that the light/gate battery is charged.
Step 2	Verify that all connectors on the SSCC have been properly positioned, seated and secured.
Step 3	Verify that all the electrical connections in the Bell, Lamp, and Gate circuits are properly assembled, tightened and secured.
Step 4	Verify that all flashing lamps light and none are burned out.
Step 5	Verify that all lights have been aligned.
Step 6	Verify that the gates are operational.
Step 7	Verify that the bells are operational.
Step 8	Verify that all SSCC Flash Sync operation is correct between the Master SSCC IIIi, Slave SSCC IIIi, and any External crossing controllers. NOTE The terminology for flash sync control differs between a GCP 4000 and an external SSCC device. The GCP 4000 terms Master and Slave SSCC, are called “Flash Sync Out” and “Flash Sync In” respectively in an external SSCC (Slave = Flash Sync In)
Step 9	Verify that all lamp voltages have been set.
Step 10	Momentarily turn on the flashers from the TEST menu and verify that the battery charger is operational and providing current to the lamps and battery.
Step 11	Verify that each input controls the crossing warning devices as determined by the programming.
Step 12	Verify that the gate delay times are correct.
Step 13	Verify that the lights continue to flash while the gates are rising.

This completes the **SSCC OPERATIONAL TESTS**. Go to paragraph 10.8, **GCP OPERATIONAL CHECKS**.

10.8 GCP OPERATIONAL CHECKS

Prior to placing a system in service, tests must be performed to verify proper system operation and I/O wiring. Proceed to next step if a feature is not used.

⚠ WARNING

AFTER INITIAL PROGRAMMING OR PROGRAMMING CHANGES, TESTS MUST BE PERFORMED TO VERIFY PROPER OPERATION OF THE GCP PRIOR TO PLACING THE SYSTEM IN SERVICE.

Procedure 10-7. GCP OPERATIONAL CHECKS

Step 1 UAX, DAX Enables & AND Enable input(s), if these features are used:

- Crossing activates when each remote DAX line circuit that controls a UAX, DAX Enable or AND Enable input (controlling the crossing) is de-energized or opened from the far end of the circuit.
- Pickup Delay time is correct when input closes.

Step 2 DAX outputs and "Radio DAX" operation using Spread Spectrum Radio, if these features are used:

- Downstream crossing activates when the appropriate DAX output or Radio DAX message is deenergized
- DAX Pickup Delay time is correct

Step 3 WRAP logic, if this feature is used:

- WRAP logic **W** is displayed on Main status screen for each corresponding wrapped track (when WRAP inputs are energized as seen on system I/O view).
  - ♦ **W** is removed from corresponding track on Main status screen when:
    - Corresponding track with wrap is shunted or
    - Corresponding wrap input is deenergized
- Measure WRAP LOS pickup delay from the time the wrap input is energized until the **W** is displayed on corresponding track status screen.
  - ♦ Verify the LOS pickup delay time (minimum of 5 seconds).

Step 4 OVERRIDE logic, if this feature is used.

There may be one or up to three OVERRIDE inputs used depending on OVERRIDE programming. The OVERRIDE options are: ALL PREDICTORS Override or DAX A, DAX B and DAX C Override.

- When corresponding OVERRIDE input is energized, OVERRIDE Input Status is GREEN on System I/O view.
  - ♦ Observe that corresponding Override input changes to RED when:
    - Corresponding switch in GCP approach is reversed or
    - Corresponding signal field apparatus is changed from energized to deenergized or deenergized to energized depending on field signal logic for OVERRIDE.

Procedure 10-7. GCP OPERATIONAL CHECKS - *continued*

Step 5 Traffic Signal Preemption, if this feature is used:

- The preempt output deenergizes:
  - ♦ When the prime deenergizes for simultaneous preemption
  - ♦ At the programmed preemption warning time for advance preemption
    - ▪ The warning devices activate when the prime predictor predicts, or after the Advance Preempt Delay timer times out, which ever is sooner. Time should be equal to Adv Preemption timer value or shorter.
- When used, Advance Preempt IP input open causes Preempt Output to de-energize and activates warning devices after the Advance Preempt Delay Timer times out. (Observe input on I/O view).
- When used, Preemption Health IP input open activates warning devices immediately (without advance preempt Delay time interval). (Observe input on I/O view).
- When used, Traffic Signal Health open initiates simultaneous preemption, rather than advance preemption, upon train detection

Step 6 Island detection

- **When used**, observe the ISLAND symbol on tracks on the Main Status display.
  - ♦ Place a 0.06 ohm shunt on island track wires
    - ▪ ISLAND symbol is GRAY
  - ♦ Observe island LED on track module as shunt is removed and while ISLAND Pickup Delay is timing
    - ▪ ISLAND LED is flashing
  - ♦ After the island pickup delay time expires on module and island LED is steady RED
    - ▪ ISLAND symbol on Main display is GREEN, and warning devices are deactivated.

Step 7 Out of Service, OOS, if this feature is used:

⚠ WARNING

THE RAILROAD PROCEDURES GOVERNING HOW TO TAKE A TRACK CIRCUIT OUT OF SERVICE SHALL BE FOLLOWED. THE INSTRUCTIONS IN THIS SECTION MAY BE FOLLOWED ONLY IF ALLOWED BY THE RAILROAD.

Procedure 10-7. GCP OPERATIONAL CHECKS - *concluded*

Step 7a

- If the Display method is used:
  - ♦ Take each track out of service using the display.
  - ♦ Observe
    - ▪ Display indicates track is OOS
  - ♦ Return track to service
    - ▪ Display indicates track is back in service

Step 7b

- If Display + OOS IP input is used, then for each track:
  - ♦ Turn on OOS input for the track. (observe input on I/O view).
  - ♦ Take track OOS using the display
    - ▪ Display indicates track is OOS
  - ♦ Turn off OOS input
    - ▪ Display indicates track is back in service

Step 7c

- If OOS IP Input is used:
  - ♦ Turn on OOS input for the track (observe input on I/O view).
    - ▪ Main Display indicates track is OOS
  - ♦ Turn off OOS input
    - ▪ Display indicates track is back in service

Step 7d

- If 4000 Case OOS IP Input used:
  - ♦ Turn on 4000 Case OOS input. (observe input on I/O view).
    - ▪ Main Display indicates all track are OOS
  - ♦ Turn off 4000 Case OOS input
    - ▪ Main Display indicates all tracks are back in service

Step 8 Train Detection, Warning Times and Crossing Operation

- EZ continuity check on train moves:
  - ♦ Crossing devices activate and EZ value decreases smoothly (without rapid change) for an approaching train.
  - ♦ Crossing devices turn off when island recovers after train move and the EZ rises smoothly (without rapid change) as the train recedes.

⚠ WARNING

IF A RAPID CHANGE OCCURS IN THE VALUE OF EZ AT ANY TIME THE TRAIN IS MOVING WITHIN THE TERMINATION SHUNTS, TRACK DISCONTINUITY CAUSED BY A HIGH RESISTANCE BOND OR A DEFECTIVE COUPLER IS INDICATED. LOCATE AND CORRECT THE PROBLEM IMMEDIATELY.

- For MAIN and STANDBY, check warning times for inbound train moves on each approach including DAX operation.
- If the SSCC is used, check for proper gate / flasher / bell operation on all train moves.

This completes the GCP OPERATIONAL CHECKS.
If a SEAR IIi is used, proceed to section 10.9, SEAR IIi SETUP.
If no SEAR IIi is used, proceed to paragraph 10.10 Maintenance Call (MC) Light

10.9 SEAR IIi SETUP

Selecting the SEAR button at the top of the 4000 GCP Status Screen (Figure 10-10) brings up the SEAR Interface screen, Figure 10-11.

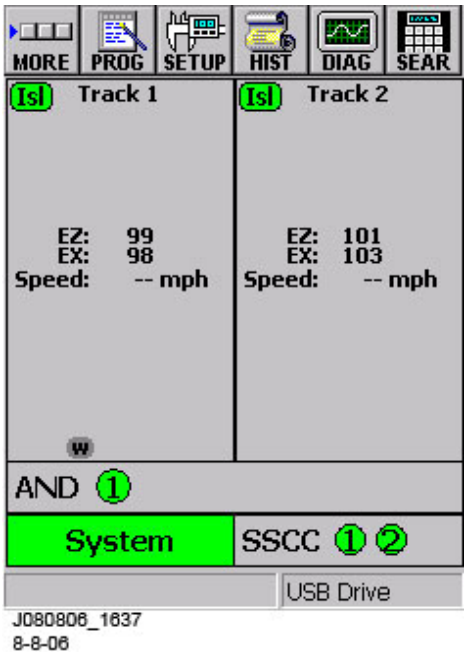


Figure 10-10. SEAR Button At Top Of Screen

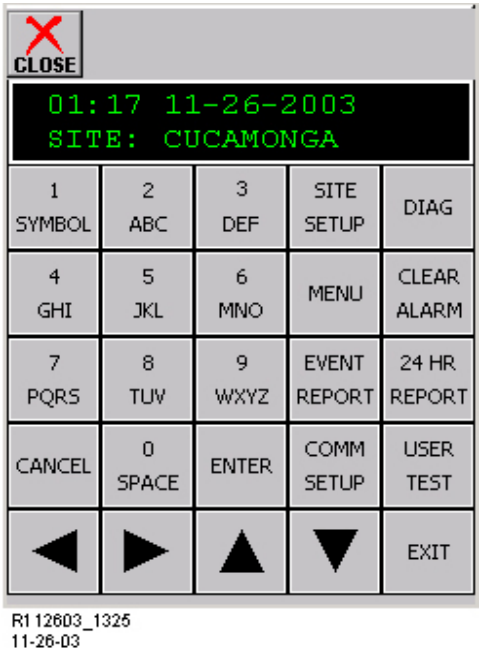


Figure 10-11. SEAR IIi Interface

The interface may also be accessed by selecting the **Site Setup** item from the **SEAR** or the **TEMPLATE: SEAR** windows.

NOTE

- The SEAR interface may be accessed only from the A80407 Display Module Diagnostic Terminal, DT, and not on the PC based DT.
- Refer to SEAR IIi Configuration Summary document for details of application CDL program, LEDs, and Alarms
- ATCS address must be entered prior to SEAR IIi communicating with GCP
- Prior to beginning SEAR IIi setup procedure have circuit plans showing SEAR IIi setup page available for reference.
- Site Setup must be run in its entirety directly from the SEAR Interface on the GCP 4000 Display. Filling in certain fields via laptop and other interfaces does not accomplish setup and cannot be substituted for Site Setup.

- Select SITE SETUP button on SEAR interface scree.
  - ♦ Step through the 3 stages of site setup by answering each question as indicated by the SEAR IIi setup page in the crossing's circuit plans.
    - ▪ Stage 1 will cover Date/Time, Site Identification Information, addressing, and serial port configuration. Refer to circuit plans for ite specific answers such as ATCS address assignments. If plans do not have proper ATCS addresses, some portions of configuration cannot be completed."
  - ♦ Press **ENTER** to accept each step, or after revising each step.
  - ♦ Each stage will automatically compile when the end of the stage is reached.
- After stage 3 has compiled, the user will be prompted to install peripheral equipment on the echelon® network. (This step assigns the ATCS subnode address of each device)
  - ♦ This may include VHF communicators, iLOD's, Analog/Digital I/O units, etc.
    - ▪ If a Wayside Access Gateway, WAG, is used for communication protocol conversion, the WAG will be setup separately. See paragraph 10.9.1.

- When prompted, push the echelon® button on the side of each device and watch for “installed” to be shown on the display.
  - The button only needs to be depressed for approximately a second.
  - The yellow LED next to the button will turn on during that time.

- The next step in the site setup process is battery calibrations.
  - At this point, the user will be prompted to turn off AC power and select **ENTER**.
  - The batteries will settle for 3 minutes.
  - The voltage of each battery channel is shown and the user will press **ENTER** for each if the voltages are correct.
  - Then, a prompt will instruct to turn AC power back on.
- The last step is lamp calibration.
  - The first calibration requires AC to be on.
  - Activate the warning devices by opening the AND 1XR ENABLE input or by disconnecting the GC/Bell WAGO connector for a SSCC IIIi module.
    - This step requires that the SEAR Interface screen be displayed
    - Once the gates are horizontal (gate tip sensors on), press “enter”.
    - After 15 seconds the user is asked how many bulbs are on each sensor, if the correct amount is not shown, enter that value, when the correct number is shown press **ENTER**.
    - Next, the SEAR IIi will prompt for the same calibration steps but with AC power off.

10.9.1 WAG NODE INSTALLATION

If a Wayside Access Gateway, WAG, is used as a protocol converter to Internet protocol, it will need to be installed as a module to the SEAR IIi.

- From the SEAR II keypad, select **MENU**.
- Press **down arrow** until you come to **CONFIGURATION**.
  - Press **ENTER** on the keypad to select it.
- Press **down arrow** until you come to **MODULES**.
- Press **ENTER** on the keypad to select it.
- **ADD MODULE** will be the first menu item displayed.
- Press **ENTER** to select it.
- The screen will read **MODULE TYPE**.
  - Press the Down Arrow key **WAG**.
  - Press **ENTER** to Select it.
  - Use the number/letter keys on the keypad to spell the Module Name. (Similar to the way you add a name on a cell phone.)
  - Press **ENTER** to enter the name you typed.
- Refer to site plans and enter proper NODE assignment.
  - Set NODE to 1, if assignment is not on plans.
- You will be returned to **MODULE MENU** at the **ADD MODULE** prompt.
- Press **EXIT** to return to the **CONFIGURATION** at the **MODULES** prompt.
- Press **EXIT** again.
- You will be prompted with **SAVE CONFIGURATION CHANGES? YES**. (You can press the UP or DOWN arrow to scroll between YES and NO.)
  - Press **ENTER** to select **YES**.
- The unit will recompile and save the changes.
- Ensure the AUX Serial Port is set to the baud rate shown on circuit plans.

10.9.2 SEAR IIi OPERATION

Now that site setup is complete, peripheral devices, as well as items onboard the SEAR IIi will be checked for proper operation. This ensures that the SEAR IIi is receiving all the information it needs for proper alarming and execution of the SEAR Application Program.

Unless specified, all items below will be described assuming a laptop is present with a HyperTerminal connection to the SEAR IIi's USER port. All items in this section can be done through similar menus from the GCP 4000 display module. Once HyperTerminal is running, enter **CTRL+L** on the computer to initiate the communication session with the SEAR IIi. The following screen will be displayed. To select a menu item, press the letter corresponding to the menu item.

