4000 GCP Crossing System
Maintainer's Handbook

Document Number: SIG-00-04-02
Version: B
March 2007

PROPRIETARY INFORMATION

SAFETRAN SYSTEMS CORPORATION has a proprietary interest in the information contained herein and, in some instances, has patent rights in the systems and components described. It is requested that you distribute this information only to those responsible people within your organization with an official interest.

This document, or the information disclosed herein, shall not be reproduced or transferred to other documents or used or disclosed for manufacturing or for any other purpose except as specifically authorized in writing by **SAFETRAN SYSTEMS CORPORATION**.

SAFETRAN SYSTEMS CORPORATION
CALIFORNIA DIVISION
10655 7th STREET
RANCHO CUCAMONGA, CALIFORNIA 91730
TELEPHONE: (909) 532-5300
CUSTOMER SERVICE: (800) 793-7233
TECHNICAL SUPPORT: (800) 793-7233
FAX: (909) 532-5400

TABLE OF CONTENTS

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. • Does not apply to Location, Milepost or DOT parameters • The CCN changes for the following: ♦ If any program parameter (hidden or not) is changed. ♦ If SIN is changed. ♦ If computed approach distance or linearization number changed. ♦ If any calibrations change to or from 'calibration required'.
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.

GLOSSARY continued

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.

GLOSSARY continued

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.

GLOSSARY continued

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 with a lower ballast resistance than the rest of the approach due to 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 is the GCP application logic file.
MEF:	Module Executable File is 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.

GLOSSARY continued

OCCN: Office Configuration Check Number – The 32 bit CRC of the configuration data, excluding field configurable parameters which will need to be verified and adjusted depending upon the exact site conditions.

- The OCCN does not change with changes to the following:
  - ♦ GCP or island frequencies
  - ♦ Computed approach distance or linearization values
  - ♦ Prime, DAX or Preempt offset distances
  - ♦ GCP transmit level
  - ♦ GCP approach or island distance (in current MCF, changing island distance will change OCCN in Bi-directional applications).
    - ▪ No need to program Island Distance in Bi-directional
    - ▪ Island distance only used in DAX logic

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 port or USB drive.

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.

RADIO DAX: DAX information transmitted via Spread Spectrum Radio or other communications devices.

RIO: Relay Input Output Module

GLOSSARY continued

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
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.
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).

GLOSSARY continued

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.

This page intentionally left blank

INTRODUCTION

This handbook is intended to provide guidance to maintenance personnel and supplement the *Microprocessor Based Grade Crossing Predictor Model 4000 Family Reference Manual, Document No: SIG-00-02-02*. Refer to the reference manual for detailed procedures and definitions.

WARNING

DURING MODULE CHANGE OUT, MODULE SOFTWARE UPDATES, REBOOT AND CALIBRATION PROCEDURES, WARNING DEVICES MAY NOT OPERATE AS INTENDED. TAKE ALTERNATE MEANS TO WARN VEHICULAR TRAFFIC, PEDESTRIANS, AND EMPLOYEES.

4000 GCP CHASSIS CONFIGURATIONS

Common Chassis Components

The various 4000 GCP chassis encountered in the field will have the following similarities (see figure 1):

- Echelon connector location
- Chassis diagnostic port location, same as the DIAG (CP) port of the active CPU in dual units
- Battery/CPU interface connector location
- CPU Module connector location (left most card slot)
- CIC (Chassis Identification Chip) location
- ECD (External Configuration Device) location
- Grounding strap location
- Keyed Interface Connectors

NOTE

The keyed interface connectors used on the 4000 GCP front panel consist of both screw-down type and cage-clamp type connectors. Refer to Appendix D for wire preparation and insertion instructions.

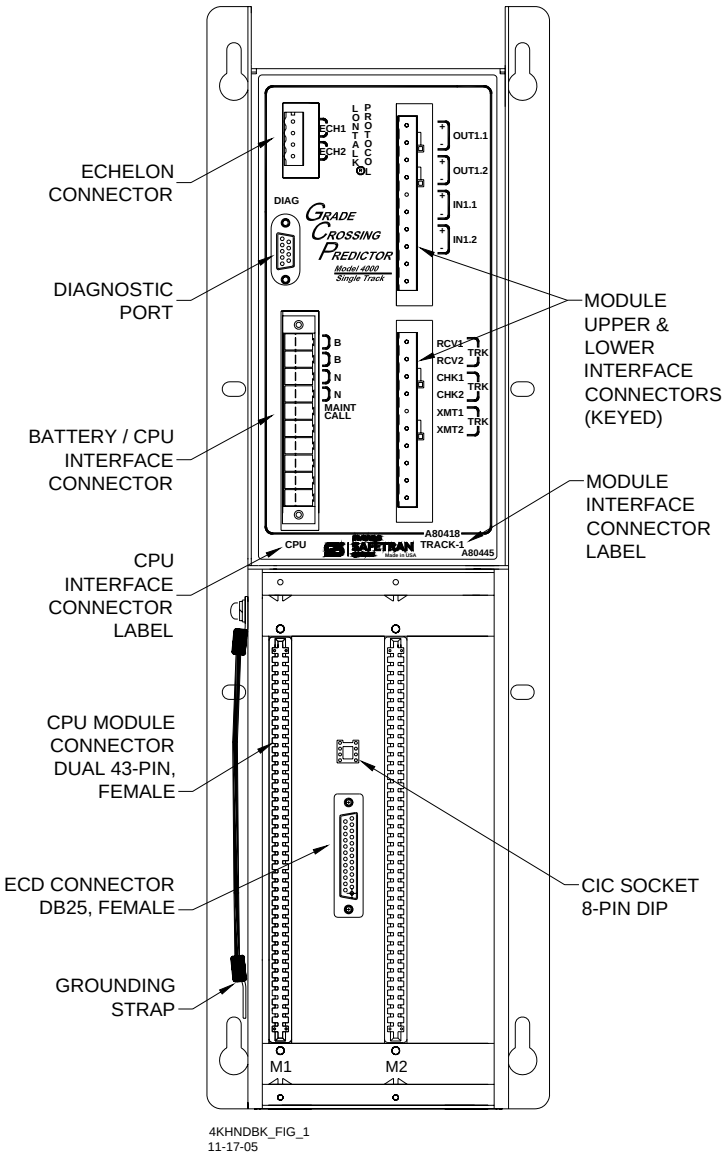


Fig. 1. Common Chassis Component Locations

Module Locations, Dual Six-Track Chassis (A80460)

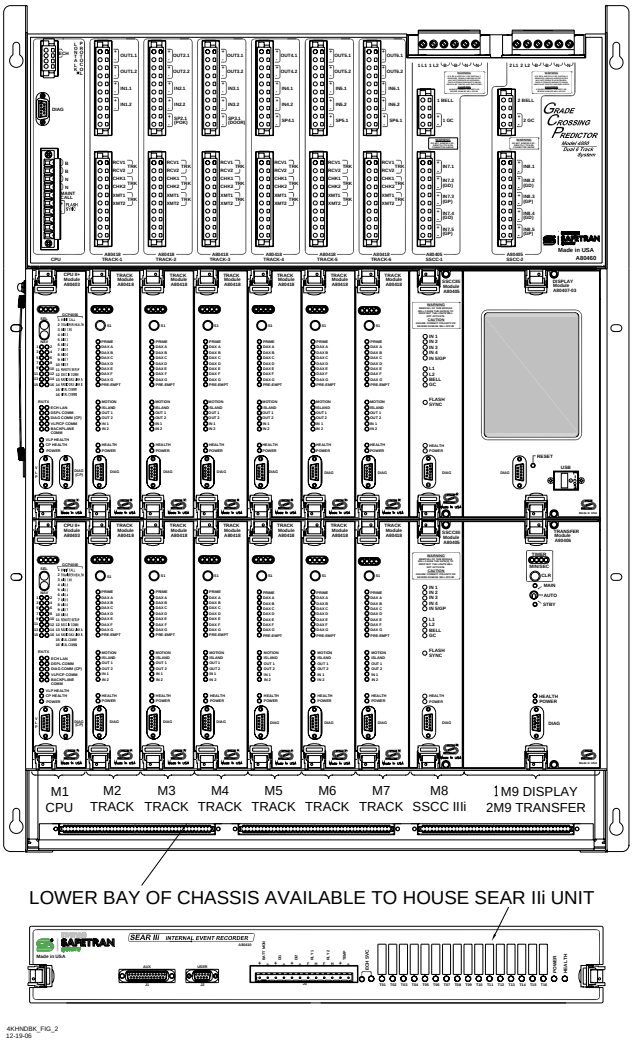


Fig. 2. Module Locations, Dual 6-Track Chassis, A80460

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

*MAIN & STANDBY may contain RIO in slots M3, M6 & M7.

Module Locations, Dual Two-Track Chassis (A80465)

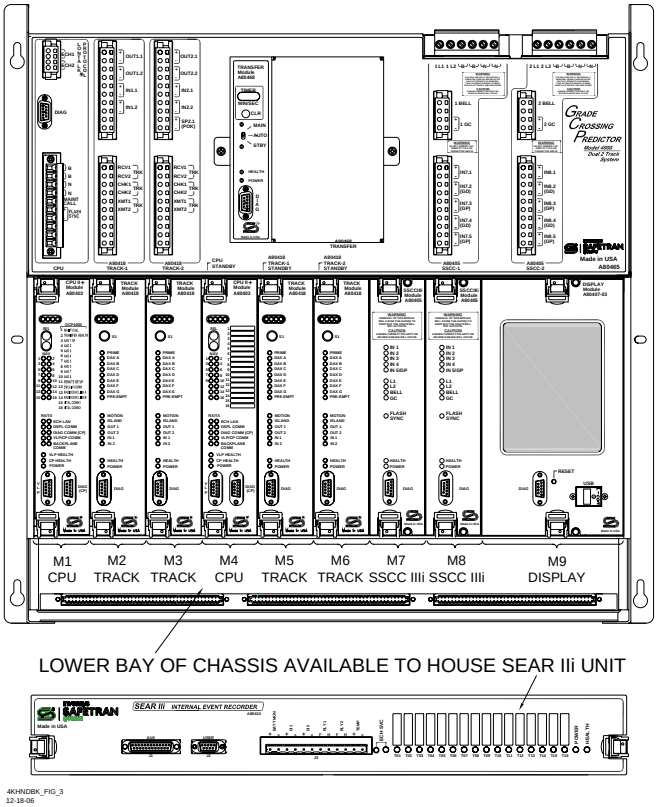


Fig. 3. Module Locations, Dual 2-Track Chassis, A80465

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 & STANDBY may use RIO in Track-2 slots (M3 & M6)

Module Locations, Single Five-Track Chassis (A80440)

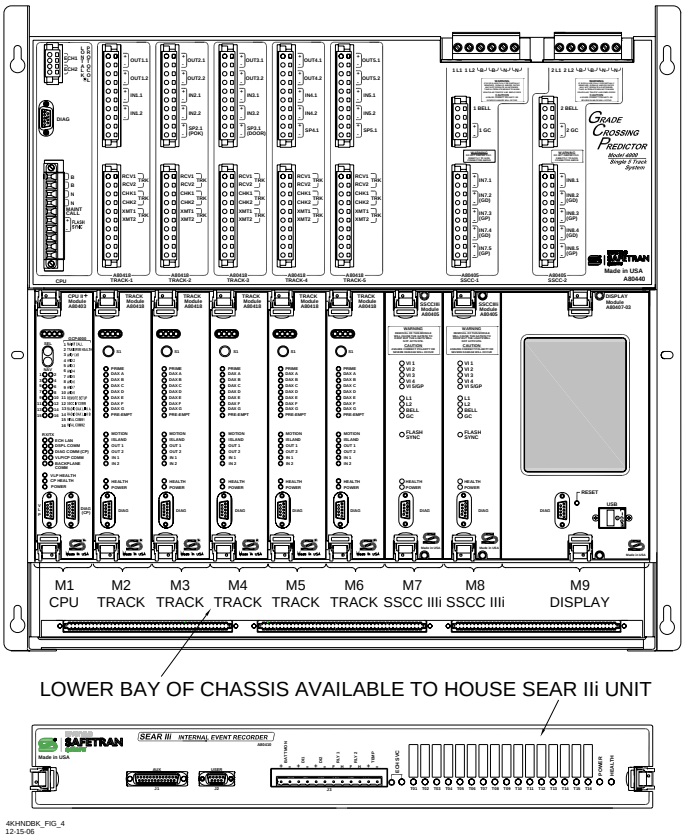


Fig. 4. Module Locations, Single 5-Track Chassis, A80440

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 & M6.

Module Locations, Dual Four-Track Chassis (A80400)

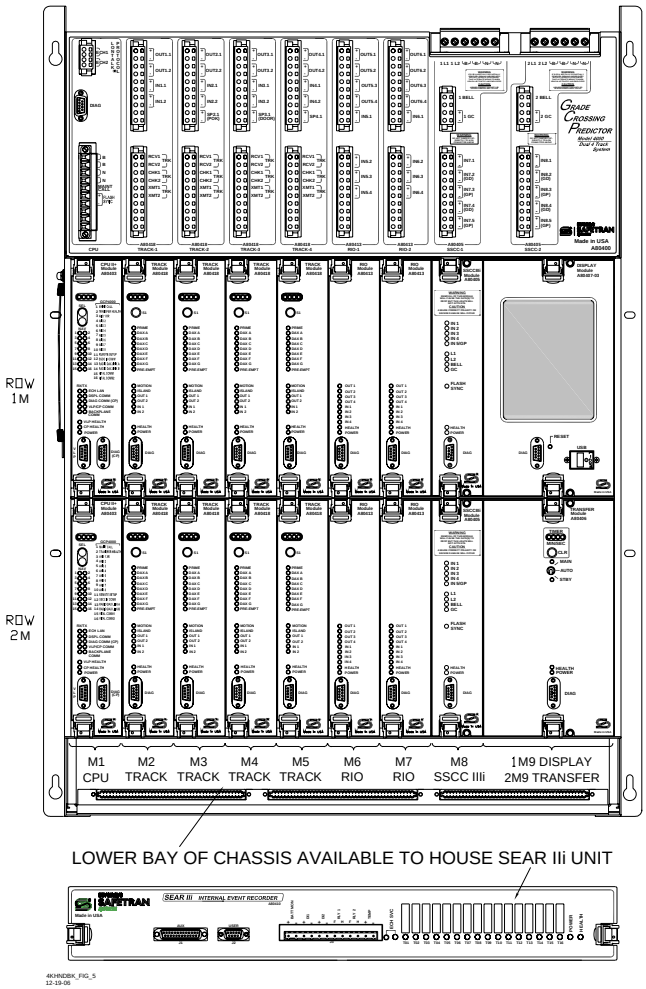


Fig. 5. Module Locations, Dual 4-Track Chassis, A80400

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

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

Module Locations, Basic Crossing Chassis (A80455)

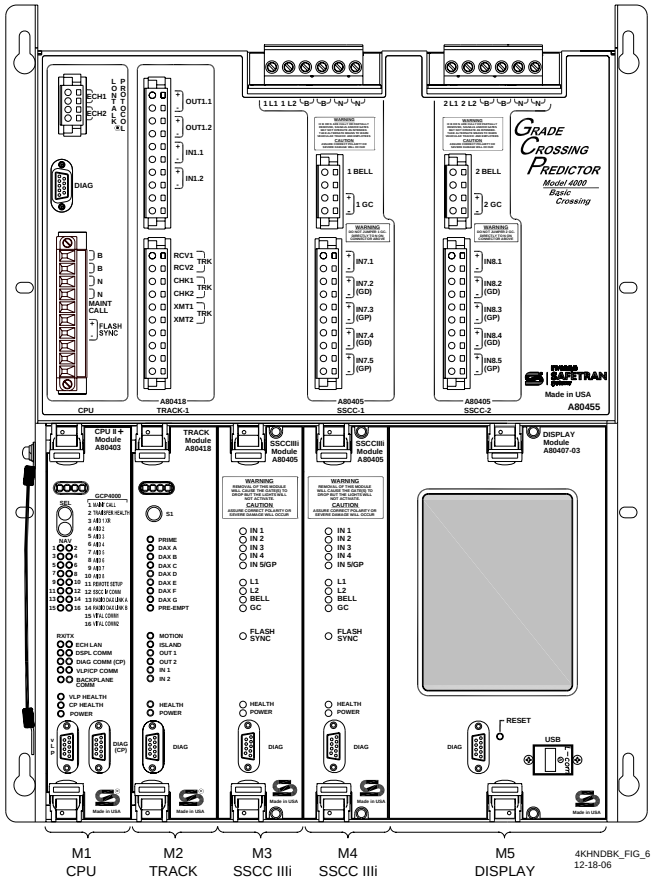


Fig. 6. Module Locations, Basic Crossing Chassis, A80455

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

Module Locations, Single Track Chassis (A80445)

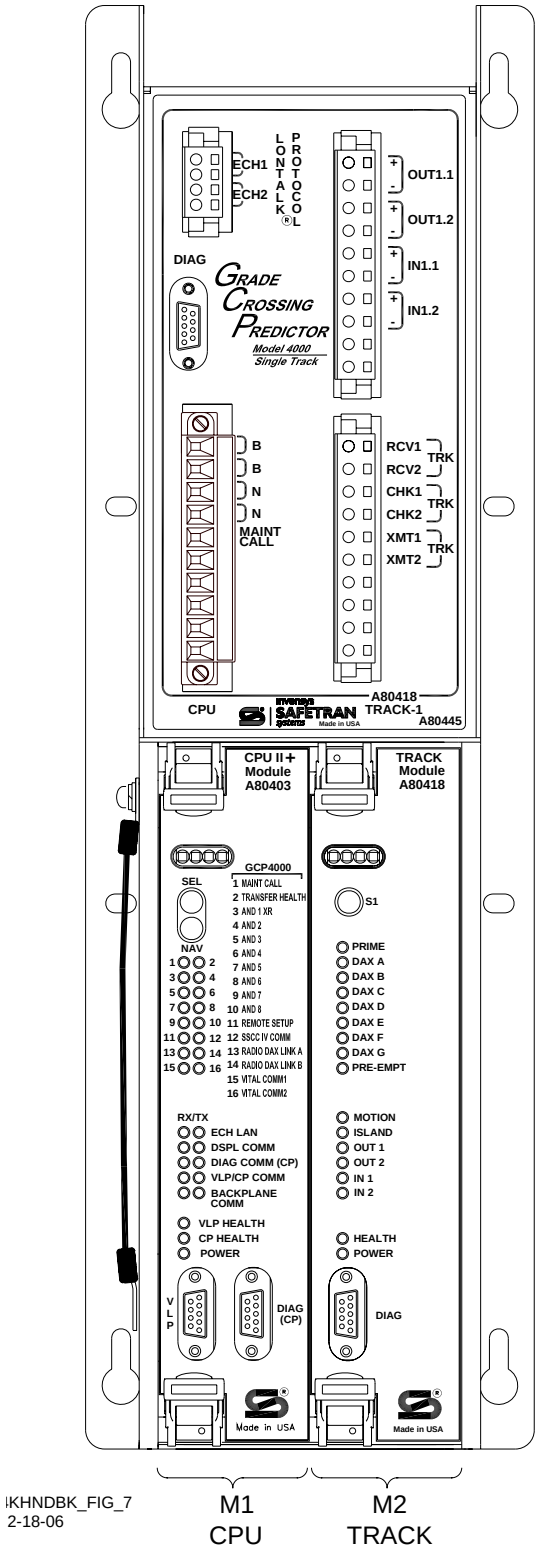


Fig. 7. Module Locations, Single Track Chassis, A80445

Module Part No.	Slot Position	Module
A80403	M1	CPU
A80418	M2	TRACK-1

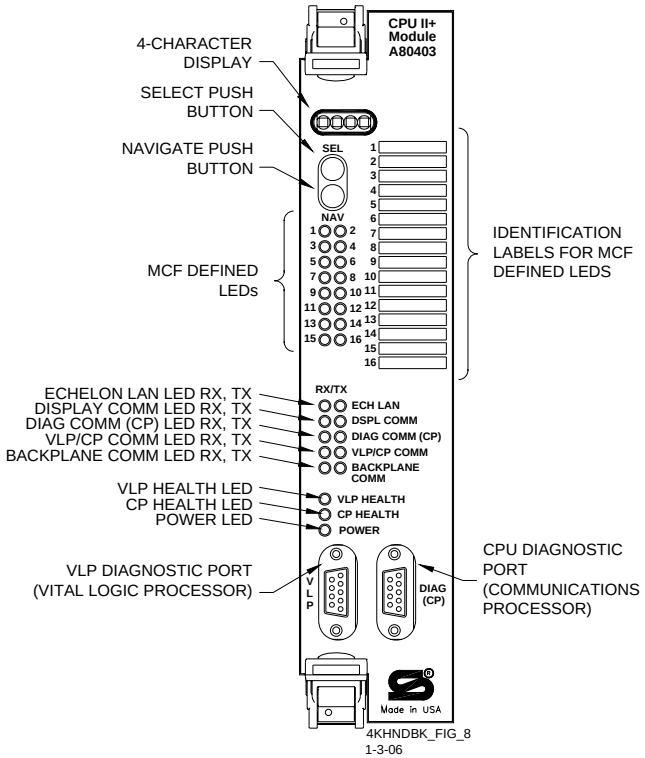


Fig. 8. Central Processing Unit (CPU II+) Module, A80403, Early Production Units

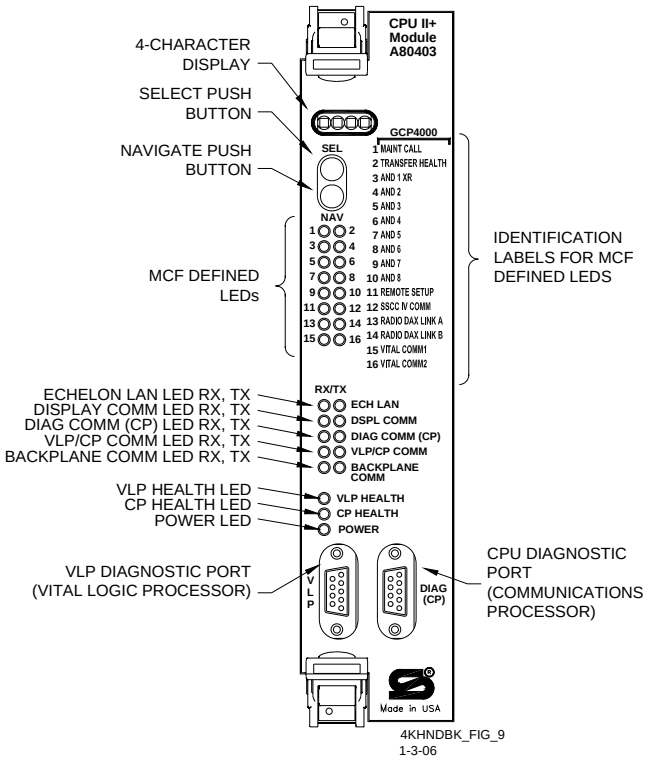


Fig. 9. Central Processing Unit (CPU II+) Module, A80403, Current Production Units

CPU Module LED Descriptions

LED		Function	Description
Name	**Color**		
1 (MAINT CALL)	Red	Mainten-ance Call • see mainte-nance 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 ener-gized Off – AND 1 XR is De-energized
4 to 10 (AND 2 through AND 8)	Red	AND 2 through AND 8	On – AND is Energized Off – AND is De-energized or Not Used
11 (REMOTE SETUP)	Red	Remote Setup Session	On – The GCP has been primed for a remote one-person setup (see Appendix F) Off – No remote setup is in progress
12 (SSCC IV COMM)	Red	SSCCIV Echelon Active	On – External SSCC IV Echelon is in session Off – External SSCC IV Echelon not used or not in session
13 (RADIO DAX LINK A)	Red	Radio DAX Link A	On – Radio DAX Link A is in session Off – Radio DAX Link A 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 not used or not in session
15 (VITAL COMM1)	Red	Vital Comm 1	On – Vital Comm1 is in session
16 (VITAL COMM2)	Red	Vital Comm 2	On – Vital Comm2 is in session

CPU Module LED Descriptions continued

LED		Function	Description
Name	**Color**		
ECH LAN RX	Green	Echelon Message Received	Flashes when the CPU is receiving an ATCS message via the Echelon LAN.
ECH LAN TX	Red	Echelon Message Sent	Flashes when the CPU is transmitting an ATCS message via the Echelon LAN.
DSPL COMM RX	Green	Display Port Message Received	Flashes when the CPU is receiving data from the display module.
DSPL COMM TX	Red	Display Port Message Sent	Flashes when the CPU is sending data to the display module.
DIAG COMM (CP) RX	Green	Diag Port Message Received	Flashes when the CPU is receiving data from the communications processor diagnostic (**DIAG CP**) serial port.
DIAG COMM (CP) TX	Red	Diag Port Message Sent	Flashes when the CPU is transmitting data on the communications processor diagnostic (**DIAG CP**) serial port.
VLP/CP COMM RX	Green	Comm Message Received	Flashes when the VLP is receiving data from the CP.
VLP/CP COMM TX	Red	Comm Message Sent	Flashes when the VLP is transmitting data to the CP.
BACKPLANE COMM RX	Green	Backplane Message Received	Flashes when the VLP is receiving data from the serial bus.
BACKPLANE COMM TX	Red	Backplane Message Sent	Flashes when the VLP is sending data onto the serial bus.
VLP HEALTH	Yellow	VLP Health Status	Flashes slowly (1Hz) when the CPU VLP is functioning normally.
			Flashes fast (4Hz) when the VLP is unhealthy.
CP HEALTH	Yellow	CP Health Status	Flashes slowly (1Hz) when the CP is functioning normally.
			LED is not lit when the CP is unhealthy.
POWER	Green	Power Indication	On steadily when power is applied to the module.

CPU Module Display Messages

Note: Steady messages may alternate with other messages

Display	Mode	Meaning	System State
MCF Name; e.g. **GCP-T6X-01-2**	Scrolling	VLP is healthy	CPU is healthy.
BOOT	Steady	CPU is booting up.	CPU is booting up. Crossing is activated.
CRC	Steady	MCF CRC is incorrect for the current MCF	Entered CRC does not match CRC of MCF. Crossing is activated.
MCF	Steady	CPU is not healthy because of MCF not valid.	Reboot CPU or reload MCF. Crossing is activated.
SIN	Steady	Site Identification Number is invalid.	Enter valid SIN. Crossing is activated.
VLP UCFG	Scrolling	VLP is unconfigured.	No comm to I/O modules. Crossing is activated.
VLP INITIAL	Scrolling	The CP is transferring the configuration from NVRAM to the VLP.	No comm to I/O modules. Crossing is activated.
CMCF / *MCF	Scrolling	The CP is copying the MCF from the ECD into flash memory.	No comm to I/O modules. Crossing is activated.
NO VLP COMMS	Scrolling	The CP is not communicating with the VLP. • VLP could be rebooting or performing its initial configuration checks	No comm 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 comm to I/O modules. Crossing is activated.
ADR	Steady	The radio DAXing neighbor ATCS address is invalid	Address of DAX session cannot be computed. Enter valid SIN

CPU Module Display Messages continued

Note: Steady messages may alternate with other messages

Display	Mode	Meaning	System State
INIT	Steady	Rebooting	System Reboot - Crossing is activated.
Exxx	Steady	Internal error, System will reboot. • xxx is 3 digit hex number	Reload MCF - Crossing is activated.

TRACK MODULE USER INTERFACE (A80418)

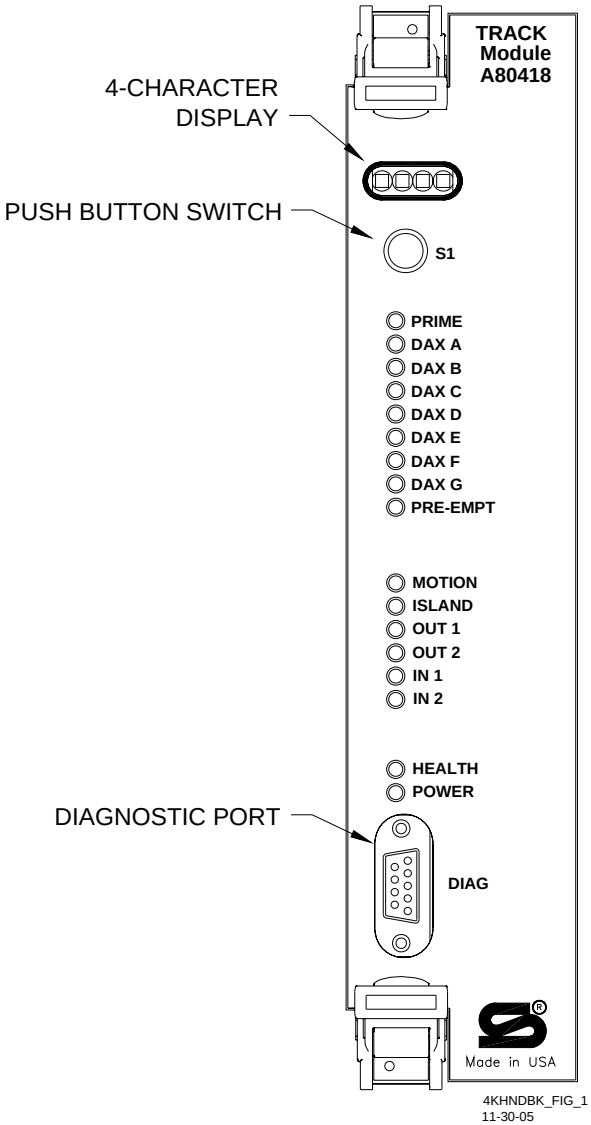


Fig. 10. Track Module, A80418

Track Module LED Descriptions

LED		
Name	**Color**	**Description**
PRIME	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	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
DAX B	Red	On – DAX B predictor is energized Off – DAX B predictor is de-energized 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 de-energized 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 de-energized 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 de-energized 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 de-energized 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 de-energized or not used Flashing – DAX G predictor is running its pickup delay
PREEMPT	Red	On – Preempt predictor is energized Off – Preempt predictor is de-energized or not used Flashing – Preempt predictor is running its pickup delay
MOTION	Red	On – GCP has not detected motion Off – GCP has detected motion

Track Module LED Descriptions 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 de-energized or failed
OUT 2	Red	On – output energized Off – output de-energized or failed
IN 1	Red	On – input energized Off – input de-energized or failed
IN 2	Red	On – input energized Off – input de-energized or failed
HEALTH	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	Green	On steadily when power is applied to the module

Track Module Display Messages (Operational)

Indication	Mode	Meaning	Module State
***GCP**	*blinks on and off, GCP steady	Module is healthy • MS/GCP Operation is on • No trains are detected on the approach	Performing train predictions
***ISL**	*blinks on and off, ISL steady	Module is healthy • MS/GCP Operation is programmed "not used" • Island Oper-ation 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 prediction
S*nnn* e.g. **S045**	Steady	The module has not detected inbound or outbound motion. • EZ is given by the value 'nnn'	Performing train prediction
O*nnn* e.g. **O049**	Steady	The module has detected outbound motion. • EZ is given by the value 'nnn'	Performing train prediction
GCAL	Blinks on and off	GCP Calibration in progress	All predictors are de-energized
GAPP	Blinks on and off	GCP Approach calibration in progress	All predictors are de-energized
GLIN	Blinks on and off	GCP Linearization in progress.	All predictors are de-energized
ICAL	Blinks on and off	Island Calibration in progress	Island is de-energized

Track Module Display Messages (Diagnostic)

Indication	Meaning	Module State
CKEX	The check wire phase is incorrect	All predictors are de-energized
CHK1	The receive wire EZ reading is very low in comparison with the check wire EZ	All predictors are de-energized
CHK2	The check wire EZ reading is very low in comparison with the receive wire EZ	All predictors are de-energized
CHK4	The check wire and receive wire readings are more than 50 points different	All predictors are de-energized
GAPP	GCP Approach Calibration is required	All predictors are de-energized
GCAL	GCP Calibration is required	All predictors are de-energized
GEXP	GCP detected decreasing phase which could be a bad bond	All predictors are de-energized
GFRQ	GCP frequency not set	All predictors are de-energized
GHWR	GCP hardware error	All predictors are de-energized
GIPS	Enhanced detection is turned on and the GCP detects poor shunting	Prime and Preempt de-energized (any zero offset predictors)
GLIN	GCP Linearization Calibration is required	All predictors are de-energized
GLCK	EZ or check EZ is below 3 after GCP has booted up • Possible broken wires	All predictors are de-energized
GOFS	MS/GCP Operation is Out of Service	All used predictors energized All unused predictors de-energized
GRCV	GCP receiver error	All predictors are de-energized
GSLV	GCP slaving error	No effect on predictors
GSTB	GCP is stabilizing after transmitter was turned on	All predictors are de-energized
GXMT	GCP transmitter error	All predictors are de-energized

Track Module Display Messages (Diagnostic) continued

Indication	Meaning	Module State
HIEZ	High EZ (>115) detected on main or check wires	All predictors are de-energized
ICAL	Island Calibration is required	Island is de-energized
IFRQ	Island frequency not set	Island is de-energized
IOFS	Island Operation is Out of Service	Island energized
ISTB	Island is stabilizing after transmitter has been turned on	Island is de-energized
ITST	Island has detected a possible interfering signal	No effect on Island occupancy
IXMT	Island transmitter error	Island is de-energized
LWEX	Low EX detected • Low EX Adjustment is usually 39	All predictors are de-energized
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 de-energized
RECV (RECOVERY)	The GCP is running a 30 second Recovery Time-out after an error has cleared.	All predictors are de-energized
RECV (RECOVERY)	The Island is running a 30 second Recovery Time-out after an error has cleared.	Island is occupied
RXEX	The receive wire phase is incorrect	All predictors are de-energized
UCFG	Track module is unconfigured	All predictors are de-energized, Island is de-energized • Outputs de-energized • Inputs de-energized
VOER	Output hardware failure detected. • Output is commanded on but is detected as off	Failed output(s) de-energized

SOLID-STATE CROSSING CONTROLLER (SSCC IIIi) MODULE USER INTERFACE (A80405)

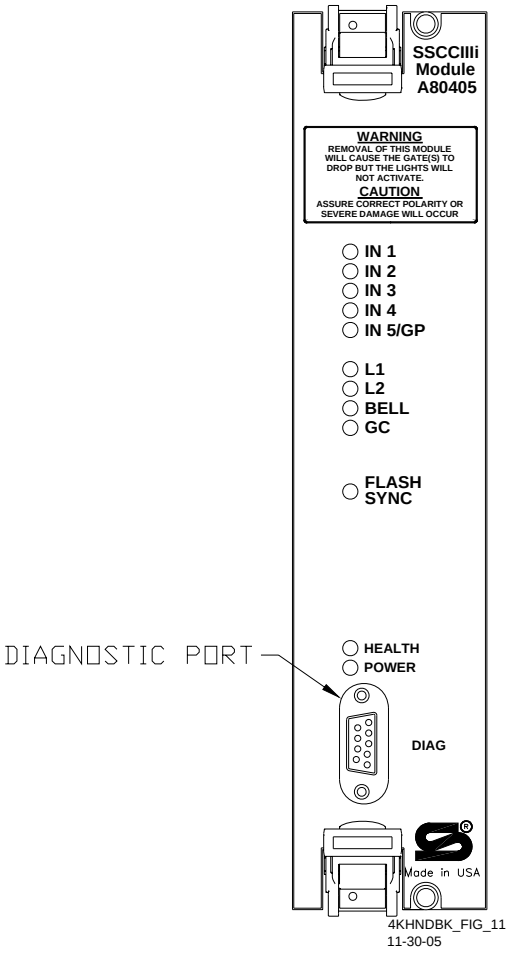


Fig. 11. Solid State Crossing Controller IIIi (SSCC IIIi) Module, A80405

SSCC IIIi LED Descriptions

LED		Description
Name	**Color**	
IN 1	Red	On – input 1 energized Off – input 1 de-energized
IN 2	Red	On – input 2 energized Off – input 2 de-energized
IN 3	Red	On – input 3 energized Off – input 3 de-energized
IN 4	Red	On – input 4 energized Off – input 4 de-energized
IN 5/GP	Red	On – input 5 energized Off – input 5 de-energized
L1	Red	On – Lamp Output L1 is on Off – Lamp Output L1 is off
L2	Red	On – Lamp Output L2 is on Off – Lamp Output L2 is off
BELL	Red	On – bell output is on Off – bell output is off
GC	Red	On – gate control (GC) output is energized Off – gate control (GC) output is de-energized
FLASH SYNC	Red	Flashes when sync pulse is present at **FLASH SYNC** input/output
HEALTH	Yellow	Slow (1Hz) – module fully operational and communicating with CPU Fast (2Hz) – not communicating with CPU Very Fast (4Hz) – fault detected within the module
POWER	Green	On steadily when power is applied to the SSCC IIIi module

NOTE

The SSCC IIIi module performs a self-diagnostic test at approximately noon each day. The test momentarily energizes each lamp output to verify operation. Four very brief flashes may be noticed on the L1 and then the L2 LEDs of each SSCC IIIi module during a normal test.

RELAY INPUT OUTPUT (RIO) MODULE USER INTERFACE (A80413)

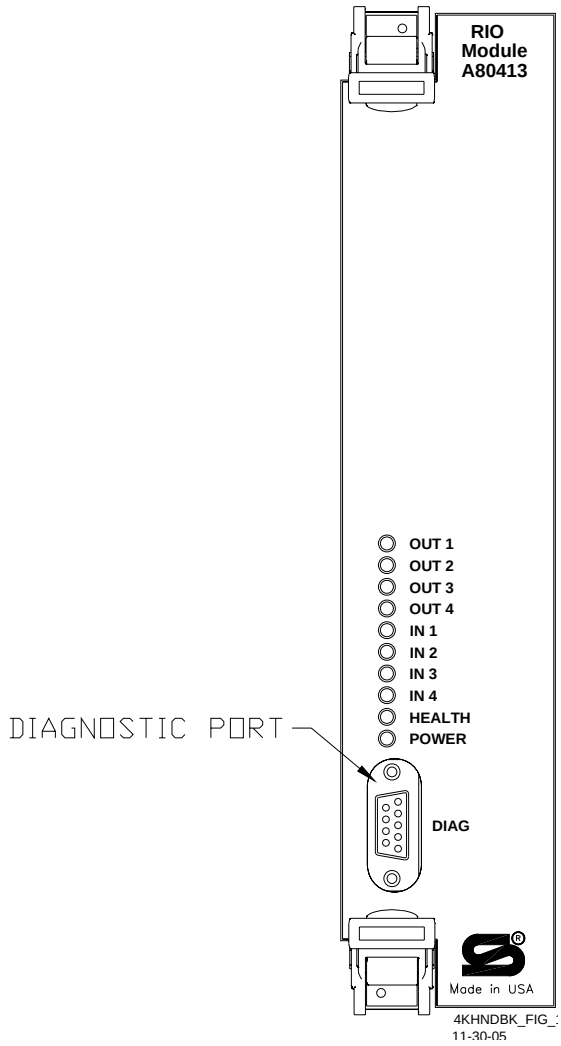


Fig. 12. Relay Input Output Module (RIO), A80413

RIO Module LED Descriptions

LED		
Name	**Color**	**Description**
OUT 1	Red	On – vital Output 1 energized Off – vital Output 1 de-energized
OUT 2	Red	On – vital Output 2 energized Off – Vital Output 2 de-energized
OUT 3	Red	On – vital Output 3 energized Off – vital Output 3 de-energized
OUT 4	Red	On – vital Output 4 energized Off – vital Output 4 de-energized
IN 1	Red	On – vital Input 1 energized Off – vital Input 1 de-energized
IN 2	Red	On – vital Input 2 energized Off – vital Input 2 de-energized
IN 3	Red	On – vital Input 3 energized Off – vital Input 3 de-energized
IN 4	Red	On – vital Input 4 energized Off – vital Input 4 de-energized
HEALTH	Yellow	Slow (1Hz) – module fully operational communicating with CPU Fast (2Hz) – module is not communicating with CPU Very Fast (4Hz) – fault detected within the module
POWER	Green	On steadily when power is applied to the RIO module

TRANSFER MODULES (A80406, A80468)

Two transfer modules are available depending on the 4000 GCP system chassis installed:

- A80406 Transfer Module - used in the Dual Four Track Chassis, A80400, and Dual Six Track Chassis, A80460.
- A80468 Transfer Module - used on the Dual Two Track Chassis, A80465.

The Timer Controls, LEDs, and TIMER Display on each module function the same. Refer to figures 13 and 14 for control, LED and display locations.

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.

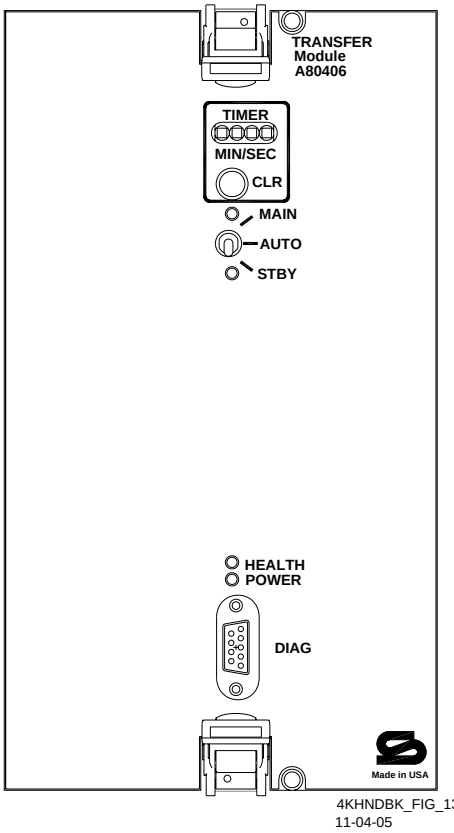


Fig. 13. Transfer Module, A80406, Front Panel

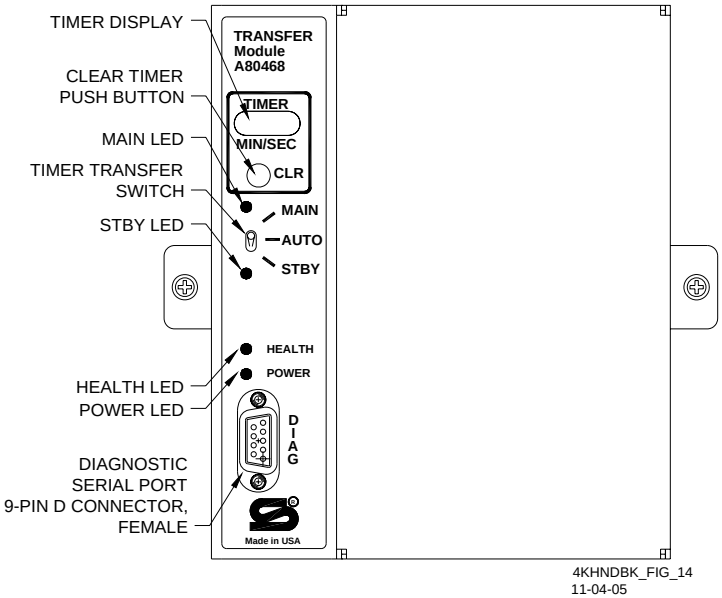


Fig. 14. Transfer Module A80468, Front Panel

Transfer Module LED Descriptions

LED		Description
Name	**Color**	
MAIN	Red	On – Main modules enabled while Transfer Timer Switch is set to **AUTO** or Transfer Timer Switch is set to **MAIN** Off – Main side is currently not powered
STBY	Red	On – Standby modules enabled while Transfer Timer Switch is set to **AUTO** or Transfer Timer Switch is set to **STBY** Off –Standby side is currently not powered
HEALTH	Yellow	Slow (1Hz) – Module is functioning normally
POWER	Green	On steadily when power is applied to the Transfer module

Transfer Module TIMER Controls

Item	Function
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. • Switches MAIN to STANDBY or Switches STANDBY to MAIN

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.**

When transfer delay is set using DIP switch S3, the Transfer Module 4-character display shows the:

- set transfer delay time in minutes and seconds
- transfer timer delay count down in 1 sec. increments
- selected module set (MAIN or STBY)

Transfer Module TIMER Display Indications

Indication	Mode	Meaning	Module State
MAIN	Steady	Timer Transfer switch is set to Main	Main side is powered
STBY	Steady	Timer Transfer switch is set to Standby	Standby side is powered
MMSS e.g. 0240 (2 mins 40 secs)	Steady	If the number is not changing, the module is set to AUTO. This represents the programmed transfer time.	Main or Standby side is powered
MMSS e.g 0200 (2 mins 00 secs)	Decreasing	If the number is decreasing, the module is set to AUTO. The currently selected side is unhealthy and this number represents the time taken until a transfer occurs.	Main or Standby side is powered
MMSS alternating with **SWCH**	Steady	SWCH shows the module has transferred since the CLR button was pressed	Main or Standby side is powered

Transfer Delay Interval Selection

The transfer delay interval for the transfer modules is set by the positions of the switch segments on switch assembly 3, (S3). The switch positions required to set the desired number of minutes are shown in the following table. A similar table is located on each module. The delay range is 0 to 31 minutes, in 1 minute increments. The factory setting is 3 minutes.

NOTE

When viewing switch S3 with the transfer module in the normal operating position, the orientation of S3 on the A80468 module is inverted compared to the orientation of S3 on the A80406 module. This changes the location of switch position S3-0. Refer to figures 15 and 16 for switch position locations.

NOTE

After changing switches on S3, verify timer setting by switching the timer transfer switch to AUTO. The transfer time (MM:SS) will be displayed in minutes and seconds on the 4-character display.

Transfer Delay Interval Switch Settings

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 is OPEN (UP, away from board).

1 is CLOSED (DOWN, towards board)

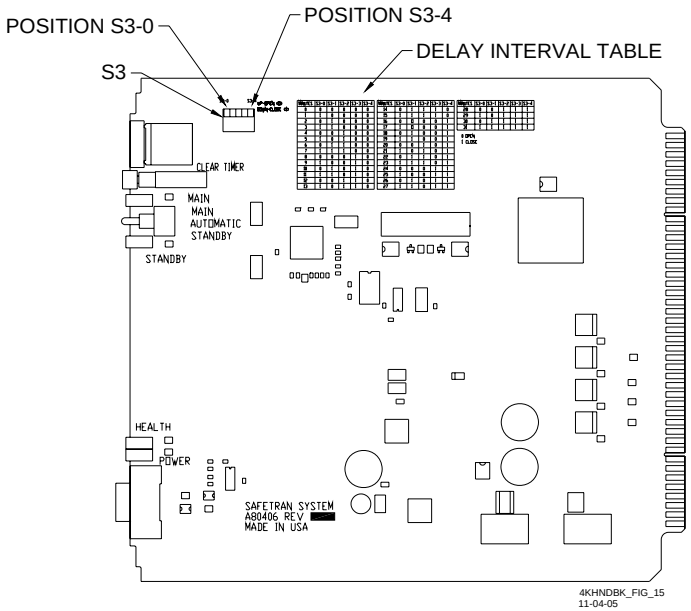


Fig. 15. Transfer Module, A80406, S3 Switch Positions

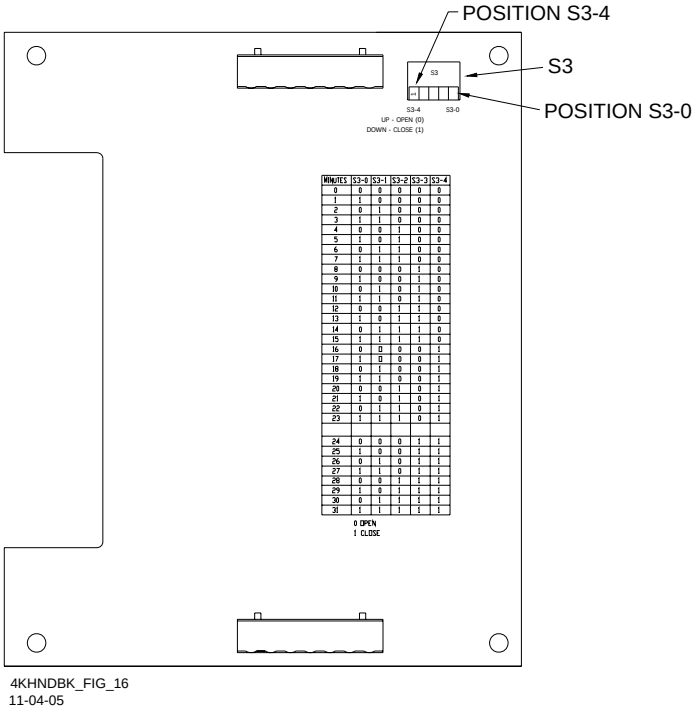


Fig. 16. Transfer Module, A80468, S3 Switch Positions

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 17).

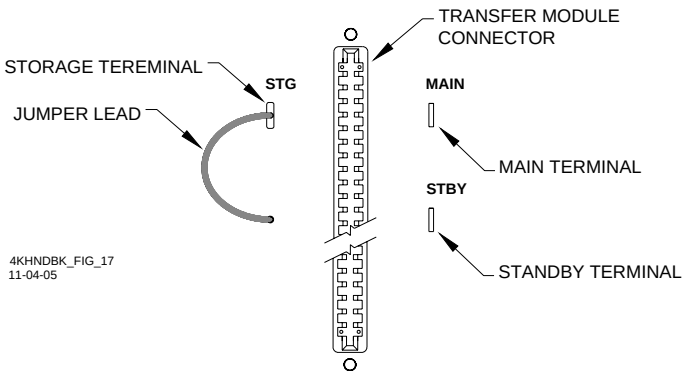


Fig. 17. Transfer Module (A80406) Jumper Positions

Operation Without Transfer Module A80468

To disable the A80468 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 18).

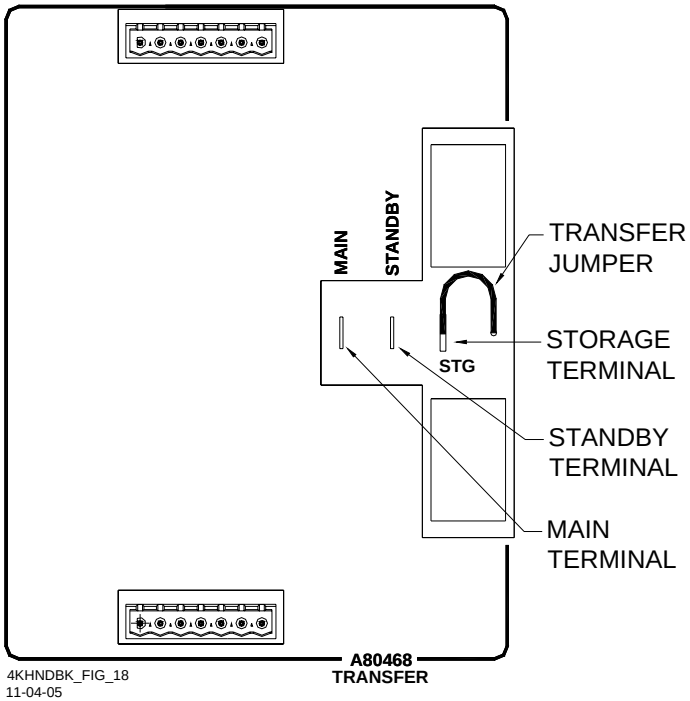


Fig. 18. Transfer Module (A80468) Jumper Positions

DISPLAY MODULE USER INTERFACE (A80407)

NOTE

The A80407 Display Module has a built-in heater for the LCD screen that turns on below approximately 40 °F (4.5 °C).

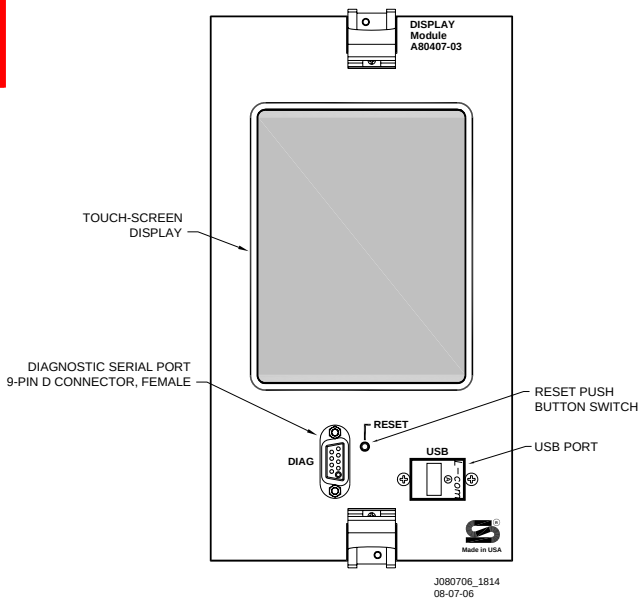


Fig. 19. Display Module, A80407-03, Front Panel

NOTE

Refer to Appendix G, **Using The USB Wizard**, for instructions on using the Display Module USB Port.

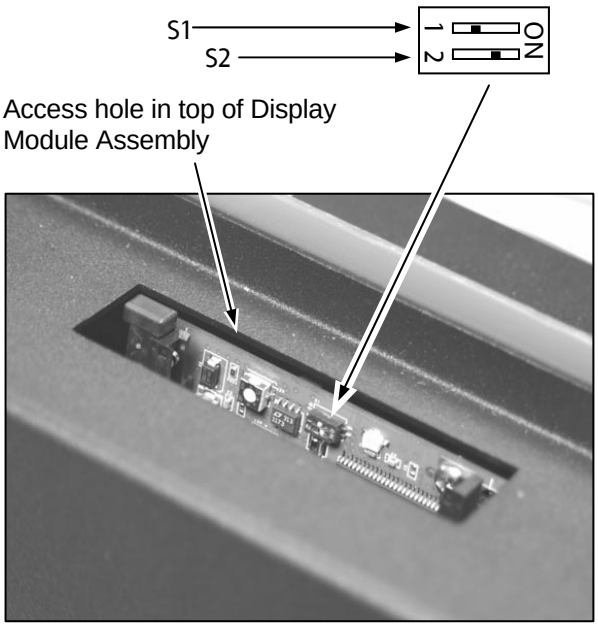


Fig. 20. S1 & S2 Location On Display Module, A80407

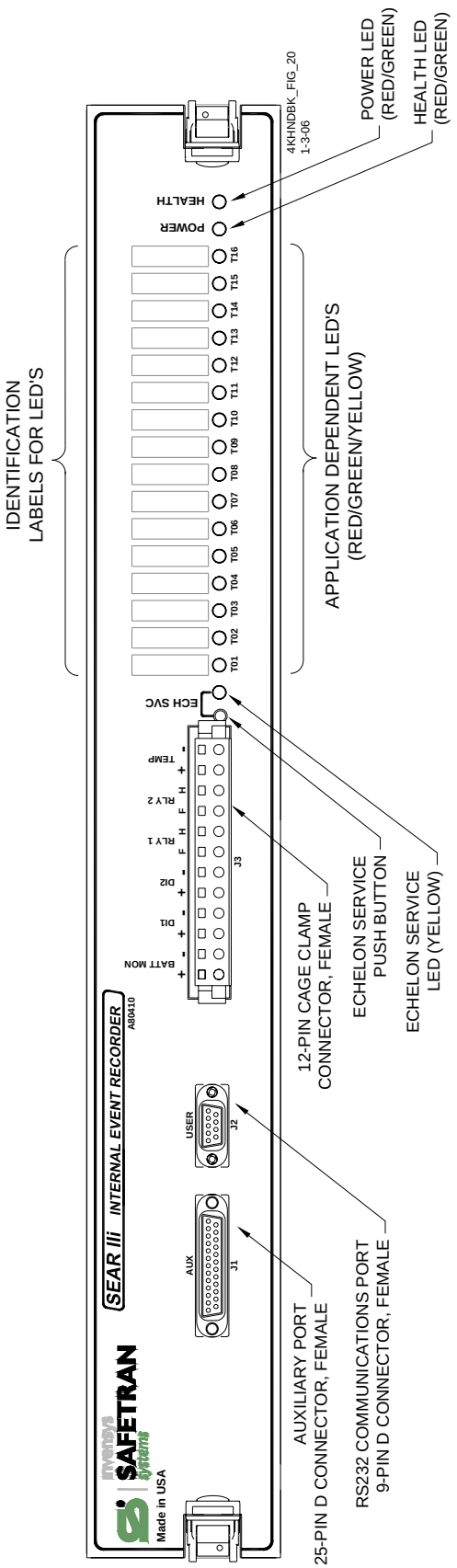
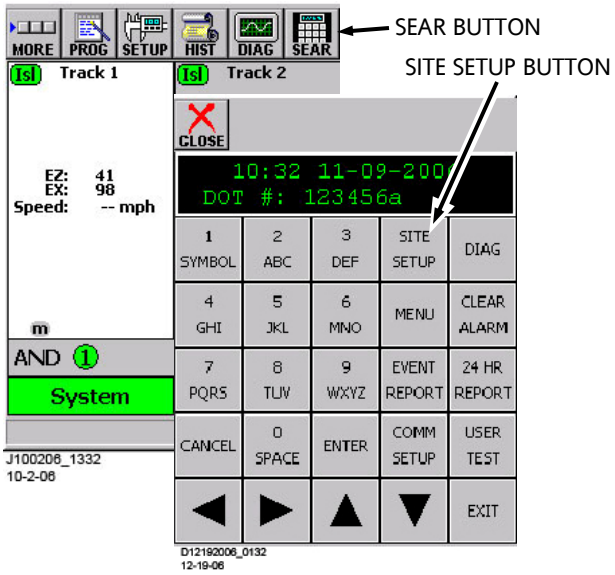


Fig. 21. SEAR IIi Module, A80410

The SEAR IIi is an internal event analyzer recording device that is operated by an application program. The following "Site Setup" is an example of the customer-specific application program, which was in effect at the writing of this handbook.

WARNING

THE SEAR IIi IS A NON-VITAL MODULE. DO NOT USE FOR VITAL APPLICATIONS.



SEAR IIi SITE SETUP

The SEAR site setup is accessed from the Main Status Screen by pressing the **SEAR** button. When the SEAR keypad window is displayed, press the SITE SETUP button.

There are three stages of all application programs that must be completed to setup the SEAR IIi. The 1st and 3rd stage apply to all application programs. The 2nd stage may be either a "generic" configuration or one that is "specific" to the railroad's application program.

Entries for the three stages are defined in the following tables. Each table is identified in the table header as to whether it applies to a specific application program, the generic application program (9V864) or all application programs.

Entering Information on the SEAR Keypad Display

The entries are made on the SEAR setup keypad screen shown above. The keypad has 10 alpha-numeric keys similar to a telephone, (i.e., the number 2, and letters A, B, C are on one key, etc). Words are formed in the same way as entering names or telephone numbers in a mobile telephone phonebook. Pressing a key repeatedly will change the character from the number to a letter to the next letter on the key (i.e., pressing the #2 key three times enters the letter "B", etc.).

Stage 1 (for all application programs)

Question	Options/Range	Typical Configuration
DATE/TIME	Current date & time	Current date & time
AUTOMATIC DST ADJUSTMENT ?	YES, NO	YES
TIME ZONE?	Eastern, Central, Mountain, Pacific, Alaska, Hawaii, Atlantic, Saskatchewan, Newfoundland	Select local time zone
SITE NAME?	Site Name, e.g. Dodge St.	Enter Site Name
MILEPOST?	e.g., 1234.56	Enter Milepost
DOT #?	e.g., 654321Z	Enter DOT crossing number
TESTER TYPE?	Crossing, Wayside	Crossing
DATE FORMAT?	mm-dd-yyyy, dd-mm-yyyy	mm-dd-yyyy
TEMP. FORMAT?	Fahrenheit, Celsius	Fahrenheit
INDICATE HOLD (SEC)?	0 - 99	0
SITE TYPE?	No Communication, Bullhorn/ModBus, Dial-up, Node, Collector, CDS-902X	No Communication
SITE ATCS ADDRESS?	7.RRR.LLL.GGG.99.01	All locations must be programmed with a unique address assigned by the RR if ATCS communications are used. However, default address of 7.620.100.100.99.01 may be used at stand alone locations (No Communication)
POLL ID?	1-999	Typically 1 for dial up. SITE TYPE = Bullhorn/ModBus or Collector
MODEM PORT?	AUX, COM	SITE TYPE = Dial-up
INIT STRING?	Optional Hayes Modem Initialization String	SITE TYPE = Dial-up or OFFICE COMM. DEVICE = Dial modem (RS232)

Stage 1 (for all application programs) continued

Question	Options/Range	Typical Configuration
OFFICE ATCS ADDRESS	2.RRR.NN.DDDD	Typically 2.RRR.00.0000. SITE TYPE = Node or Collector
PRIMARY HOP?	7.RRR.LLL.GGG.99.01	Primary hop address. SITE TYPE = Node
BACKUP HOP 1?	7.RRR.LLL.GGG.99.01	Secondary Hop address. SITE TYPE = Node
BACKUP HOP 2?	7.RRR.LLL.GGG.99.01	Third hop address. SITE TYPE = Node
FIELD COMM. DEVICE?	VHF Comm (Echelon), VHF Comm (RS232), WAG (Echelon), Spread-Spec(RS232) None	SITE TYPE = Node or Collector
MODE?	Gen/ATCS, Genisys	SITE TYPE = Collector
WAMS XID?	Enabled, Disabled	SITE TYPE = Collector
OFFICE COMM. DEVICE?	Direct (RS232), MCM (RS232), MCM (Echelon), WAG (Echelon),	SITE TYPE = Collector
RADIO ATCS ADDR?	7.000.000.000.00.00 to 7.999.999.999.99.99	OFFICE COMM. DEVICE = MCM (RS232), MCM (Echelon) or WAG (Echelon)
PHONE #	Phone number of WAMS	OFFICE COMM. DEVICE = Dial Modem (RS232)
USER PORT	Baud, Data bits, Parity, Stop Bits, Flow Control	Typically 57600, 8,N,1,N
AUX PORT	Baud, Data bits, Parity, Stop Bits, Flow Control	Typically 9600, 8,N,1,N

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 is always subnode 99 and device 01. The ATCS address of the GCP 4000 must always be the same 7RRRLLLGGG as the SEAR IIi. And unless specified otherwise the GCP subnode number is 16. The GCP device number is not user selected. Setting the GCP 4000 ATCS address is discussed in Appendix C.

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.

Stage 2 (for generic application 9V864-A01X, 9V864-A01X.CDL only)

Question	Options / Range	Condition For Menu Display
RAILROAD NUMBER?	1 - 999	
ENTRANCE GATES?	0 - 8	
CROSSING CONFIGURATION?	NORMAL, SPLIT GATE, DUAL CROSSING, EXTERNAL ENTRANCE GATE CONTROLLER(S)	
XR CONTROLLED BY 2ND CROSSING?	AND1 thru AND8	CROSSING CONFIGURATION = DUAL CROSSING
XR CONTROLLED BY FOREIGN RR?	AND1 thru AND8	CROSSING CONFIGURATION = SPLIT GATE
ISLAND CONTROLLED BY 2ND CROSSING?	ISLAND1 thru ISLAND6	CROSSING CONFIGURATION = DUAL CROSSING
ENTRANCE GATES?	0-8	
GATE CONTROLLED BY FOREIGN RR?	NONE, TSS2, TSS3, TSS4	CROSSING CONFIGURATION = SPLIT GATE
GATE POSITION FAIL TIME (SECONDS)?	10 - 60	GATES>0
GATES NOT STARTING TIME (SECONDS)?	10 - 20	RAILROAD= 005
CROSSING ACTIVE TIME (MINUTES)?	20 - 30	RAILROAD= 005
RING THRU TIME (SECONDS)?	10 - 15	RAILROAD= 005
BATTERY BANKS?	1 - 3	
BATT MON USED?	YES, NO	
OB RESOLUTION?	0.2, 0.5, 1.0	RAILROAD= 125
X-B RESOLUTION?	0.2, 0.5, 1.0, NOT PRESENT	RAILROAD= 125

Stage 2 (for generic application 9V864-A01X, 9V864-A01X.CDL only) continued

Question	Options / Range	Condition For Menu Display
X-B2 RESOLUTION?	0.2, 0.5, 1.0, NOT PRESENT	RAILROAD= 125
BATT MON RESOLUTION?	0.2, 0.5, 1.0, NOT PRESENT	RAILROAD= 125
INTERNAL CROSSING CONTROLLERS?	0 – 2	
EXTERNAL CROSSING CONTROLLERS?	0 – 2	
VHF COMMUNICATOR?	YES, NO	
DTMF ACTIVATION?	YES, NO	RAILROAD<>103
ALLOW DTMF CONTROL?	YES, NO	RAILROAD=103
DIGIT #1?	0 – 9	ALLOW DTMF CONTROL=YES
DIGIT #2?	0 – 9	ALLOW DTMF CONTROL=YES
DIGIT #3?	0 – 9	ALLOW DTMF CONTROL=YES
DIGIT #4?	0 – 9	ALLOW DTMF CONTROL=YES
DIGIT #5?	0 – 9	ALLOW DTMF CONTROL=YES
DTMF TIME-OUT?	30 – 240	ALLOW DTMF CONTROL=YES
DTMF OUTPUT 2 DELAY?	0 – 20	ALLOW DTMF CONTROL=YES
ACTIVATION CODE?	1 – 999	VHF COMMUNICATOR= YES
ACTIVATION TIMEOUT (SECONDS)?	1 – 600	VHF COMMUNICATOR= YES
iLOD MODULES?	0 – 4	
ANY LED BULBS USED?	YES, NO	iLOD MODULES>0
AUTO INSPECTIONS?	YES, NO	
BELL SENSORS?	0 – 8	
BELL SENSOR TSS1?	YES, NO	BELL SENSORS>0
BELL SENSOR TSS2?	YES, NO	BELL SENSORS>0
BELL SENSOR TSS3?	YES, NO	BELL SENSORS>0
BELL SENSOR TSS4?	YES, NO	BELL SENSORS>0
BELL SENSOR TSS5?	YES, NO	BELL SENSORS>0
BELL SENSOR TSS6?	YES, NO	BELL SENSORS>0
BELL SENSOR TSS7?	YES, NO	BELL SENSORS>0
BELL SENSOR TSS8?	YES, NO	BELL SENSORS>0

Stage 2 (for generic application 9V864-A01X, 9V864-A01X.CDL only) continued

Question	Options / Range	Condition For Menu Display
BELL ON?	GATES LOWERING, GATES MOVING, ALWAYS	BELL SENSORS>0
GFT'S?	YES, NO	
BATTERIES ON GFT1?	1 – 2	GFT'S?=YES
GATE TIP SENSORS?	YES, NO	GATES>0
RTU?	YES, NO	
VHF VOICE CHANNEL?	1 – 8	VHF COMMUNICATOR= YES
VHF DATA CHANNEL?	1 – 8	VHF COMMUNICATOR= YES
USE NON-CRITICAL FEATURE?	YES, NO	
FULL APPROACH MOVE ALARMS?	ACTIVATE, DO NOT ACTIVATE	

Stage 2 (specific for 9V814-A01X, UPX0XX.CDL only)

Question	Options/Range	Typical Configuration
Reset Names and Modules	Yes, No	YES for initial setup
EXT XING CONTROLLER?	0-3	0
BATTERY BANKS?	1-3	2
BATTERY MON USED?	NO, YES	NO
LOW BATT PERCENTAGE?	75%, 90%	75%
HI BATT PERCENTAGE?	110%, 120%	110%
ILOD MODULES?	0-8	2
LAMPS OUT?	1-2	2
TEMPERATURE ALARM?	NO, INT, EXT, BOTH	NO
BULLHORN USED?	NO, YES	NO
HEALTH REPORT? DAYS	0-30	0
LA ALARM ENABLED?	YES, NO	YES
GD ALARM ENABLED?	YES, NO	YES
GU ALARM ENABLED?	YES, NO	YES
TR ALARM ENABLED?	YES, NO	YES
BA ALARM ENABLED?	YES, NO	YES
EO ALARM ENABLED?	YES, NO	YES
PK ALARM ENABLED?	YES, NO	YES
DO ALARM ENABLED?	NO, YES	NO
TP ALARM ENABLED?	NO, YES	NO
AF ALARM ENABLED?	YES, NO	YES
VH ALARM ENABLED?	NO, YES	NO
GF ALARM ENABLED?	NO, YES	NO

Stage 3 (for all application programs)

Question	Options/Range	Typical Configuration
Edit Digital Inputs	No, Yes	NO
Edit Batteries	No, Yes	NO
Edit Relays	No, Yes	NO
Edit Test Leds	No, Yes	NO
Edit Modules	No, Yes	NO
GCP4K NODE?	1-16	

Remaining SEAR IIi parameters are specific to customer application programs as indicated in each table header.