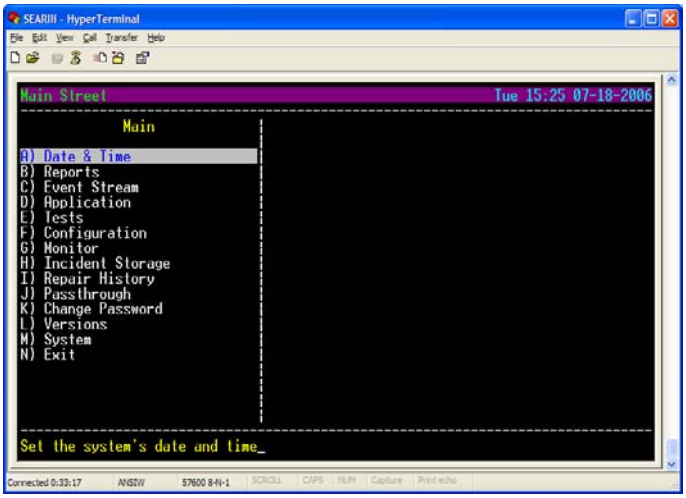


Figure 10-12. SEAR IIi Main Screen Using HyperTerminal

- All peripheral equipment on the Echelon® network will need to be checked for good communication with the SEAR IIi.
  - All of those modules can be checked in one screen by choosing, **Main>Monitor>Module Comm. status.**
  - The type of module will be shown on the left and the communication status will be on the right. The status of each module should be "GOOD".

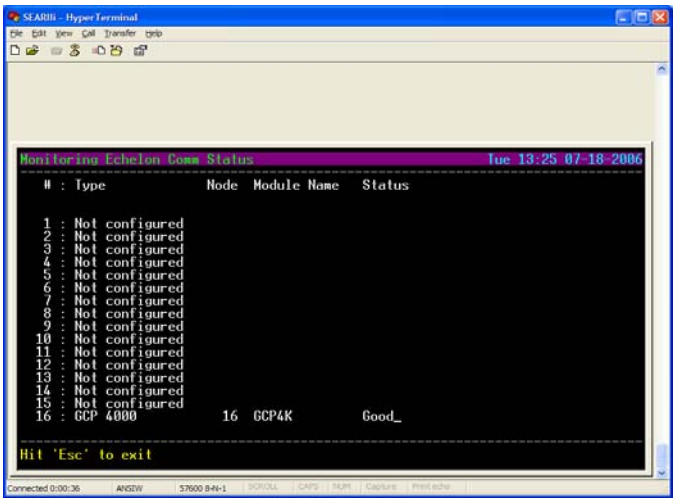


Figure 10-13. SEAR Echelon Communication Status

- Verify iLOD operation by the following:
  - Once good communication is verified, further checks of the iLOD can verify that it is seeing normal amperage/flash rates.
  - The view these values in real time, select **Main>Monitor>Module I/O>** and then choose the iLOD unit to view.
    - In that screen both sensors are shown, the first iLOD unit will show EB1, EN1.
    - When the lamps are flashed, both sensors should display that lamps are on, the amperage reading, and the flash rate in flashes per minute.
    - These values are shown in real time, they should be steady and not fluctuate. If the value fluctuates, the lighting circuit will need to be checked for intermittent operation.

- Verify operation of Ground Fault Testers (GFT's):
  - All LED's on the GFT units should be on steady.
    - If the BAT 1 Fault or BAT 2 Fault LED's are slow flashing then they have detected a ground condition.
  - The GFT can be monitored at **Menu>Monitor>Onboard I/O>** and then use the right arrow keys until the GFT input is displayed.
    - If the input shows STUCK LOW, that indicates the data wire between the GFT and SEAR IIi is open and will need to be repaired.

- If the data connection is good, the following would be displayed for GFT1:
  - GFT1: HL=G MD=N B1=0 B2=0
  - HL=G indicates that the GFT health is good.
  - MD=N indicates hat test mode=no
  - B1 & B2 = 0 shows that there are no ground faults on BAT 1 or BAT 2.
  - A ground can be simulated on those inputs by running a wire from the ground input of the GFT to each BAT input, one at a time.
    - The state of each BAT input will change to '1' if a ground is present.

- Verify MTSS/gate tip/bell sensor:
  - The MTSS can be monitored in the same screen as the GFT: **Menu>Monitor>Onboard I/O>**
    - As with the GFT, if the input shows STUCK LOW, then the data wire between the MTSS and SEAR IIi is open and will need to be repaired. If the data connection is good, the following would be displayed for TSS1:
  - TSS1: U=1 D=0 T=0 A=0 P=0
  - U=Gate Up
  - D=Gate Down
  - T=Gate Tip Sensor
  - A=Bell Audio
  - P=Bell Power

NOTE

These items can be either 1 or 0. In the example, U=1 so the gate up contact is energized. The other items are all deenergized. Dropping the gates to horizontal will activate the tip sensors and deenergize the gate up contact, changing the MTSS data to U=0 and T=1. Activating the bell will check the bell sensor, A & P should both equal 1 when the bell is on.

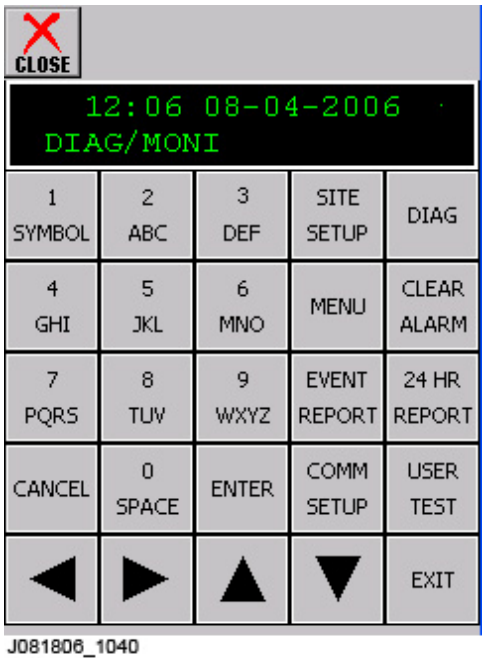
The SEAR IIi relays must function properly in order to run automated inspection tests. These outputs are most easily tested using the SEAR menu on the GCP 4000 display module.

- Verify SEAR IIi relays:
  - Go to **MENU>DIAG/MONITOR>RELAYS>GndFltTest** and press **ENTER**.
  - Then press '**1**' to energize the relay output.
    - Both BAT FAULT LED's on the Ground Fault Testers should be flashing.
  - Now press '**0**' to deenergize the relay. The LED's should go on steady.
  - Press **EXIT** and then **ENTER** to get back into the **RELAYS** menu.
  - Select **AC Control**.
    - Press '1' to energize the relay output. AC power to the chargers should go off.
    - Press '0' to deenergize the relay and be sure that AC power to the chargers is restored.
    - Press "exit" until the date/time main screen is visible.

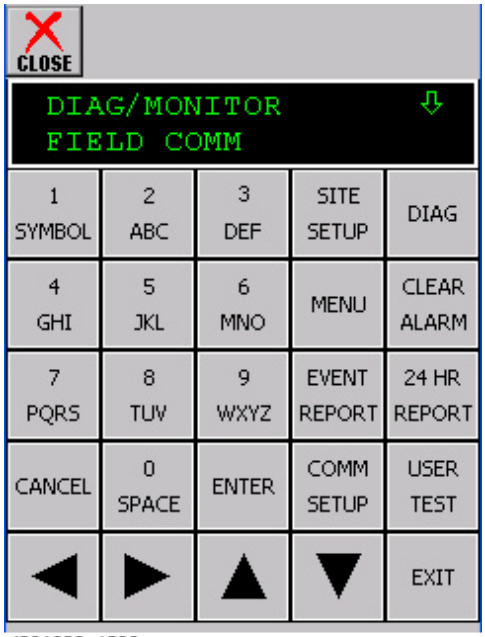
10.9.3 SEAR IIi COMMUNICATION

Testing communications to the office can be accomplished using a menu function to generate a test alarm and by creating events that generate alarms. Before testing the SEAR IIi by sending alarms to the office, the unit must be configured for communications in the Site Setup and the communications that is selected must be operational. Once a SEAR IIi is configured thru Site Setup and communication established, the location will register itself with the WAMS office. Refer to the WAMS Manual for more information.

- Test Communications with SEAR option on the display menu.
  - ♦ In the SEAR Interface menu, select MENU, Figure 10-11.
    - ▪ Press the down arrow to DIAG/Monitor (Figure, 10-14A) press ENTER
    - ▪ Press the down arrow to FIELD COMM, (Figure 10-14B), press ENTER
      - TX: waiting... RX: waiting... will be displayed (Figure.10-15A)
    - ▪ If site is to hop data to, or receive data from, another crossing:
      - To send a test packet to the other crossing:
        - ▪ Press 4 (Figure 10-15B).
        - ▪ Enter ATCS address of the other crossing.
    - ▪ To send a test packet to the WAMS office:
      - Press 5 (Figure 10-16)
      - Enter railroad specific office address.
      - Refer to circuit plans for office address.
      - Typically, the office ATCS address is 2.RRR.00.0000, where RRR is the ATCS number assigned to the railroad.

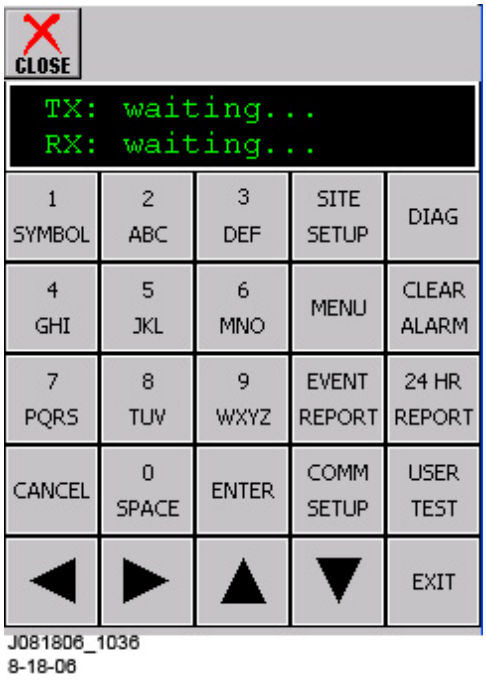


A

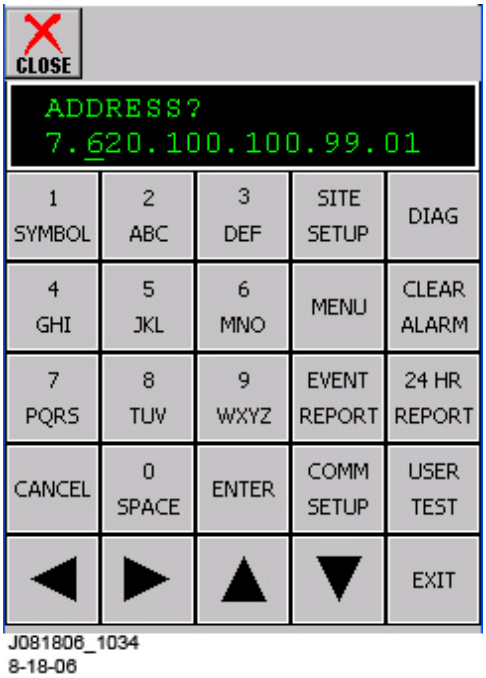


B

Figure 10-14. DIAG/MONITOR Menu



A



B

Figure 10-15. Node Address

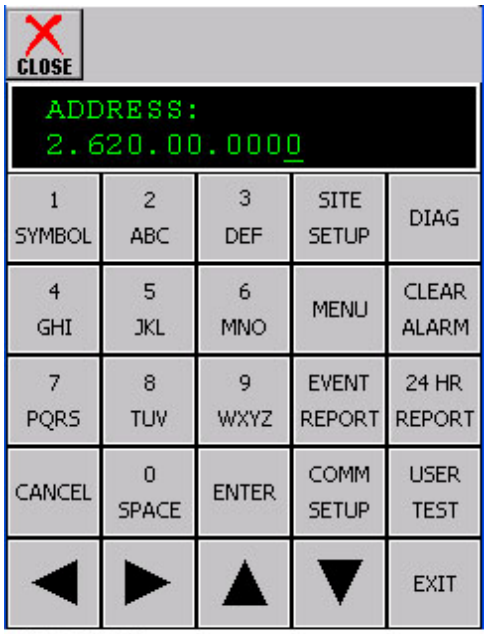


Figure 10-16. WAMS Office Address

- Alarm Generation is the final step in checking out the SEAR IIi/WAMS interface. The following procedure tests the wiring of the various components in the SEAR/ WAMS sub-system.
  - ♦ Ground Fault Alarm
    - ▪ A ground can be simulated on those inputs by running a wire from the ground input of the GFT to each BAT input, one at a time.
    - ▪ Each Battery's LED will flash when ground id detected and a "Ground Fault Detected on xxx" alarm will be generated where xxx represents the Battery name.
  - ♦ Ground Fault Clear
    - ▪ Removing the wire that simulates the ground will generate a Ground Fault Cleared message.
  - ♦ Analyzer Failure Alarm
    - ▪ Remove the connector that powers the GFT or that MTSS unit inside the gate mechanism. Doing so on either unit will cause an "Analyzer Failure" alarm.
  - ♦ Analyzer Normal
    - ▪ Restoring the connector will generate an Analyzer Normal message.

⚠ WARNING

GATES WILL BEGIN TO LOWER IMMEDIATELY (WITHOUT GATE DELAY TIME) WHEN THE TRANSFER SWITCH IS USED TO SWAP BETWEEN HEALTHY UNITS. USE CAUTION WHEN TRANSFERRING CONTROL TO AVOID GATES HITTING VEHICLES OR PEDESTRIANS.

- GCP Transferred Alarm
  - Force the GCP to switch to Standby by the transfer switch on the Transfer Module.
  - This will create a GCP Transferred Alarm.
  - Forcing it to switch back will cause another GCP Transferred message.

⚠ WARNING

TAKE ALTERNATE MEANS TO WARN VEHICULAR TRAFFIC, PEDESTRIANS AND EMPLOYEES. REMOVAL OF A SSCC IIIi WILL CAUSE THE GATES TO DESCEND IMMEDIATELY (WITHOUT GATE DELAY); HOWEVER, THE LIGHTS WILL NOT ACTIVATE.