Echelon Node Address (specific for 9V814.A01X, UPX0XX.CDL only)

Assembly	Description	Node Address
A80410	SEAR IIi Module	99
A80271	ILOD Module	7-14
A91210	SSCC III or SSCC IV	4-6
A80403	GCP 4000 CPU	16*
Reserved	Reserved	3

* The MAIN and STANDBY CPU utilize the same ATCS Address and node number.

SEAR IIi LED Descriptions (for generic application 9V864-A01X, 9V864-A01X.CDL only)

LED	Alarm Num.[1]	Designator	Notes
T01	5,17,18,19,34,35,36, 37,38,47	POWER	2,3,4
T02	6,8,9,20,21,28,44,49,55	GATE	2,3,4
T03	1,10,11,12,13,14,16, 25,30,45,46	WARNING DEVICES	2,3,4
T04	2,3,4,22,23,26,33,39, 40,41,42,43	CROSSING	2,3,4
T05	7, 56	ANALYZER FAILURE	2,3,4
T06		RESERVED	
T07		RESERVED	
T08		ONLINE	5,6
T09		234.249 GROUND TEST	7-10
T10		234.251 STANDBY POWER	7-10
T11		234.253 FLASHING LIGHT UNITS	7-10
T12		234.255 GATE ARM AND GATE MECHANISMS	7-10
T13		234.257 WARNING SYSTEM OPERATION	7-10
T14		234.259 WARNING TIME	7-10
T15		234.261 TRAFFIC PREEMPTION	7-10
T16		MONTHLY MANUAL INSPECTIONS	7-10

1. See alarm descriptions, (page 55). (LEDs T01 – T07 only)
2. No Alarm / Reserved = LEDs are GREEN (LEDs T01 – T07 only)
3. In Alarm = LEDs FAST FLASH RED (LEDs T01 – T07 only)
4. Alarm Stop = LEDs SLOW FLASH RED (LEDs T01 – T07 only)
5. User Test Mode (LED T08 only)
6. User Test Mode (LED T08 only)
7. Test Pending = LEDs are YELLOW (LEDs T09 – T16 only)
8. Test Ready to Run = LEDs SLOW FLASH YELLOW (LEDs T09 – T16 only)
9. Test Passed = LEDs FAST FLASH GREEN (LEDs T09 – T16 only)
10. Test Failed = LEDs are RED (LEDs T09 – T16 only)

SEAR IIi LED Descriptions (specific for 9V814-A01X, UPX0XX.CDL only)

LED	Alarm Label	Designator	Checked	Notes
T01	LA, CL	LONG ACTIVATION ALARM	ALWAYS	1-4
T02	Reserved	Reserved	Reserved	Reserved
T03	Reserved	Reserved	Reserved	Reserved
T04	GD	GATE DOWN ALARM	TRAIN MOVE	1-3
T05	GU	GATE UP ALARM	TRAIN MOVE	1-3
T06	TR	TROUBLE LITE	ALWAYS	1-3
T07	BA	BATTERY	ALWAYS	1-3
T08	EO	LITE OUT	ALWAYS	1-3
T09	IP, PK, OP	POWER OFF	ALWAYS	1-5
T10	DO	DOOR ALARM	ALWAYS	1-3, 6
T11	TP	TEMPERATURE	ALWAYS	1-3
T12	AF	ANALYZER FAILURE	ALWAYS	1-3
T13	VH	VEHICLE DETECTOR HEALTH	ALWAYS	1-3
T14	GF	GROUND FAULT	ALWAYS	1-3
T15	NO	NORMAL OPERATION	ALWAYS	2,3
T16	OL	ONLINE	ALWAYS	7,8

1. LEDS are OFF when alarm is disabled
2. LEDS are GREEN when alarm is enabled
3. LEDS are RED when alarm condition exists
4. LEDS are YELLOW when CL or IP condition exists
5. LEDS are GREEN SLOW FLASH if OP condition exist
6. LEDS are GREEN FAST FLASH when door is opened and DO alarm is armed
7. LEDS are GREEN if online
8. LEDS are RED if offline

SEAR IIi Relay Outputs (for generic application 9V864-A01X, 9V864-A01X.CDL only)

Channel	Menu Conditions			Name	Software Designator	Alarm Num.
	RTU?	Allow DTMF Control	Railroad Num.			
1	YES		22	RTU1		4
	YES	YES	103	DTMFOUT1A		
	YES		260	RTU1		4
	YES		400	N/A		
	YES		550	N/A		
	YES		671	RTU1		4
2	YES		22	RTU2		9, 49
	YES	YES	103	DTMFOUT1B		
	YES		260	RTU2		9
	YES		400	N/A		
	YES		550	N/A		
	YES		671	RTU2		6
3	YES		22	RTU3		6
	YES	YES	103	DTMFOUT2A		
	YES		260	RTU3		9
	YES		400	N/A		
	YES		550	N/A		
	YES		802	RTU3		9
4	YES		22	RTU4		1, 7, 11, 12, 13, 14, 18, 19, 35, 36
	YES	YES	103	DTMFOUT2B		
	YES		260	RTU4		1, 7
	YES		400	N/A		
	YES		550	N/A		
	YES		671	RTU4		19
5	YES		22	N/A		
	YES		103	N/A		
	YES		260	N/A		
	YES		400	N/A		
	YES		550	N/A		
	YES		671	N/A		
6	YES		22	N/A		
	YES		103	N/A		
	YES		260	RTU6		5
	YES		400	N/A		
	YES		550	N/A		
	YES		671	RTU6		18

SEAR IIi Relay Outputs (for generic application 9V864-A01X, 9V864-A01X.CDL only) continued

Channel	Menu Conditions			Name	Software Designator	Alarm Num.
	RTU?	Allow DTMF Control	Railroad Num.			
7		YES	22	GROUND FAULT TESTER	GFTTEST	N/A
		YES	103			
		YES	260			
		YES	400			
		YES	550			
		YES	671			
8		YES	22	AC POWER TEST	AC_ CONTROL	N/A
		YES	103			
		YES	260			
		YES	400			
		YES	550			
		YES	671			

SEAR IIi Relay Outputs (specific for 9V814-A01X, UPX0XX.CDL only)

Tag	Name	Port/Pin/Color	Condition Indicated
RLY1	RLY1 TR DO AF	AUX / 11 / White	TR, DO, AF
RLY2	RLY2 EO TP	AUX / 12 / Red	EO, TP
RLY3	RLY3 GD GU	AUX / 13 / Green	GD, GU
RLY4	RLY4 Door Buzzer	AUX / 24 / Brown	On for 2 seconds after Door alarm is armed
RLY5[1]	RLY5 XR	AUX / 23 / Blue	XR
RLY6	RLY6 Reserved	AUX / 10 / Orange	N/A
N/A	Common	AUX / 25 / Black	N/A
RLY7	Bull Horn Ctrl[2]	RLY 1	Any Alarm condition
RLY8	RTU ctrl	RLY 2	RTU1, RTU2, RTU3

1. RLY5 is a repeater of the GCP4000 AND1 XR (therefore: crossing normal = RLY5 closed, crossing active = RLY5 open)
2. Bullhorn ® is an external remote telemetry device.

SEAR IIi Alarm Configuration (for generic application 9V864-A01X, 9V864-A01X.CDL only)

Alarm Num.	Railroad Num.	Name	Description
1	n/a	Crossing Controller Failure	Any crossing controller reports a Vital Health error or communications error and POK1 is ON for 30 seconds.
2	n/a	Warning Time TK1	Time between Crossing Active and Island 1 Occupied. Sent to office if less than 20 seconds and no train stop is detected since last train move.
3	n/a	Possible Tail Ring	1. Crossing Active 2. Island Occupied 3. Valid warning time 4. Within 40 seconds Crossing Active 5. No Island drop 6. Crossing Inactive 7. Activations on same track
4	n/a	Crossing Active For xx	Crossing has been active for 20 minutes or longer. **user configurable time if RAILROAD= 005**
5	n/a	AC Power Off For 20 Minutes	POK1 has been off for 20 minutes or more.
6	n/a	Gate Not Up After Crossing Clear	All gates are not reporting UP or any tip reporting LEVEL after crossing was clear for at least 2 minutes. *Entrance gates only
7	n/a	Analyzer failure	MTSS, GFT, VHF or iLOD stops communicating with SEAR IIi.
8	n/a	Fail 3 Second Test	A gate started down less than 3 seconds after Crossing Active. *Entrance gates only

SEAR IIi Alarm Configuration (for generic application 9V864-A01X, 9V864-A01X.CDL only) continued

Alarm Num.	Railroad Num.	Name	Description
9	n/a	Gate Position Fail	1. Gate Control activates 2. Gate position fail time has elapsed 3. All gates are not DOWN 4. All tips are not LEVEL Or any tip sensor turns OFF while island occupied *Entrance gates only
---	n/a	Bulb Out	1. Crossing Active for > 11 seconds or Foreign Railroad active > 11 seconds. 2. Island Occupied for > 4 seconds (not required for foreign train move) 3. A single bulb out condition exists **not sent to office** **ANY LED BULBS USED=NO**
11	n/a	Two Bulbs Out	1. Crossing Active for > 11 seconds or Foreign Railroad active > 11 seconds. 2. Island Occupied for > 4 seconds (not required for foreign train move) 3. A two bulb out condition exists **ANY LED BULBS USED=NO**

SEAR IIi Alarm Configuration (for generic application 9V864-A01X, 9V864-A01X.CDL only) continued

Alarm Num.	Railroad Num.	Name	Description
12	n/a	Multiple Bulbs Out	1. Crossing Active for > 11 seconds or Foreign Railroad active > 11 seconds 2. Island Occupied for > 4 seconds (not required for foreign train move) 3. A multiple bulb out condition exists **ANY LED BULBS USED=NO**
13	n/a	Flash Rate Too Slow	1. Crossing Active for > 11 seconds or Foreign Railroad active > 11 seconds. 2. Island Occupied for > 4 seconds (not required for foreign train move) 3. Flash rate is less than 35 flashes per minute
14	n/a	Flash Rate Too Fast	1. Crossing Active for > 1 seconds or Foreign Railroad active > 11 seconds. 2. Island Occupied for > 4 seconds (not required for foreign train move) 3. Flash rate is greater than 65 flashes per minute
15	n/a	Possible Pre-Ring	1. Crossing Active 2. No Island/Train Stop 3. Crossing Inactive 4. Crossing Active 5. Island Occupied within 4 minutes

SEAR IIi Alarm Configuration (for generic application 9V864-A01X, 9V864-A01X.CDL only) continued

Alarm Num.	Railroad Num.	Name	Description
16	n/a	Bell Not Ringing	Crossing Active and BELL OUT ON and TSS Bell Audio or TSS Bell Power FALSE for at least 3 seconds. Crossing has been active for 5 seconds with no island and BELL OUT is OFF.
17	22	MB Ground Fault Alarm	BAT 1 (Battery Channel 1) on GFT1 is in FAULT state. This alarm is sent to the office once every 24 hours until it is cleared.
	125	OB Ground Fault Alarm	
	400	B10 Ground Fault Alarm	
	550, 103 or 260	B12 Ground Fault Alarm	
	671	MB-12 Ground Fault Alarm	
18	22	Low MB	Battery Channel 1 is less than 85% of calibrated voltage for at least 20 seconds.
	125	Low OB	
	400	Low B10	
	550, 103 or 260	Low B12	
	671	Low MB-12	
19	22	Low 1XB	Battery Channel 2 is less than 85% of calibrated voltage for at least 20 seconds.
	125	Low X-B	
	400, 103 or 260	Low 1XB12	
	550	Low B16	
	671	Low XB-14	
20	n/a	Gates Not Starting	All Entrance Gates have not started down within 10 seconds of Crossing Active. **user configurable time if RAILROAD=005** *Entrance gates only

SEAR IIi Alarm Configuration (for generic application 9V864-A01X, 9V864-A01X.CDL only) continued

Alarm Num.	Railroad Num.	Name	Description
21	n/a	Fail 5 Second Test	Any gate not DOWN or any tip not LEVEL within 5 seconds prior to Island Occupied after Crossing Active for at least 15 seconds. *Entrance gates only
22	n/a	Preemption Alarm	Crossing Active and Preemption is ON.
23	n/a	False Detection	1. Crossing Active 2. No Island/Train Stop/Tail Ring 3. Crossing Inactive 4. No train on same track for 30 minutes
25	n/a	Bell On During Island	**Crossing Active** > 20 seconds and **Island Occupied** and (TSS bell audio ON or BELL OUT ON) **BELL ON MENU OPTION <> "ALWAYS"**.
26	n/a	Slow Train – Possible Switching Move	Train stop is detected prior to Crossing Active or average train speed < 15 mph and warning time is less than 20 seconds.
28	n/a	Hold Clear Fail	TSS gate up input toggles > 10 times after Crossing Inactive.
30	n/a	Bell Sensor Error	Bell Sensor detects audio or power when Bell Output is off.
33	n/a	Possible Ring-thru	All islands unoccupied. The last island active has been unoccupied for 10 seconds and crossing is still active. **user configurable time if RAILROAD=005**

SEAR IIi Alarm Configuration (for generic application 9V864-A01X, 9V864-A01X.CDL only) continued

Alarm Num.	Railroad Num.	Name	Description
34	22	1XB Ground Fault Alarm	BAT 2 (Battery Channel 2) on GFT1 is in FAULT state. This alarm is sent to the office once every 24 hours until it is cleared.
	125	X-B Ground Fault Alarm	
	400, 103 or 260	1XB12 Ground Fault Alarm	
	550	B16 Ground Fault Alarm	
		XB-14 Ground Fault Alarm	
35	22	Low 2XB	Battery Channel 3 is less than 85% of calibrated voltage for at least 20 seconds.
	125	Low XB-2	
	400, 103 or 260	Low 2XB12	
	550	Low B16A	
	671	Low BATT3	
36	22	Low Batt Mon	Battery Channel 4 is less than 85% of calibrated voltage for at least 20 seconds.
	103	Low Batt Mon	
	125	Low Batt Mon	
	260	Low Batt Mon	
	400	Low Batt Mon	
	550	Low Batt Mon	
	671	Low Batt Mon	
37	22	2XB Ground Fault Alarm	BAT 1 (Battery Channel 3) on GFT2 is in FAULT state. This alarm is sent to the office once every 24 hours until it is cleared.
	125	X-B2 Ground Fault Alarm	
	400, 103 or 260	2XB12 Ground Fault Alarm	
	550	B16A Ground Fault Alarm	
	671	BATT3 Ground Fault Alarm	

SEAR IIi Alarm Configuration (for generic application 9V864-A01X, 9V864-A01X.CDL only) continued

Alarm Num.	Railroad Num.	Name	Description
38	22	Batt Mon Ground Fault Alarm	BAT 2 (Battery Channel 4) on GFT2 is in FAULT state. This alarm is sent to the office once every 24 hours until it is cleared.
	103	Batt Mon Ground Fault Alarm	
	125	Batt Mon Ground Fault Alarm	
	260	Batt Mon Ground Fault Alarm	
	400	Batt Mon Ground Fault Alarm	
	550	Batt Mon Ground Fault Alarm	
	671	Batt Mon Ground Fault Alarm	
44	n/a	Vehicle Detector Health Alarm	Vehicle Detector Health input is deenergized for 8 seconds.
--	n/a	Lamp current dropped .7A - 1.4A	1. Crossing Active for > 11 seconds or Foreign Railroad active > 11 seconds. 2. Island Occupied for > 4 seconds (not required for foreign train move) 3. The iLODs record a total current drop of .7A – 1.4A . **not sent to office** **ANY LED BULBS USED=YES**
45	n/a	Lamp current dropped ≥ 2.1A	1. Crossing Active for > 11 seconds or Foreign Railroad active > 11 seconds. 2. Island Occupied for > 4 seconds (not required for foreign train move) 3. The iLODs record a total current drop of ≥ 2.1A . **ANY LED BULBS USED=YES**

SEAR IIi Alarm Configuration (for generic application 9V864-A01X, 9V864-A01X.CDL only) continued

Alarm Num.	Railroad Num.	Name	Description
46	n/a	Lamp current dropped 1.4A - 2.1A	1. Crossing Active for > 11 seconds or Foreign Railroad active > 11 seconds. 2. Island Occupied for > 4 seconds (not required for foreign train move) 3. The iLODs record a total current drop of 1.4A – 2.1A . **ANY LED BULBS USED=YES**
47	n/a	AC Power Not On After Test	POK1 did not come back on after FRA standby power test ended.
50	n/a	Warning Time TK2	Time between Crossing Active and Island 2 Occupied. Sent to office if less than 20 seconds and no train stop is detected since last train move.
51	n/a	Warning Time TK3	Time between Crossing Active and Island 3 Occupied. Sent to office if less than 20 seconds and no train stop is detected since last train move.
52	n/a	Warning Time TK4	Time between Crossing Active and Island 4 Occupied. Sent to office if less than 20 seconds and no train stop is detected since last train move.
53	n/a	Exit Gate Not Down	Island Occupied and Exit Gates are not down.
55	n/a	Interior Gate Not Down	Island Occupied and Interior Gate is not down.
56	n/a	GCP4K Comm Bad	GCP4K stops communicating with the SEAR IIi

SEAR IIi Alarm Configuration (for generic application 9V864-A01X, 9V864-A01X.CDL only) continued

Alarm Num.	Railroad Num.	Name	Description
60	n/a	Warning Time TK5	Time between Crossing Active and Island 5 Occupied. Sent to office if less than 20 seconds and no train stop is detected since last train move.
61	n/a	Warning Time TK6	Time between Crossing Active and Island 6 Occupied. Sent to office if less than 20 seconds and no train stop is detected since last train move.
231	n/a	Full Approach Move	1. Crossing Active 2. Island Occupied 3. No train stop is detected prior to Crossing Active
232	n/a	Slow Train On Island	Island Occupied within 5 seconds prior to Crossing Active. Alarms are ignored.
233	n/a	GCP Transferred	GCP4K has transferred.
234	103	DTMF Station Track 1 Control Received	Station stop on is enabled.
235	103	DTMF Station Track 2 Control Received	Station stop 2 is enabled.
236	103	DTMF Maintenance Control Received	Maintenance is enabled.
237	103	DTMF Time-Out	DTMF activation has timed out.
238	103	DTMF Stop Control Received	Stop DTMF activation control has been received.
239	103	DTMF Off Due To Island	DTMF activation has halted due to island drop.

SEAR IIi Alarm Configuration (specific for 9V814-A01X, UPX0XX.CDL only)

Alarm Num.	Alarm Label	Designator	Condition
1	LA	LONG ACTIVATION ALARM	Xing 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 xing is active
5	GU	GATE UP ALARM	Gate not UP 180 seconds after xing clears
6	TR	TROUBLE LITE	Trouble lite off and POK1,2 on for more than 60 seconds
7	BA	BATTERY	Any battery input that is below or above the user defined thres-holds 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 than 20 minutes
10	PK	POWER OFF	POK off for more than 2 hours
11	DO	DOOR ALARM	Intrusion alarm. See description following table (page 68).
12	TP	TEMPERATURE	Temperature Above 150 Degrees Fahrenheit
13	AF	ANALYZER FAILURE	SEAR losses communications with any of its installed Echelon nodes, Ground fault detectors or TSS units
14	VH	VEHICLE DETECTOR HEALTH	Vehicle health output down for more than 15 seconds

SEAR IIi Alarm Configuration (specific for 9V814-A01X, UPX0XX.CDL only) continued

Alarm Num.	Alarm Label	Designator	Condition
15	GF	Ground Fault	Ground fault detected for more than 20 seconds
101	CL	XING CLEARED	Indicates xing cleared for 5 minutes after long activation alarm
102	OP	POWER	POK ON for 5 minutes after a IP or PK alarm
103	NO	ONLINE	Pressing the clear alarms key once causes SEAR to go offline and no alarms are reported during this time. Pressing clear alarms key a second time causes the SEAR to go online and reset all alarms. Note SEAR always powers up online after a 2 minute delay and if left offline it will automatically return online in 60 minutes. Also, the unit will set itself offline if the GCP transfers for 2 minutes to allow the GCP to power up.
104	CK	UNIT HEALTH	Sends a health message to the office on a periodic time base as determined by the user.

NOTE

All alarms and Clear alarms are both recorded and displayed.

SEAR IIi Alarm Clears (for generic application 9V864-A01X, 9V864-A01X.CDL only)

Alarm Num.	Railroad Num.	Name	Description
101	n/a	Crossing Controller Normal	Crossing Controller Failure alarm clears
104	n/a	Crossing Normal	*Crossing Active Too Long* alarm clears.
105	n/a	AC Power Back On	POK1 back on for at least 1 minute.
106	n/a	Gate Not Up Clear	*Gates Not Up After Crossing Clear* alarm clears.
107	n/a	Analyzer Normal	*Analyzer Failure* alarm clears.
108	n/a	Fail 3 Second Test Clear	*Fail 3 Second Test* alarm clears.
109	n/a	Gate Position Fail Clear	*Gate Position Fail* alarm clears.
111	n/a	Bulbs Normal	*Two Bulbs Out* or *Multiple Bulbs Out*, *Lamp Current Dropped 1.4 A -2.1A, Lamp Current Dropped ≥2.1A,* alarm clears.
113	n/a	Flash Rate Normal	*Flash Rate Too Slow* alarm clears.
114	n/a	Flash Rate Normal	*Flash Rate Too Fast* alarm clears.
116	n/a	Bell Normal	*Bell Not Rringing* alarm clears.
117	n/a	GFT Normal	*Ground Fault* alarms clear.
118	22	MB Normal	*Low Battery Channel 1* alarm clears for 5 seconds.
	125	OB Normal	
	400	B10 Normal	
	550, 103 or 260	B12 Normal	
		MB-12 Normal	
119	22	1XB Normal	*Low Battery Channel 2* alarm clears for 5 seconds.
	125	X-B Normal	
	400, 103 or 260	1XB12 Normal	
	550	B16 Normal	
	671	XB-14 Normal	

SEAR IIi Alarm Clears (for generic application 9V864-A01X, 9V864-A01X.CDL only) continued

Alarm Num.	Railroad Num.	Name	Description
120	n/a	Gates Not Starting Clear	*Gates Not Starting* alarm clears.
121	n/a	Fail 5 Second Test Clear	*Fail 5 Second Test* alarm clears.
122	n/a	Preempt Normal	*Preemption Fail* alarm clears.
125	n/a	Bell Normal	Any *Bell* alarm clears.
128	n/a	Hold Clear Normal	*Hold Clear Fail* alarm clears.
135	22	2XB Normal	*Low Battery Channel 3 alarm* clears for 5 seconds.
	125	X-B2 Normal	
	400, 103 or 260	2XB12 Normal	
	550	B16A Normal	
	671	BATT3 Normal	
136	22	Batt Mon Normal	*Low Battery Channel 4 alarm* clears for 5 seconds.
	103	Batt Mon Normal	
	125	Batt Mon Normal	
	260	Batt Mon Normal	
	400	Batt Mon Normal	
	550	Batt Mon Normal	
	671	Batt Mon Normal	
153	n/a	Exit Gate Not Down Clear	*Exit Gate Not Down* alarm clears.
155	n/a	Interior Gate Not Down Clear	*Interior Gate Not Down* alarm clears.
156	n/a	GCP4K Comm Good	*GCP4K Comm Bad* clears
200	n/a	Normal Train Move	Generated after **FullApproachMove** TRUE and no *Tail Ring*, *Pre-Ring*, *Ring-thru or Short Warning* occurred, but one of the above occurred previously. The alarm conditions are all cleared.

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.

This page intentionally left blank

RECALIBRATION & REPROGRAMMING REQUIREMENTS

NOTE

If CPU module MCF or Track module MEF are changed, complete programming and recalibration will be required.

Recalibration & Reprogramming Requirements Due to Module Replacement

The recalibration requirements due to the replacement of a module are shown in the following table.

Recalibration & Reprogramming Requirements Due to Module/Chassis Replacement

Module /Assembly Replacement		Calibration Required				Reprogramming Required
		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
A40413	RIO (I/O)	No	No	No	No	No
A80406	Transfer	No	No	No	No	No
A80405	SSCC[5]	No	No	No	No	No
A80407	Display (DT)	No	No	No	No	No
A80410	SEAR	No	No	No	No	N/A[3]
A80438-2	ECD[4]	No	No	No	No	No
n/a	Chassis	Yes	Yes	Yes	Yes	Yes

Notes:

1. For track with changed A80418.
2. May be bypassed using **BYPASS** button instead of the **START** button in calibration procedure.
3. Site setup required.
4. Plug-in located on chassis behind CPU Module. Requires same MCF as previously in use.
5. SSCC lamp voltages must be readjusted.

Recalibration Requirements Due to Program Changes

The GCP program changes that require track recalibration are indicated in the following table.

Recalibration Requirements Due to Program Changes					
	Calibration Required				Reprogramming Required
Program Changes	GCP CAL	GCP APP	GCP LIN	ISL CAL	
Increased Number of Tracks	Yes[1]	Yes[1]	Yes[1]	Yes[2]	Yes[1]
GCP Frequency Change	Yes[3]	Yes[3]	Yes[3]	No	No
Island Frequency change	No	No	No	Yes[4]	No
Application changed: Unidirectional to Bidirectional, Bidirectional to Unidirectional or Unidirectional to Simulated Bidirectional	Yes[5]	Yes[5]	Yes[5]	No	No
Transmit Level Changed: 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
Template Changed	Yes[9]	Yes[9]	Yes[9]	Yes[9]	Yes[10]
Template Set To Default selected					

Notes:

1. For added tracks only
2. If island is used
3. For tracks with new GCP frequencies
4. For tracks with new island frequencies
5. For changed tracks only
6. If EZ varies more than 2
7. Can be bypassed
8. If changed to internal
9. For all tracks
10. Complete re-programming required

Recalibration Requirements Due to Track Equipment Changes

Changes made to the existing track equipment that require track recalibration are shown in the following table.

NOTE

Approach distance in the Program menu must be changed to reflect the new approach distance prior to start of track calibration. Otherwise, the system will prompt for recalibration.

Recalibration Requirements Due to Track Equipment Changes

Track Equipment Changes	Calibration Required			
	GCP CAL	GCP APP	GCP LIN	ISL CAL
Termination Shunts Changed	Yes[1]	No	No	No
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
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

Notes:
1. For changed tracks only.
2. Requires bypass.

CALIBRATION PROCEDURES

NOTE

If the outlined procedures fail, they should be repeated once. If the error repeats, refer to the Troubleshooting section.

WARNING

TRACK RELATED ISSUES MUST BE CORRECTED OR VERIFIED TO BE CORRECT PRIOR TO RECALIBRATION.

GCP calibration is divided into the following automated procedures:

- GCP Calibration (GCP CAL)
- Approach Distance (APP CAL) and Linearization (LIN CAL) Calibration
- Island Calibration (ISL CAL)
- Standby Module Calibration

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.**

Calibrating A Track Module

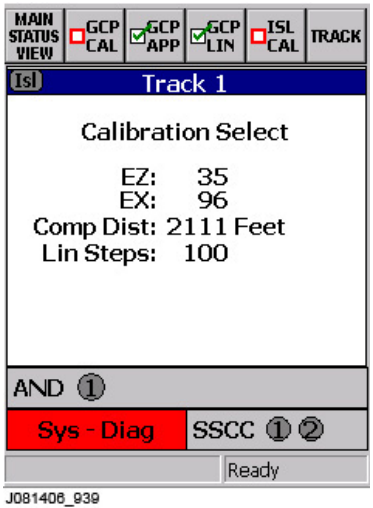
WARNING

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.

Track Module calibration is required if:

- The DT Status Screen shows one of the following:
  - **GCP Cal Req**
  - **GCP Approach Req**
  - **Linearization Req**
  - **Island Cal Req**
- The Track Module 4-character display shows one of the following:
  - **GCAL**
  - **GAPP**
  - **GLIN**
  - **ICAL**

- The DT Calibration screen indicates which calibrations are required with an empty box in each calibration select button. A check mark is displayed in the box when the indicated calibration is complete.



NOTE

Removal of DC power from the 4000 GCP case is not required before removing or installing modules.

GCP Calibration

Step 1	If system has a transfer module, 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. Menu shows only enabled tracks.
Step 4	Select the **GCP CAL** button. • The **GCP Calibration** Window appears. ♦ The current **EZ** and **EX** values appear. ♦ If **Calibration Req.** appears below the **EZ** and **EX** values. calibration is required.
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 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.
Step 6	To record the reason for the recalibration in the Maintenance log, select the **GCP CAL** button. • The **GCP Calibration** Window appears.

GCP Calibration continued

Step 7	Select the **ADD LOG ENTRY** button. • The **Log Entry** Window opens.
Step 8	Type any notes concerning the reason and select **OK** to save the entry. • **Log Entry** Window closes and the display returns to the **GCP Calibration** Window
Step 9	Select the **CAL SELECT** button. • The display changes to **Calibration Select** Window.

NOTE

This completes **GCP Calibration (GCP CAL)**. Proceed to **Approach Distance and Linearization Calibration**.

NOTE

If an in-service 4000 GCP requires only that the **GCP CAL** procedure be performed, the BYPASS procedure must be completed for both **GCP APP** and **GCP LIN**. See next page.

WARNING

USE THE FOLLOWING BYPASS PROCEDURE ONLY IF THE CURRENT COMPUTED APPROACH DISTANCE AND LINEARIZATION VALUES ARE KNOWN TO BE CORRECT.

GCP APP & GCP LIN Calibration Bypass Procedure

Step 1	Once **GCP CAL** is completed, bypass the approach calibration by first selecting **GCP APP** and then **BYPASS**. • Do not select **START**.
Step 2	Bypass the linearization calibration by first selecting **GCP LIN** and then **BYPASS**. • Do not select **START**.

Approach Distance 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 at the end of this procedure. 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.
Step 3	Select the **GCP APP** button. • The **GCP Approach** Window appears.

Approach Length and Linearization Calibration continued

Step 4	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 appears. ♦ The computed approach distance (**Comp Dist**) appears. ♦ The **GCP APP** button has a green check in the box. • If calibration is not successful, the display shows a **Failed** message (see Troubleshooting).
Step 5	Record the computed approach distance in feet for the track in the **First Approach, Step 5** column (**Comp Dist**) on the Calibration Values History form at the end of this procedure.
Step 6	Accurately (within 1%) locate the midpoint of the longest approach and move the hardwire shunt to that point on the rails.
Step 7	Select the **GCP LIN** button. • The **GCP Linearization** Window appears.
Step 8	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 appears. ♦ The **GCP LIN** button has a green check in the box. • If calibration is not successful, the display shows a **Failed** message (see Troubleshooting).
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 at the end of this procedure. • 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.
Step 11	Remove the hardwire shunt from the track.

Approach Length 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 first approach distance, 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.
Step14	Record the EZ and EX values for the track in the **Second Approach, Step 14** column on the Calibration Values History form at the end of this procedure.
Step 15	Select the **GCP APP** button. • The **GCP Approach** Window appears.
Step 16	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 appears. ♦ The computed approach distance (**Comp Dist**) appears. ♦ The **GCP APP** button has a green check in the box. • If calibration is not successful, the display shows a **Failed** message (see Troubleshooting).
Step 17	Record the computed approach distance in feet in the **Second Approach, Step 17** column on the Calibration Values History form at the end of this procedure.
Step 18	Accurately (within 1%) locate the midpoint of this approach and move the hardwire shunt to that point on the rails.
Step 19	Select the **GCP LIN** button. The **GCP Linearization** Window appears.
Step 20	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 appears. ♦ **GCP LIN** button has a green check in box. • If calibration is not successful, the display shows a **Failed** message (see Troubleshooting).

Approach Length and Linearization Calibration continued

Step 21	Record the linearization (**Lin Steps**) value for the track in the **Second Approach, Step 21** column (**Lin Steps**) on the Calibration Values History form at the end of this procedure. • 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.
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 appears.
Step 25	Select the **EDIT** button. • The **Linearization Steps** dialog box appears.
Step 26	Enter the **Lin Steps** value recorded on the Calibration Values History form for the first approach (step 9) into the **New Value field** using the keypad numbers and select **UPDATE**. • The **Calibration Select** Window appears.
Step 27	Select the **GCP APP** button. • The **GCP Approach** Window 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 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.

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.

NOTE

This completes **Approach and Linearization Calibration**. If the system includes an internal island, proceed to **Island Calibration (ISL CAL).**

Calibration Values History

	Calibrated Values (Step 1)		First 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)
	EZ	EX	EZ	EX		
Track 1						
Track 2						
Track 3						
Track 4						
Track 5						
Track 6						

	Calibrated Values (Step 1)		Second Approach E/W( ) N/S			
			Hardwire Across Term. Shunt (Step 14)		Computed Approach Distance (Comp Dist) (Step 17)	Linearization Step Value (Lin Steps) (Step 21)
	EZ	EX	EZ	EX		
Track 1						
Track 2						
Track 3						
Track 4						
Track 5						
Track 6						

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 appears.

Step 2 Temporarily install a hardwire shunt beyond the island receiver rail connections at the appropriate distance specified below the **Calibration Required** message.

- Shunt distances for island frequencies are provided in the table following the Island Calibration procedure.

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 appears.
  - The **ISL CAL** button has a green check in the box.
- If calibration is not successful the display shows a **Failed** message (see Troubleshooting).

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.

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

NOTE

Repeat all GCP approach, linearization, and island calibration steps for each MAIN side track module installed. When complete, go to **Standby Modules Calibration**, if a **Standby** set of modules is present.

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. • Only enabled tracks appear on the menu.
Step 4	Select the **GCP CAL** button. • The **GCP Calibration** Window appears. ♦ 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 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 (see Troubleshooting).
Step 6	Select the **GCP APP** button. • The **GCP Approach** Window appears. ♦ The computed approach distance (**Comp Dist)** appears. ▪ This is the value calculated on the MAIN side. ▪ **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.
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.

Standby Modules Calibration continued

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 Required** message. (See also preceding Island Shunt Distance table.)
Step 12	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 appears. ♦ The **ISL CAL** button has a green check in the box. • If calibration is not successful, the display shows a **Failed** message (see Troubleshooting).
Step 13	Verify the island LED is off and remove the hardwire shunt. • Island LED is now on.
Step 14	Repeat steps 1 through 13 for each standby-side Track Module installed.

NOTE

IF SSCC IIIi modules are included in the system, proceed to **SSCC IIIi LAMP VOLTAGE ADJUSTMENT** and **SSCC LAMP TESTS**. Otherwise, proceed to **OPERATIONAL CHECKS**.

SSCC IIIi LAMP VOLTAGE ADJUSTMENT

NOTES

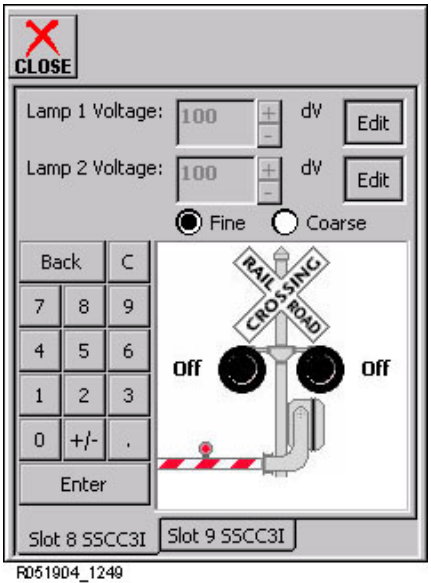
- Before performing Lamp Voltage Adjustment procedure, the crossing controllers must be inactive; i.e., gates up, lights off and bell off.
- If a train approaches during lamp adjustment, the crossing controllers will activate and the lamps will flash. Restart Lamp Voltage Adjustment Procedure following completion of train move.
- The regulated output is a pulse-width modulated output that produces a produces a square wave. A meter with a "True RMS AC + DC" scale is required to accurately measure the voltage. Appendix A 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

On the Lamp Setup screen dV indicates tenths of a volt (decivolt). 100 dV is equal to 10.0 volts. etc.



R051904_1249
05-19-04

Crossing Controller Lamp Voltage Adjustment

Step 1 Select the **Setup** button at the top of the Main Status screen.
- The Track Setup Menu appears

Step 2 Select the **SSCC Lamps** entry of the Track Setup Menu
- The **Lamp Setup** window 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. (It may take a few seconds for Edit button to become active – turns black.)

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 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 Appendix A).

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.
- Corresponding lamp output is turned off.

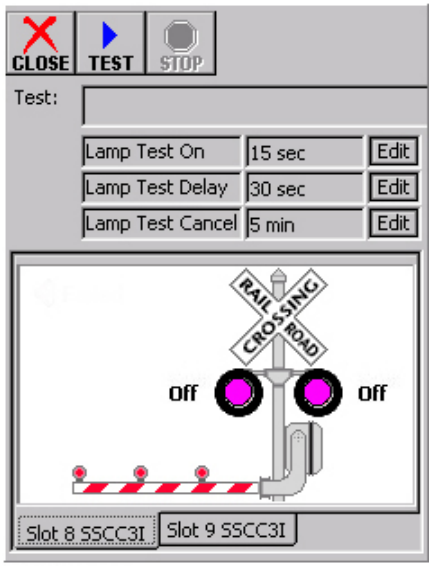
Step 7 Select the **Edit** button to right of the **Lamp 2 Voltage** field.
- The **Lamp 2 Voltage** field highlights.
- Corresponding lamp output is turned on.

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 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 Appendix A).

Crossing Controller Lamp Voltage Adjustment continued

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. • 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.

SSCC LAMP TESTS



WARNING

THE SSCC TEST MODE WILL NOT PREEMPT TRAFFIC SIGNALS. VERIFY THAT VEHICLES ARE CLEAR OF THE WARNING DEVICES BEFORE ACTIVATING THE SIGNALS.

Crossing Controller Lamp Test Selection

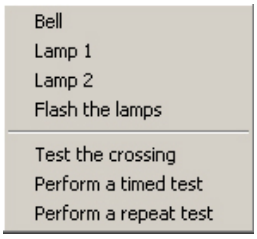
Step 1	Select the **Setup** button at the top of the Main Status screen. • The Track Setup Menu appears
Step 2	Select **SSCC Tests** entry from the Track Setup Menu • The SSCC **Test** window appears

The operation of each Solid State Crossing Controller (SSCCIIIi) can be tested from this window.

- 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 control 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
    - Identifies selected test in **Test:** field



- The **STOP** button stops a selected test.
  - Button is active when the test is started.

What Can Be Tested

The following SSCC tests may be performed:

- **Bell**: Turn on the bell output
- **Lamp 1**: Turn on Lamp 1 output
- **Lamp 2**: Turn on Lamp 2 output
- **Flash the Lamps:** Test the lamp outputs on both controllers
- **Test the crossing**: Flash the lights, ring the bell, run the gate delay, then drop 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

Types of Timed Tests

Timed Tests: 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.

Repeat Tests: 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.

Parameters for Timed Tests

Parameters for each SSCC timed test are set in the fields below the **Test:** field.

- The **Lamp Test On** field designates the duration of the Lamp On test.
  - Select the **Edit** button to the right of the field to open the **Set Parameter** dialog box.
    - This **Set Parameter** dialog box allows the test duration timer to be modified.
    - Default value: **15 sec**
    - Valid entry range: **15** to **60** seconds
- The **Lamp Test Delay** field designates the time between test selection and test start.
  - Select the **Edit** button to the right of the field to open the **Set Parameter** dialog box.
    - This **Set Parameter** dialog box allows the **Lamp Test Delay** timer to be modified.
    - Default value: **30 sec**
    - Valid entry range: **30** to **120** seconds
- The **Lamp Test Cancel** field designates the automatic test termination time following test initiation.
  - Select the **Edit** button to the right of the field to open the **Set Parameter** dialog box.
    - This **Set Parameter** dialog box allows the **Lamp Test Cancel** timer to be modified.
    - Default value: **5 min**
    - Valid entry range: **1** to **15** minutes

Test Status Indications

The status of the SSCCIIIi module appears in the gate display field at the bottom of the window during tests.

- Four status notations appear during operational tests:
  - **Off** indicates that the SSCCIIIi module lamp drive outputs are off.
  - **Ringing** indicates that the SSCCIIIi module bell output is energized.
  - **Flashing** indicates that the SSCCIIIi module lamp outputs are alternately energizing (flashing).
  - **Failed** indicates that a bell, lamp, or crossing gate output failure has been detected.

SSCC OPERATIONAL TESTS

After the 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 the SSCC Operational Tests procedure provided below.

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

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).

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.

SSCC OPERATIONAL TESTS continued

Step 8	Verify that all SSCC programming is correct (program and configure menus).
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.

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.

GCP OPERATIONAL CHECKS

WARNING

AFTER INITIAL PROGRAMMING OR PROGRAMMING CHANGES, TESTS MUST BE PERFORMED TO VERIFY PROPER OPERATION OF THE GCP PRIOR TO PLACING A SYSTEM IN SERVICE.

In addition to operational checks required by the maintaining railroad, the 4000 GCP system should be tested to verify the operation of the following:

Track connections

- Open transmit wire
  - Crossing activates
  - EZ = 0
- Open receive wire
  - Crossing activates
  - EZ = 0

UAX, DAX Enables & AND Enable input(s)

- 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

Traffic Signal Preemption

- When used, Advance Preempt input open causes Preempt Output to de-energize and activates warning devices after the Advance Preempt Timer times out.
- When used, Preemption health input open activates warning devices immediately (without advance preempt time interval).
- When used, Traffic Signal Health open initiates simultaneous preemption, rather than advance preemption, upon train detection.

Maintenance Call (MC) Light, if this feature is used:

- Verify that the light is lit
- Verify that the MC extinguishes when one of the following occurs:
  - Taking a track out of service, or by energizing an out-of-service input.
  - If "Low Battery Enable" is ON, temporarily raise the "Low Battery Level" to above the battery voltage.
  - Removing CPU module from the chassis, which will activate the crossing also.
- Restore the track, low battery level, or CPU module to operation and the MC light should turn on.

Train detection

- Crossing activates and EZ value decreases smoothly for an approaching train
- For bidirectional applications, the EZ rises smoothly 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.

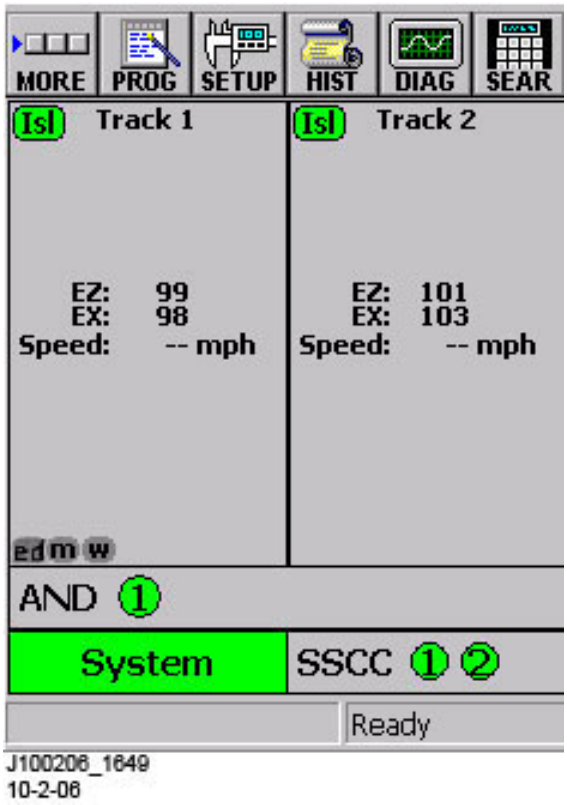
Warning Times and Crossing operation

- 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.

The GCP OPERATIONAL CHECKS completes the GCP and SSCC calibration and operational checks / tests.

MAINTENANCE

The GCP Display Module is the main diagnostic tool available to maintenance personnel. The display is a touch screen activated device equipped with a timeout feature. To activate the display, touch it with the stylus. The track status view is shown below:



J100206_1649
10-2-06

The EZ and EX are shown for each track. A track status area (two in the example above) is displayed for each track module in the system (up to six). The approximate speed of a train approaching the crossing is shown as a positive (+) number. The approximate speed of a train moving away from the crossing is shown as negative (-) number.

Track Status Window Color Scheme

The status window background color indicates track status:

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

Track Function Status

The status of optional track functions are displayed in the lower portion of each track status window.

- 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.

ISL, AND, SSCC and SYSTEM Status Indications

- ISL:
  - Gray symbol = island occupied
  - Green symbol = island unoccupied or, if used, Wrap input energized regardless of occupancy state.
  - No symbol = not used
- AND:
  - Status Bar indicates which AND functions are programmed as shown by a circled number.
  - Gray circle = the AND function is de-energized and not Wrapped (if used).
  - Green circle = the AND function is energized and not Wrapped (if used).
  - Yellow circle = the AND function is Wrapped regardless of state of AND function logic.
- SSCC:
  - Status bar Indicates which SSCC IIIi are used as shown by circled number.
  - Green circle = not activated (lamps not flashing)
  - Grey circle = signals are activated (lamps flashing)
- System:
  - Green status bar = all tracks are calibrated
    - track conditions are within normal operating parameters
    - system is fully functional
  - Red status bar = unhealthy system or track condition exists.
    - displays system status
    - status window for affected track also displays red
  - Flashing blue background = the AND functions are out of service.

Additional information is obtained by tapping the track section with the stylus and selecting DETAILED STATUS VIEW.

The TRACK DIAGNOSTICS and OUT OF SERVICE menus are also available when the track section is tapped in the main status window.

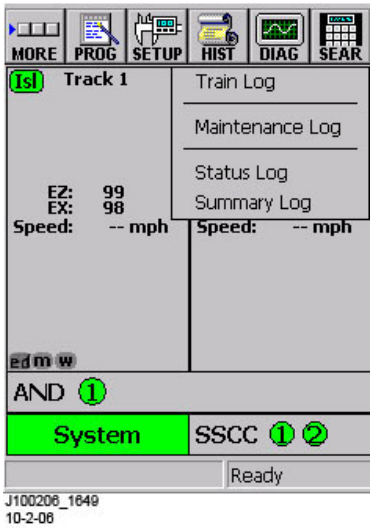
NOTE

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

- The train speeds 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.

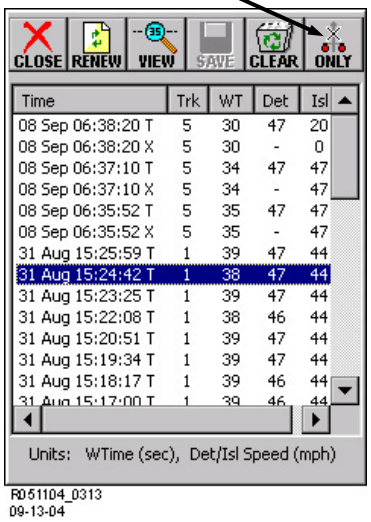
HISTORY LOGS

Four history logs may be accessed as shown below:



Train Log

- Separate log for Main and Standby:
  - Train Log stored on CPU Module
    - Main log on main CPU
    - Standby log on standby CPU
- Contains:
  - Date and time of move
  - Crossing warning time (**WT**)
  - Detection (**Det**) speed
  - Island (**Isl**) speed
- Each move listing is designated by either an **X** (crossing) or **T** (track) to the right of the time entry.
  - Selecting the **ONLY** button selects only the crossing moves for display.

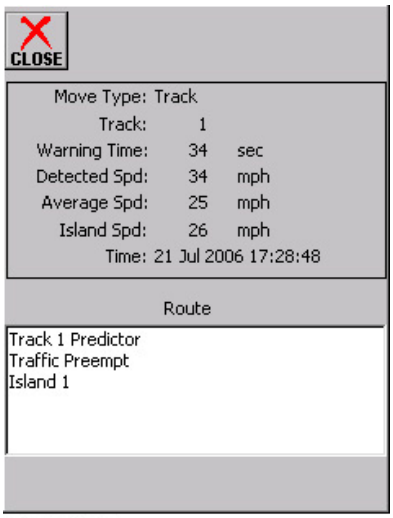


NOTE

The above screen shows a CLEAR button. It may be necessary to select a MORE button for the CLEAR button to appear. The CLEAR selection allows the maintainer to clear the log after it is reviewed so that only events that occur between this visit and the next visit will appear next time. **SEAR IIi logs cannot be cleared by maintenance personnel.**

Select a train move entry and then the **VIEW** button to display the Train Move History Detail screen which includes:

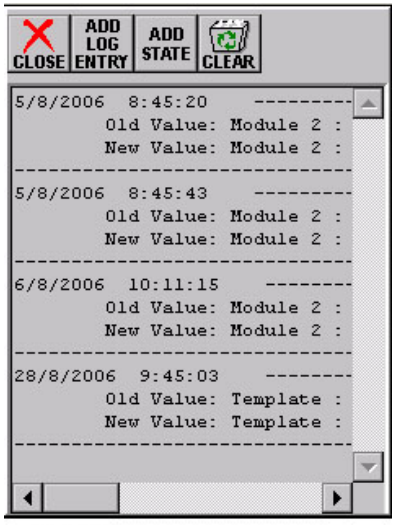
- Average speed of the train move
- Route of the train move which is useful when multiple track circuits are used.



J081006_1508
8-10-06

Maintenance Log

- Combines entries for both Main and Standby
  - Maintenance Log stored on Display Module
  - Information from Main and Standby CPUs stored in same log.
- Contains programming changes
- Contains Calibration information
- Contains user entered maintenance notes (ADD LOG ENTRY). For instance Maintainer can add notes about weather, periodic tests, or reason for calibration.
- Can be cleared by maintainer after review.



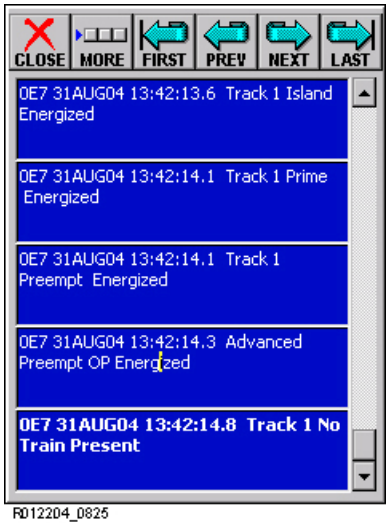
D12212006_0222
12-21-06

NOTE

The Status Log and Summary Log show fewer events per screen when viewed on the 4000 GCP Display Module than on the PC based DT.

Status Log

- Separate log for Main and Standby
  - ♦ Status Log stored on CPU Module
    - Main log on main CPU
    - Standby log on standby CPU
- Contains all system events



R012204_0825
08-31-04

MAINTENANCE & TROUBLESHOOTING

Summary Log

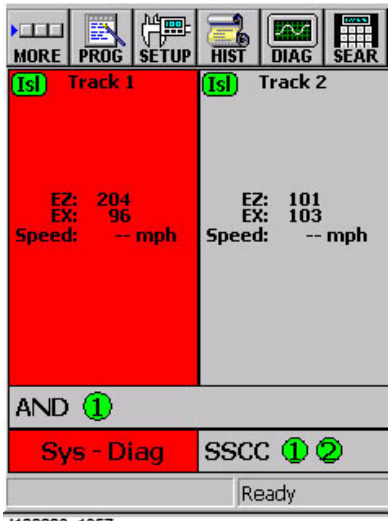
- Provides a summary of the significant events from the status log.
- Separate log for Main and Standby (log stored on each CPU)
- Contains error events.
- Can be cleared by maintainer after review

R012204_1400
08-31-04

DIAGNOSTICS

When entering the signal house, the GCP display will be dark because the touch screen display has a timeout feature. To activate the display, touch it with the stylus. Each module also has diagnostic LEDs, and may have a four-character display, that assist in setup, calibration, diagnostics and trouble-shooting. Refer to the HARDWARE section at the front of this handbook for LED and module four-character display information.

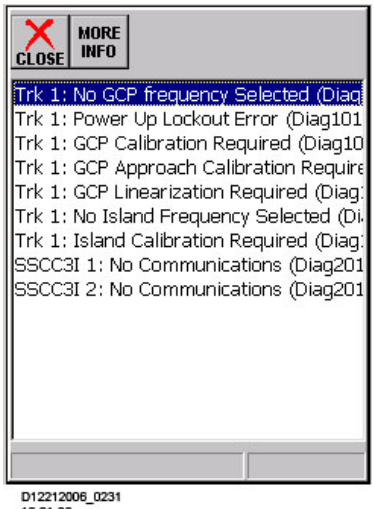
When an unhealthy system or track condition exists, the System status bar is displayed red. The status window for the affected track module will also be displayed red as shown below.



J100206_1357
10-2-06

System Diagnostics

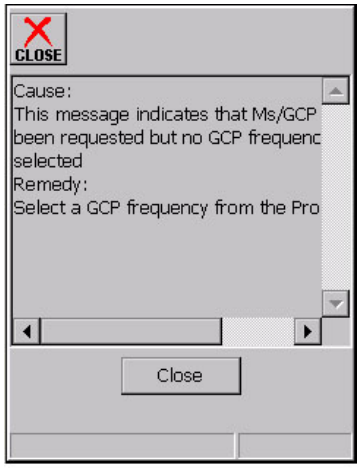
- System Diagnostics Window can be accessed in two ways:
  - Select the **DIAG**. button, then **System Diagnostics.**
  - Select the System status bar, then **View System Diagnostics** from the pop-up menu.



D12212006_0231
12-21-06

- Selecting one of the displayed error descriptions and then the **MORE INFO** button displays the diagnostic detail screen shown on the following page.

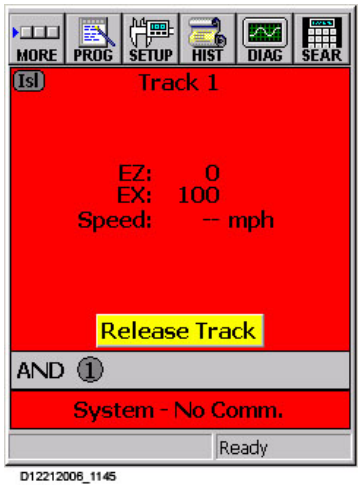
This screen lists the cause and remedies for the selected error. Use the vertical and horizontal scroll bars as needed to view all of the data.



D12212006_0236
12-21-06

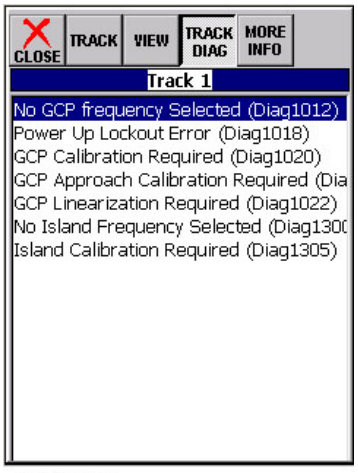
Release Track

When problems exist at initial start up or when transferring to or from MAIN and STBY, a 'Release Track' message is displayed as an added precaution during power up.



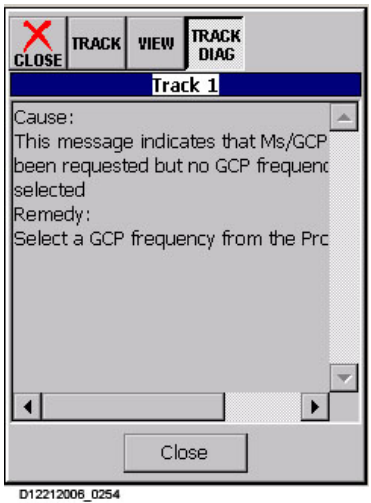
D12212006_1145
12-21-06

Touch anywhere on the red Track Status area for the affected track with the stylus, then select **Track Diagnostic** from the pop-up menu.



D12212006_0252
12-21-06

Select a displayed error description and then the **MORE INFO** button to show a list of possible causes for that error.



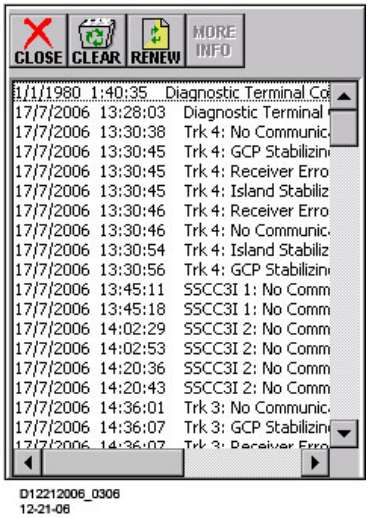
After the cause of the power-up lockout problem is corrected, press the yellow Release Track area on the display to release the track.

The GCP 4000 is programmed with self-diagnostic causes and remedies for most common problems. Accessing the information is similar to the method above.

Diagnostics Log

The diagnostic log provides a time and date stamp of all previous errors. Select **DIAG**, then **DIAGNOSTIC LOG.**

- Can be used to provide important information for intermittent track or equipment problems.
- Log is stored in the Display Module.
- Captures events only while the Display Module is connected to the GCP.
- Can be cleared by maintainer after being reviewed.



Maintenance Call Lamp Output

NOTE

When energized, the MAINT CALL lamp output completes the circuit to the negative CPU battery. A MAINT CALL light can be connected between B and MAINT CALL. A series limiting resistor should be used to lower voltage across the lamp and limit the total current to 4 amps.

The Maintenance Call feature can provide an additional level of diagnostics. When the 4000 GCP system is healthy, the maintenance call output is energized.

The maintenance call output de-energizes when:

- The SEAR IIi application program detects low voltage, power off indication or other custom conditions in the railroad specific application program.
- 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 low voltage 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.

Transfer Output

When a Transfer Module is installed in the 4000 GCP, it provides an additional user diagnostic. When the 4000 GCP system is healthy, the transfer output is energized (on) as shown by LED2 lit on the active CPU module.

- This output level stops the Transfer Module from counting down and transferring to the opposite side when the Transfer Module is in the auto mode.
- The transfer output is de-energized (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.

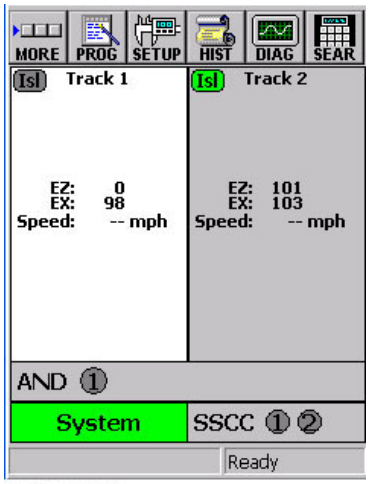
TROUBLESHOOTING

This subsection describes the method of troubleshooting a problem in a system that has previously been in service.

When entering the signal house, the GCP display will be dark because the touch screen display has a timeout feature. To activate the display touch it with the stylus.

The first step in troubleshooting a problem is to determine whether the components of a 4000 GCP system have detected a problem. When the 4000 GCP system is healthy, it shows the following:

- Track windows are gray (or white if a train has been detected) on the DT Display.

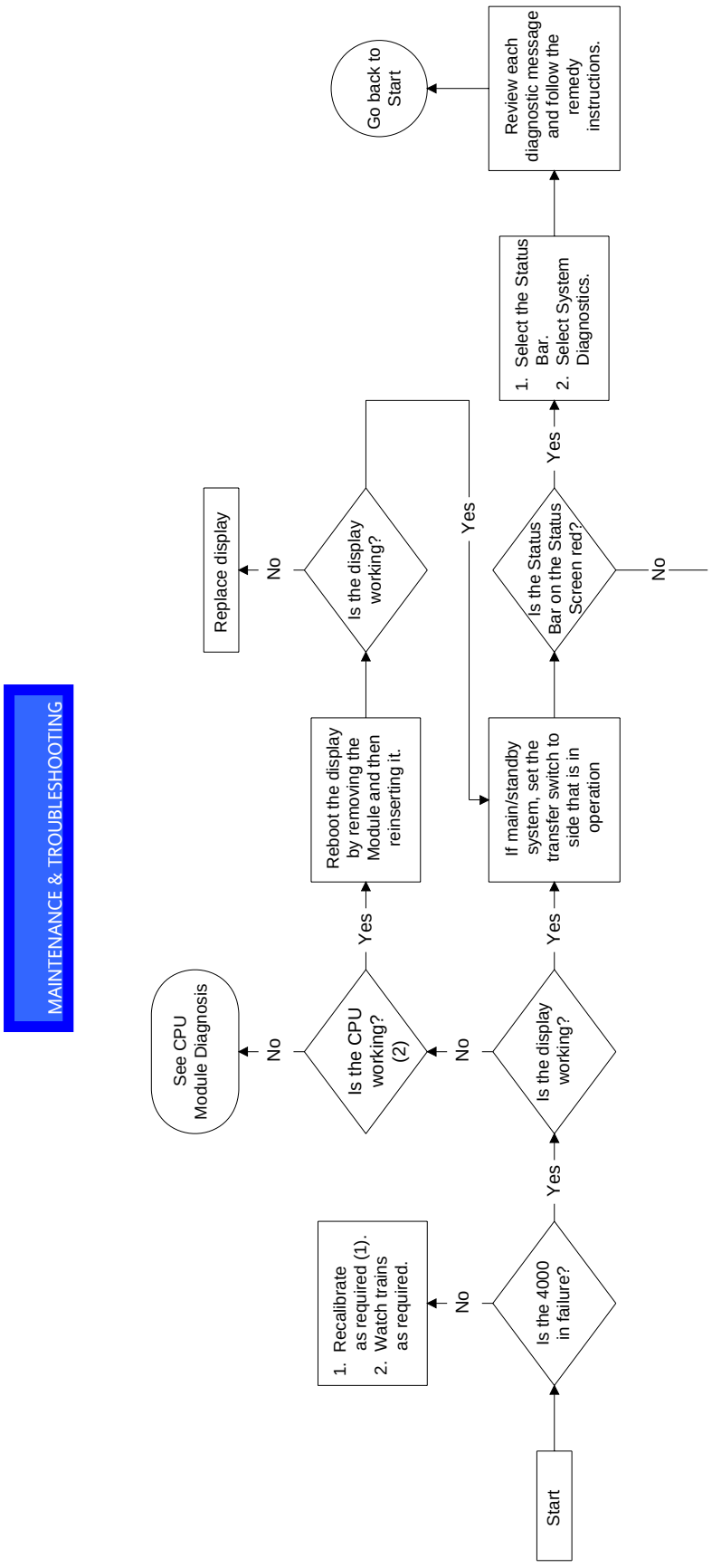


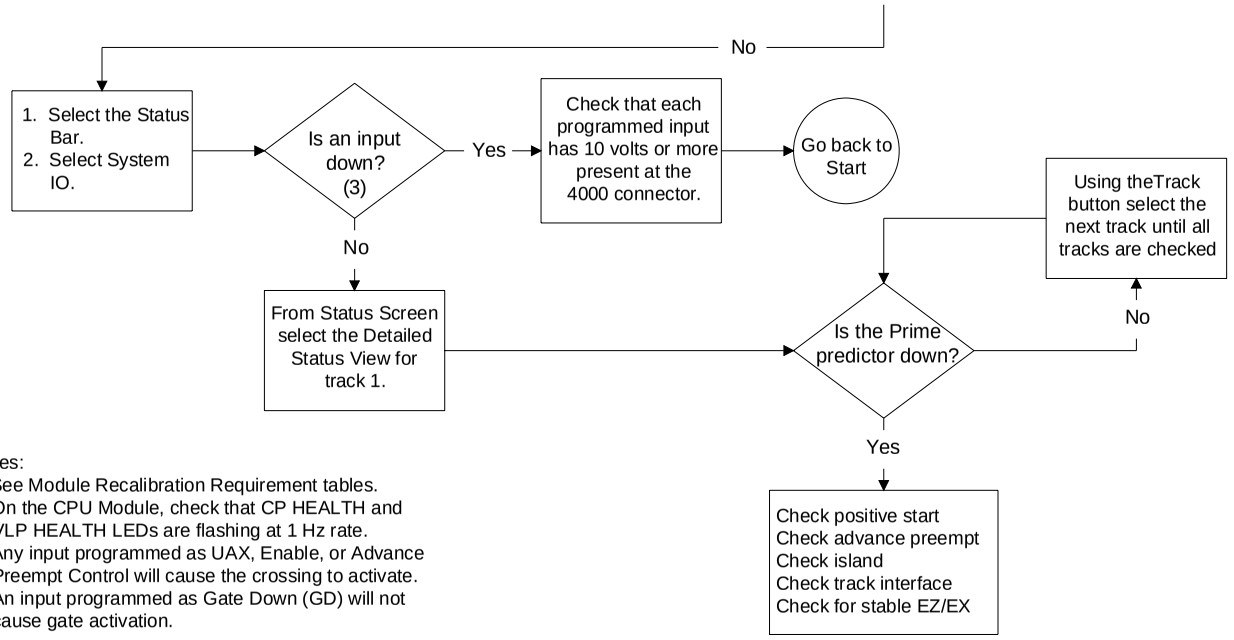
- System Status bar on DT Status Screen is green.
- Health LEDs on all modules (CPU, Track, RIO, SSCCIIIi) are flashing slowly (1HZ).
- Transfer Module display is not counting down.
- SEAR Alarm LED's indicate that no alarms are present.
- CPU LED **1** is on, indicating that the Maintenance Call output is on.
- CPU LED **2** is on, indicating that the transfer signal is being generated.
- Power LEDs on all modules are on and steady.

If the system has detected a problem, use the System Diagnostics or the Track Diagnostics to locate the problem.

Refer to the Troubleshooting Flow Chart, on the following two pages, to assist in system and track problem diagnosis.

Troubleshooting Flowchart





Notes:
1. See Module Recalibration Requirement tables.
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.