- Crossing Controller Failure Alarm
  - Temporarily remove a SSCC IIIi to generate Crossing Controller Failure alarm
  - Restore SSCC IIIi for a Crossing Controller Normal message.
- False Detection Alarm
  - Activate the crossing using test switch (or other method shown on plans) allowing the gates to drop and then cancel activation.
  - After 30 minutes a False Detection alarm will be generated.
    - If a normal train move occurs prior to the 30 minutes, a Pre-Ring alarm will be generated.
- AC Power Off For 20 Minutes Alarm
  - Turn off AC power for at least 20 minutes and this alarm will be generated.
- AC Power Back On
  - Restore power and wait at least 1 minute.

This completes the SEAR IIIi setup. Proceed to Paragraph 10.10 Maintenance Call (MC) light.

10.10	**MAINTENANCE CALL (MC) LIGHT**	Maintenance Call (MC) Light, if this feature is used, ♦ Verify that the MC light is lit ♦ Verify that the MC extinguishes when: ▪ If used, Deenergizing the MAINT CALL RPT Input (observe input on I/O view). ▪ Restore MAINT CALL RPT input and MC lights. ♦ If power-off relay used to control MC light ▪ deenergize POK relay ▪ Restore POK relay and MC lights.
10.11	**VERIFY OFFICE CONFIGURATION CHECK NUMBER**	If used validate the office configuration check number is per the circuit plan.

This completes the 4000 system check out procedure.

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GCP 4000 System Cutover Test Form

Crossing Name: _____ **Date:** _____-_____-_____

DOT Number: __ __ __-__ __ __-__ **Milepost:** _____

Number of GCP Tracks: _____ **Standby: Y or N**
Type & Number of each type of Warning Devices:
Gates____ , Pairs of FLS _____, Bell _____,

Signed: _____
Traffic Signal Preemption (check):
None ____, Advance _____, Simultaneous____

Place a check in the appropriate space when the procedure has been checked, verified, or completed. Write n/a if procedure is not applicable. Write X if track# is not applicable. Verify wiring and programming in accordance with the location's circuit plans. Verify polarity and voltage with a meter. If as-built wiring or programming is different from the circuit plans, explain in remarks area.

Do not connect power to GCP 4000 or GCP outputs to warning devices until instructed to do so.

Test Procedure

10.1.2 Preliminary (Transfer switch set to MAIN)
Verify:
____GCP modules in correct slots and inserted properly
____ CPU battery voltage and polarity
____ GCP programming
____ ATCS SIN
____ Office configuration check number (OCN)
____Wiring to GCP & Surge equipment
____Wiring to Track
____Wiring to Warning Devices
____Wiring to other cables
____Polarity & voltage on SSCC connectors
____Connect remainder of connections on GCP system
____Connect other equipment to battery buss

10.2 Procedure 10-1 GCP Calibration

	Track Circuit (circle)
____ GCP Calibration	1 2 3 4 5 6

10.3 Procedure 10-2 Approach & Linearization

____ GCP App. & Lin	1 2 3 4 5 6

10.4 Procedure 10-3 Island Calibration

____ GCP Island Cal.	1 2 3 4 5 6
____ Shunt Island	1 2 3 4 5 6

10.5 Procedure 10-4 Standby Calibration

____ GCP Calibration	1 2 3 4 5 6
____ GCP App & Lin	1 2 3 4 5 6
____ GCP Island Cal.	1 2 3 4 5 6
____ Shunt Island	1 2 3 4 5 6

10.6 Lamp Adjustment (Procedure 10-5)
1L1 display _____volts, far lamp _____volts

Continued from Column 1
1L2 display _____volts, far lamp _____volts
2L1 display _____volts, far lamp _____volts
2L2 display _____volts, far lamp _____volts
(If additional controllers are used, enter values in remarks)

10.7 SSCC Operational Checks (Procedure 10-6)
Verify:
1. ____Light/gate battery is charged
2. ____B/N connectors positioned and secured
3. ____GC, GP, Bell connections secured
4. ____All FLS flash, are visible and aligned properly
5. ____Gates operational
6. ____Bell(s) operational
7. ____Flash Sync & External SSCC operation
8. ____Battery charger(s) operation
9. ____ SSCC inputs operational
10. ___ Verify gate delay times
11. ___ Verify that FLS flash while gate rising

Record Battery Name & Voltage:

_____ _____ _____ _____

10.8 GCP Operational Tests (Procedure 10-7)

	Track Circuit (circle)
____ Open Trans. wire	1 2 3 4 5 6
____ Open Recv. wire	1 2 3 4 5 6
____ Open DAX ckts	1 2 3 4 5 6
____ DAX pickup time	1 2 3 4 5 6
____ Open UAX ckts	1 2 3 4 5 6
____ UAX pickup time	1 2 3 4 5 6
____ Open AND Enable Input	1XR 2 3 4 5 6
____ AND Enable Pickup time	1XR 2 3 4 5 6
____ WRAP Operation	1 2 3 4 5 6
____ OVERRIDE Operation	1 2 3 4 5 6
____ Radio DAX Operation	1 2 3 4 5 6 Other

GCP 4000 System Cutover Test Form (continued)

10.8 GCP Operational Tests (continued)

Traffic Signal Preemption

____ Train Detection drops preempt output
____ Adv. Preempt input drops preempt out
____ Verify Adv Preempt Time Interval
____ Preempt Health input down activates crossing
____ Traffic Signal Health input down switches to Simultaneous preemption

Train Detection M=Main S=Standby

Observe train move(s)	Track Circuit (circle)
____ EZ decrease without rapid changes	M 1 2 3 4 5 6 S 1 2 3 4 5 6
____ EZ increase without rapid changes	M 1 2 3 4 5 6 S 1 2 3 4 5 6
____ Proper Warning Time	M 1 2 3 4 5 6 S 1 2 3 4 5 6
____ Proper Preempt Time	M 1 2 3 4 5 6 S 1 2 3 4 5 6
____ Proper DAX Time	M 1 2 3 4 5 6 S 1 2 3 4 5 6
____ Island Operation	M 1 2 3 4 5 6 S 1 2 3 4 5 6
____ Crossing Recovery	M 1 2 3 4 5 6 S 1 2 3 4 5 6
____ Out of Service	1 2 3 4 5 6

10.9 SEAR IIi SETUP

____ User and Aux Port setup complete
____ Stage 1 complete
____ Stage 2 complete
____ Stage 3 complete
Install Echelon peripheral devices
____ Install iLODs
____ Install VHF Communicator
____ Install Ground Fault Tester(s)
____ Install Analog/Digital I/O units(s)

Battery Calibration	Battery(circle)
____ AC off, Battery	1 2 3 4
Lamp Calibration	iLOD (circle)
____ Activate with AC on	1 2 3 4
____ Activate with AC off	1 2 3 4

10.9.1 WAG Node Installation

____ WAG setup complete

Continued from Column 1

10.9.2 SEAR IIi Operation

Module Communication Status Good
____ iLODs 1 2 3 4
____ VHF Communicator
____ Ground Fault Tester(s) 1 2 3
Module I/O tests (If modules are used)
____ Analog/Digital I/O units(s)
____ iLODs Module I/O 1 2 3 4
____ Ground Fault Tester(s) Onboard I/O 1 2
____ MTSS Onboard I/O 1 2 3 4 5 6 7 8
____ SEAR IIi relay output test 1 2

10.9.3 SEAR IIi Communications

____ SEAR IIi Data Analyzer Test

10.10 Maintenance Call (MC) Light

____ Maint. Call light output on
____ Maint Call light output turns off

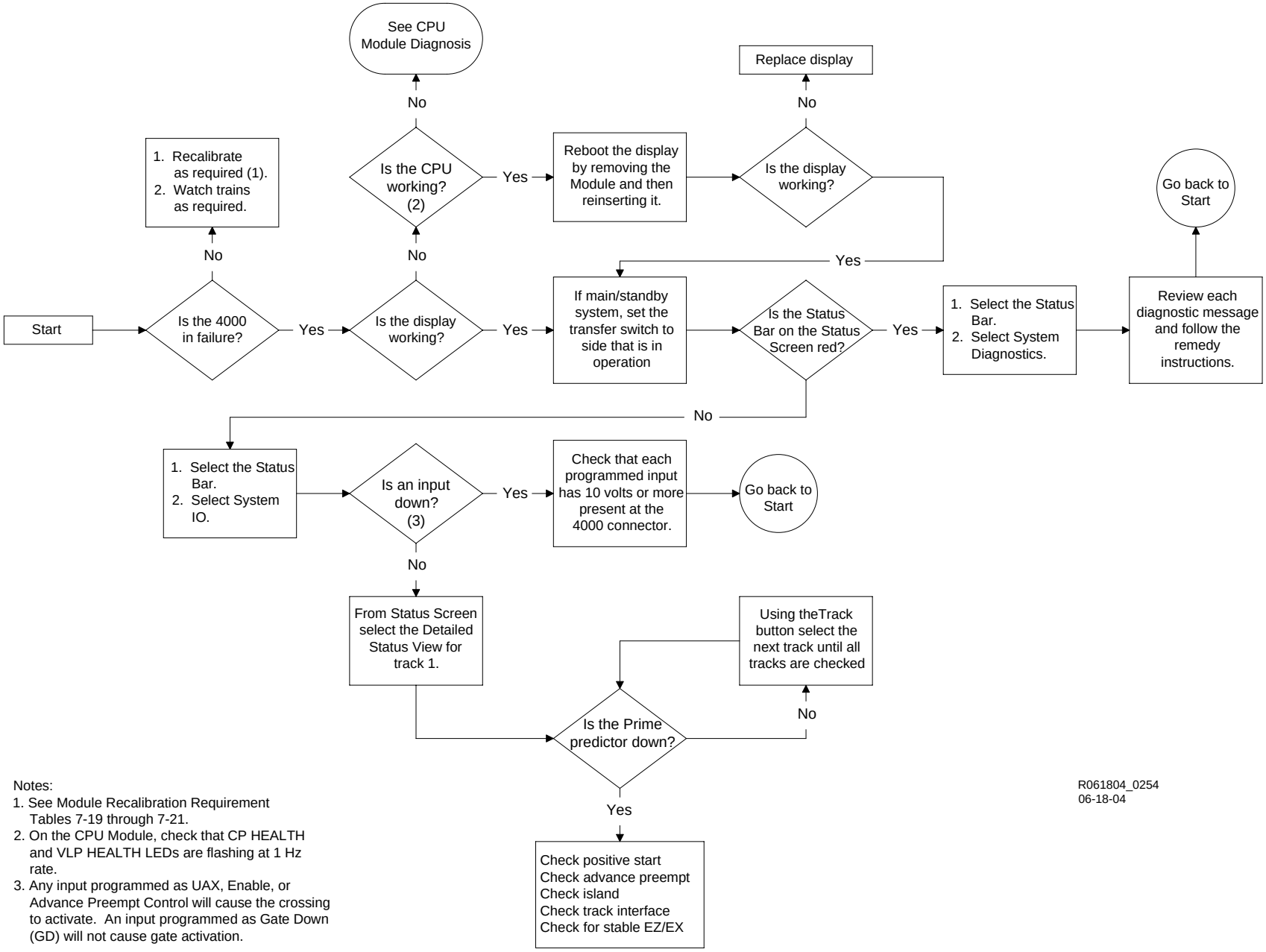
10.11 Verify Office Configuration Check Number

_____

Remarks:

SECTION 11 – TROUBLESHOOTING FLOW CHART & HISTORY CARD

MODEL 4000 GCP TROUBLESHOOTING FLOW CHART



Notes:
1. See Module Recalibration Requirement Tables 7-19 through 7-21.
2. On the CPU Module, check that CP HEALTH and VLP HEALTH LEDs are flashing at 1 Hz rate.
3. Any input programmed as UAX, Enable, or Advance Preempt Control will cause the crossing to activate. An input programmed as Gate Down (GD) will not cause gate activation.

R061804_0254
06-18-04

MODEL 4000 GCP APPLICATION HISTORY
Document No. SIG-00-04-21

Unit Serial Number: _____

Crossing Number: _____

Template MTF Number: _____

Date: _____

SITE Programming

Site Name: _____ (25 characters)

DOT Crossing Number: __ __ __ __ __ __ - __

Milepost Number _____ (11 characters)

ATCS Site ID: 7 __ __ __ __ __ __ __ __ __ __ __

NOTES

MODEL 4000 GRADE CROSSING PREDICTOR APPLICATION HISTORY

Menu	Menu Entry	Default Value	Initial Setting		Changed Setting	
			Date	Value	Date	Value
TEMPLATE: module configuration	Track 1 Slot	Track				
	Track 2 Slot/RIO 1 Slot	td [1]				
	Track 3 Slot	td [1]				
	Track 4 Slot	td [1]				
	Track 5/RIO 2 Slot	td [1]				
	Track 6/RIO 3 Slot	td [1]				
	SSCC 1 Slot [2]	SSCC3I				
	SSCC 2 Slot [2]	SSCC3I				
	SEAR Used [2]	Yes				
TEMPLATE: preemption [2]	Preempt Logic	No				
	Adv Preempt Delay [3]	10 sec				
	Preempt Hlth IP Used [4]	Yes				
	Adv Preempt IP Used [3]	No				
	Traffic Sys Hlth IP Used [3]	No				
	Gate Down Logic Used [3]	No				
	Second Trn Logic Used [3]	Yes				
TEMPLATE: track 1 [5]	GCP Frequency	Not Set				
	Approach Distance	9999 ft				
	Prime Warning Time [2]	35 sec				
	Preempt Warning Time [2] [3]	45 sec				
	Prime UAX [2]	IP				
	Prime UAX Pickup [2] [6]	5 sec				
	Dax A Warning Time [7]	35 sec				
	Dax A Offset Distance [7]	99 ft				
	Dax A Enable [7]	Not Used				
	Dax A Enable Pickup [8]	2 sec				
	GCP Transmit level	Medium				
	Uni/Bi/Sim-Bidirnl [9]	Unidirnl				
	Isl Frequency [2]	Not Set				
	Island Distance [2] [9]	199 ft				
TEMPLATE: Track 1 Daxes [5] [9]	Dax A Used [2]	No				
	Dax A Warning Time [2] [10]	35 Sec				
	Dax A Offset Distance [2] [10]	99 ft				
	Dax A Enable [2] [10]	Not Used				
	Dax B Used	No				
	Dax B Warning Time [10]	35 Sec				
	Dax B Offset Distance [10]	99 ft				
	Dax B Enable [10]	Not Used				
	Dax C Used	No				
	Dax C Warning Time [10]	35 Sec				
	Dax C Offset Distance [10]	99 ft				
	Dax C Enable [10]	Not Used				
	Dax D Used	No				
	Dax D Warning Time [10]	35 Sec				
	Dax D Offset Distance [10]	99 ft				
	Dax D Enable [10]	Not Used				