R021605_0804
02-18-05

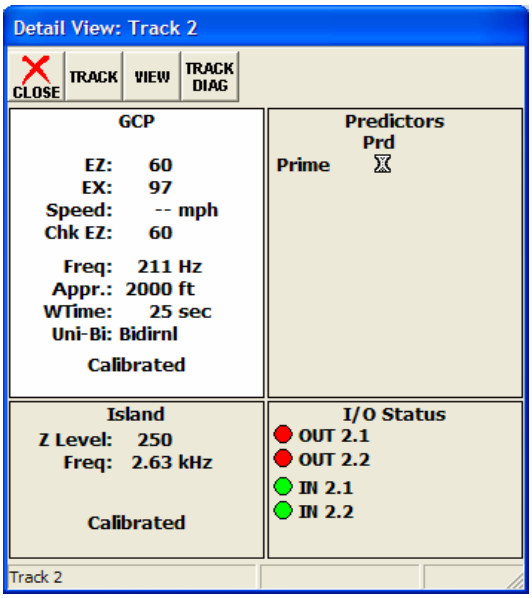
Troubleshooting A De-energized Predictor

If the track module is healthy, predictors can be de-energized for the following reasons:

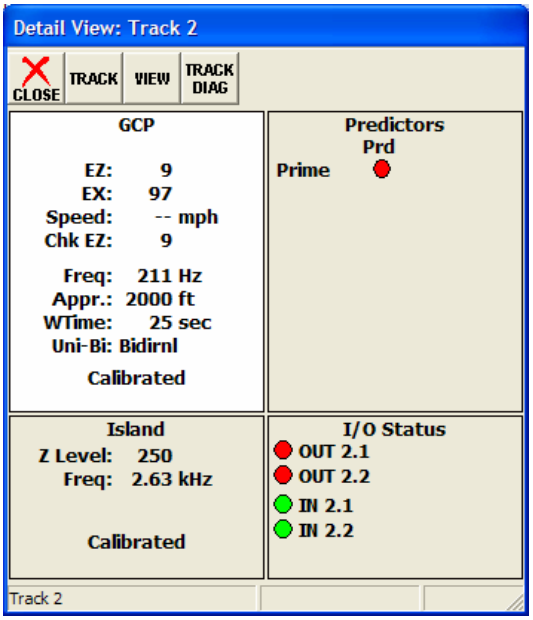
Reason	How
The track module senses that EZ is decreasing at a rate that is fast enough to trigger the prediction.	An approaching train.
The predictor (usually Prime and Preempt) has a zero offset distance and the island used by the MS/GCP is de-energized	If the Island LED on the Track Module is off the island is de-energized.
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 de-energized.
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 de-energized 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.
An UAX input 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.

Reason	How
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.

An example of a predictor running the pickup delay is shown below. Note, the "--" indicates no speed and the hour glass symbol appears next to the PRIME predictor.

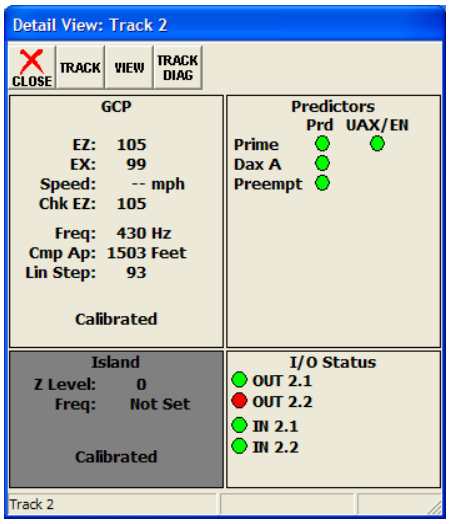


An example of a predictor below the POSITIVE START value is shown track's DETAIL STATUS VIEW below. Note, the "--" indicates no speed and the prime predictor is de-energized as indicated by the red circle.

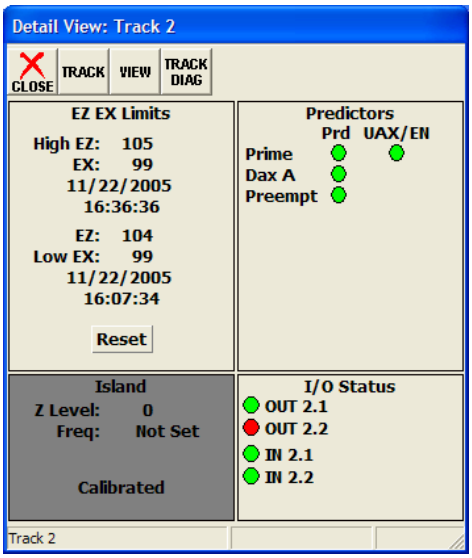


High EZ and Low EX History & Calibrated Approach

When in the track detail screen, selecting VIEW allows selection of the high EZ and low EX history (HEZ LEX) and the Computed Approach distance for that track.

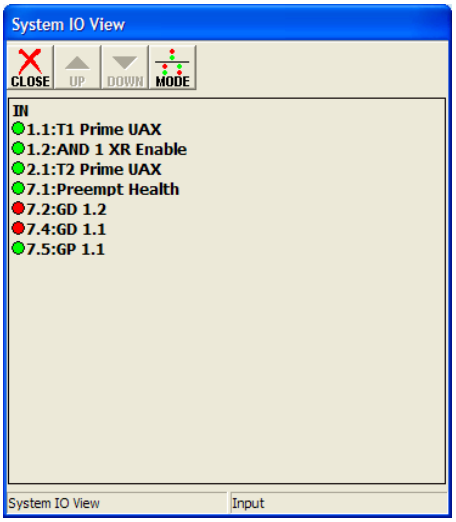


The HEZ and LEX values are useful in determining when the EZ was high and when the EX was low. The maintainer may reset this information after review.

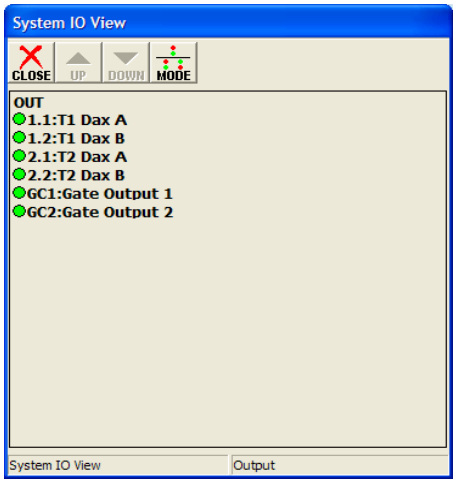


Troubleshooting A Physical 4000 GCP Input

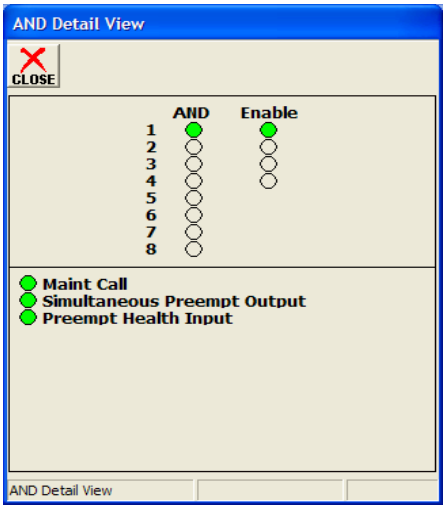
To determine the status of the physical inputs and outputs, select **SYSTEM IO** in the **VIEW** menu.



Press **MODE** to select the OUTPUTS.



Another useful screen for determining internal logic states is the AND detail screen, found by selecting **VIEW** then **AND Detail**. Note that the MAINT CALL output is also indicated. The status of Sim Preempt is shown as Simultaneous Preempt Output. Similarly, the status of Adv Preempt would be shown as Advance Preempt Output and Preempt Hlth input is shown as Preempt Health Input.



After it is determined that a problem is caused by a de-energized physical input, use the following procedure to isolate the cause.

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 de-energized, 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.

Troubleshooting Maintenance Call (MC) Light Problems

Several operations in the 4000 GCP system 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, page 102)
- 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, Figures 8 & 9, page 22), 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.

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.

a. If the MC lamp turns on, replace the initial CPU module.
b. If the MC lamp stays off, call Safetran Technical Support.

Track Circuit Problems

When a failure occurs in a bi-directional GCP track circuit, the EZ and CHECK EZ on the Detailed Status View will generally change in relationship to the normal range and possibly to each other as follows:

- If EZ and Check EZ move higher or lower than normal, but remain relatively equal to each other, the track circuit problem lies on the transmitter side of the crossing.
- If EZ and Check EZ move higher or lower than normal, but their values differ by more than 5, the track circuit problem most likely lies on the receiver side of the crossing.

WARNING

DO NOT USE A NARROW BAND SHUNT TO REPLACE A DEFECTIVE COUPLER.

Testing Insulated Joint Couplers

Step 1	Connect a hardwire shunt on the crossing side of the joint coupler.
Step 2	Note the EZ value: _____
Step 3	Move the hardwire shunt to the termination side of the joint coupler.
Step 4	Note the EZ value: _____
Step 5	Remove the hardwire shunt.
Step 6	Note the difference in EZ values in steps 2 and 4. • Wideband shunt coupler - if the difference in EZ is more than 2, the wideband shunt is defective. • Tuned Insulated Joint Coupler, TIJC - (located in the outer half of the approach), if the EZ difference is more than 3, the TIJC is mistuned or defective.

Testing Rail Bonds

EZ must be greater than 15 for this test to work.

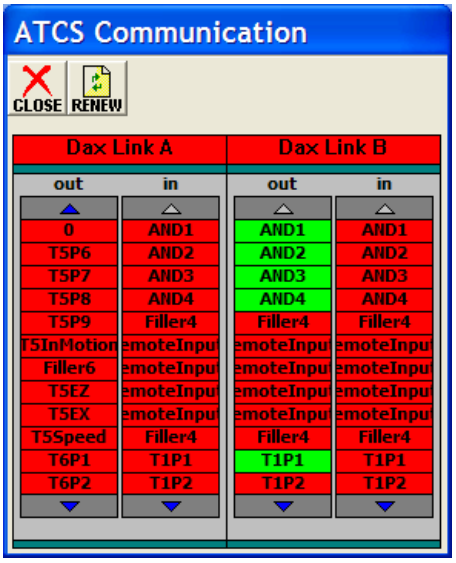
Step 1	Note the EX value with no shunt: _____
Step 2	Place a hardwire shunt at the 50% point of the approach.
Step 3	Note the EX value: _____
Step 4	Note the difference in EX values in steps 1 and 3. • An EX value **always** increases as a shunt is placed closer to the crossing. • If the EX value recorded 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 further away from the starting point, based on the value in step 3. When the EX value increases, the last bond passed is the bad bond.

Testing Termination Shunts (Hardwire, Wideband and Narrow Band (NBS))

Step 1	Note the EZ value: _____
Step 2	Install a hardwire shunt across the termination.
Step 3	Note the change in EZ: _____ • If termination is hardwire, no EZ change occurs. • If termination is wideband, an EZ change of no more than ± 2 occurs. • If termination is NBS, EZ can decrease up to 30. ♦ Lower frequencies and shorter approaches produce a greater change. • If termination is NBS and an increase in EZ is noted, then the NBS is defective.

ATCS COMMUNICATION

The ATCS communication window displays a real-time view of **in** and **out** vital messages for each vital serial communications link. Radio DAX link sessions are shown by LED #13 and LED #14 on the active CPU module.



ATCS Communications Display Acronyms

Display Acronyms	Definition
AND1 – AND4	AND functions
T1P1	Track 1 Prime
T1P2 – T1P8	Track 1 DAX A-H
T1P9	Track 1 Preempt

OUT OF SERVICE FEATURE

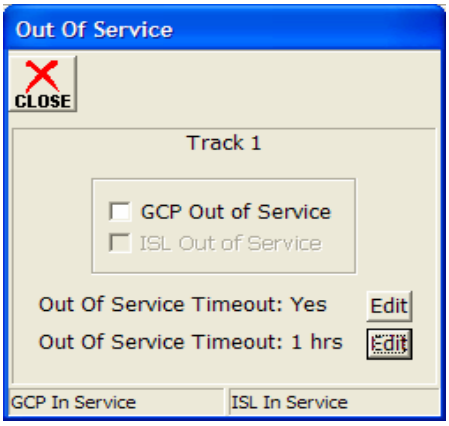
WARNING

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.

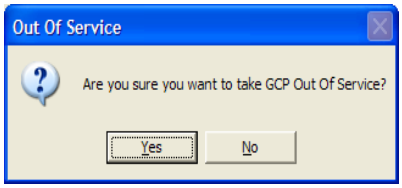
This section describes how to take a track out of service.

- What logic functions are bypassed
- Affect on other modules and I/O
- How to place the track circuits(s) back in operation

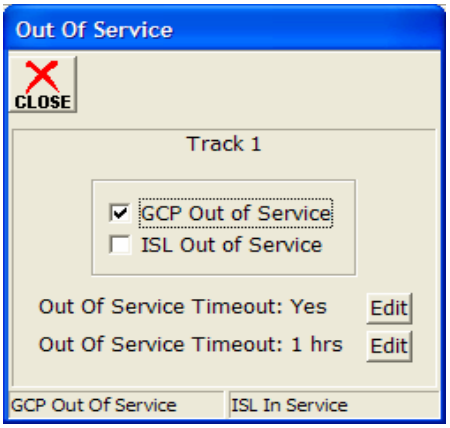
The Out of Service Menu is accessed on the display by touching the desired track in the Track Status window on the display. Select OUT OF SERVICE from the drop down display.



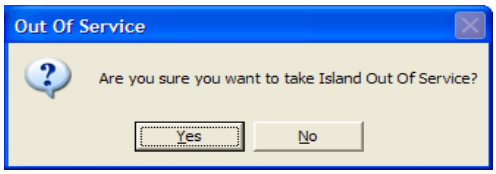
When GCP OUT OF SERVICE is checked, the following message will appear.



Once the GCP approach is taken out of service the option to take the ISL OUT OF SERVICE is presented.

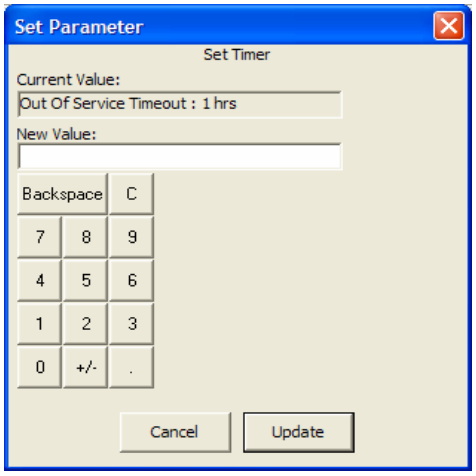


When ISLAND OUT OF SERVICE is checked, the following message will appear.



The out of service selection has a timer option, which will restore the track back to service after the specified time. The default setting for the timer is 1 hour. The range is 1 to 23 hours.

The OUT OF SERVICE TIMEOUT: YES can be turned off by selecting **EDIT**, then **NO**, which will take the track out of service until returned to service by the user. The time period can be changed by selecting **EDIT** on the OUT OF SERVICE TIMEOUT: 1 HRS line. The NEW VALUE of 2 to 23 hours can be entered on the keypad, then press **UPDATE.**



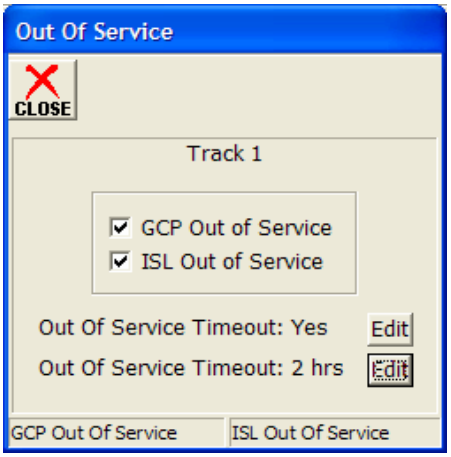
NOTE

If more than one track is taken out of service, the Out of Service Timeout covers all tracks taken out of service with one time interval.

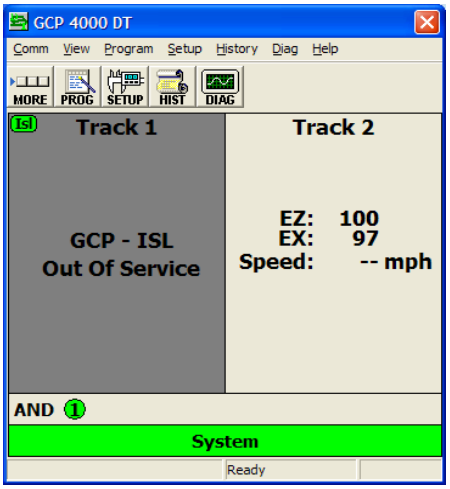
If the timer is running for one or more tracks out of service, and it is desired to take another track out of service for an added amount of time, do the following:

- Return all tracks to service.
- Edit the Out of Service Timeout to the new value.
- Take the tracks out of service.

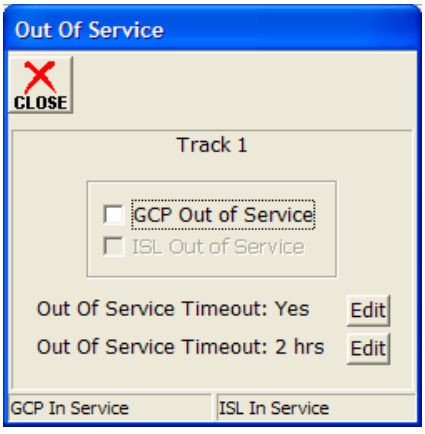
The following will be displayed to indicate the final selections.



When the OUT OF SERVICE screen is closed, the display returns to the TRACK STATUS SCREEN. Note that the out of service track is dark gray.



To return the track(s) to service, touch the desired TRACK STATUS screen and select the OUT OF SERVICE menu. Select **Return Track to Service**.



Remove the checked selections by touching the check box. When the tracks are unselected, they are back in service.

WARNING

REQUIRED OPERATIONAL TESTS SHALL BE PERFORMED IN ACCORDANCE WITH RAILROAD PROCEDURES WHEN RESTORING TRACKS TO SERVICE.

Out of Service Inputs

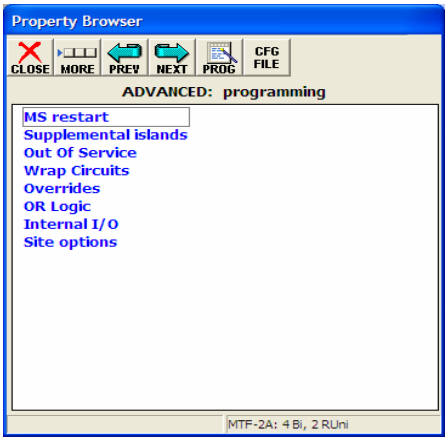
Sometimes it is desired to have an additional step be required to take a track out of service. When Out of Service Inputs are programmed, an input must be energized as well as the track out of service box checked for the track to be taken out of service.

WARNING

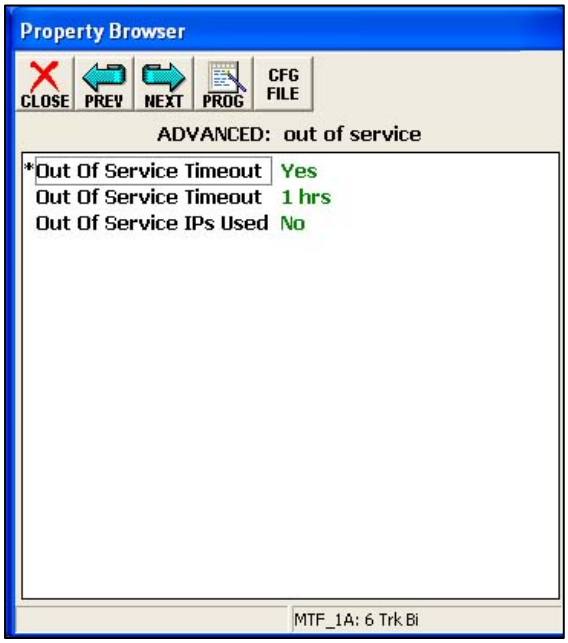
THE RAILROAD PROCEDURES FOR APPLYING TEMPORARY JUMPERS MUST BE FOLLOWED WHEN ENERGIZING THE "OUT OF SERVICE" INPUT(S).

The Out of Service Input programming is found in the following screen by selecting ADVANCE PROGRAMMING.

Then select **Out of Service.**



The following screen will appear.



If out of service inputs are set to Yes, the proper input must be energized.

Return Track to Service

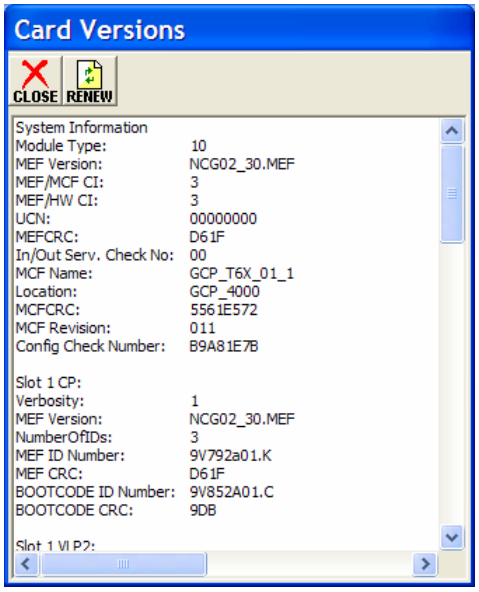
De-energizing the Out of Service Input or un-checking the track Out of Service box will return the track to service.

NOTE

If the Transfer Module transfers while a track is out of service, the track will be returned to service and may activate the warning devices.

SOFTWARE VERSIONS

This screen allows quick access to CPU, Track, SSCC, RIO and MCF software versions. It is accessed by pressing MORE, VIEW then SOFTWARE INFORMATION.



The SEAR IIi software versions are determined by selecting the SEAR button on the display. Select MENU on the SEAR Keypad Display screen. Use the UP Arrow until the display says MAIN MENU VERSIONS. Press ENTER and display will alternate between the Executive and Application software version names.

The software running the Display Module is found by selecting HELP on the display.

DIAGNOSTIC TERMINAL RUNNING ON A PC

The Safetran Diagnostic Terminal (DT) is Windows ® based software for use with the GCP 4000 and other Safetran products. The procedures and programming steps previously described in this handbook using the GCP display can generally be performed with the PC that is connected to the GCP 4000. The exception is the SEAR IIi, the SEARIIi is accessed through its own USER port, which is covered in the next section.

NOTE

Some newer personal computers do not come equipped with RS-232 serial communication ports. These computers come equipped with USB ports (Universal Serial Buss). Adapter Cables for converting USB to serial connections are commercially available in electronics stores. Depending on the PC some of USB to Serial Cables may not operate as desired. Contact Safetran Technical Support for additional information.

Installing DT on PC

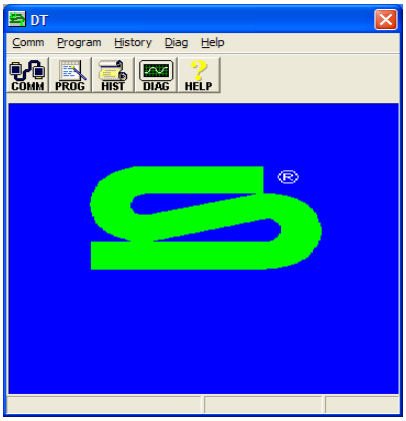
The DT is available on a CD for installation on laptop or desktop PCs.

NOTE

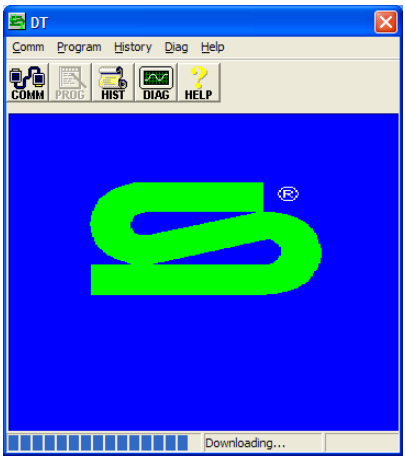
Follow railroad specific procedures for installing software on railroad computers. Some companies require software to be approved by the company before it can be installed on company computers.

Insert the Diagnostic Terminal CD in the PC and follow the installation instructions. Connect the serial communications port of the PC to the DIAG (CP) port on the GCP with a DB9 serial cable or USB-Serial Adapter Cable. The USB or female end of the cable attaches to the PC. The male end connects to the GCP.

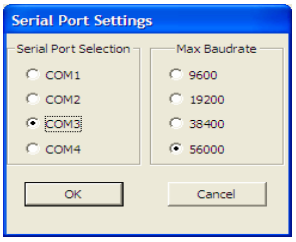
The following screen will appear.



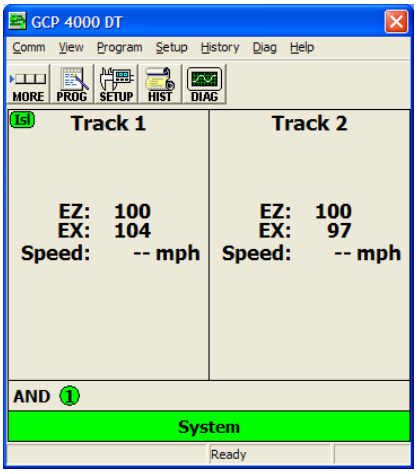
To begin a session using the DT press the **COMM** button then select **CONNECT**. While the DT is learning the GCP configuration, the following screen appears. Note the bar at the bottom of the window indicates activity.



It may be necessary to set the communications port setup between the PC and the GCP. Press the COMM button, then select the **DT Port Setup** menu.



The initial screen is the familiar TRACK STATUS window. Accessing menus is dine by left-clicking the mouse on a command button or right-clicking on a window section.



The following selections are accessed by right-clicking the desired indicated window:

- Track Status
  - ♦ Detailed Status View
  - ♦ Track Diagnostics
  - ♦ Calibrate Track
  - ♦ Out of Service
- AND – AND Detail View
- SYSTEM
  - ♦ View System Diagnostics
  - ♦ View System IO

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:

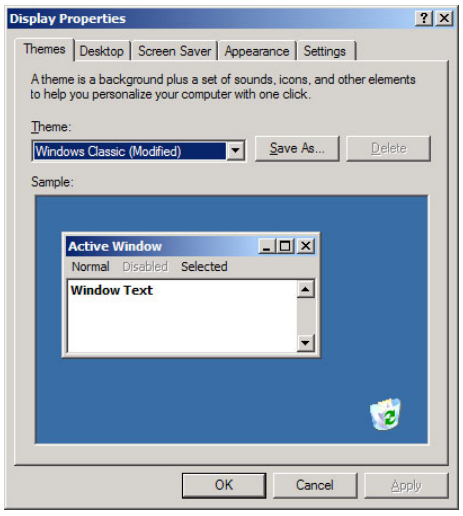
- ♦ Font is set to 'clear font'
- ♦ DPI is set to 'normal size (96 DPI)'
- ♦ Tahoma font properties are installed

To set display to 'clear font':

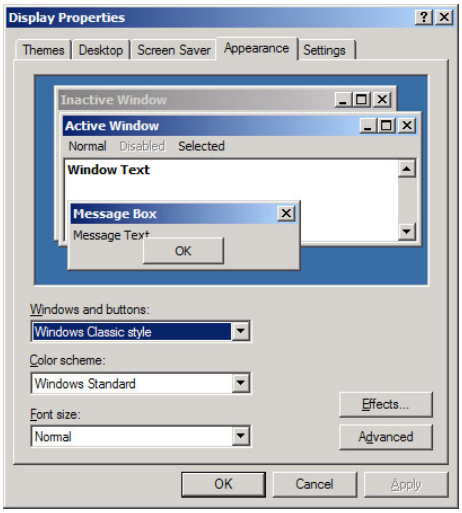
a. Place cursor on an open area of the Windows® background screen and right-click the mouse.

b. In the drop-down box select 'properties'.

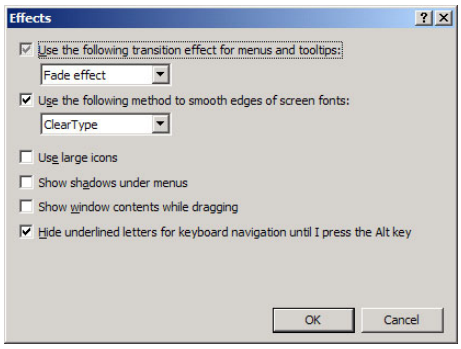
- ♦ A **Display Properties** window similar to the following (depends on Windows® version used) should appear.



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.



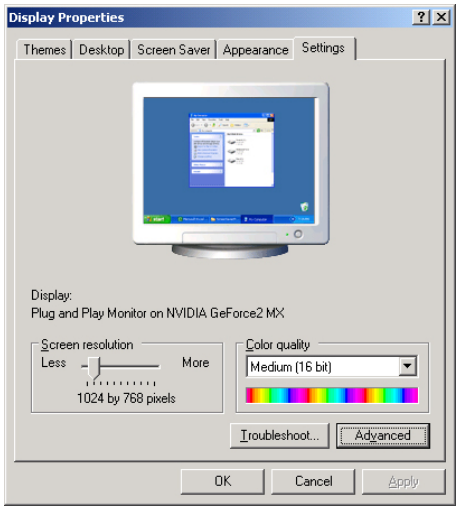
e. In the drop-down list below 'Use the following method to smooth edges of screen fonts', select 'Clear Type'.

- 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.

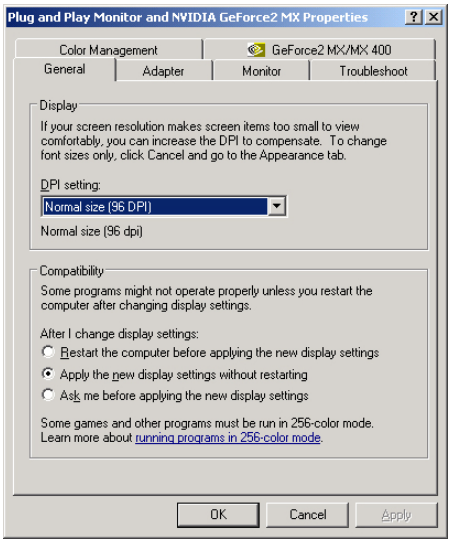
To set the DPI setting:

a. Open the **Display Properties** window as described in step 1b above.

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)'.

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'.

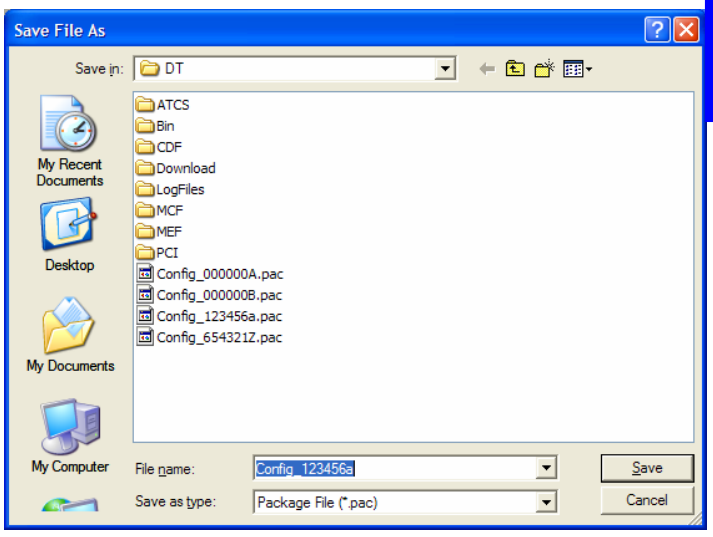
e. From the View drop-down list, select 'Refresh'.

Programmed Configuration Information

Programmed configuration information for the entire GCP or software and hardware versions for the active set of modules (MAIN or STBY) can be saved to a PAC (Package) file on the GCP. For the software and hardware versions for the inactive set of modules, use the switch on the transfer module to select the other set of modules. The SEAR configuration is accessed directly from the SEAR User port by selecting **Menu** and then **Configuration**.

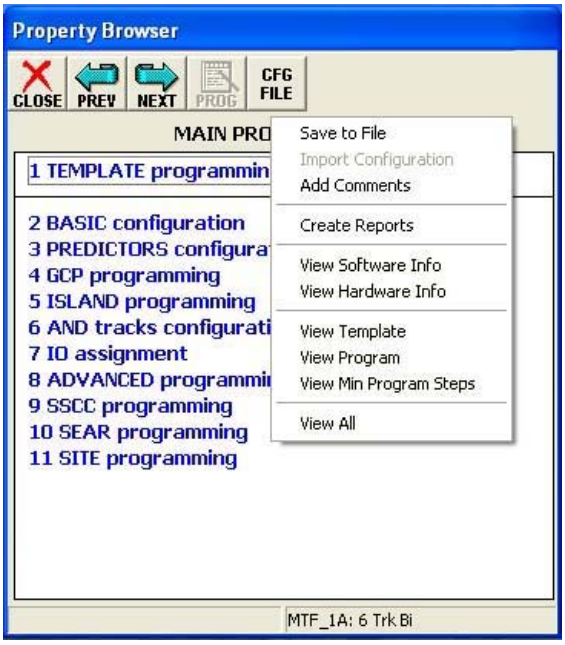
When in the programming mode, press the **CFG FILE** button. Select Save to File. Note this may take several minutes.

The file will be saved on the hard drive using the SAVE AS window.



While the file is being saved the MAIN MENU program screen will appear, but the selections will be inactive (gray).

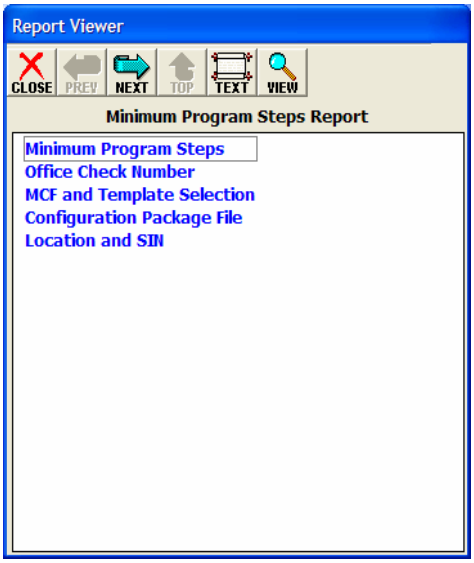
Several important options and reports are generated from the PAC file and are accessed again through the **CFG FILE** button, as seen on the following screen.