MODEL 4000 GRADE CROSSING PREDICTOR APPLICATION HISTORY

Menu	Menu Entry	Default Value	Initial Setting		Changed Setting	
			Date	Value	Date	Value
TEMPLATE: track 2 [5]	**GCP Frequency**	**Not Set**				
	Approach Distance	**9999 ft**				
	Prime Warning Time [2]	**35 sec**				
	Preempt Warning Time [2] [3]	**45 sec**				
	Prime UAX	**IP**				
	Prime UAX Pickup [6]	**5 sec**				
	Dax A Warning Time [7]	**35 sec**				
	Dax A Offset Distance [7]	**99 ft**				
	Dax A Enable [7]	**Not Used**				
	Dax A Enable Pickup [8]	**2 sec**				
	GCP Transmit level	**Medium**				
	Uni/Bi/Sim-Bidirnl [9]	**Unidirnl**				
	Isl Frequency	**Not Set**				
	Island Distance [9]	**199 ft**				
TEMPLATE: Track 2 Daxes [10] [9]	**Dax A Used**	**No**				
	Dax A Warning Time [10]	**35 Sec**				
	Dax A Offset Distance [10]	**99 ft**				
	Dax A Enable [10]	**Not Used**				
	Dax B Used	**No**				
	Dax B Warning Time [10]	**35 Sec**				
	Dax B Offset Distance [10]	**99 ft**				
	Dax B Enable [10]	**Not Used**				
	***Dax B Used**	**No**				
	Dax B Warning Time [10]	**35 Sec**				
	Dax B Offset Distance [10]	**99 ft**				
	Dax B Enable [10]	**Not Used**				
	***Dax C Used**	**No**				
	Dax C Warning Time [10]	**35 Sec**				
	Dax C Offset Distance [10]	**99 ft**				
	Dax C Enable [10]	**Not Used**				
	Dax D Used	**No**				
	Dax D Warning Time [10]	**35 Sec**				
	Dax D Offset Distance [10]	**99 ft**				
	Dax D Enable [10]	**Not Used**				
TEMPLATE: track 3 [5]	**GCP Frequency**	**Not Set**				
	Approach Distance	**9999 ft**				
	Prime Warning Time [2]	**35 sec**				
	Preempt Warning Time [2] [3]	**45 sec**				
	***Prime UAX**	**IP**				
	Prime UAX Pickup [6]	**5 sec**				
	Dax A Warning Time [7]	**35 sec**				
	Dax A Offset Distance [7]	**99 ft**				
	Dax A Enable [7]	**Not Used**				
	Dax A Enable Pickup [9]	**2 sec**				
	GCP Transmit level	**Medium**				
	Uni/Bi/Sim-Bidirnl [9]	**Unidirnl**				
	Isl Frequency	**Not Set**				
	Island Distance [9]	**199 ft**				

MODEL 4000 GRADE CROSSING PREDICTOR APPLICATION HISTORY

Menu	Menu Entry	Default Value	Initial Setting		Changed Setting	
			Date	Value	Date	Value
TEMPLATE: Track 3 Daxes [5] [9]	Dax A Used	No				
	Dax A Warning Time [10]	35 Sec				
	Dax A Offset Distance [10]	99 ft				
	Dax A Enable [10]	Not Used				
	Dax B Used	No				
	Dax B Warning Time [10]	35 Sec				
	Dax B Offset Distance [10]	99 ft				
	Dax B Enable [10]	Not Used				
	Dax C Used	No				
	Dax C Warning Time [10]	35 Sec				
	Dax C Offset Distance [10]	99 ft				
	Dax C Enable [10]	Not Used				
	Dax D Used	No				
	Dax D Warning Time [10]	35 Sec				
	Dax D Offset Distance [10]	99 ft				
	Dax D Enable [10]	Not Used				
TEMPLATE: track 4 [5]	GCP Frequency	Not Set				
	Approach Distance	9999 ft				
	Prime Warning Time [2]	35 sec				
	Preempt Warning Time [2] [3]	45 sec				
	Prime UAX	IP				
	Prime UAX Pickup [6]	5 sec				
	Dax A Warning Time [7]	35 sec				
	Dax A Offset Distance [7]	99 ft				
	Dax A Enable [7]	Not Used				
	Dax A Enable Pickup [8]	2 sec				
	GCP Transmit level	Medium				
	Uni/Bi/Sim-Bidirnl [9]	Unidirnl				
	Isl Frequency	Not Set				
	Island Distance [9]	199 ft				
TEMPLATE: Track 4 Daxes [5] [9]	Dax A Used	No				
	Dax A Warning Time [10]	35 Sec				
	Dax A Offset Distance [10]	99 ft				
	Dax A Enable [10]	Not Used				
	Dax B Used	No				
	Dax B Warning Time [10]	35 Sec				
	Dax B Offset Distance [10]	99 ft				
	Dax B Enable [10]	Not Used				
	Dax C Used	No				
	Dax C Warning Time [10]	35 Sec				
	Dax C Offset Distance [10]	99 ft				
	Dax C Enable [10]	Not Used				
	Dax D Used	No				
	Dax D Warning Time [10]	35 Sec				
	Dax D Offset Distance [10]	99 ft				
	Dax D Enable [10]	Not Used				

MODEL 4000 GRADE CROSSING PREDICTOR APPLICATION HISTORY

Menu	Menu Entry	Default Value	Initial Setting		Changed Setting	
			Date	Value	Date	Value
TEMPLATE: track 5 [5]	**GCP Frequency**	**Not Set**				
	Approach Distance	**9999 ft**				
	Prime Warning Time [2]	**35 sec**				
	Preempt Warning Time [2] [3]	**45 sec**				
	Prime UAX	**IP**				
	Prime UAX Pickup [6]	**5 sec**				
	Dax A Warning Time [11]	**35 sec**				
	Dax A Offset Distance [11]	**99 ft**				
	Dax A Enable [11]	**Not Used**				
	Dax A Enable Pickup [8]	**2 sec**				
	GCP Transmit level	**Medium**				
	Uni/Bi/Sim-Bidirnl [9]	**Unidirnl**				
	Isl Frequency	**Not Set**				
	Island Distance [9]	**199 ft**				
TEMPLATE: Track 5 Daxes [5] [9]	**Dax A Used**	**No**				
	Dax A Warning Time [10]	**35 Sec**				
	Dax A Offset Distance [10]	**99 ft**				
	Dax A Enable [10]	**Not Used**				
	Dax B Used	**No**				
	Dax B Warning Time [10]	**35 Sec**				
	Dax B Offset Distance [10]	**99 ft**				
	Dax B Enable [10]	**Not Used**				
	Dax C Used	**No**				
	Dax C Warning Time [10]	**35 Sec**				
	Dax C Offset Distance [10]	**99 ft**				
	Dax C Enable [10]	**Not Used**				
	Dax D Used	**No**				
	Dax D Warning Time [10]	**35 Sec**				
	Dax D Offset Distance [10]	**99 ft**				
	Dax D Enable [10]	**Not Used**				
TEMPLATE: track 6 [5]	**GCP Frequency**	**Not Set**				
	Approach Distance	**9999 ft**				
	Prime Warning Time [2]	**35 sec**				
	Preempt Warning Time [2] [3]	**45 sec**				
	Prime UAX	**IP**				
	Prime UAX Pickup [6]	**5 sec**				
	Dax A Warning Time [12]	**35 sec**				
	Dax A Offset Distance [12]	**99 ft**				
	Dax A Enable [12]	**Not Used**				
	Dax A Enable Pickup [8]	**2 sec**				
	GCP Transmit level	**Medium**				
	Uni/Bi/Sim-Bidirnl [9]	**Unidirnl**				
	Isl Frequency	**Not Set**				
	Island Distance [9]	**199 ft**				

MODEL 4000 GRADE CROSSING PREDICTOR APPLICATION HISTORY

Menu	Menu Entry	Default Value	Initial Setting		Changed Setting	
			Date	Value	Date	Value
TEMPLATE: Track 6 Daxes [4] [9]	**Dax A Used**	**No**				
	Dax A Warning Time [10]	**35 Sec**				
	Dax A Offset Distance [10]	**99 ft**				
	Dax A Enable [10]	**Not Used**				
	Dax B Used	**No**				
	Dax B Warning Time [10]	**35 Sec**				
	Dax B Offset Distance [10]	**99 ft**				
	Dax B Enable [10]	**Not Used**				
	Dax C Used	**No**				
	Dax C Warning Time [10]	**35 Sec**				
	Dax C Offset Distance [10]	**99 ft**				
	Dax C Enable [10]	**Not Used**				
	Dax D Used	**No**				
	Dax D Warning Time [10]	**35 Sec**				
	Dax D Offset Distance [10]	**99 ft**				
	Dax D Enable [10]	**Not Used**				
TEMPLATE: Track Anding [13]	**AND 1 XR Used**	**Yes**				
	AND 2 Used	**No**				
	AND 3 Used	**No**				
	AND 4 Used	**No**				
TEMPLATE: AND 1 XR [14]	**AND 1 Enable Used**	**No**				
	And 1 Enable Pickup [15]	**5 sec**				
TEMPLATE: AND 2 [14]	**AND 2 Track 1** [5]	**Not Used**				
	AND 2 Track 2 [5]	**Not Used**				
	AND 2 Track 3 [5]	**Not Used**				
	AND 2 Track 4 [5]	**Not Used**				
	AND 2 Track 5 [5]	**Not Used**				
	AND 2 Track 6 [5]	**Not Used**				
	AND 2 Enable Used	**No**				
	AND 2 Enable Pickup [15]	**2 sec**				
TEMPLATE: AND 3 [14]	**AND 3 Track 1** [5]	**Not Used**				
	AND 3 Track 2 [5]	**Not Used**				
	AND 3 Track 3 [5]	**Not Used**				
	AND 3 Track 4 [5]	**Not Used**				
	AND 3 Track 5 [5]	**Not Used**				
	AND 3 Track 6 [5]	**Not Used**				
	AND 3 Enable Used	**No**				
	AND 3 Enable Pickup [15]	**2 sec**				
TEMPLATE: AND 4 [17]	**AND 4 Track 1** [5]	**Not Used**				
	AND 4 Track 2 [5]	**Not Used**				
	AND 4 Track 3 [5]	**Not Used**				
	AND 4 Track 4 [5]	**Not Used**				
	AND 4 Track 5 [5]	**Not Used**				
	AND 4 Track 6 [5]	**Not Used**				
	AND 4 Enable Used	**No**				
	AND 4 Enable Pickup [15]	**2 sec**				

MODEL 4000 GRADE CROSSING PREDICTOR APPLICATION HISTORY

Menu	Menu Entry	Default Value	Initial Setting		Changed Setting	
			Date	Value	Date	Value
TEMPLATE: SSCC [2] [20]	**Gates Used**	**Yes**				
	SSCC1+2 GPs Coupled	**Yes**				
	SSCC-1 Number of GPs [20]	**1**				
	SSCC-1 Number of GDs [20]	**2**				
	SSCC-2 Number of GPs [20]	**0**				
	SSCC-2 Number of GDs [20]	**0**				
TEMPLATE: OP assignment 1 [16]	**Out 1.1** [5]	**Not Used**				
	Out 1.2 [5]	**Not Used**				
	Out 2.1 [5]	**Not Used**				
	Out 2.2 [5]	**Not Used**				
	Out 2.3 [19]	**Not Used**				
	Out 2.4 [19]	**Not Used**				
	Out 3.1 [5]	**Not Used**				
	Out 3.2 [5]	**Not Used**				
	Out 4.1 [5]	**Not Used**				
	Out 4.2 [5]	**Not Used**				
TEMPLATE: OP assignment 2 [17]	**Out 5.1** [18]	**Not Used**				
	Out 5.2 [18]	**Not Used**				
	Out 5.3 [18]	**Not Used**				
	Out 5.4 [18]	**Not Used**				
	Out 6.1 [18]	**Not Used**				
	Out 6.2 [18]	**Not Used**				
	Out 6.3 [19]	**Not Used**				
	Out 6.4 [19]	**Not Used**				
TEMPLATE: IP assignment 1 [16]	**IN 1.1** [14]	**Not Used**				
	IN 1.2 [14]	**Not Used**				
	IN 2.1 [15]	**Not Used**				
	IN 2.2 [15]	**Not Used**				
	IN 2.3 [19]	**Not Used**				
	IN 2.4 [19]	**Not Used**				
	IN 3.1 [16]	**Not Used**				
	IN 3.2 [16]	**Not Used**				
	IN 4.1 [17]	**Not Used**				
	IN 4.2 [17]	**Not Used**				
TEMPLATE: IP assignment 2 [17]	**IP 5.1** [18]	**Not Used**				
	IP 5.2 [18]	**Not Used**				
	IP 5.3 [19]	**Not Used**				
	IP 5.4 [19]	**Not Used**				
	IP 6.1 [18]	**Not Used**				
	IP 6.2 [18]	**Not Used**				
	IP 6.3 [19]	**Not Used**				
	IP 6.4 [19]	**Not Used**				