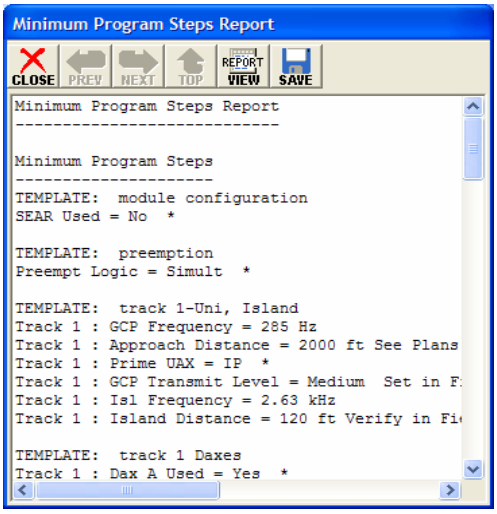
All View selections may be accessed from the GCP display but saving them to the PC allows easy retrieval and printing.

The MIN PROGRAM STEPS report, indicates the minimum programming steps that were entered to transform the initial template into the site specific programming of the GCP. When a template is selected that most closely describes the track layout of the crossing, the minimum program steps report will have the fewest steps.

The above reports can be saved to the PC as text files by selecting the report, TEXT, SAVE.



An example of the beginning of text file of the MIN PROGRAM STEPS report is shown below.



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 CHANGE OUT, 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.

Installing Software on CPU Module

NOTE

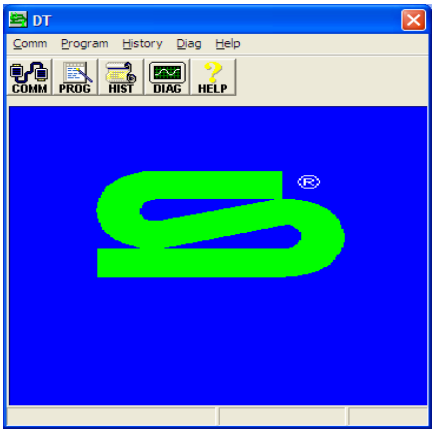
The examples in this section are used to explain how to install software and indicate screens that may be seen. The software and version names may not be the same as seen in an actual GCP. The example will also assume the GCP is a Dual unit and the main modules are loaded first. The procedure is repeated for the standby modules.

In this example the following files will be loaded into the indicated modules and data port:

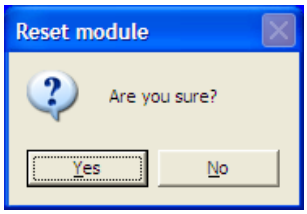
- CPU Module
  - VLP Port – File: VPH02_12.MEF
  - DIAG (CP) Port – File: NCG02_32.MEF
  - DIAG (CP) Port – File: gcp_t6x_01_01L.mcf, CRC=74A5474F
- Track Module
  - DIAG Port – File: GCP02_32.MEF

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.

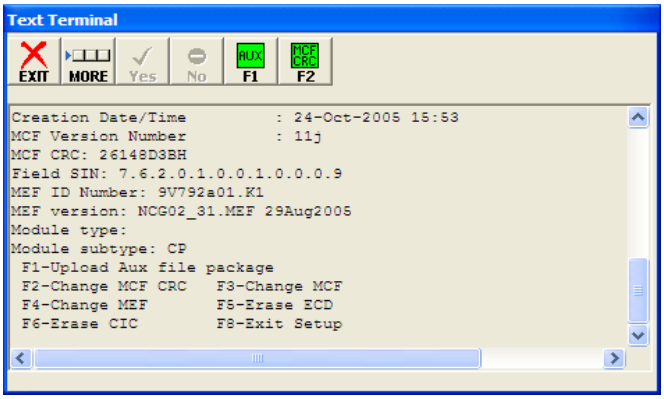
Connect the serial cable between the PC and the DIAG (CP) port of the CPU module. Open the DT software.



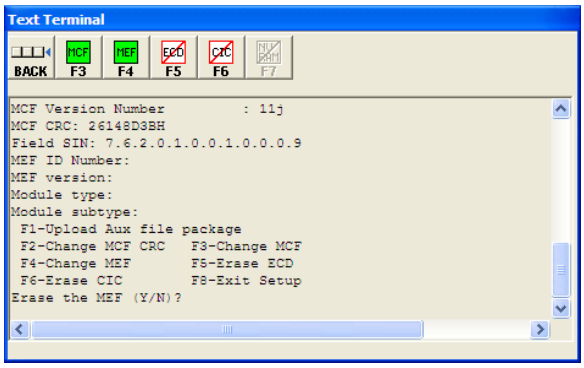
Select **COMM**, then select **Install Software**. A prompt window will ask if you want to REST MODULE. Select YES.



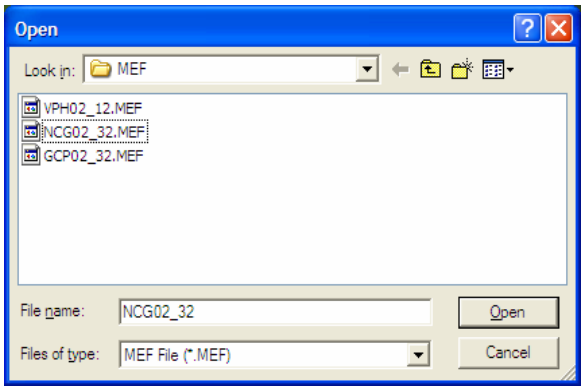
The following Text Terminal screen will appear.



Press F4, or select MORE then the MEF/F4 button.

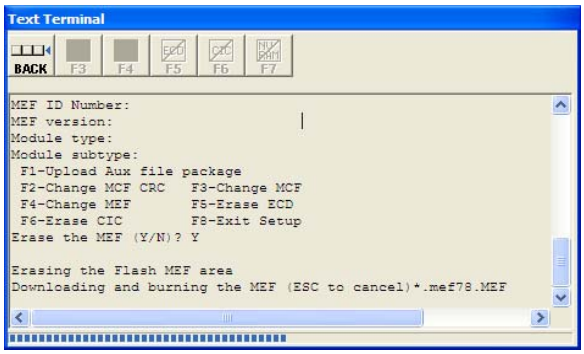


If the Erase the MEF (Y/N)? prompt is displayed, select **Y**. After erasing the previous MEF, the following window will appear.

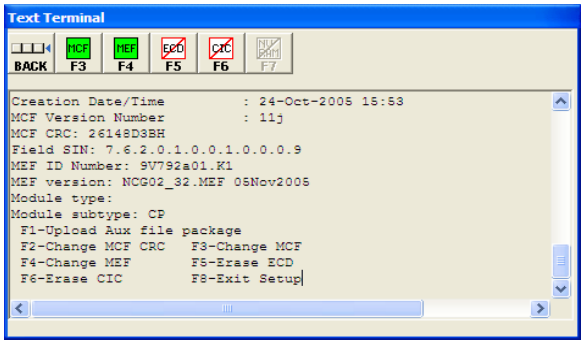


Select the file to be installed, in this example NCG02_32.MEF. This may take a few minutes.

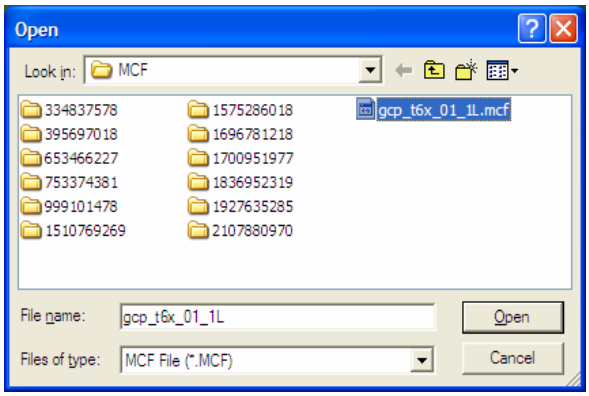
While the file is downloading, progress will be indicated on the bottom line of the window.



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.

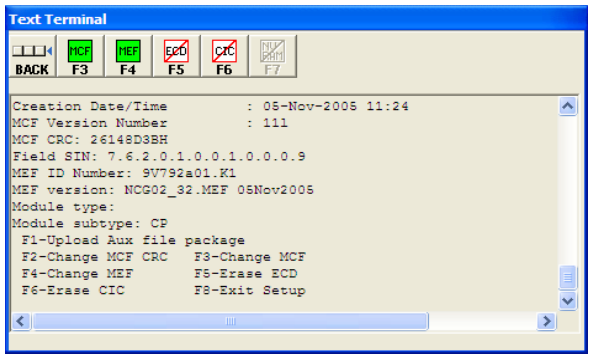


Again, this step may take a few minutes. While it is downloading, progress will be indicated on the bottom line of the window.

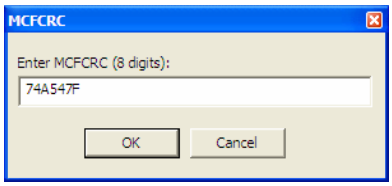
NOTE

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**.



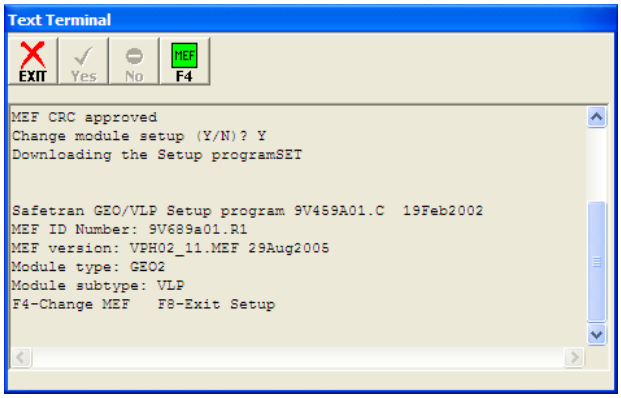
The following dialog box will be displayed. Enter the CRC issued with the software revision instructions. The CRC will always be 8 characters consisting of 0 through 9 and A through F.



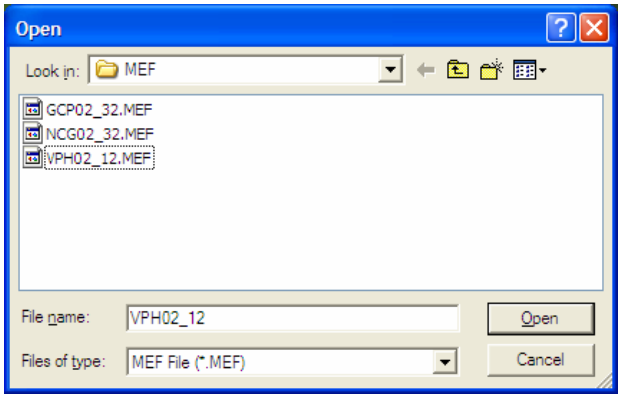
This completes the software installation on the DIAG (CP) port. Next, the software will be installed on the VLP port.

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.



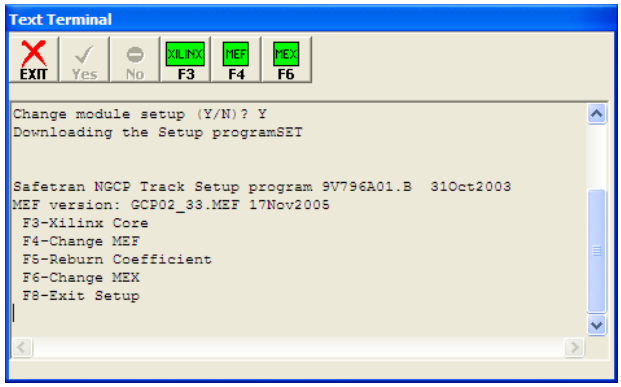
This step may take a few minutes. While it is downloading, progress is indicated at the bottom of the window. When complete select **EXIT** and return to the DT screen.

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.

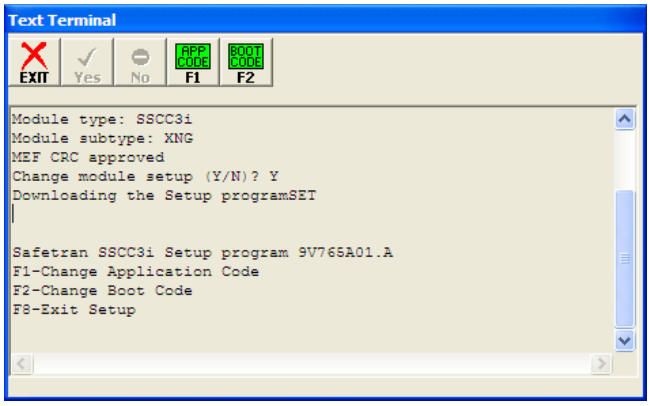
The track software upgrade screen is shown below.



Installing Software on SSCC IIIi Module

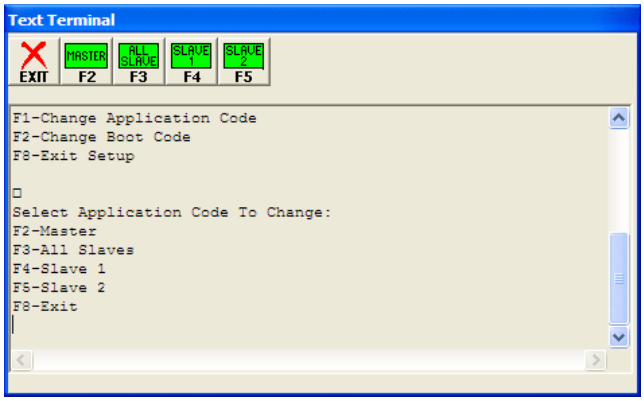
If the instructions issued with the software revision, call for upgrading the software in the SSCC IIIi Module, the next step is to install the specified MEF file on the SSCC modules. The SSCC Modules have a master processor that controls slave processors, which control the independent lamp outputs. 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 Appendix E - Changing Display Module Software.

SEAR IIi DOWNLOADS

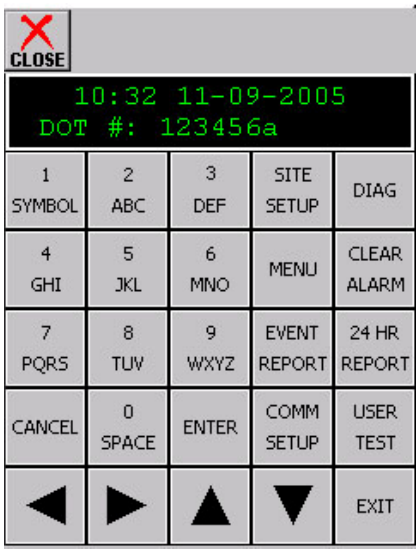
The information in the SEAR IIi can be viewed in two ways:

- Information on the display
- Download SEAR IIi information to a PC

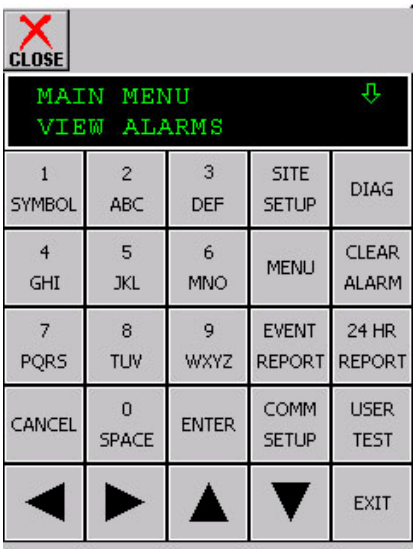
Viewing SEAR IIi Information on Display

The SEAR button is on the top row of the track status screen.

When SEAR is selected, a SEAR screen is displayed.



From the MENU screen the MAIN MENU can be accessed.



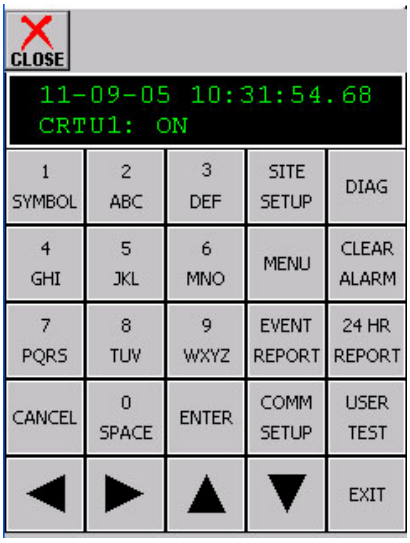
The options on the MAIN MENU are:

- 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.



The EVENT STREAM displays events as they occur in real time.

A more efficient method of viewing SEAR IIi information is on a PC.

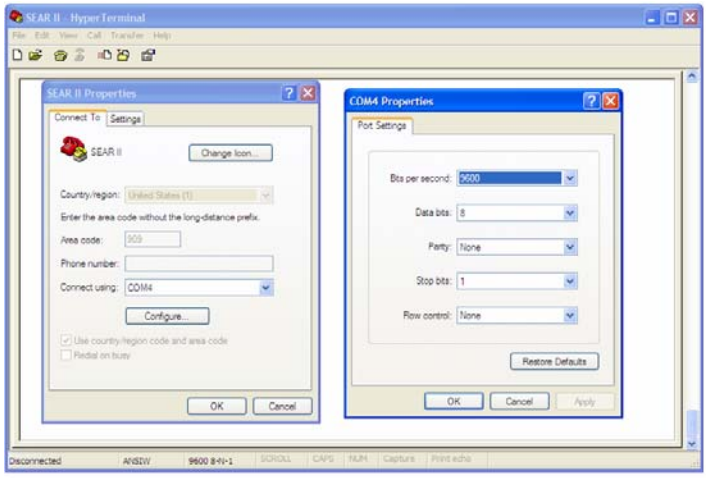
Downloading SEAR IIi information to a PC

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.

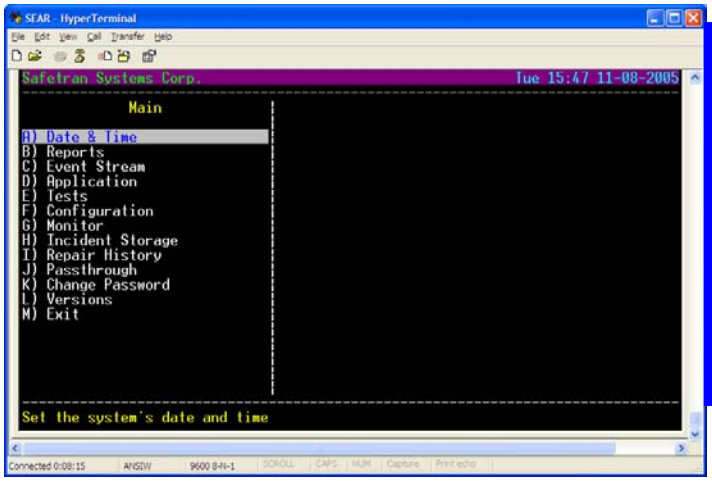
The SEAR II I USER J2 serial port and the computer COMM port settings must match in order to communicate. The default SEAR IIi settings are:

- 57600 baud,
- 8 data bits,
- No parity bits,
- 1 stop bit.

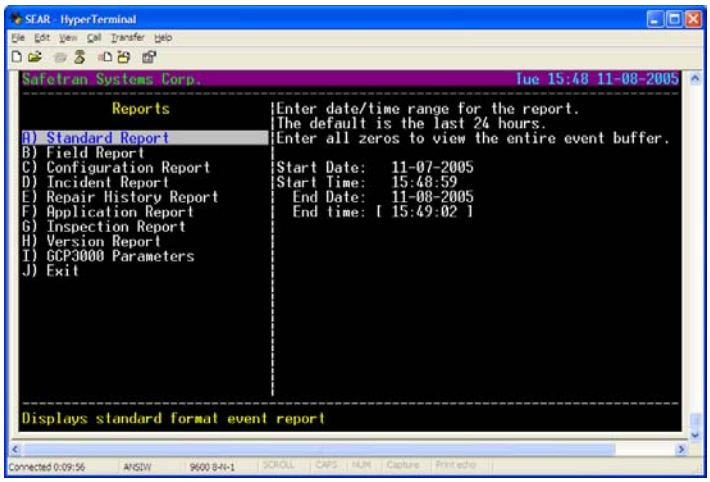
The COMM port settings are changed in the HyperTerminal program by selecting FILE then PROPERTIES. In the properties window select CONFIGURE. The next window is PORT SETTINGS. Set the port settings as desired and select OK until it returns to the HyperTerminal screen.



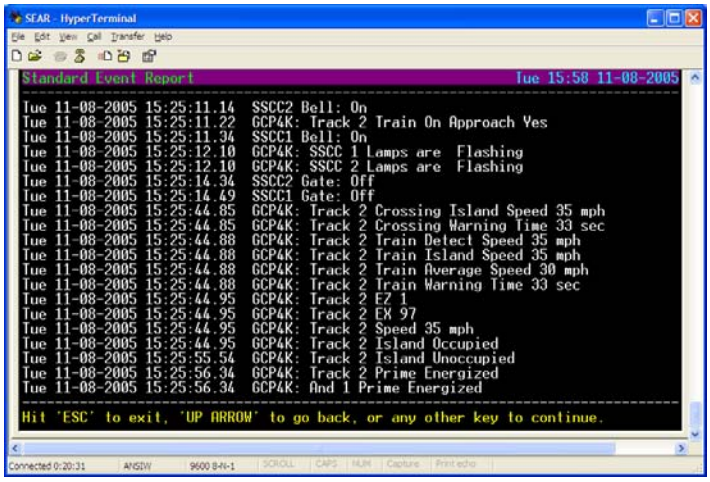
Once HyperTerminal is running, enter **CTRL L** on the computer to initiate the communication session with the SEAR IIi. The following screen will be displayed.



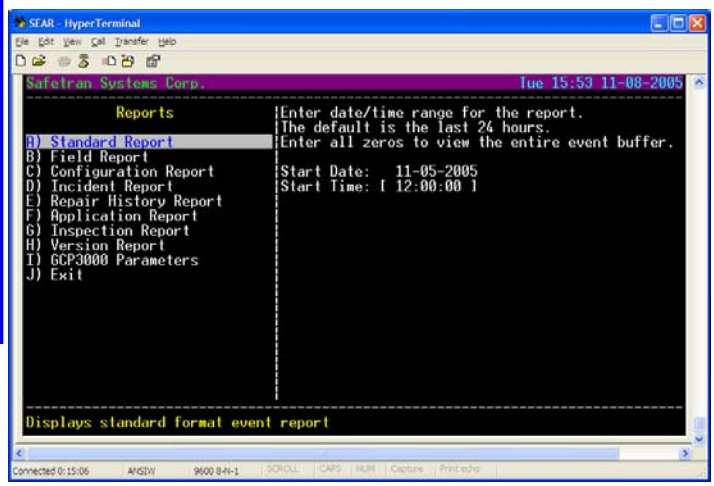
The options are selected by entering the option's letter, or using the keyboard ARROW keys and ENTER. Enter B for Reports, etc. The Reports screen appears as:



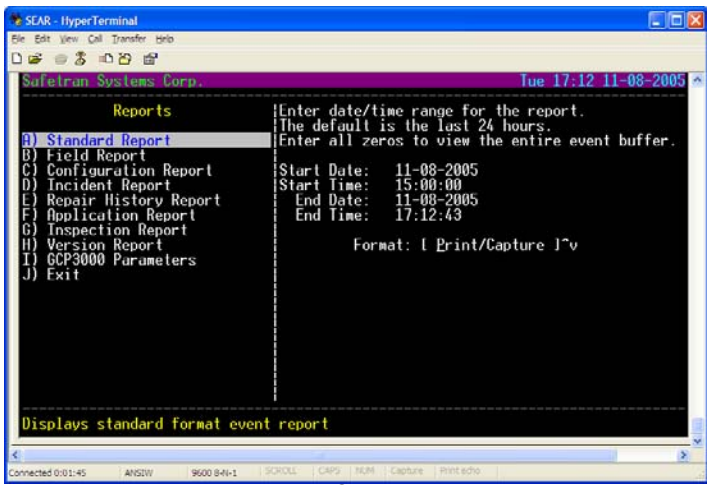
The default time range is the previous 24 hours. The date and time range may be changed as each item is selected. The Start Date appears first. The date may be changed by moving the cursor over the entry that is to be changed and typing over. Hit ENTER to move to the Start Time, and so on. After the 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.



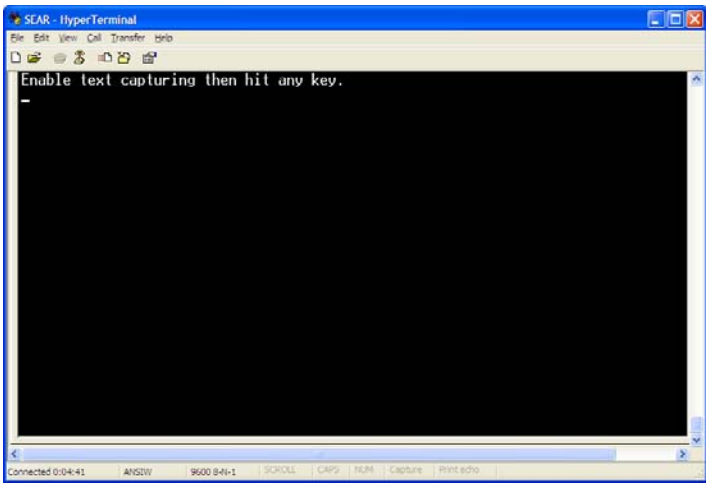
The report is a complete list of all GCP 4000 activity during that period.



Capturing reports on the computer allows retrieval at a later date. The following is an example of a PRINT/CAPTURE.

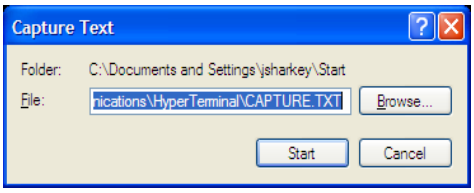


Use the ARROW key to switch (toggle) from On Screen to PRINT/CAPTURE, then hit ENTER. The next screen requires enabling text capture BEFORE proceeding.



Select TRANSFER on the menu bar, then select CAPTURE TEXT.

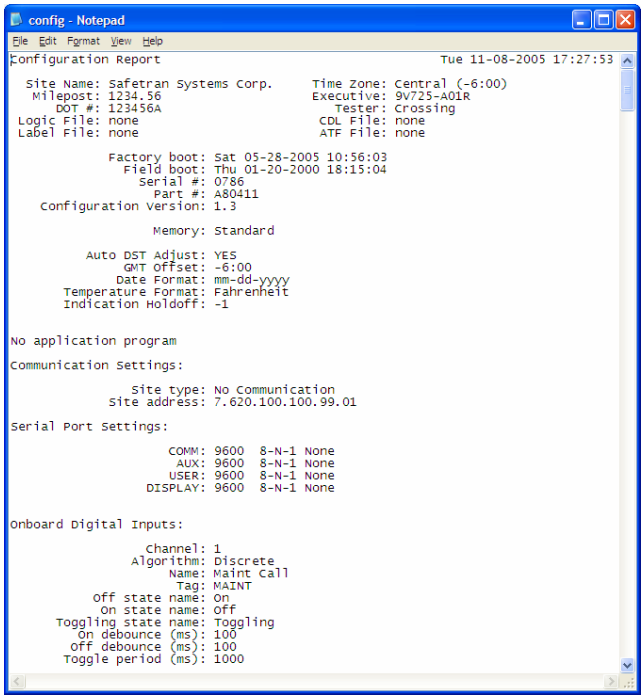
A standard dialog box appears that allows the user to choose the location the file will be saved to.



Then press START and any other key. The text file of the report will be saved in the specified location.

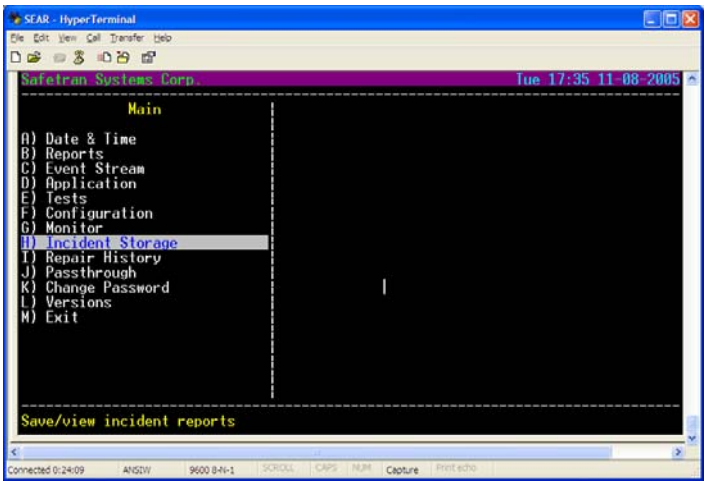
Configuration Report

The CONFIGURATION REPORT is useful for storing all the parameters entered into the SEAR IIi. A portion of the text file is shown below.

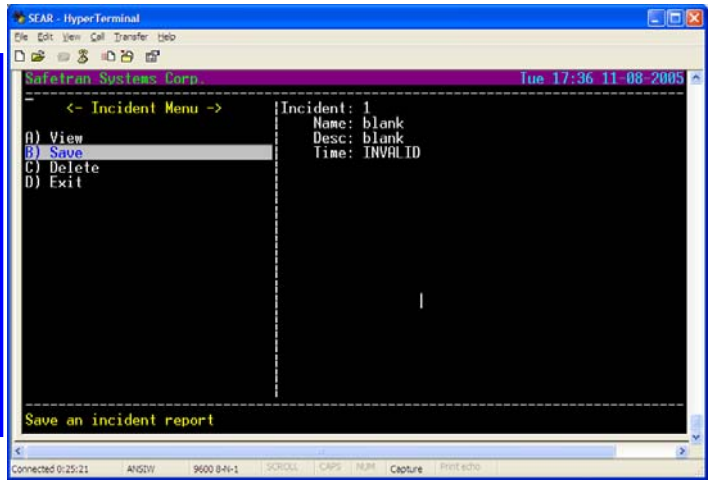


INCIDENT STORAGE is an important feature in the SEAR IIi. The SEAR IIi is capable of storing a range of events after an incident in a file that can be securely stored. Each line of data in the file is identified by a security code that validates that the data has not changed.

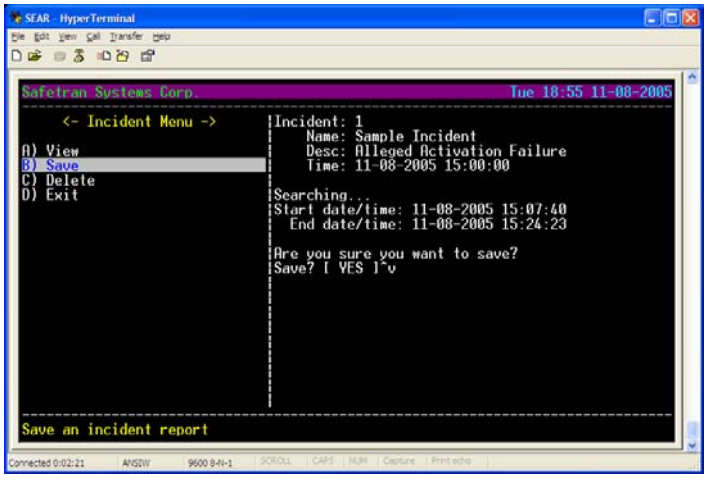
Select INCIDENT STORAGE on the main menu.



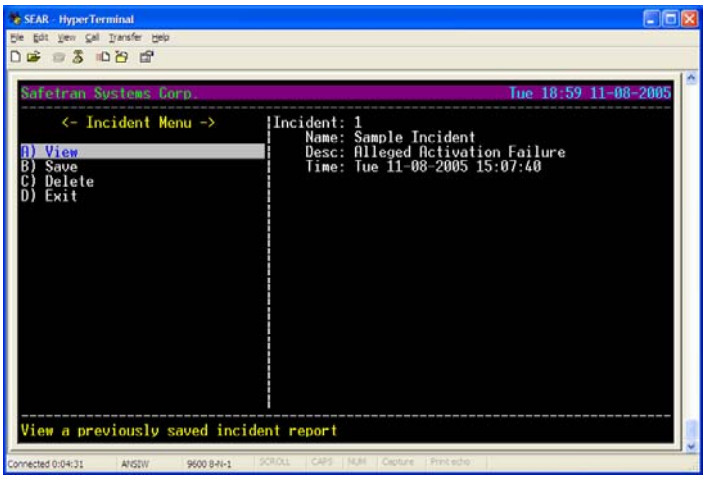
To save an incident, select SAVE and ENTER.



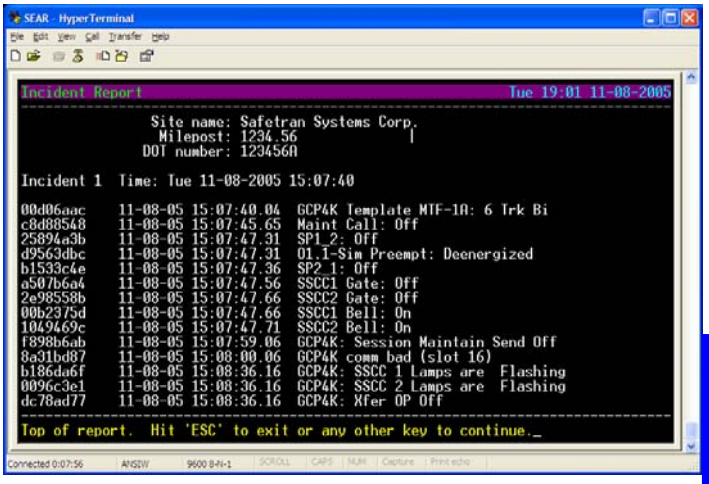
Fill in the requested information.