MODEL 4000 GRADE CROSSING PREDICTOR APPLICATION HISTORY

Menu	Menu Entry	Default Value	Initial Setting		Changed Setting	
			Date	Value	Date	Value
TEMPLATE: IP assignment SSCC [2] [20]	IN 7.1 [20]	Not Used				
	IN 7.2 [20]	GD 1.2				
	IN 7.3 [20]	Not Used				
	IN 7.4 [20]	GD 1.1				
	IN 7.5 [20]	GP 1.1				
	IN 8.1 [20]	Not Used				
	IN 8.2 [20]	Not Used				
	IN 8.3 [20]	Not Used				
	IN 8.4 [20]	Not Used				
	IN 8.5 [20]	Not Used				
TEMPLATE: SEAR [2] [21]	SP 2.1	POK 1				
	SP 3.1	Door 1				
	SP 4.1	Not Used				
	SP 5.1	Not Used				
	SP 6.1	Not Used				
BASIC: module configuration	Track 1 Slot	Track				
	Track 2 Slot/RIO Slot 1	td [1]				
	Track 3 Slot	td [1]				
	Track 4 Slot	td [1]				
	Track 5/RIO 2 Slot	td [1]				
	Track 6/RIO 3 Slot	td [1]				
	SSCC-1 Slot [2]	SSCC3i				
	SSCC-2 Slot [2]	SSCC3i				
	SEAR Used [2]	Yes				
BASIC: MS/GCP operation	Track 1 MS/GCP Operation [5]	Yes				
	Track 2 MS/GCP Operation [5]	No				
	Track 3 MS/GCP Operation [5]	No				
	Track 4 MS/GCP Operation [5]	No				
	Track 5 MS/GCP Operation [5]	No				
	Track 6 MS/GCP Operation [5]	No				
BASIC: island operation	Island 1 Used [5]	Internal				
	Island 2 Used [5]	td [1]				
	Island 3 Used [5]	td [1]				
	Island 4 Used [5]	td [1]				
	Island 5 Used [5]	td [1]				
	Island 6 Used [5]	td [1]				
BASIC: preemption	Preempt Logic	No				
	Adv Preempt Delay [3]	10 sec				
	Preempt Hlth IP Used [4]	Yes				
	Adv Preempt IP Used [3]	No				
	Traffic Sys Hlth IP Used [3]	No				
	Gate Down Logic Used [3]	No				
	Second Trn Logic Used [3]	Yes				

MODEL 4000 GRADE CROSSING PREDICTOR APPLICATION HISTORY

Menu	Menu Entry	Default Value	Initial Setting		Changed Setting	
			Date	Value	Date	Value
BASIC: radio Dax links	Radio DAX link A Used	No				
	Radio DAX link B Used	No				
	Link A UAX Connection [23]	Next Prd				
	Link B UAX Connection [23]	Next Prd				
	Remote Inputs Used [23]	No				
	Remote Outputs Used [23]	No				
BASIC: track 1 link A [24]	T1 Daxed to by Link A	Yes				
	T1 Daxed to by Remote T1 [25]	Yes				
	T1 Daxed to by Remote T2 [25]	No				
	T1 Daxed to by Remote T3 [25]	No				
	T1 Daxed to by Remote T4 [25]	No				
	T1 Daxed to by Remote T5 [25]	No				
	T1 Daxed to by Remote T6 [25]	No				
BASIC: track 1 link B [25]	T1 Daxed to by Link B	Yes				
	T1 Daxed to by Remote T1 [25]	Yes				
	T1 Daxed to by Remote T2 [25]	No				
	T1 Daxed to by Remote T3 [25]	No				
	T1 Daxed to by Remote T4 [25]	No				
	T1 Daxed to by Remote T5 [25]	No				
	T1 Daxed to by Remote T6 [25]	No				
BASIC: track 2 link A [24]	T2 Daxed to by Link A	Yes				
	T2 Daxed to by Remote T1 [25]	No				
	T2 Daxed to by Remote T2 [25]	Yes				
	T2 Daxed to by Remote T3 [25]	No				
	T2 Daxed to by Remote T4 [25]	No				
	T2 Daxed to by Remote T5 [25]	No				
	T2 Daxed to by Remote T6 [25]	No				
BASIC: track 2 link B [25]	T2 Daxed to by Link B	Yes				
	T2 Daxed to by Remote T1 [25]	No				
	T2 Daxed to by Remote T2 [25]	Yes				
	T2 Daxed to by Remote T3 [25]	No				
	T2 Daxed to by Remote T4 [25]	No				
	T2 Daxed to by Remote T5 [25]	No				
	T2 Daxed to by Remote T6 [25]	No				
BASIC: track 3 link A [24]	T3 Daxed to by Link A	Yes				
	T3 Daxed to by Remote T1 [25]	No				
	T3 Daxed to by Remote T2 [25]	No				
	T3 Daxed to by Remote T3 [25]	Yes				
	T3 Daxed to by Remote T4 [25]	No				
	T3 Daxed to by Remote T5 [25]	No				
	T3 Daxed to by Remote T6 [25]	No				

MODEL 4000 GRADE CROSSING PREDICTOR APPLICATION HISTORY

Menu	Menu Entry	Default Value	Initial Setting		Changed Setting	
			Date	Value	Date	Value
BASIC: track 3 link B [25]	T3 Daxed to by Link B	Yes				
	T3 Daxed to by Remote T1 [25]	No				
	T3 Daxed to by Remote T2 [25]	No				
	T3 Daxed to by Remote T3 [25]	Yes				
	T3 Daxed to by Remote T4 [25]	No				
	T3 Daxed to by Remote T5 [25]	No				
	T3 Daxed to by Remote T6 [25]	No				
BASIC: track 4 link A [24]	T3 Daxed to by Link A	Yes				
	T3 Daxed to by Remote T1 [25]	No				
	T3 Daxed to by Remote T2 [25]	No				
	T3 Daxed to by Remote T3 [25]	No				
	T3 Daxed to by Remote T4 [25]	Yes				
	T3 Daxed to by Remote T5 [25]	No				
	T3 Daxed to by Remote T6 [25]	No				
BASIC: track 4 link B [25]	T3 Daxed to by Link B	Yes				
	T3 Daxed to by Remote T1 [25]	No				
	T3 Daxed to by Remote T2 [25]	No				
	T3 Daxed to by Remote T3 [25]	No				
	T3 Daxed to by Remote T4 [25]	Yes				
	T3 Daxed to by Remote T5 [25]	No				
	T3 Daxed to by Remote T6 [25]	No				
BASIC: track 5 link A [24]	T3 Daxed to by Link A	Yes				
	T3 Daxed to by Remote T1 [25]	No				
	T3 Daxed to by Remote T2 [25]	No				
	T3 Daxed to by Remote T3 [25]	No				
	T3 Daxed to by Remote T4 [25]	No				
	T3 Daxed to by Remote T5 [25]	Yes				
	T3 Daxed to by Remote T6 [25]	No				
BASIC: track 5 link B [25]	T3 Daxed to by Link B	Yes				
	T3 Daxed to by Remote T1 [25]	No				
	T3 Daxed to by Remote T2 [25]	No				
	T3 Daxed to by Remote T3 [25]	No				
	T3 Daxed to by Remote T4 [25]	No				
	T3 Daxed to by Remote T5 [25]	Yes				
	T3 Daxed to by Remote T6 [25]	No				
BASIC: track 6 link A [24]	T3 Daxed to by Link A	Yes				
	T3 Daxed to by Remote T1 [25]	No				
	T3 Daxed to by Remote T2 [25]	No				
	T3 Daxed to by Remote T3 [25]	No				
	T3 Daxed to by Remote T4 [25]	No				
	T3 Daxed to by Remote T5 [25]	No				
	T3 Daxed to by Remote T6 [25]	Yes				

MODEL 4000 GRADE CROSSING PREDICTOR APPLICATION HISTORY

Menu	Menu Entry	Default Value	Initial Setting		Changed Setting	
			Date	Value	Date	Value
BASIC: track 6 link B [25]	T3 Daxed to by Link B	Yes				
	T3 Daxed to by Remote T1 [25]	No				
	T3 Daxed to by Remote T2 [25]	No				
	T3 Daxed to by Remote T3 [25]	No				
	T3 Daxed to by Remote T4 [25]	No				
	T3 Daxed to by Remote T5 [25]	No				
	T3 Daxed to by Remote T6 [25]	Yes				
BASIC: Dax link A [23]	RRR Offset	0				
	LLL Offset	0				
	GGG Offset	1				
	SS Offset	0				
	Msg Timeout	3600 msec				
	Msg Update Interval	800 msec				
	Max Time Offset	10 sec				
BASIC: Dax link B [23]	RRR Offset	0				
	LLL Offset	0				
	GGG Offset	32769				
	SS Offset	0				
	Msg Timeout	3600 msec				
	Msg Update Interval	800 msec				
	Max Time Offset	10 sec				
BASIC: Vital Comms links	Vital Comms link 1 Used	No				
	Vital Comms link 2 Used	No				
BASIC: Vital Comms link 1 [32]	RRR Offset	0				
	LLL Offset	0				
	GGG Offset	1				
	SS Offset	0				
	Msg Timeout	3600 msec				
	Msg Update Interval	800 msec				
	Max Time Offset	10 sec				
BASIC: Vital Comms link 2 [32]	RRR Offset	0				
	LLL Offset	0				
	GGG Offset	1				
	SS Offset	0				
	Msg Timeout	3600 msec				
	Msg Update Interval	800 msec				
	Max Time Offset	10 sec				

MODEL 4000 GRADE CROSSING PREDICTOR APPLICATION HISTORY

Menu	Menu Entry	Default Value	Initial Setting		Changed Setting	
			Date	Value	Date	Value
PREDICTORS: track 1 [5]	**Prime Used**	td [1]				
	Dax A Used	**No**				
	Dax B Used	**No**				
	Dax C Used	**No**				
	Dax D Used	**No**				
	Dax E Used	**No**				
	Dax F Used	**No**				
	Dax G Used	**No**				
	Preempt Used [3]	**Yes**				
PREDICTORS: track 2 [5]	**Prime Used**	td [1]				
	Dax A Used	**No**				
	Dax B Used	**No**				
	Dax C Used	**No**				
	Dax D Used	**No**				
	Dax E Used	**No**				
	Dax F Used	**No**				
	Dax G Used	**No**				
	Preempt Used [3]	**Yes**				
PREDICTORS: track 3 [5]	**Prime Used**	td [1]				
	Dax A Used	**No**				
	Dax B Used	**No**				
	Dax C Used	**No**				
	Dax D Used	**No**				
	Dax E Used	**No**				
	Dax F Used	**No**				
	Dax G Used	**No**				
	Preempt Used [3]	**Yes**				
PREDICTORS: track 4 [5]	**Prime Used**	td [1]				
	Dax A Used	**No**				
	Dax B Used	**No**				
	Dax C Used	**No**				
	Dax D Used	**No**				
	Dax E Used	**No**				
	Dax F Used	**No**				
	Dax G Used	**No**				
	Preempt Used [3]	**Yes**				
PREDICTORS: track 5 [5]	**Prime Used**	td [1]				
	Dax A Used	**No**				
	Dax B Used	**No**				
	Dax C Used	**No**				
	Dax D Used	**No**				
	Dax E Used	**No**				
	Dax F Used	**No**				
	Dax G Used	**No**				
	Preempt Used [3]	**Yes**				

MODEL 4000 GRADE CROSSING PREDICTOR APPLICATION HISTORY

Menu	Menu Entry	Default Value	Initial Setting		Changed Setting	
			Date	Value	Date	Value
PREDICTORS: track 6 [5]	**Prime Used**	td [1]				
	Dax A Used	**No**				
	Dax B Used	**No**				
	Dax C Used	**No**				
	Dax D Used	**No**				
	Dax E Used	**No**				
	Dax F Used	**No**				
	Dax G Used	**No**				
	Preempt Used [3]	**Yes**				
GCP: track 1 [5]	**GCP Freq Category**	**Standard**				
	GCP Frequency	**Not Set**				
	Approach Distance	**9999 ft**				
	Uni/Bi/Sim-Bidirnl	td [1]				
	GCP Transmit Level	**Medium**				
	Island Connection	td [1]				
	Island Distance	td [1]				
	Computed Distance	**9999 ft**				
	Linearization Steps	**100**				
GCP: track 1 prime [5]	**Prime Warning Time**	**35 sec**				
	Prime Offset Distance	**0 ft**				
	Switch MS EZ Level	**10**				
	Prime MS/GCP Mode	**Pred**				
	Pickup Delay Mode [33]	**td** [33]				
	Prime Pickup Delay	**15 sec**				
	Prime UAX	**Not Used**				
	Prime UAX Pickup	**5 sec**				
GCP: track 1 Dax A [5] [9]	**Dax A Warning Time**	**35 sec**				
	Dax A Offset Distance	**99 ft**				
	Switch MS EZ Level	**0**				
	Dax A MS/GCP Mode	**Pred**				
	Pickup Delay Mode	**Auto**				
	Dax A Pickup Delay	**15 sec**				
	Dax A Enable	**Not Used**				
	Dax A Enable Pickup	**2 sec**				
GCP: track 1 Dax B [5] [9]	**Dax B Warning Time**	**35 sec**				
	Dax B Offset Distance	**99 ft**				
	Switch MS EZ Level	**0**				
	Dax B MS/GCP Mode	**Pred**				
	Pickup Delay Mode	**Auto**				
	Dax B Pickup Delay	**15 sec**				
	Dax B Enable	**Not Used**				
	Dax B Enable Pickup	**2 sec**				

MODEL 4000 GRADE CROSSING PREDICTOR APPLICATION HISTORY

Menu	Menu Entry	Default Value	Initial Setting		Changed Setting	
			Date	Value	Date	Value
GCP: track 1 Dax C [5] [9]	Dax C Warning Time	35 sec				
	Dax C Offset Distance	99 ft				
	Switch MS EZ Level	0				
	Dax C MS/GCP Mode	Pred				
	Pickup Delay Mode	Auto				
	Dax C Pickup Delay	15 sec				
	Dax C Enable	Not Used				
GCP: track 1 Dax D [5] [9]	Dax D Warning Time	35 sec				
	Dax D Offset Distance	99 ft				
	Switch MS EZ Level	0				
	Dax D MS/GCP Mode	Pred				
	Pickup Delay Mode	Auto				
	Dax D Pickup Delay	15 sec				
	Dax D Enable	Not Used				
GCP: track 1 Dax E [5] [9]	Dax E Offset Distance	35 sec				
	Switch MS EZ Level	99 ft				
	Dax E MS/GCP Mode	0				
	Pickup Delay Mode	Pred				
	Dax E Pickup Delay	Auto				
	Dax E Enable	15 sec				
	Dax E Warning Time	Not Used				
GCP: track 1 Dax F [5] [9]	Dax F Offset Distance	35 sec				
	Switch MS EZ Level	99 ft				
	Dax F MS/GCP Mode	0				
	Pickup Delay Mode	Pred				
	Dax F Pickup Delay	Auto				
	Dax F Enable	15 sec				
	Dax F Warning Time	Not Used				
GCP: track 1 Dax G [5] [9]	Dax F Offset Distance	35 sec				
	Switch MS EZ Level	99 ft				
	Dax G MS/GCP Mode	0				
	Pickup Delay Mode	Pred				
	Dax G Pickup Delay	Auto				
	Dax G Enable	15 sec				
	Dax G Warning Time	Not Used				
GCP: track 1 preempt [26]	Prmpt Warning Time	45 sec				
	Prmpt Offset Distance	0 ft				
	Pickup Delay Mode	Fixed				
	Switch MS EZ Level	10				
	Prmpt MS/GCP Mode	Pred				
	Prmpt Pickup Delay	15 sec				
	Prmpt Enable	Not Used				
	Prmpt Enable Pickup	5 sec				

MODEL 4000 GRADE CROSSING PREDICTOR APPLICATION HISTORY

Menu	Menu Entry	Default Value	Initial Setting		Changed Setting	
			Date	Value	Date	Value
GCP: track 1 low EZ detect [5]	Low EZ Detection Used	No				
	Low EZ Detection Level	70				
	Low EZ Detection Time	10 min				
	Positive Start	Off				
	Positive Start Level	10				
	Positive Start Timer	10 min				
	Enhanced Detectn Used	No				
	Station Stop Timer	10 sec				
	False Activate Level	Normal				
	Poor Shunting Level	2				
	Trailing Switch Logic	Off				
GCP: track 1 MS Control [5]	MS/GCP Ctrl IP Used	No				
	MS Sensitivity Level	0				
	Compensation Level	1300				
	Low EX Adjustment	39				
	Bidirn Dax Passthru	No				
GCP: track 2 prime [5]	Prime Warning Time	35 sec				
	Prime Offset Distance	0 ft				
	Switch MS EZ Level	10				
	Prime MS/GCP Mode	Pred				
	Pickup Delay Mode [33]	td [33]				
	Prime Pickup Delay	15 sec				
	Prime UAX	Not Used				
	Prime UAX Pickup	5 sec				
GCP: track 2 Dax A [5] [9]	Dax A Warning Time	35 sec				
	Dax A Offset Distance	99 ft				
	Switch MS EZ Level	0				
	Dax A MS/GCP Mode	Pred				
	Pickup Delay Mode	Auto				
	Dax A Pickup Delay	15 sec				
	Dax A Enable	Not Used				
	Dax A Enable Pickup	2 sec				
GCP: track 2 Dax B [5] [9]	Dax B Warning Time	35 sec				
	Dax B Offset Distance	99 ft				
	Switch MS EZ Level	0				
	Dax B MS/GCP Mode	Pred				
	Pickup Delay Mode	Auto				
	Dax B Pickup Delay	15 sec				
	Dax B Enable	Not Used				
	Dax B Enable Pickup	2 sec				

MODEL 4000 GRADE CROSSING PREDICTOR APPLICATION HISTORY

Menu	Menu Entry	Default Value	Initial Setting		Changed Setting	
			Date	Value	Date	Value
GCP: track 2 Dax C [5] [9]	Dax C Warning Time	35 sec				
	Dax C Offset Distance	99 ft				
	Switch MS EZ Level	0				
	Dax C MS/GCP Mode	Pred				
	Pickup Delay Mode	Auto				
	Dax C Pickup Delay	15 sec				
	Dax C Enable	Not Used				
GCP: track 2 Dax D [5] [9]	Dax D Warning Time	35 sec				
	Dax D Offset Distance	99 ft				
	Switch MS EZ Level	0				
	Dax D MS/GCP Mode	Pred				
	Pickup Delay Mode	Auto				
	Dax D Pickup Delay	15 sec				
	Dax D Enable	Not Used				
GCP: track 2 Dax E [5] [9]	Dax E Offset Distance	35 sec				
	Switch MS EZ Level	99 ft				
	Dax E MS/GCP Mode	0				
	Pickup Delay Mode	Pred				
	Dax E Pickup Delay	Auto				
	Dax E Enable	15 sec				
	Dax E Warning Time	Not Used				
GCP: track 2 Dax F [5] [9]	Dax F Offset Distance	35 sec				
	Switch MS EZ Level	99 ft				
	Dax F MS/GCP Mode	0				
	Pickup Delay Mode	Pred				
	Dax F Pickup Delay	Auto				
	Dax F Enable	15 sec				
	Dax F Warning Time	Not Used				
GCP: track 2 Dax G [5] [9]	Dax F Offset Distance	35 sec				
	Switch MS EZ Level	99 ft				
	Dax G MS/GCP Mode	0				
	Pickup Delay Mode	Pred				
	Dax G Pickup Delay	Auto				
	Dax G Enable	15 sec				
	Dax G Warning Time	Not Used				
GCP: track 2 preempt [26]	Prmpt Warning Time	45 sec				
	Prmpt Offset Distance	0 ft				
	Pickup Delay Mode	Fixed				
	Switch MS EZ Level	10				
	Prmpt MS/GCP Mode	Pred				
	Prmpt Pickup Delay	15 sec				
	Prmpt Enable	Not Used				
	Prmpt Enable Pickup	5 sec				

MODEL 4000 GRADE CROSSING PREDICTOR APPLICATION HISTORY

Menu	Menu Entry	Default Value	Initial Setting		Changed Setting	
			Date	Value	Date	Value
GCP: track 2 low EZ detect [5]	Low EZ Detection Used	No				
	Low EZ Detection Level	70				
	Low EZ Detection Time	10 min				
	Positive Start	Off				
	Positive Start Level	10				
	Positive Start Timer	10 min				
	Enhanced Detectn Used	No				
	Station Stop Timer	10 sec				
	False Activate Level	Normal				
	Poor Shunting Level	2				
	Trailing Switch Logic	Off				
GCP: track 2 MS Control [5]	MS/GCP Ctrl IP Used	No				
	MS Sensitivity Level	0				
	Compensation Level	1300				
	Low EX Adjustment	39				
	Bidirn Dax Passthru	No				
GCP: track 3 prime [5]	Prime Warning Time	35 sec				
	Prime Offset Distance	0 ft				
	Switch MS EZ Level	10				
	Prime MS/GCP Mode	Pred				
	Pickup Delay Mode [33]	td [33]				
	Prime Pickup Delay	15 sec				
	Prime UAX	Not Used				
	Prime UAX Pickup	5 sec				
GCP: track 3 Dax A [5] [9]	Dax A Warning Time	35 sec				
	Dax A Offset Distance	99 ft				
	Switch MS EZ Level	0				
	Dax A MS/GCP Mode	Pred				
	Pickup Delay Mode	Auto				
	Dax A Pickup Delay	15 sec				
	Dax A Enable	Not Used				
	Dax A Enable Pickup	2 sec				
GCP: track 3 Dax B [5] [9]	Dax B Warning Time	35 sec				
	Dax B Offset Distance	99 ft				
	Switch MS EZ Level	0				
	Dax B MS/GCP Mode	Pred				
	Pickup Delay Mode	Auto				
	Dax B Pickup Delay	15 sec				
	Dax B Enable	Not Used				
	Dax B Enable Pickup	2 sec				

MODEL 4000 GRADE CROSSING PREDICTOR APPLICATION HISTORY

Menu	Menu Entry	Default Value	Initial Setting		Changed Setting	
			Date	Value	Date	Value
GCP: track 3 Dax C [5] [9]	Dax C Warning Time	35 sec				
	Dax C Offset Distance	99 ft				
	Switch MS EZ Level	0				
	Dax C MS/GCP Mode	Pred				
	Pickup Delay Mode	Auto				
	Dax C Pickup Delay	15 sec				
	Dax C Enable	Not Used				
GCP: track 3 Dax D [5] [9]	Dax D Warning Time	35 sec				
	Dax D Offset Distance	99 ft				
	Switch MS EZ Level	0				
	Dax D MS/GCP Mode	Pred				
	Pickup Delay Mode	Auto				
	Dax D Pickup Delay	15 sec				
	Dax D Enable	Not Used				
GCP: track 3 Dax E [5] [9]	Dax E Offset Distance	35 sec				
	Switch MS EZ Level	99 ft				
	Dax E MS/GCP Mode	0				
	Pickup Delay Mode	Pred				
	Dax E Pickup Delay	Auto				
	Dax E Enable	15 sec				
	Dax E Warning Time	Not Used				
GCP: track 3 Dax F [5] [9]	Dax F Offset Distance	35 sec				
	Switch MS EZ Level	99 ft				
	Dax F MS/GCP Mode	0				
	Pickup Delay Mode	Pred				
	Dax F Pickup Delay	Auto				
	Dax F Enable	15 sec				
	Dax F Warning Time	Not Used				
GCP: track 3 Dax G [5] [9]	Dax F Offset Distance	35 sec				
	Switch MS EZ Level	99 ft				
	Dax G MS/GCP Mode	0				
	Pickup Delay Mode	Pred				
	Dax G Pickup Delay	Auto				
	Dax G Enable	15 sec				
	Dax G Warning Time	Not Used				
GCP: track 3 preempt [26]	Prmpt Warning Time	45 sec				
	Prmpt Offset Distance	0 ft				
	Pickup Delay Mode	Fixed				
	Switch MS EZ Level	10				
	Prmpt MS/GCP Mode	Pred				
	Prmpt Pickup Delay	15 sec				
	Prmpt Enable	Not Used				
	Prmpt Enable Pickup	5 sec				

MODEL 4000 GRADE CROSSING PREDICTOR APPLICATION HISTORY

Menu	Menu Entry	Default Value	Initial Setting		Changed Setting	
			Date	Value	Date	Value
GCP: track 3 low EZ detect [5]	Low EZ Detection Used	No				
	Low EZ Detection Level	70				
	Low EZ Detection Time	10 min				
	Positive Start	Off				
	Positive Start Level	10				
	Positive Start Timer	10 min				
	Enhanced Detectn Used	No				
	Station Stop Timer	10 sec				
	False Activate Level	Normal				
	Poor Shunting Level	2				
	Trailing Switch Logic	Off				
GCP: track 3 MS Control [5]	MS/GCP Ctrl IP Used	No				
	MS Sensitivity Level	0				
	Compensation Level	1300				
	Low EX Adjustment	39				
	Bidirn Dax Passthru	No				
GCP: track 4 prime [5]	Prime Warning Time	35 sec				
	Prime Offset Distance	0 ft				
	Switch MS EZ Level	10				
	Prime MS/GCP Mode	Pred				
	Pickup Delay Mode [33]	td [33]				
	Prime Pickup Delay	15 sec				
	Prime UAX	Not Used				
	Prime UAX Pickup	5 sec				
GCP: track 4 Dax A [5] [9]	Dax A Warning Time	35 sec				
	Dax A Offset Distance	99 ft				
	Switch MS EZ Level	0				
	Dax A MS/GCP Mode	Pred				
	Pickup Delay Mode	Auto				
	Dax A Pickup Delay	15 sec				
	Dax A Enable	Not Used				
	Dax A Enable Pickup	2 sec				
GCP: track 4 Dax B [5] [9]	Dax B Warning Time	35 sec				
	Dax B Offset Distance	99 ft				
	Switch MS EZ Level	0				
	Dax B MS/GCP Mode	Pred				
	Pickup Delay Mode	Auto				
	Dax B Pickup Delay	15 sec				
	Dax B Enable	Not Used				
	Dax B Enable Pickup	2 sec				

MODEL 4000 GRADE CROSSING PREDICTOR APPLICATION HISTORY

Menu	Menu Entry	Default Value	Initial Setting		Changed Setting	
			Date	Value	Date	Value
GCP: track 4 Dax C [5] [9]	Dax C Warning Time	35 sec				
	Dax C Offset Distance	99 ft				
	Switch MS EZ Level	0				
	Dax C MS/GCP Mode	Pred				
	Pickup Delay Mode	Auto				
	Dax C Pickup Delay	15 sec				
	Dax C Enable	Not Used				
GCP: track 4 Dax D [5] [9]	Dax D Warning Time	35 sec				
	Dax D Offset Distance	99 ft				
	Switch MS EZ Level	0				
	Dax D MS/GCP Mode	Pred				
	Pickup Delay Mode	Auto				
	Dax D Pickup Delay	15 sec				
	Dax D Enable	Not Used				
GCP: track 4 Dax E [5] [9]	Dax E Offset Distance	35 sec				
	Switch MS EZ Level	99 ft				
	Dax E MS/GCP Mode	0				
	Pickup Delay Mode	Pred				
	Dax E Pickup Delay	Auto				
	Dax E Enable	15 sec				
	Dax E Warning Time	Not Used				
GCP: track 4 Dax F [5] [9]	Dax F Offset Distance	35 sec				
	Switch MS EZ Level	99 ft				
	Dax F MS/GCP Mode	0				
	Pickup Delay Mode	Pred				
	Dax F Pickup Delay	Auto				
	Dax F Enable	15 sec				
	Dax F Warning Time	Not Used				
GCP: track 4 Dax G [5] [9]	Dax F Offset Distance	35 sec				
	Switch MS EZ Level	99 ft				
	Dax G MS/GCP Mode	0				
	Pickup Delay Mode	Pred				
	Dax G Pickup Delay	Auto				
	Dax G Enable	15 sec				
	Dax G Warning Time	Not Used				
GCP: track 4 preempt [26]	Prmpt Warning Time	45 sec				
	Prmpt Offset Distance	0 ft				
	Pickup Delay Mode	Fixed				
	Switch MS EZ Level	10				
	Prmpt MS/GCP Mode	Pred				
	Prmpt Pickup Delay	15 sec				
	Prmpt Enable	Not Used				
	Prmpt Enable Pickup	5 sec				

MODEL 4000 GRADE CROSSING PREDICTOR APPLICATION HISTORY

Menu	Menu Entry	Default Value	Initial Setting		Changed Setting	
			Date	Value	Date	Value
GCP: track 4 low EZ detect [5]	Low EZ Detection Used	No				
	Low EZ Detection Level	70				
	Low EZ Detection Time	10 min				
	Positive Start	Off				
	Positive Start Level	10				
	Positive Start Timer	10 min				
	Enhanced Detectn Used	No				
	Station Stop Timer	10 sec				
	False Activate Level	Normal				
	Poor Shunting Level	2				
	Trailing Switch Logic	Off				
GCP: track 4 MS Control [5]	MS/GCP Ctrl IP Used	No				
	MS Sensitivity Level	0				
	Compensation Level	1300				
	Low EX Adjustment	39				
	Bidirn Dax Passthru	No				
GCP: track 5 prime [5]	Prime Warning Time	35 sec				
	Prime Offset Distance	0 ft				
	Switch MS EZ Level	10				
	Prime MS/GCP Mode	Pred				
	Pickup Delay Mode [33]	td [33]				
	Prime Pickup Delay	15 sec				
	Prime UAX	Not Used				
	Prime UAX Pickup	5 sec				
GCP: track 5 Dax A [5] [9]	Dax A Warning Time	35 sec				
	Dax A Offset Distance	99 ft				
	Switch MS EZ Level	0				
	Dax A MS/GCP Mode	Pred				
	Pickup Delay Mode	Auto				
	Dax A Pickup Delay	15 sec				
	Dax A Enable	Not Used				
	Dax A Enable Pickup	2 sec				
GCP: track 5 Dax B [5] [9]	Dax B Warning Time	35 sec				
	Dax B Offset Distance	99 ft				
	Switch MS EZ Level	0				
	Dax B MS/GCP Mode	Pred				
	Pickup Delay Mode	Auto				
	Dax B Pickup Delay	15 sec				
	Dax B Enable	Not Used				
	Dax B Enable Pickup	2 sec				