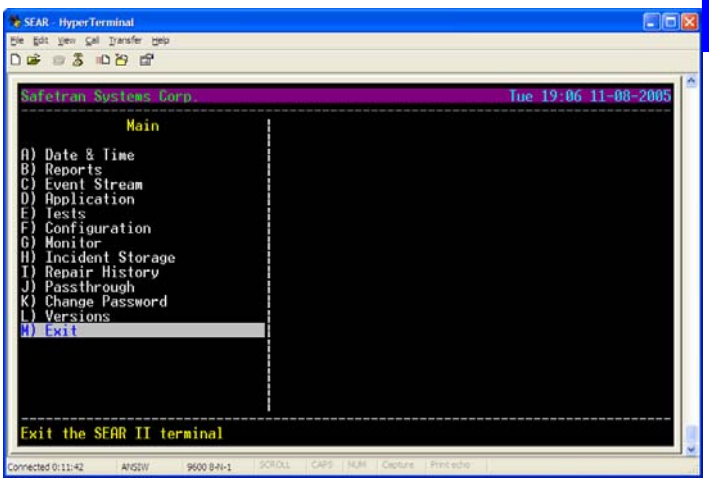
The Incident will be saved in the SEAR IIi and can be captured and saved on a computer.



The incident report looks like the following.



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.



NOTE

An incident can be named, described, stored using the Display Module for later retrieval to a computer. If in doubt, store the incident.

APPENDIX A - USING A CONVENTIONAL METER

(when a "True RMS AC + DC" meter is not available)

General

WARNING

TO PREVENT AN OVER-VOLTAGE CONDITION AT THE LAMPS, USE A VOLTMETER WITH A "TRUE RMS AC + DC" SCALE AND MAKE ALL MEASUREMENTS USING THAT SCALE.

To accurately read the crossing lamp voltages, a "true rms AC + DC" multimeter (e.g., Fluke 187 or 189 digital multimeter) must be used. However, a conventional multimeter may be used, but the voltage reading will be lower than "true rms AC + DC" values. The variance is not a set percentage and is dependent on battery voltage. A conversion table for several conventional meters is provided in the table below.

Table A-1
Multimeter Reading Variance From Actual Incandescent Lamp Voltage

Battery Bank Voltage	Valid Lamp Output Range (in volts)[1]	Digital Meter (Fluke 87 or equivalent)	Analog Meter (Simpson 260 or TS111)
13.3	9.0 to 12.0	1.3 volts below actual value	0.6 volts below actual value
14.7	9.0 to 12.0	2.2 volts below actual value	1.1 volts below actual value
15.8	9.0 to 12.0	2.6 volts below actual value	2.0 volts below actual value

[1] For lamp output settings greater than 12.0 volts, reduce the listed values by 30%. Lamp voltage measurements should be accurate to 0.3 volt.

NOTE

The variance table applies to incandescent lamps and only LED lamps that present a resistive load to the SSCC III PLUS. For other kinds of LED lamps, it is recommended that the voltage measured by a meter which is set to "True RMS AC + DC" be considered as correct.

Meter Reading Conversion Examples

NOTE

Following are examples of how to read the lamp voltages with a conventional meter.

1. With a battery bank voltage of 14.7 volts (10 cells of Nicad) and with lamp voltages to be set to 9.5 volts, use one of the following conversions.

   Using a conventional digital multimeter set to read DC (e.g., Fluke 87):

desired lamp voltage =	9.5
subtract meter variance from table A-1 =	2.2
desired meter reading =	7.3

   Using a conventional analog multimeter set to read DC (e.g., Simpson 260):

desired lamp voltage =	9.5
subtract meter variance from table A-1 =	1.1
desired meter reading =	8.4

2. During battery capacity testing with AC power turned off, lamp voltages must be greater than 8.5 volts DC. With a battery bank voltage of 14.7 volts, verify that lamp voltages are above 8.5 volts DC.

   Using a conventional digital multimeter set to read DC (e.g., Fluke 87):

minimum lamp voltage threshold =	8.5
subtract meter variance from table A-1 =	2.2
meter reading must be greater than =	6.3

   Using a conventional analog multimeter set to read DC (e.g., Simpson 260):

minimum lamp voltage threshold =	8.5
subtract meter variance from table A-1 =	1.1
meter reading must be greater than =	7.4

This page intentionally left blank

APPENDIX B – PROGRAMMING

The design on the circuit plans for the crossing warning system determines the programming of the 4000 GCP.

WARNING

PROGRAM CHANGES MUST BE PERFORMED IN ACCORDANCE WITH RAILROAD PROCEDURES.

SYSTEM OPERATION MUST BE VERIFIED PRIOR TO PLACING SYSTEM IN SERVICE OR FOLLOWING PROGRAMMING, HARDWARE CHANGES, OR WIRING CHANGES.

Templates are used to simplify 4000 GCP programming. The GCP provides several templates that represent common track circuit arrangements, including bidirectional, unidirectional, end of siding, and crossovers, including remote GCPs.

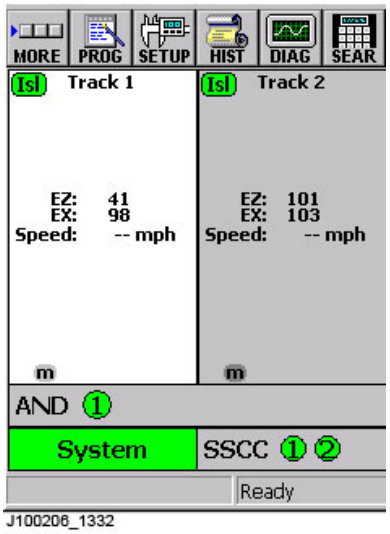
Each template:

- Provides the simplified programming menus and programming defaults for a typical track arrangement and application
- Predefines default parameters for train detection
- Has rules that specify which:
  - Track circuits are unidirectional and bidirectional
  - Track circuits have islands (indicated by an *)
  - Islands are connected to multiple track circuits
  - Track circuits are remote and DAX towards the crossing
  - Track circuits are remote and DAX away from the crossing

NOTE

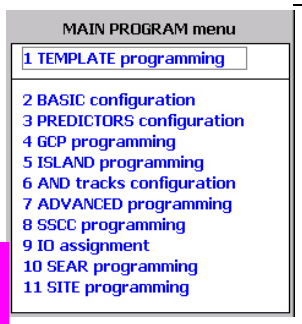
Please refer to the 4000 GCP Reference Manual, SIG-00-02-02, for complete programming procedures.

Programming is initiated by selecting the **PROG** button.

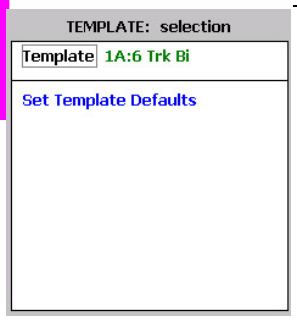


J100206_1332
10-2-06

TEMPLATE programming



The **1 TEMPLATE programming** entry provides access to the following configuration menu windows:

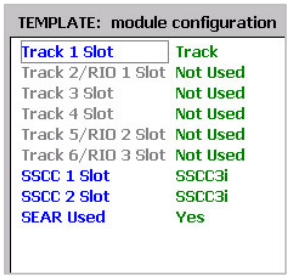


Selecting the **Template** assignment field displays a list of templates

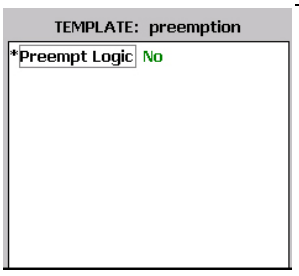
- each selected template item configures the 4000 GCP to specific default parameters
- 6 track bidirectional is the default template configuration

CAUTION: Selecting the **Set Template Defaults** item returns the system to the default values of the active template.

ALL PROGRAMMING WILL HAVE TO BE RE-ENTERED

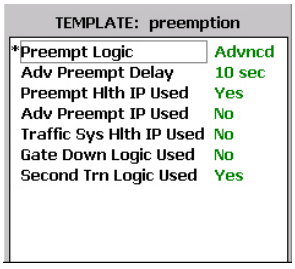


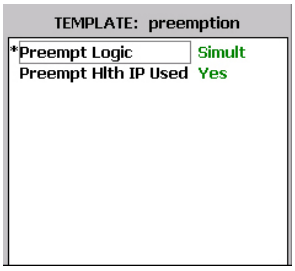
Displays which modules are used in the system including optional RIO modules.



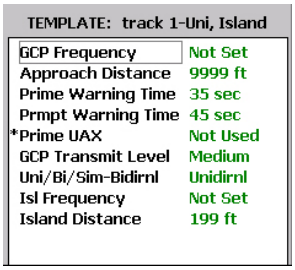
The **TEMPLATE: preemption** window provides three program displays:

- The no preemption window displays when the **Preempt Logic** selection field is set to **No**.
  - ♦ Default window.
- The advanced preemption window displays when the **Preempt Logic** selection field is set to **Advncd**.
- **Adv Preempt IP Used** should be used when a remote input, UAX input or test switch input is needed that will run advance preempt delay prior to activating signals.



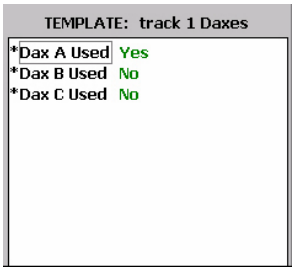


- The simultaneous preemption window displays when the **Preempt Logic** selection field is set to **Simult.**



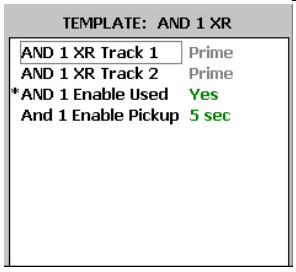
Sets track circuit/island configuration parameters

- A window appears for each assigned Track Module
- The window default settings vary according to:
  - ♦ track circuit directional configuration
  - ♦ track circuit location relative to the crossing



Sets operating perimeters of DAX A, B, and C.

- A window appears for each enabled track that is configured by the template for unidirectional operation

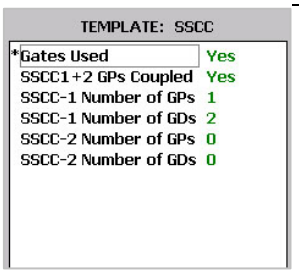


Shows the AND 1 XR function input allocation for each track module assigned to a track slot.

- Enables and configures the **AND 1 XR Enable Used** input.

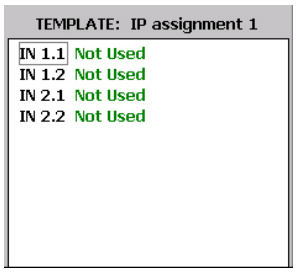
WARNING

IF ADVANCE PREEMPTION IS USED, THE "AND 1 XR ENABLE" DEENERGIZED WILL PREEMPT THE TRAFFIC SIGNALS IMMEDIATELY (WITHOUT ADVANCE PREEMPTION DELAY). DO NOT START TEST UNLESS VEHICLES ARE CLEAR OF GATES.



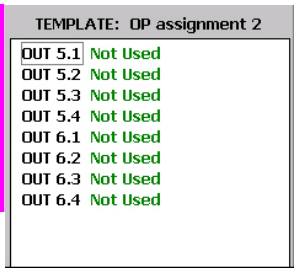
Sets SSCC circuit configuration parameters

- Appears when one or both modules are assigned to SSCC slots



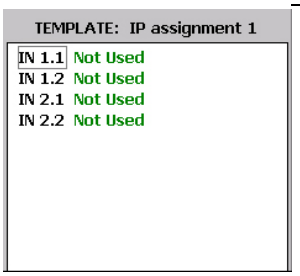
Sets output functions for modules assigned to **Track Slots 1** through **4**

- Only outputs for slots with assigned Track Modules appear.



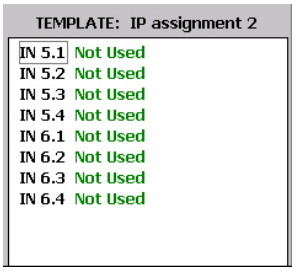
Sets output functions for RIO modules assigned to **Track 5/RIO 2** and **Track 6/RIO 3** slots.

- Four outputs display for each assigned RIO Module
- Displays only when slots 5 and/or 6 are active.



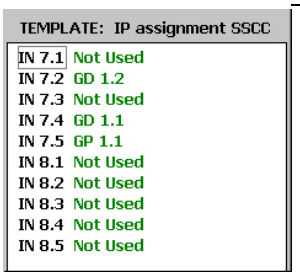
Sets input functions for Track Modules assigned to **Track Slots 1** through **4**.

- Only inputs for slots with assigned modules appear



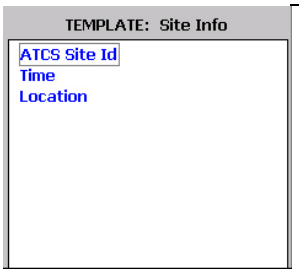
Sets input functions for modules assigned to **Track 5/RIO 2** and **Track 6/RIO 3** slots.

- Four input display for each assigned RIO Module
- Displays only when slots 5 and/or 6 are active.



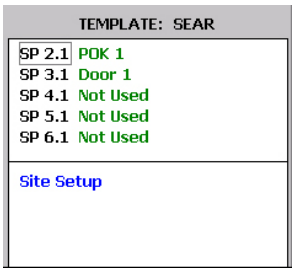
Sets input allocations for modules assigned to **SSCC 1** and **SSCC 2** slots

- Appears only when modules are assigned to **SSCC 1** and/or **SSCC 2** slots
- Only inputs for slots with assigned SSCC module appear



Sets: system:

- ATCS site identification number
- Time
- Location Data



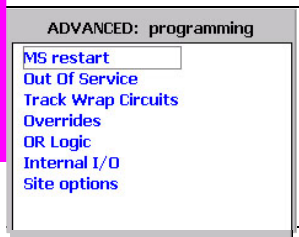
Sets SEAR input assignments.

- Appears only when **SEAR Used** status field of **TEMPLATE: module configuration** is set to **Yes**

Site Setup entry provides access to the SEAR interface display

Menu Programming Map – ADVANCED Programming

The **7 ADVANCED programming** entry provides access to the **ADVANCED programming** window.



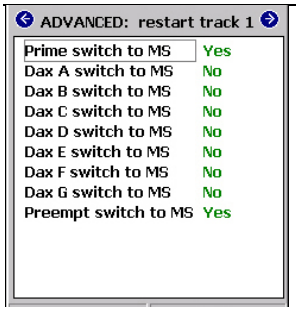
The **ADVANCED programming** window provides access to the following configuration menu windows:

Used to program the MS/GCP Restart function. When set to **Yes**, provides two additional program displays.

- This function allows enabled predictors to:
  - ♦ function in predictor mode during through train moves
  - ♦ switch from predictor to motion sensor 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.

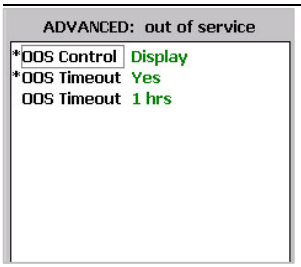
This display appears when **MS/GCP Restart Used** set to **Yes**. Use this second display to:

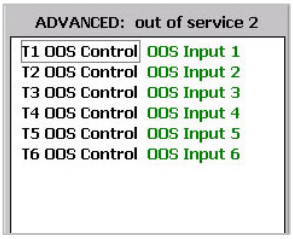
- select the Restart function for all tracks.
- enter the length of time the selected predictors will operate in motion sensor mode.

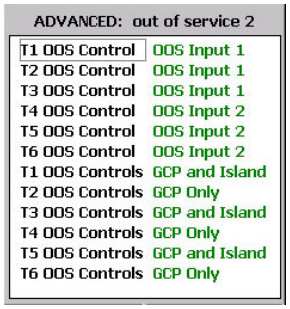


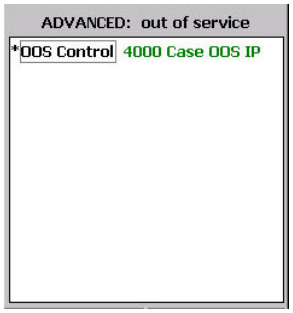
This display appears for each track module when **MS/GCP Restart Used** set to **Yes**. Use this second display to:

- select the Track module predictors affected by the MS/GCP Restart time of the MS Control input..









Use to select the method by which **out of service** is selected; **OOS Control**. This function has the following options:

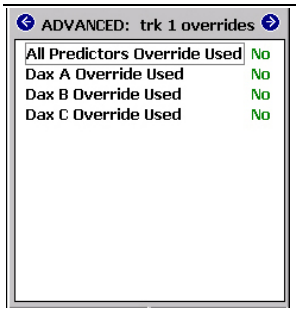
- **Display –** select to take track out of service from the 4000 Display module
- **Display+OOS IPs -** to take a track out of service, assign an Out of Service input to a physical input, energize this input and select to take the track out of service from the display.
- **OOS IPs -** to take a track out of service, assign an Out of Service input to a physical input and energize this input (no action is required on the display).
- **4000 Case OOS IP -** to take a track out of service, assign the **4000 Case OOS IP** to a physical input and energize this input (no action is required on the display).

Use to configure Track Wrap circuits.

- **Wrap LOS Timer**
  - ♦ Select time for loss of shunt Timer for the wrap circuit inputs
- **Track 1** thru **Track 6 Wrap Used**
  - ♦ Set to **Yes** to enable responding wrap circuit function.
- When a **Wrap** is set to **Used**, an input must also be programmed as a wrap input in the input assignment menus.
- When a wrap input for a track is energized, the wrap will override the predictors or island on that track.

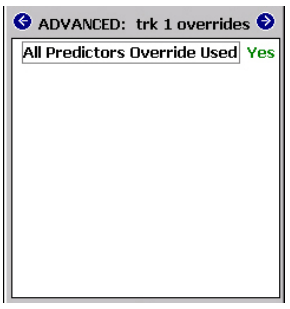
If predictors de-energize or the island goes down, the crossing will not activate and the predictor outputs will not drop while the wrap is energized.

- Emergency Activation will override wrap inputs and activate the crossing.



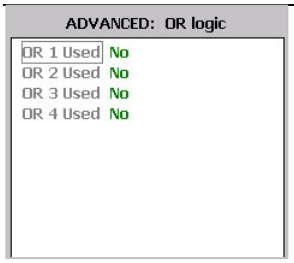
Similar **trk overrides** screen displayed for each enabled track when **All Predictors Override Used** set to **No** (default). Use to disable (override) selected prediction outputs when specific track condition exists, for example:

- a train within an inbound approach is routed to another track that does not go through the crossing.



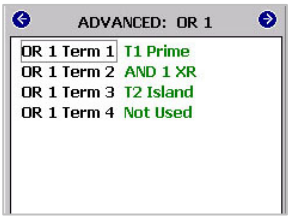
Displayed when **All Predictors Override Used** set to **Yes**.

- A **Prediction Override** input is provided for the track
- 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.



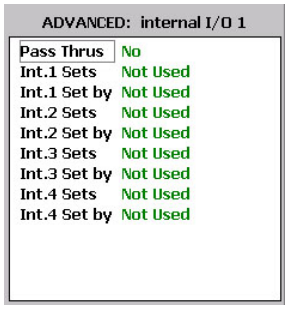
Selecting the **OR Logic** menu item displays a list of available OR functions.

- When an OR is enabled (set to **Yes**), an OR output function is selectable to be assigned to an output.



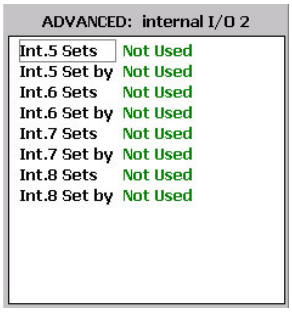
Displayed for each OR enabled. Allows selection of the inputs to the 4-input OR gate.

- 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.

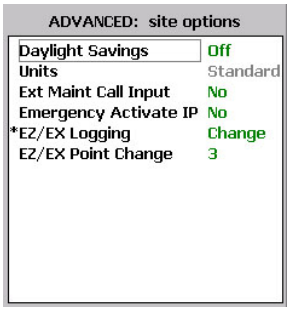


Selecting the **Internal I/O** menu item displays the **ADVANCED: internal I/O 1** window.

- 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 1 to 4 are shown on this display).
- **Int.1 Sets** thru **Int.4 Sets** determine the assignment of each channel input.
- **Int.1 Set by** thru **Int.4 Set by** determine the assignment of each channel output.
- If **Pass Thrus** 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.

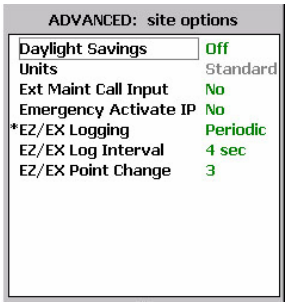


Displays internal I/O states 5 to 8.



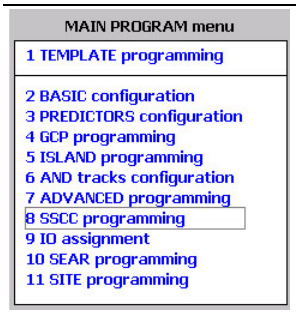
Selecting the **Site options** item brings up the **ADVANCED: site options** display. Set the following options:

- Automatic daylight savings adjustment to system clock
- Measurement standard in use by the 4000 GCP system (standard or metric).
- Program an input as an external maintenance call input (option = **Yes**).
- Program an input as an Emergency Activation input (option = **Yes**).
- Set the **EZ/EX Logging** interval.
- **EZ/EX Point Change** entry allows the EZ/EX point change range to be set.

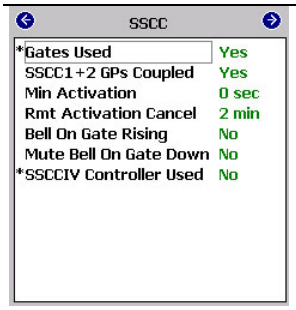


- **EZ/EX Log Interval** entry
  - ♦ Displays when **EZ/EX Logging** entry is set to **Periodic**.

Menu Programming Map – SSCC Programming



The **SSCC Programming** menu item provides access to the following **SSCC** windows:

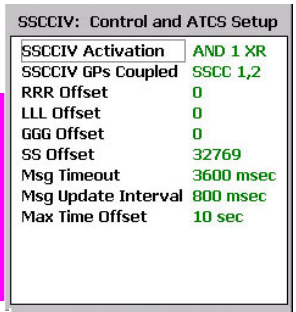


The following high-level options for crossing operation are available:

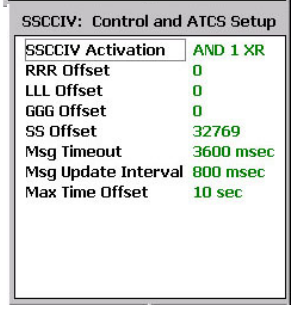
- **Gates Used -** Use to specify if gates are used at this crossing.
- **SSCC1+2 GPs Coupled -** Select whether gate positions of the two SSCC modules are coupled together.
- **Min Activation -** Sets the minimum crossing activation time.
- **Rmt Activation Cancel -** Set the maximum length of time that the SSCC modules will remain activated if they are activated from a remote device, such as the SEAR IIi. (i.e., if the SEAR IIi tries to activate a crossing for 5 minutes and **Rmt Activation Cancel** is set to 2 minutes, then the crossing activation will stop after 2 minutes.
- **Bell On Gate Rising -** Controls whether the bell outputs on the SSCC modules are turned on when the gate position input is deenergized.
- **Mute Bell On Gate Down -** Controls whether the SSCC module Bell outputs are turned off when all the gate down inputs are energized.
- **SSCCIV Controller Used -** Set whether the 4000 GCP is interfacing to an external SSCCIV module via the Echelon.

- **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 or exit gate controller.

When **SSCCIV Controller Used** is set to **Yes**, the menu following the **SSCC** screen is the **SSCCIV Control and ATCS Setup** screen. Options displayed depend on the setting of the **4000 Control type**.



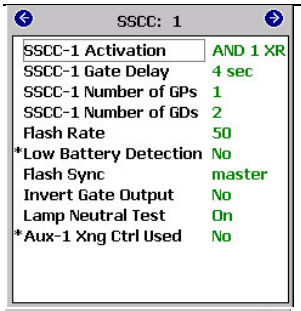
- When **4000 Control Type** is set to **Entrnce**, this screen appears.

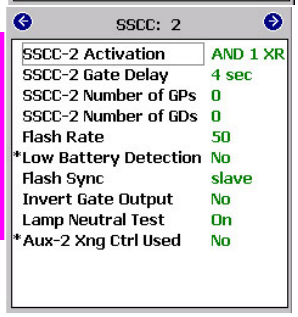


- When **4000 Control Type** is set to **Exit**, this screen appears.

- **SSCCIV Activation** - Select which AND function is used to activate the SSCCIV.
- **SSCCIV GPs Coupled -** Select whether the gate position inputs on the SSCC modules are coupled with the gate position inputs on the SSCCIV unit.
  - If **No Coupling**, then deenergizing GPs on the SSCC module has no effect on the SSCCIV unit and visa versa.
  - If **SSCC1**, then deenergizing GPs on the SSCC1 module flashes the lamps on the SSCCIV unit and visa versa.
  - If **SSCC2**, then deenergizing GPs on the SSCC2 module flashes the lamps on the SSCCIV unit and visa versa.
  - If **SSCC1,2**, then deenergizing GPs on the SSCC1 or SSCC2 module flashes the lamps on the SSCCIV unit and visa versa.

- **RRR Offset -** ATCS Railroad number
- **LLL Offset -** ATCS Region number
- **GGG Offset - A**TCS Group number
- **SS Offset - A**TCS Site number
- **Msg Timeout –** this 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** setting are activated.
- **Max Time Offset -** this value sets the maximum permissible delay in transferring a message from the remote to the local site.





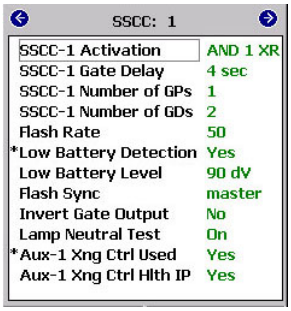
The **SSCC 1** and **2** windows display following the **SSCC** window. The functions in these windows are similar.

- **SSCC Activation -** determines which AND function is used to activate the crossing controller.
- **Gate Delay -** sets the delay between crossing lamp flashing start and gate drive dropping.
- **SSCC Number of GPs -** sets how many independent gate position inputs are to be assigned to inputs at the GCP.
- **Flash Rate -** sets the crossing lamp flash rate.
- **Low Battery Detection -** selects the low battery detection function.

- **Low Battery Level –**
  - 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 **Low Battery Detect** is set to **Yes**.
- **Flash Sync -** select the SSCC **Flash Sync** as master or slave.
- **Invert Gate Output -** allows 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 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.
- **Lamp Neutral Test -** set to On to enable lamp neutral test.

NOTE: Where only LED lamps are used, set **Lamp Neutral Test** to **Off**.

- **Aux-1** and **Aux-2 Xng Ctrl Used - e**nables the use of outputs to control an external crossing controller.
  - When 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.



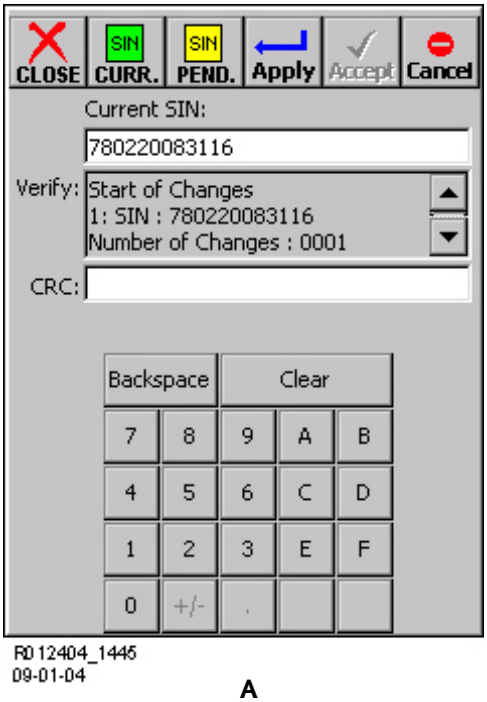
  - When **Aux-1 Xng Ctrl Used** is set to **Yes**, the option **Aux-1 Xng Ctrl Hlth IP** is displayed.
    - ❖ Enables the use of a health input from an external crossing controller.
    - ❖ When **Aux-1 Xng Ctrl Hlth IP** set to **Yes**, an input called **Aux-1 Xng Ctrl Hlth** is available to be assigned to a physical input. When **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.

This page intentionally left blank

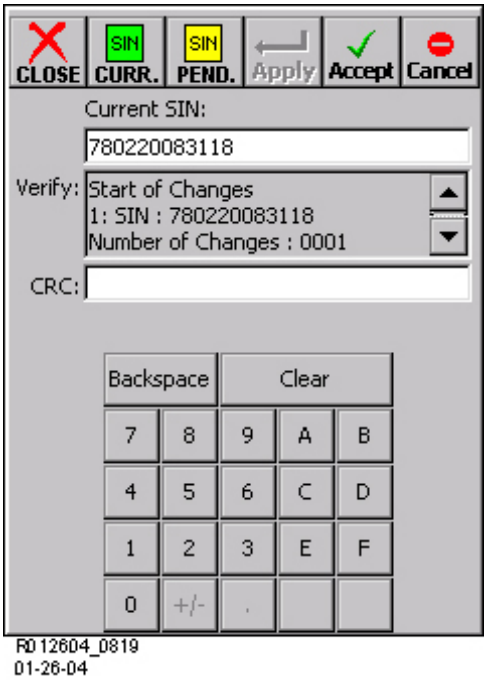
APPENDIX C - ATCS SITE ID ENTRY

Selecting the **ATCS Site Id** entry on the **TEMPLATE: Site Info** menu window brings up the dialog window shown in figure 22A. This dialog window:

- Displays the current Site Identification Number (SIN)
- Allows the current SIN to be changed
  - ♦ A SIN may be changed as described in procedure C-1
- Is controlled by six function buttons



A



B

Fig. 22. 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 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.** (current) 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 C-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 C-1. CHANGING SITE IDENTIFICATION NUMBER	
Step 1	Select the **ATCS Site Id** entry from the **TEMPLATE: Site Info** menu window • The SIN dialog window, figure 22A, displays.
Step 2	Highlight the number displayed in the **Current SIN** text box. • If the site identification number (SIN) is not displayed in the **Current SIN** text box, select the **Curr.** 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. • The keypad **Backspace** button clears the right-most SIN position each time it is selected. • 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 22B. • 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 22A.
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 CPU module. • The new SIN is embedded in the Chassis Identification Chip (CIC).
Step 8	Select the **Accept** button at the top of the SIN Window. • If the SIN window changes as shown in figure 22B, 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 by momentarily removing the module from the chassis. • 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.

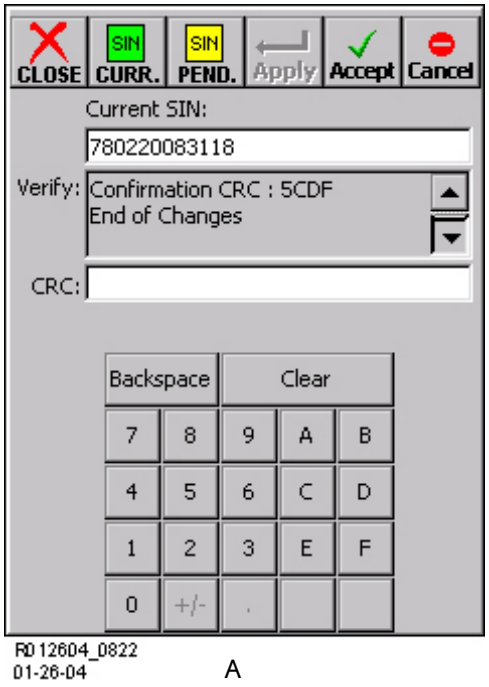


Fig. 23. Site Identification Number Window with CRC Display

APPENDIX D – WIRE PREPARATION & INSERTION INSTRUCTIONS FOR KEYED INTERFACE CONNECTORS

External Wiring Connectors and 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.

Wire Preparation

Strip insulation from the end of the wire as indicated in the table below.

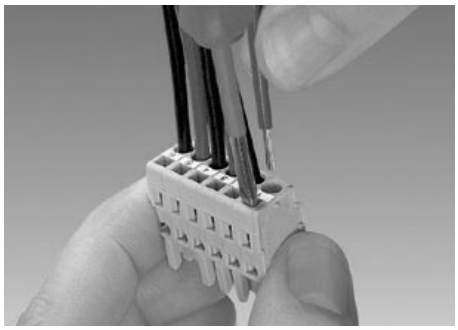
Type of Connection	Strip Length
Screw-down	0.28" (7 mm)
Cage clamp	0.32" – 0.35" (8 – 9 mm)

It is recommended that a stripping tool be used which allows the strip length to be set accurately. The addition of ferrules is not required. Prepare all wires in this fashion.

Wire Insertion

- For screw-down type connectors:
    1. Insert stripped end of a wire into the wire receptor of the connector until it stops.
    2. Verify that no portion of the wire insulation is in contact with the wire receptor.
    3. Tighten screw to a torque of 4.5 inch pounds (0.5 – 0.6 Nm). (About the same tightness as required when tightening a signal terminal nut.)
    4. Pull on wire to determine that it does not move within the connector. (Pull with about the same amount of force as when tightening boot laces.)
    5. If a wire is suspected of moving when pulled, remove the wire and run the wire receptor through its full range of motion. Repeat steps 1 through 4 for this wire.
    6. Repeat steps 1 through 4 for each wire being attached to the connector.
    7. If any wire receptor fails to hold the wire securely, replace the screw-type connector with an appropriate cage-clamp style connector.

- For cage clamp type connectors:
  1. Insert blade of appropriate sized flat bladed screwdriver in rectangular slot in connector next to the wire receptor (see figure below).