MODEL 4000 GRADE CROSSING PREDICTOR APPLICATION HISTORY

Menu	Menu Entry	Default Value	Initial Setting		Changed Setting	
			Date	Value	Date	Value
GCP: track 5 Dax C [5] [9]	Dax C Warning Time	35 sec				
	Dax C Offset Distance	99 ft				
	Switch MS EZ Level	0				
	Dax C MS/GCP Mode	Pred				
	Pickup Delay Mode	Auto				
	Dax C Pickup Delay	15 sec				
	Dax C Enable	Not Used				
GCP: track 5 Dax D [5] [9]	Dax D Warning Time	35 sec				
	Dax D Offset Distance	99 ft				
	Switch MS EZ Level	0				
	Dax D MS/GCP Mode	Pred				
	Pickup Delay Mode	Auto				
	Dax D Pickup Delay	15 sec				
	Dax D Enable	Not Used				
GCP: track 5 Dax E [5] [9]	Dax E Offset Distance	35 sec				
	Switch MS EZ Level	99 ft				
	Dax E MS/GCP Mode	0				
	Pickup Delay Mode	Pred				
	Dax E Pickup Delay	Auto				
	Dax E Enable	15 sec				
	Dax E Warning Time	Not Used				
GCP: track 5 Dax F [5] [9]	Dax F Offset Distance	35 sec				
	Switch MS EZ Level	99 ft				
	Dax F MS/GCP Mode	0				
	Pickup Delay Mode	Pred				
	Dax F Pickup Delay	Auto				
	Dax F Enable	15 sec				
	Dax F Warning Time	Not Used				
GCP: track 5 Dax G [5] [9]	Dax F Offset Distance	35 sec				
	Switch MS EZ Level	99 ft				
	Dax G MS/GCP Mode	0				
	Pickup Delay Mode	Pred				
	Dax G Pickup Delay	Auto				
	Dax G Enable	15 sec				
	Dax G Warning Time	Not Used				
GCP: track 5 preempt [26]	Prmpt Warning Time	45 sec				
	Prmpt Offset Distance	0 ft				
	Pickup Delay Mode	Fixed				
	Switch MS EZ Level	10				
	Prmpt MS/GCP Mode	Pred				
	Prmpt Pickup Delay	15 sec				
	Prmpt Enable	Not Used				
	Prmpt Enable Pickup	5 sec				

MODEL 4000 GRADE CROSSING PREDICTOR APPLICATION HISTORY

Menu	Menu Entry	Default Value	Initial Setting		Changed Setting	
			Date	Value	Date	Value
GCP: track 5 low EZ detect [5]	Low EZ Detection Used	No				
	Low EZ Detection Level	70				
	Low EZ Detection Time	10 min				
	Positive Start	Off				
	Positive Start Level	10				
	Positive Start Timer	10 min				
	Enhanced Detectn Used	No				
	Station Stop Timer	10 sec				
	False Activate Level	Normal				
	Poor Shunting Level	2				
	Trailing Switch Logic	Off				
GCP: track 5 MS Control [5]	MS/GCP Ctrl IP Used	No				
	MS Sensitivity Level	0				
	Compensation Level	1300				
	Low EX Adjustment	39				
	Bidirn Dax Passthru	No				
GCP: track 6 prime [5]	Prime Warning Time	35 sec				
	Prime Offset Distance	0 ft				
	Switch MS EZ Level	10				
	Prime MS/GCP Mode	Pred				
	Pickup Delay Mode [33]	td [33]				
	Prime Pickup Delay	15 sec				
	Prime UAX	Not Used				
	Prime UAX Pickup	5 sec				
GCP: track 6 Dax A [5] [9]	Dax A Warning Time	35 sec				
	Dax A Offset Distance	99 ft				
	Switch MS EZ Level	0				
	Dax A MS/GCP Mode	Pred				
	Pickup Delay Mode	Auto				
	Dax A Pickup Delay	15 sec				
	Dax A Enable	Not Used				
	Dax A Enable Pickup	2 sec				
GCP: track 6 Dax B [5] [9]	Dax B Warning Time	35 sec				
	Dax B Offset Distance	99 ft				
	Switch MS EZ Level	0				
	Dax B MS/GCP Mode	Pred				
	Pickup Delay Mode	Auto				
	Dax B Pickup Delay	15 sec				
	Dax B Enable	Not Used				
	Dax B Enable Pickup	2 sec				

MODEL 4000 GRADE CROSSING PREDICTOR APPLICATION HISTORY

Menu	Menu Entry	Default Value	Initial Setting		Changed Setting	
			Date	Value	Date	Value
GCP: track 6 Dax C [5] [9]	Dax C Warning Time	35 sec				
	Dax C Offset Distance	99 ft				
	Switch MS EZ Level	0				
	Dax C MS/GCP Mode	Pred				
	Pickup Delay Mode	Auto				
	Dax C Pickup Delay	15 sec				
	Dax C Enable	Not Used				
GCP: track 6 Dax D [5] [9]	Dax D Warning Time	35 sec				
	Dax D Offset Distance	99 ft				
	Switch MS EZ Level	0				
	Dax D MS/GCP Mode	Pred				
	Pickup Delay Mode	Auto				
	Dax D Pickup Delay	15 sec				
	Dax D Enable	Not Used				
GCP: track 6 Dax E [5] [9]	Dax E Offset Distance	35 sec				
	Switch MS EZ Level	99 ft				
	Dax E MS/GCP Mode	0				
	Pickup Delay Mode	Pred				
	Dax E Pickup Delay	Auto				
	Dax E Enable	15 sec				
	Dax E Warning Time	Not Used				
GCP: track 6 Dax F [5] [9]	Dax F Offset Distance	35 sec				
	Switch MS EZ Level	99 ft				
	Dax F MS/GCP Mode	0				
	Pickup Delay Mode	Pred				
	Dax F Pickup Delay	Auto				
	Dax F Enable	15 sec				
	Dax F Warning Time	Not Used				
GCP: track 6 Dax G [5] [9]	Dax F Offset Distance	35 sec				
	Switch MS EZ Level	99 ft				
	Dax G MS/GCP Mode	0				
	Pickup Delay Mode	Pred				
	Dax G Pickup Delay	Auto				
	Dax G Enable	15 sec				
	Dax G Warning Time	Not Used				
GCP: track 6 preempt [26]	Prmpt Warning Time	45 sec				
	Prmpt Offset Distance	0 ft				
	Pickup Delay Mode	Fixed				
	Switch MS EZ Level	10				
	Prmpt MS/GCP Mode	Pred				
	Prmpt Pickup Delay	15 sec				
	Prmpt Enable	Not Used				
	Prmpt Enable Pickup	5 sec				

MODEL 4000 GRADE CROSSING PREDICTOR APPLICATION HISTORY

Menu	Menu Entry	Default Value	Initial Setting		Changed Setting	
			Date	Value	Date	Value
GCP: track 6 low EZ detect [5]	Low EZ Detection Used	No				
	Low EZ Detection Level	70				
	Low EZ Detection Time	10 min				
	Positive Start	Off				
	Positive Start Level	10				
	Positive Start Timer	10 min				
	Enhanced Detectn Used	No				
	Station Stop Timer	10 sec				
	False Activate Level	Normal				
	Poor Shunting Level	2				
	Trailing Switch Logic	Off				
GCP: track 6 MS Control [5]	MS/GCP Ctrl IP Used	No				
	MS Sensitivity Level	0				
	Compensation Level	1300				
	Low EX Adjustment	39				
	Bidirn Dax Passthru	No				
ISLAND: track 1 [2] [5]	Isl Frequency	Not Set				
	Pickup Delay(2s +) [34]	0 sec				
	Pickup Delay[35]	1 sec				
ISLAND: track 2 [2] [5]	Isl Frequency	Not Set				
	Pickup Delay(2s +) [34]	0 sec				
	Pickup Delay[35]	1 sec				
ISLAND: track 3 [2] [5]	Isl Frequency	Not Set				
	Pickup Delay(2s +) [34]	0 sec				
	Pickup Delay[35]	1 sec				
ISLAND: track 4 [2] [5]	Isl Frequency	Not Set				
	Pickup Delay(2s +) [34]	0 sec				
	Pickup Delay[35]	1 sec				
ISLAND: track 5 [2] [5]	Isl Frequency	Not Set				
	Pickup Delay(2s +) [34]	0 sec				
	Pickup Delay[35]	1 sec				
ISLAND: track 6 [2] [5]	Isl Frequency	Not Set				
	Pickup Delay(2s +) [34]	0 sec				
	Pickup Delay[35]	1 sec				
AND: track Anding	AND 1 XR Used	Yes				
	AND 2 Used	No				
	AND 3 Used	No				
	AND 4 Used	No				
	AND 5 Used	No				
	AND 6 Used	No				
	AND 7 Used	No				
	AND 8 Used	No				

MODEL 4000 GRADE CROSSING PREDICTOR APPLICATION HISTORY

Menu	Menu Entry	Default Value	Initial Setting		Changed Setting	
			Date	Value	Date	Value
AND: AND 1 XR [14]	AND 1 XR Track 1 [5]	Prime				
	AND 1 XR Track 2 [5]	Prime				
	AND 1 XR Track 3 [5]	Prime				
	AND 1 XR Track 4 [5]	Prime				
	AND 1 XR Track 5 [5]	Prime				
	AND 1 XR Track 6 [5]	Prime				
	AND 1 Enable Used	Yes				
	And 1 Enable Pickup [15]	5 sec				
	And 1 Enable Drop [15]	0 sec				
	And 1 Wrap Used	No				
AND: AND 2 [14]	AND 2 Track 1 [5]	Not Used				
	AND 2 Track 2 [5]	Not Used				
	AND 2 Track 3 [5]	Not Used				
	AND 2 Track 4 [5]	Not Used				
	AND 2 Track 5 [5]	Not Used				
	AND 2 Track 6 [5]	Not Used				
	AND 2 Enable Used	No				
	And 2 Enable Pickup [15]	2 sec				
	And 2 Enable Drop [15]	0 sec				
	And 2 Wrap Used	No				
AND: AND 3 [14]	AND 3 Track 1 [5]	Not Used				
	AND 3 Track 2 [5]	Not Used				
	AND 3 Track 3 [5]	Not Used				
	AND 3 Track 4 [5]	Not Used				
	AND 3 Track 5 [5]	Not Used				
	AND 3 Track 6 [5]	Not Used				
	AND 3 Enable Used	No				
	And 3 Enable Pickup [15]	2 sec				
	And 3 Enable Drop [15]	0 sec				
	And 3 Wrap Used	No				
AND: AND 4 [14]	AND 4 Track 1 [5]	Not Used				
	AND 4 Track 2 [5]	Not Used				
	AND 4 Track 3 [5]	Not Used				
	AND 4 Track 4 [5]	Not Used				
	AND 4 Track 5 [5]	Not Used				
	AND 4 Track 6 [5]	Not Used				
	AND 4 Enable Used	No				
	And 4 Enable Pickup [15]	2 sec				
	And 4 Enable Drop [15]	0 sec				
	And 4 Wrap Used	No				

MODEL 4000 GRADE CROSSING PREDICTOR APPLICATION HISTORY

Menu	Menu Entry	Default Value	Initial Setting		Changed Setting	
			Date	Value	Date	Value
AND: AND 5 [14]	AND 5 Track 1 [5]	Not Used				
	AND 5 Track 2 [5]	Not Used				
	AND 5 Track 3 [5]	Not Used				
	AND 5 Track 4 [5]	Not Used				
	AND 5 Track 5 [5]	Not Used				
	AND 5 Track 6 [5]	Not Used				
	AND 5 Enable Used	No				
	And 5 Enable Pickup [15]	2 sec				
	And 5 Enable Drop [15]	0 sec				
	And 5 Wrap Used	No				
AND: AND 6 [14]	AND 6 Track 1 [5]	Not Used				
	AND 6 Track 2 [5]	Not Used				
	AND 6 Track 3 [5]	Not Used				
	AND 6 Track 4 [5]	Not Used				
	AND 6 Track 5 [5]	Not Used				
	AND 6 Track 6 [5]	Not Used				
	AND 6 Enable Used	No				
	And 6 Enable Pickup [15]	2 sec				
	And 6 Enable Drop [15]	0 sec				
	And 6 Wrap Used	No				
ADVANCED: MS restart	MS/GCP Restart Used	No				
	MS/GCP Restart all Trks [27]	Yes				
	MS/GCP Restart Time [27]	10 sec				
ADVANCED: restart track 1 [5]	Prime switch to MS [28]	Yes				
	Dax A switch to MS [28]	No				
	Dax B switch to MS [28]	No				
	Dax C switch to MS [28]	No				
	Dax D switch to MS [28]	No				
	Dax E switch to MS [28]	No				
	Dax F switch to MS [28]	No				
	Dax G switch to MS [28]	No				
	Preempt switch to MS [3]	Yes				
ADVANCED: restart track 2 [5]	Prime switch to MS [28]	Yes				
	Dax A switch to MS [28]	No				
	Dax B switch to MS [28]	No				
	Dax C switch to MS [28]	No				
	Dax D switch to MS [28]	No				
	Dax E switch to MS [28]	No				
	Dax F switch to MS [28]	No				
	Dax G switch to MS [28]	No				
	Preempt switch to MS [3]	Yes				

MODEL 4000 GRADE CROSSING PREDICTOR APPLICATION HISTORY

Menu	Menu Entry	Default Value	Initial Setting		Changed Setting	
			Date	Value	Date	Value
ADVANCED: restart track 3 [5]	Prime switch to MS [28]	Yes				
	Dax A switch to MS [28]	No				
	Dax B switch to MS [28]	No				
	Dax C switch to MS [28]	No				
	Dax D switch to MS [28]	No				
	Dax E switch to MS [28]	No				
	Preempt switch to MS [3]	Yes				
ADVANCED: restart track 4 [5]	Prime switch to MS [28]	Yes				
	Dax A switch to MS [28]	No				
	Dax B switch to MS [28]	No				
	Dax C switch to MS [28]	No				
	Dax D switch to MS [28]	No				
	Dax G switch to MS [28]	No				
	Preempt switch to MS [3]	Yes				
ADVANCED: restart track 5 [5]	Prime switch to MS [28]	Yes				
	Dax A switch to MS [28]	No				
	Dax B switch to MS [28]	No				
	Dax C switch to MS [28]	No				
	Dax D switch to MS [28]	No				
	Dax G switch to MS [28]	No				
	Preempt switch to MS [3]	Yes				
ADVANCED: restart track 6 [5]	Prime switch to MS [28]	Yes				
	Dax A switch to MS [28]	No				
	Dax B switch to MS [28]	No				
	Dax C switch to MS [28]	No				
	Dax D switch to MS [28]	No				
	Dax G switch to MS [28]	No				
	Preempt switch to MS [3]	Yes				
ADVANCED: out of service	OOS Control	Display				
	OOS Timeout [36]	Yes				
	OOS Timeout [37]	1 hrs				
ADVANCED: track wrap circuits	Wrap LOS Timer	5 sec				
	Track 1 Wrap Used [5]	No				
	Track 2 Wrap Used [5]	No				
	Track 3 Wrap Used [5]	No				
	Track 4 Wrap Used [5]	No				
	Track 5 Wrap Used [5]	No				
	Track 6 Wrap Used [5]	No				
ADVANCED: trk 1 overrides	All Predictors Override Used	No				
	Dax A Override Used [29] [10]	No				
	Dax B Override Used [29] [10]	No				
	Dax C Override Used [29] [10]	No				

MODEL 4000 GRADE CROSSING PREDICTOR APPLICATION HISTORY

Menu	Menu Entry	Default Value	Initial Setting		Changed Setting	
			Date	Value	Date	Value
ADVANCED: trk 2 overrides	All Predictors Override Used	No				
	Dax A Override Used [29] [10]	No				
	Dax B Override Used [29] [10]	No				
	Dax C Override Used [29] [10]	No				
ADVANCED: trk 3 overrides	All Predictors Override Used	No				
	Dax A Override Used [29] [10]	No				
	Dax B Override Used [29] [10]	No				
	Dax C Override Used [29] [10]	No				
ADVANCED: trk 4 overrides	All Predictors Override Used	No				
	Dax A Override Used [29] [10]	No				
	Dax B Override Used [29] [10]	No				
	Dax C Override Used [29] [10]	No				
ADVANCED: trk 5 overrides	All Predictors Override Used	No				
	Dax A Override Used [29] [10]	No				
	Dax B Override Used [29] [10]	No				
	Dax C Override Used [29] [10]	No				
ADVANCED: trk 6 overrides	All Predictors Override Used	No				
	Dax A Override Used [29] [10]	No				
	Dax B Override Used [29] [10]	No				
	Dax C Override Used [29] [10]	No				
ADVANCED: OR logic	OR 1 Used	No				
	OR 2 Used	No				
	OR 3 Used	No				
	OR 4 Used	No				
ADVANCED: OR 1	OR 1 Term 1	Not Used				
	OR 1 Term 2	Not Used				
	OR 1 Term 3	Not Used				
	OR 1 Term 4	Not Used				
ADVANCED: OR 2	OR 2 Term 1	Not Used				
	OR 2 Term 2	Not Used				
	OR 2 Term 3	Not Used				
	OR 2 Term 4	Not Used				
ADVANCED: OR 3	OR 3 Term 1	Not Used				
	OR 3 Term 2	Not Used				
	OR 3 Term 3	Not Used				
	OR 3 Term 4	Not Used				
ADVANCED: OR 4	OR 4 Term 1	Not Used				
	OR 4 Term 2	Not Used				
	OR 4 Term 3	Not Used				
	OR 4 Term 4	Not Used				

MODEL 4000 GRADE CROSSING PREDICTOR APPLICATION HISTORY

Menu	Menu Entry	Default Value	Initial Setting		Changed Setting	
			Date	Value	Date	Value
ADVANCED: internal I/O 1	Pass Thrus	No				
	Int.1 Sets	Not Used				
	Int.1 Sets by	Not Used				
	Int.2 Sets	Not Used				
	Int.2 Sets by	Not Used				
	Int.3 Sets	Not Used				
	Int.3 Sets by	Not Used				
	Int.4 Sets	Not Used				
	Int.4 Sets by	Not Used				
ADVANCED: internal I/O 2	Int.5 Sets	Not Used				
	Int.5 Sets by	Not Used				
	Int.6 Sets	Not Used				
	Int.6 Sets by	Not Used				
	Int.7 Sets	Not Used				
	Int.7 Sets by	Not Used				
	Int.8 Sets	Not Used				
	Int.8 Sets by	Not Used				
ADVANCED: site options	Daylight Savings	Off				
	Units	Standard				
	Ext Maint Call Input	No				
	Emeregncy Activate IP	No				
	EZ/EX Logging	Change				
	EZ/EX Point Change	3				
SSCC [20]	Gates Used	Yes				
	SSCC 1+2 GPs Coupled[39]	Yes				
	Min Activation	0 sec				
	Remote Activation Cancel	2 min				
	Bell On Gate Rising[39]	No				
	Mute Bell On Gate Down[39]	No				
	SSCCIV Controller Used	No				
	4000 Controller Type[38]	Exit				
SSCCIV: Control and ATCS Setup[38]	SSCCIV Activation	AND 1 XR				
	RRR Offset	0				
	LLL Offset	0				
	GGG Offset	0				
	SS Offset	32769				
	Msg Timeout	3600 msec				
	Msg Update Interval	800 msec				
	Max Time Offset	10 sec				

MODEL 4000 GRADE CROSSING PREDICTOR APPLICATION HISTORY

Menu	Menu Entry	Default Value	Initial Setting		Changed Setting	
			Date	Value	Date	Value
SSCC: 1 [20]	SSCC-1 Activation[39]	AND 1 XR				
	SSCC-1 Gate Delay	4 sec				
	SSCC-1 Number of GPs	1				
	SSCC-1 Number of GDs	2				
	Flash Rate	50				
	Low Battery Detection	No				
	Flash Sync	master				
	Invert Gate Output	No				
	Lamp Neutral Test	On				
	Aux-1 Xng Ctrl Used	No				
	Aux-1 Xng Ctrl Hlth IP[40]	Yes				
SSCC: 2 [20]	SSCC-2 Activation	AND 1 XR				
	SSCC-2 Gate Delay	4 sec				
	SSCC-2 Number of GPs	0				
	SSCC-2 Number of GDs	0				
	Flash Rate	50				
	Low Battery Detection	No				
	Flash Sync	slave				
	Invert Gate Output	No				
	Lamp Neutral Test	On				
	Aux-2 Xng Ctrl Used	No				
	Aux-2 Xng Ctrl Hlth IP[40]	Yes				
OUTPUT: assignment page 1 [16]	Out 1.1 [5]	Not Used				
	Out 1.2 [5]	Not Used				
	Out 2.1 [5]	Not Used				
	Out 2.2 [5]	Not Used				
	Out 2.3 [5]	Not Used				
	Out 2.4 [5]	Not Used				
	Out 3.1 [5]	Not Used				
	Out 3.2 [5]	Not Used				
	Out 4.1 [5]	Not Used				
	Out 4.2 [5]	Not Used				
OUTPUT: assignment page 2 [17]	Out 5.1 [18]	Not Used				
	Out 5.2 [18]	Not Used				
	Out 5.3 [18]	Not Used				
	Out 5.4 [18]	Not Used				
	Out 6.1 [18]	Not Used				
	Out 6.2 [18]	Not Used				
	Out 6.3 [19]	Not Used				
	Out 6.4 [19]	Not Used				

MODEL 4000 GRADE CROSSING PREDICTOR APPLICATION HISTORY

Menu	Menu Entry	Default Value	Initial Setting		Changed Setting	
			Date	Value	Date	Value
INPUT: assignment page 1 [16]	**IN 1.1** [14]	**Not Used**				
	IN 1.2 [14]	**Not Used**				
	IN 2.1 [15]	**Not Used**				
	IN 2.2 [15]	**Not Used**				
	IN 2.3 [15]	**Not Used**				
	IN 2.4 [15]	**Not Used**				
	IN 3.1 [16]	**Not Used**				
	IN 3.2 [16]	**Not Used**				
	IN 4.1 [17]	**Not Used**				
	IN 4.2 [17]	**Not Used**				
INPUT: assignment page 2 [17]	**IP 5.1** [18]	**Not Used**				
	IP 5.2 [18]	**Not Used**				
	IP 5.3 [19]	**Not Used**				
	IP 5.4 [19]	**Not Used**				
	IP 6.1 [18]	**Not Used**				
	IP 6.2 [18]	**Not Used**				
	IP 6.3 [19]	**Not Used**				
	IP 6.4 [19]	**Not Used**				
IO: assignment SSCC [2] [20]	**OUT GC 1**[20]	**Gate Output 1**				
	OUT GC 2[20]	**Gate Output 2**				
	IN 7.1 [20]	**Not Used**				
	IN 7.2 [20]	**GD 1.2**				
	IN 7.3 [20]	**Not Used**				
	IN 7.4 [20]	**GD 1.1**				
	IN 7.5 [20]	**GP 1.1**				
	IN 8.1 [20]	**Not Used**				
	IN 8.2 [20]	**Not Used**				
	IN 8.3 [20]	**Not Used**				
	IN 8.4 [20]	**Not Used**				
	IN 8.5 [20]	**Not Used**				
SEAR [21]	**SEAR Subnode**	**99**				
	DI 1	**Not Used**				
	DI 2	**Not Used**				
	Rly 1	**Not Used**				
	Rly 2	**Not Used**				
SEAR: inputs [21] [30]	**SP 2.1**	**POK 1**				
	SP 3.1	**Door 1**				
	SP 4.1	**Not Used**				
	SP 5.1	**Not Used**				
	SP 6.1	**Not Used**				

MODEL 4000 GRADE CROSSING PREDICTOR APPLICATION HISTORY

Menu	Menu Entry	Default Value	Initial Setting		Changed Setting	
			Date	Value	Date	Value
SEAR: slot 1-4 inputs [21]	IN 1.1	Not Used				
	IN 1.2	Not Used				
	IN 2.1	Not Used				
	IN 2.2	Not Used				
	IN 2.3	Not Used				
	IN 2.4	Not Used				
	IN 3.1	Not Used				
	IN 3.2	Not Used				
	IN 4.1	Not Used				
	IN 4.2	Not Used				
SEAR: slot 5 inputs [21]	IN 5.1	Not Used				
	IN 5.2	Not Used				
	IN 5.3	Not Used				
	IN 5.4	Not Used				
	IN 5.5	Not Used				
	IN 5.6	Not Used				
	IN 5.7	Not Used				
	IN 5.8	Not Used				
SEAR: slot 6 inputs [21]	IN 6.1	Not Used				
	IN 6.2	Not Used				
	IN 6.3	Not Used				
	IN 6.4	Not Used				
	IN 6.5	Not Used				
	IN 6.6	Not Used				
	IN 6.7	Not Used				
	IN 6.8	Not Used				
SEAR: slot 7-8 inputs [21]	IN 7.1	Not Used				
	IN 7.2	Not Used				
	IN 7.3	Not Used				
	IN 7.4	Not Used				
	IN 8.1	Not Used				
	IN 8.2	Not Used				
	IN 8.3	Not Used				
	IN 8.4	Not Used				
	IN 8.5	Not Used				
SITE: programming	Radio Subnode	1				
	Password Access	Off				
	Low Battery Enabled	Off				

Notes:

[1] Template dependant
[2] Not used in MTF_4A and MTF_5A.
[3] Appears only when Preempt Logic is set to Advnce.
[4] Appears only when Preempt Logic is set to Advnce or Simult.
[5] Appears only when corresponding track slot is set to Track.
[6] Appears only when corresponding track Prime UAX is set to IP, RDAX or IP + RDAX
[7] Used only in MTF_3A through MTF_3G, MTF_4A, and MTF_5A.
[8] Appears only when corresponding Track Dax A Enable is set to IP, RDAX, or IP + RDAX.
[9] Appears only for unidirectional designated track.
[10] Appears only when corresponding track Dax Uses is set to yes.
[11] Used only in MTF_3F, MTF_4A, and MTF_5A.
[12] Used only in MTF_3B through MTF_3D, MTF_3G, MTF_4A, and MTF_5A.
[13] Does not appear in MTF_1A and MTF_1B.
[14] Appears only when corresponding AND Used is set to Yes.
[15] Appears only when corresponding AND Enable Used is set to Yes.
[16] Appears only when Track 1, Track 2, Track 3, or Track 4 Slot is set to Track.
[17] Appears only when either Track /RIO slot Slot is set to Track or RIO.
[18] Appears only when corresponding Track /RIO Slot is set to Track or RIO.
[19] Appears only when corresponding Track /RIO Slot is set to RIO.
[20] Appears only when SSCC Slot is set to SSCC3i.
[21] Appears only when SEAR Used is set to Yes.
[22] Appears only when Track 1 Slot is set to Track and Prime Used is set to Yes.
[23] Appears only when Radio DAX link Used is set to Yes.
[24] Appears only when corresponding Track Slot is set to Track and Radio DAX link A Used is set to Yes.
[25] Appears only when the corresponding Track DAX to by link is set to Yes.
[26] Appears only when Track 1 slot is set to Track and Preempt Logic is set to Advnce or Simult.
[27] Appears only when MS/GCP Restart Used is set to Yes.
[28] Appears only when corresponding predictor Use (Prime or DAX) is set to Yes.
[29] Appears only when corresponding Track All Predictors Override is set to No.
[30] Appears only when neither Track 5/RIO 1 or Track 6/RIO 2 Slot is set to SEAR input.
[31] deleted
[32] Appears only when Vital Comms link Used set to Yes
[33] Appear only when offset distance greater than 0
[34] Appears only when Island Used is set to Internal
[35] Appears only when Island Used is set to External
[36] Appears only when OOS Control set to Display or Display+OOS IPs
[37] Appears only when OOS Control set to Display or Display+OOS IPs and OOS Timeout set to yes
[38] Appears only when SSCCIV Controller Used set to Yes
[39] Appears only when SSCCIV Controller Used is No or 4000 Control Type is Entance
[40] Appeards only when Aux Xng Ctrl Used is set to yes

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