NOTE

The recommended flat-bladed screwdriver blade size is 0.10” wide, 0.020” thick (2.5mm x 0.5mm).

CAUTION

USE THE CORRECT SCREWDRIVER SIZE TO PREVENT DAMAGE TO THE CONNECTOR.

  2. Lever the wire cage clamp open by pressing straight down on the screwdriver.
  3. Insert the stripped end of a wire into the fully-open wire receptor until it stops.
  4. Hold the wire in place and remove the screwdriver blade from the slot. The wire clamp closes down on the stripped end of the wire.

APPENDIX E – 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.

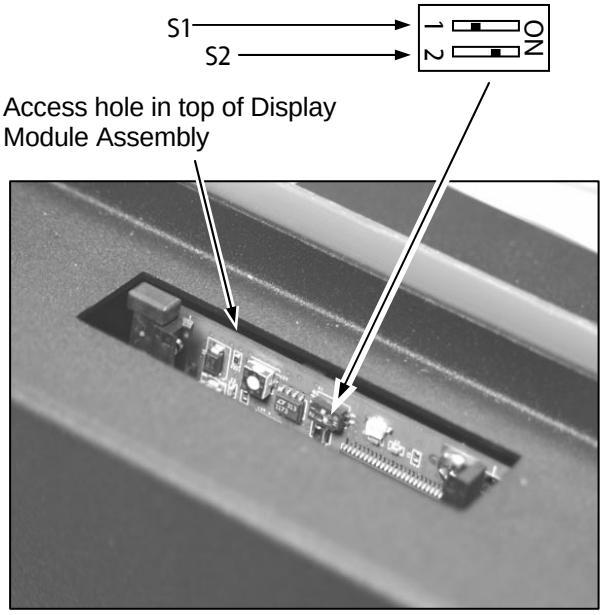
- Select the drive identified as the CompactFlash® Card as the destination folder when prompted. Select Finish when done.

- 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.

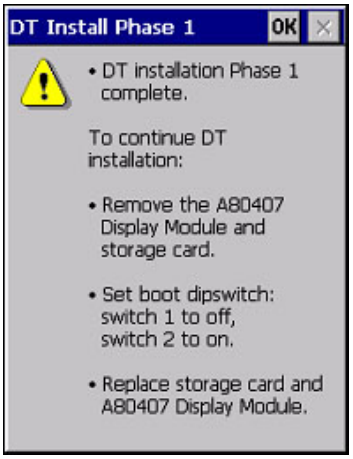


- Insert adapter with CompactFlash® Card into PCMCIA slot. See figure below.

- Insert A80407 Display Module into appropriate slot in GCP chassis.

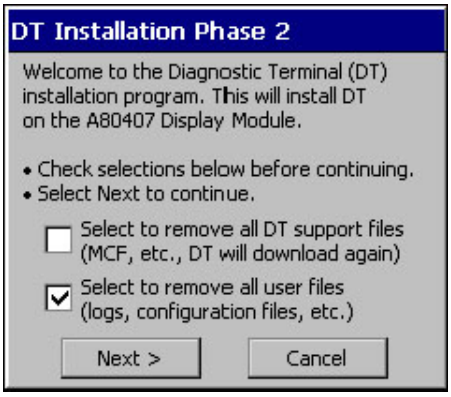
- After the Display Module boots up, a stylus calibration screen will display (white screen with a target in the middle). Tap the target firmly and accurately at each location on the screen. The target will continue to move until the screen is aligned. When the screen displays "Time limit: ...", tap 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.

This page intentionally left blank

APPENDIX F – OPTIONAL REMOTE CALIBRATION AND REMOTE CROSSING LAMP VOLTAGE ADJUSTMENT PROCEDURES

Optional remote GCP calibration and Crossing lamp voltage adjustment may be used as needed. The remote calibration and adjustment procedures are the same as the other procedures, except that the person doing the adjustment or calibration communicates directly with the GCP via VHF radio. The GCP sends voice options and the person performing the operation replies via a DTMF keypad on a VHF radio.

To perform remote calibration and/or lamp adjustment the following are required:

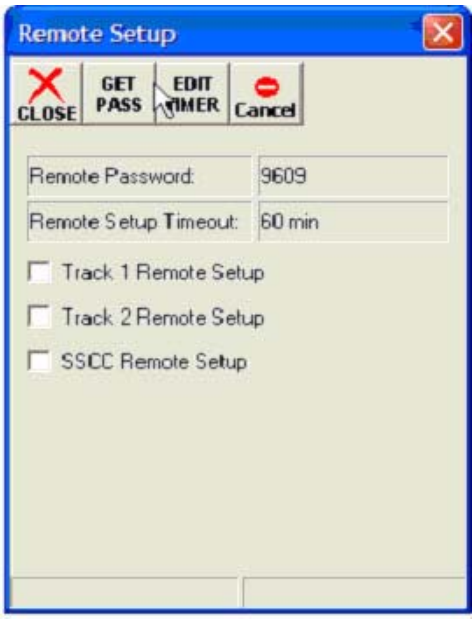
1. Safetran VHF Communicator (A80276) programmed and connected to the GCP Echelon LAN.
   - VHF Communicator is a VHF Radio interface to the 4000 GCP that sends setup and calibration options to remote radio.
   - VHF Communicator set to a railroad VHF frequency.
2. Hand-held VHF radio with DTMF keypad.
   - Person doing remote calibration responds to options and sends commands to GCP.
   - Set to same frequency as VHF communicator.
3. Hardwire test shunt for calibration and appropriate voltmeter for lamp adjustments.
4. Obtain a one-time password from the GCP for remote operation.
   - Password expires in 60 minutes unless another setting is selected by user.
5. Previously during the programming stage, the DOT Crossing Number must be entered in the Location Information on the SITE INFO screen. During remote calibration, the DOT number is used to identify that the proper location is being calibrated.

This section includes flow charts for the commands and choices used in setup and calibration:

- Remote calibration setup
- Remote GCP and approach calibration
- Remote linearization calibration
- Remote crossing lamp voltage adjustment
- Remote calibration termination

NOTE

The GCP sends and receives commands via the VHF Communicator which includes a half-duplex radio. The radio can not receive a reply until it is finished transmitting. DO NOT send back responses until the message is completed.



Remote Calibration Setup

Step 1	Select the **Setup** button from the DT Buttons at the top of the status Screen.
Step 2	From the menu that appears, select **REMOTE SETUP**. • The **Remote Setup** dialog box 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. ♦ 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 displays.
Step 7	Using the keypad numbers, enter the required Setup Timeout value (range 1 – 120 minutes) 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.

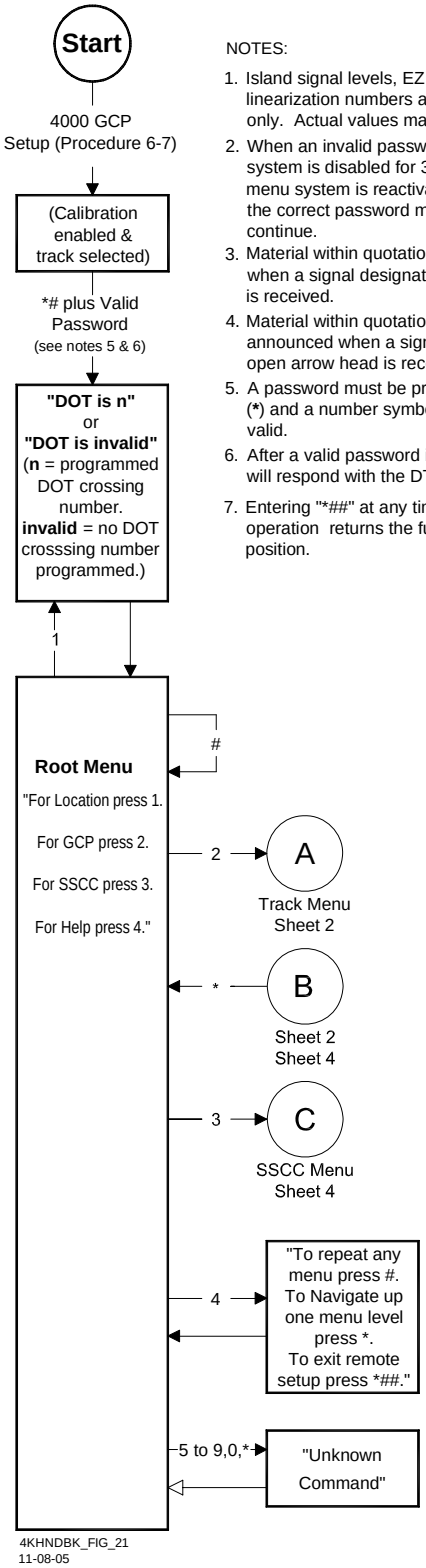
Remote Calibration Setup continued	
Step 9	Individually select each field of the Track and SSCC to be calibrated. • A check appears in the check box of each selected field.
Step 10	Select the **CLOSE** button. • The Status Screen displays.
Step 11	To perform an Island Calibration, go to the Island Calibration screen and record the shunt placement distance for shunting sensitivity.

Remote Calibration and Adjustment	
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 Remote Calibration Setup.
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	Follow the verbal instructions from the GCP, the Remote User Interface Menu and the Calibration and Adjustment procedures in the preceding "CALIBRATION PROCEDURES" section

NOTE

Figures 24 through 28 provide a detailed flow chart of the "Remote User Interface Menu".

Completing Remote Calibration	
Step 1	Repeat all remote procedures for each track module selected in the Remote Calibration steps.
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. To access the Status Log, press the History Button on the display, then select Status Log.



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.

Fig. 24. Remote User Interface Menu, Sheet 1

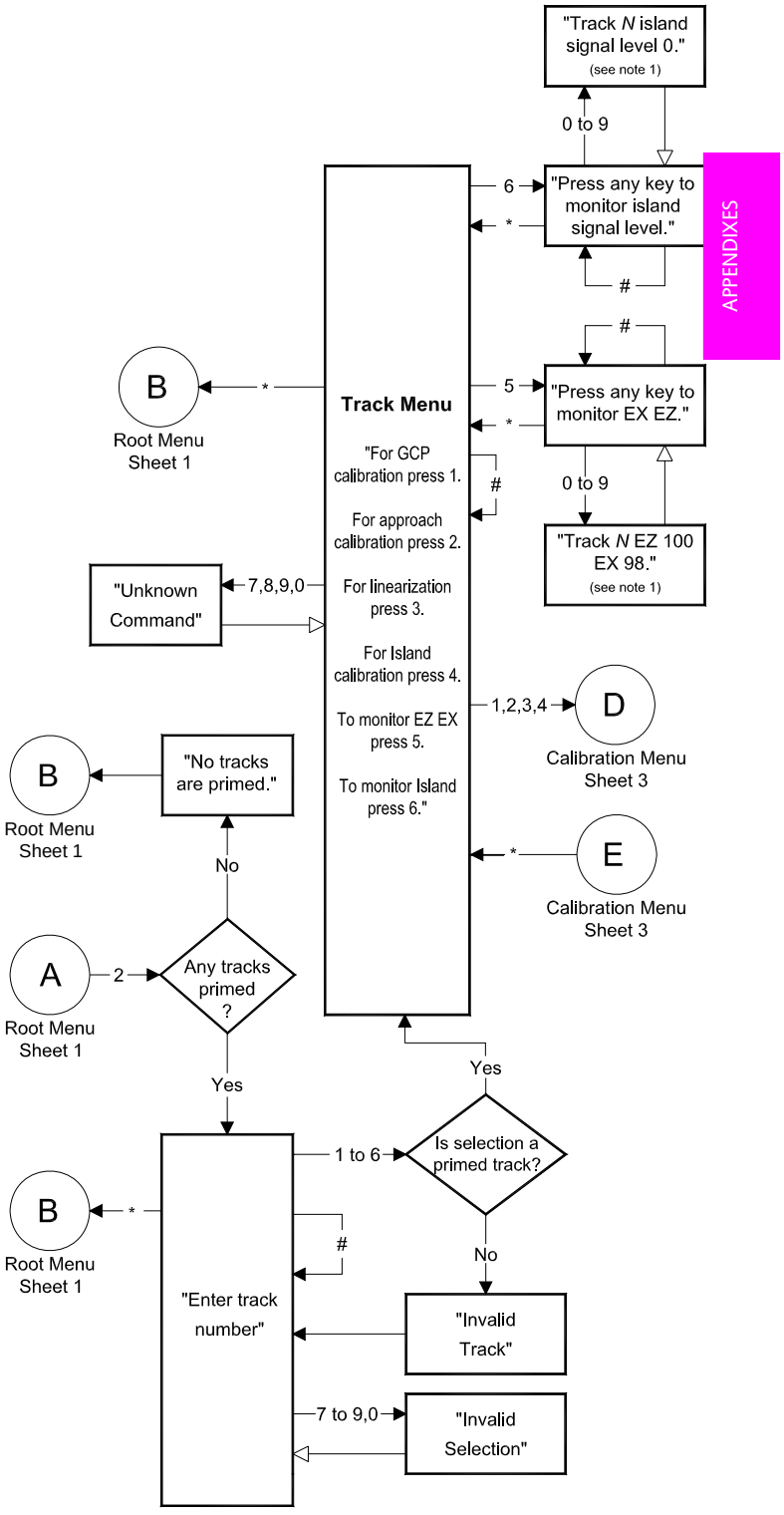


Fig. 25. Remote User Interface Menu, Sheet 2

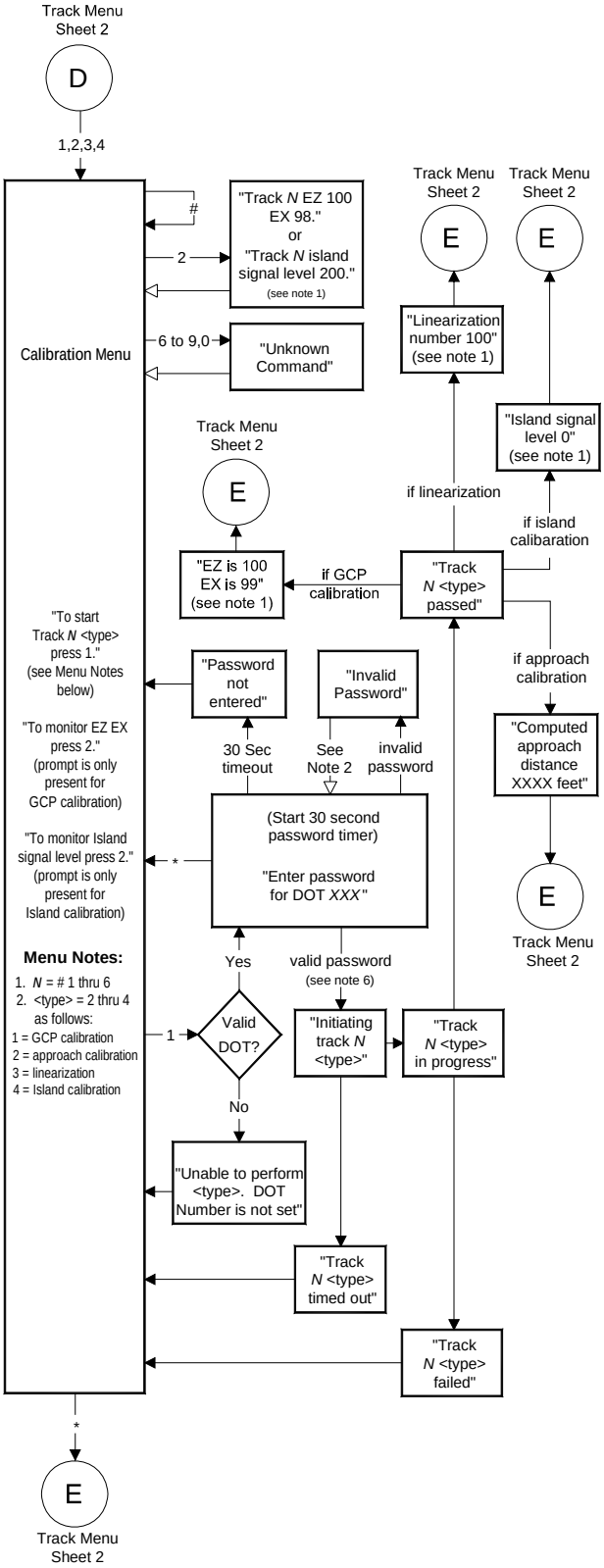


Fig. 26. Remote User Interface Menu, Sheet 3

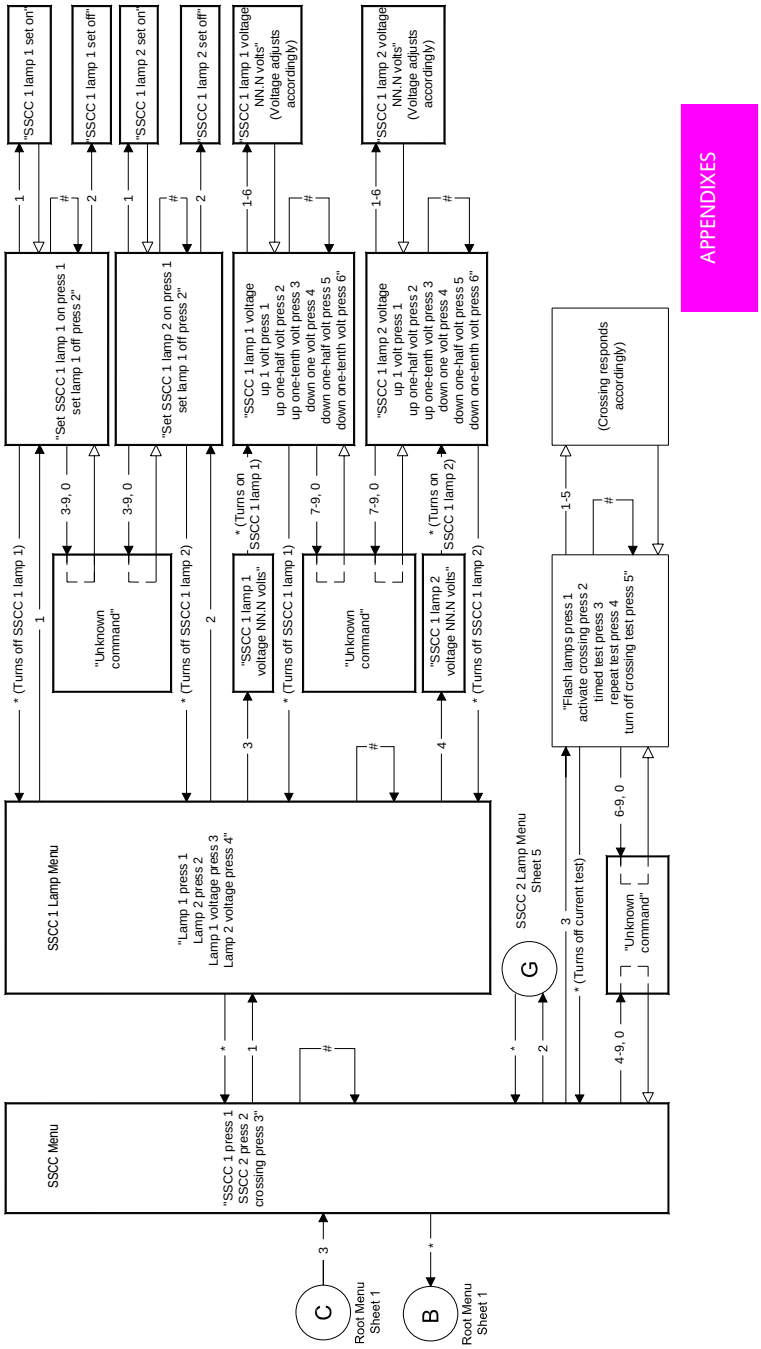


Fig. 27. Remote User Interface Menu, Sheet 4

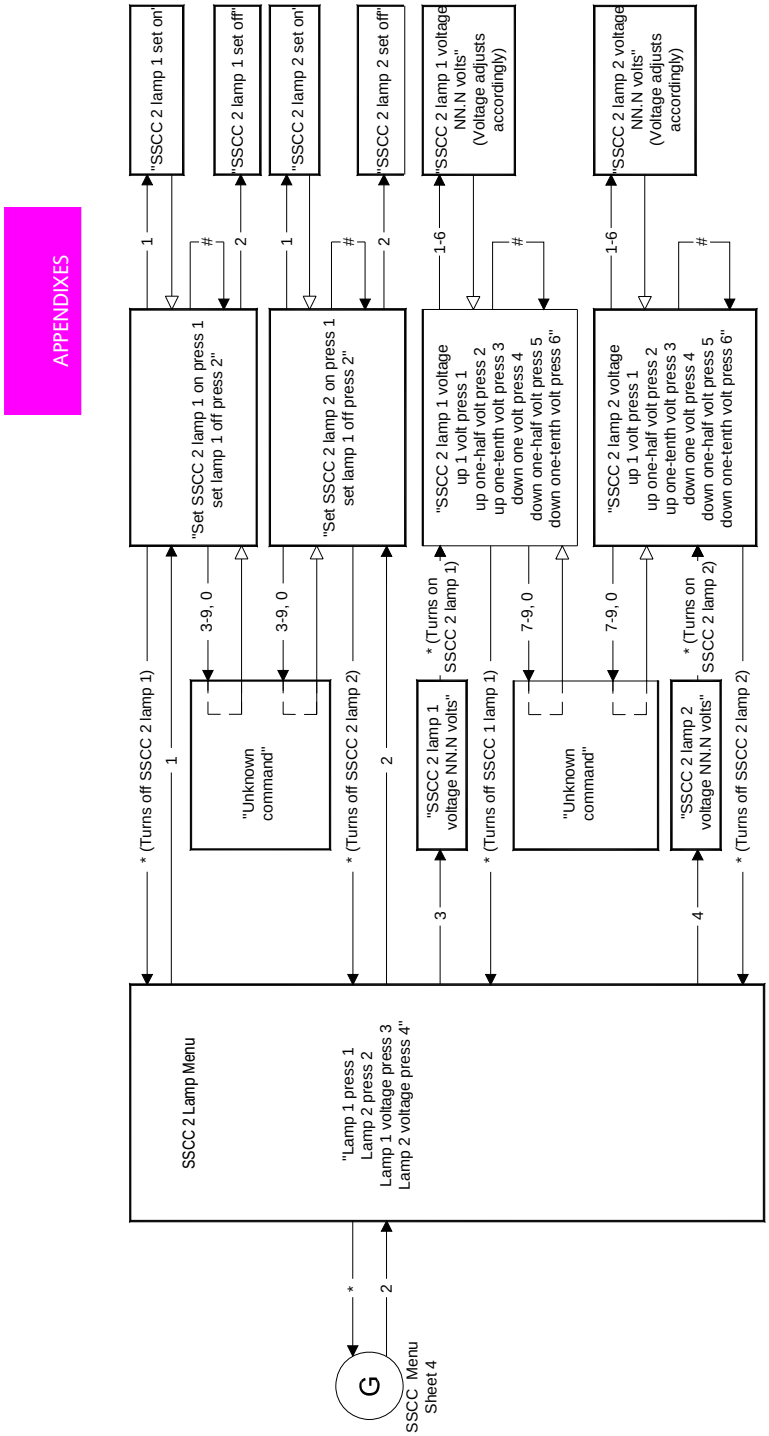


Fig. 28. Remote User Interface Menu, Sheet 5

APPENDIX G - DISPLAY DT USB WIZARD

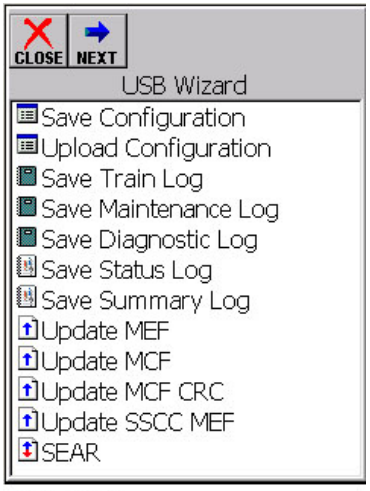
The USB Wizard is available only with the A80407-03 Display Module based Diagnostic Terminal (DT) and is not supported by the PC based DT.

- The USB Wizard allows GCP 4000 files to be saved to or uploaded from a 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 Move History Logs
  - Maintenance Logs
  - Status Logs
  - Summary Logs
  - SEAR IIi
    - Reports
    - History
    - Incidents
- The following GCP 4000 file types can be uploaded from a USB drive connected to the Display Module:
  - Configuration PAC files
  - Module Executable Files (MEF)
  - Module Configuration Files (MCF)
  - MCF Cyclical Redundancy Check (CRC)
  - SEAR IIi
    - Executive Software
    - Control Descriptor Language (CDL)
    - Ladder Logic Executive file (LLW)
    - Ladder Logic Label file (LLB)

USB Wizard Menu

Insert the USB drive in the USB port on the Display Module to automatically open the USB WIZARD menu.

- This menu may be returned to at any time by pressing the **WIZ** button at the top of the Main Status screen, providing the USB drive is still inserted in the port.



D12222006_0725
12-22-06

Saving Files to USB Drive

To save a file to the USB drive,

- Insert USB drive in port,
- touch the appropriate function name on the USB Wizard menu and
- then press **NEXT**.

CAUTION

THE DEFAULT DESTINATION DRIVE ON THE DT WHEN SAVING FILES TO THE USB DRIVE IS "\HARD DISK". DO NOT SAVE A FILE TO ANOTHER DRIVE BECAUSE IT MAY DISRUPT DISPLAY OPERATION.

NOTE

The SAVE function will default to a File Name of the file type 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 in the file name.
- Use the keyboard to backspace, add spaces or enter letters and numbers (process similar to editing names on a cell phone).

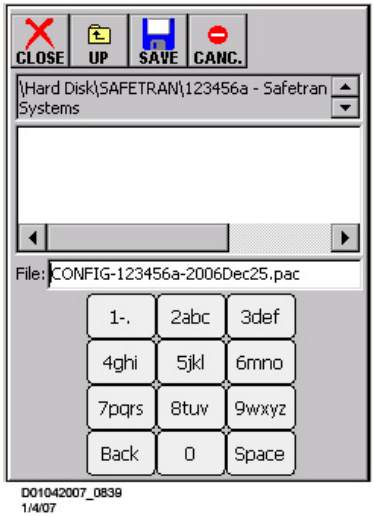
Save Configuration

- Select **Save Configuration** from the USB Wizard menu.
- Press **NEXT**. A file save screen is displayed.
- The name of the currently installed PAC file appears in the **File:** field. (Edit if necessary.)

NOTE

Other file names may appear in the display area above the **File:** field. These are PAC files currently located on the USB drive.

- Press **SAVE** button.



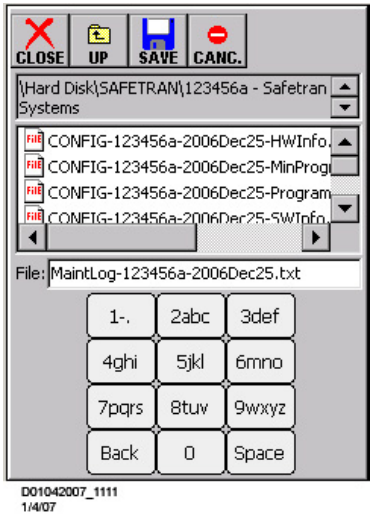
NOTE

During file save operation, progress is indicated on MAIN PROGRAM menu screen status bar.

Save Train/Maintenance/Diagnostic Log

The **Save Train Log**, **Save Maintenance Log** and **Save Diagnostic Log** functions are identical.

- Select **Save Train** / **Maintenance** / **Diagnostic Log** from USB Wizard menu, then press **NEXT**. The applicable log screen appears (see typical screen below).



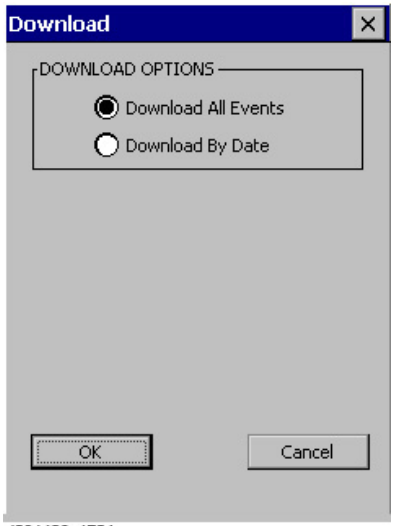
D01042007_1111
1/4/07

- The default file name for the selected log type appears in the **File Name:** field on the log screen. (Edit if necessary.)
- Press **SAVE** button

Save Status/Summary Log

Save Status and **Save Summary Log** functions are identical.

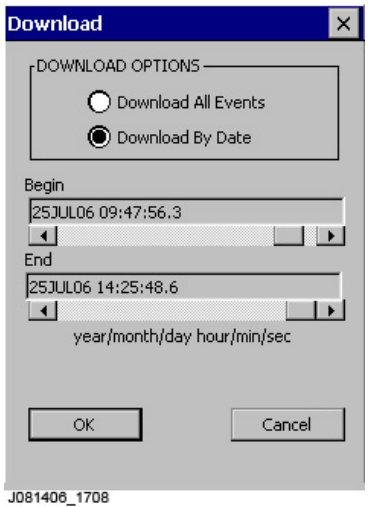
- Select **Save Status** / **Summary Log** from USB Wizard menu, then press **NEXT**. The Download screen appears.



J081406_1704
8-14-06

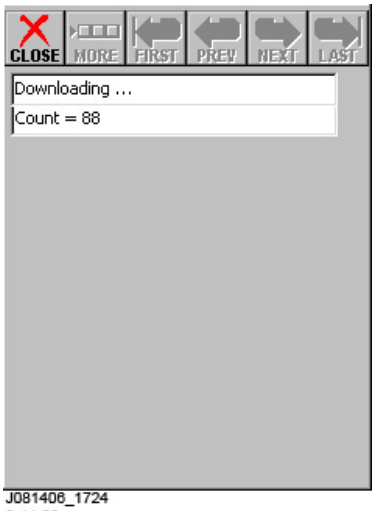
- Select the Download Option.
  - ♦ If Download By Date is selected, Begin and End date sliders appear.

♦ Move sliders to select download range.



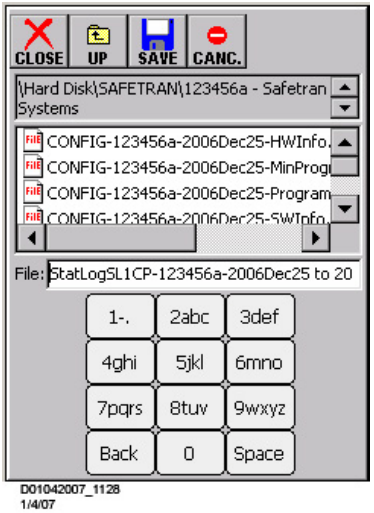
J081406_1708
8-14-06

- Press **OK** button.
- During download, a download status screen is displayed.



J081406_1724
8-14-06

After files are downloaded and ready to be saved, the log screen appears.

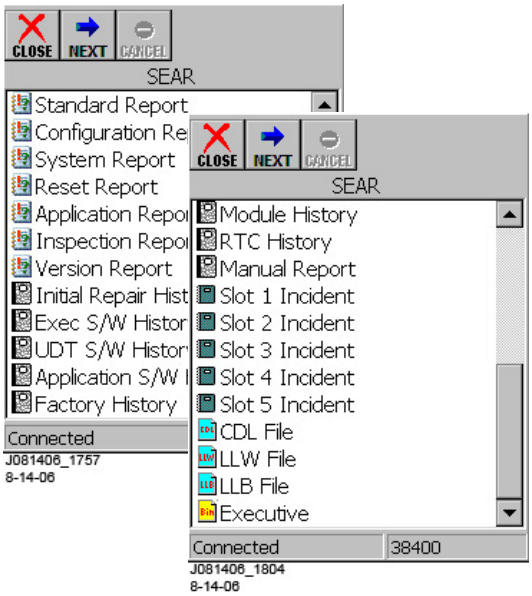


D01042007_1128
1/4/07

- The default file name for the selected log type appears in the **File Name:** field on the log screen. (Edit if necessary.)
- Press **SAVE** button

Saving SEAR IIi Reports and Files

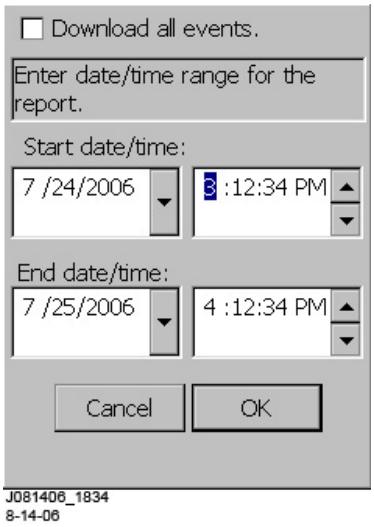
- Select **SEAR** from USB Wizard menu.
- Press **NEXT**. The SEAR report screen appears.
- Use the vertical scroll bar to view all menu entries.

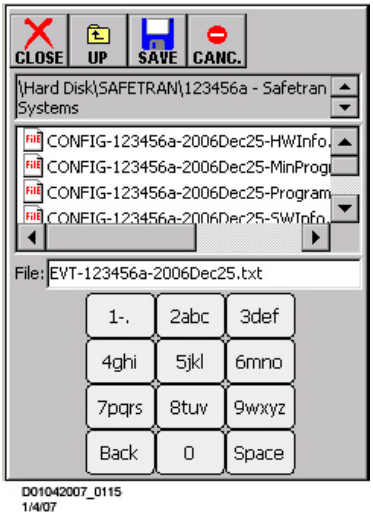


Save SEAR Standard / Application Report

The **Standard Report** and **Application Report** save functions are identical.

- Select **Standard Report** / **Application Report** from SEAR report screen.
- Press the **NEXT** button.
  - ♦ The event download screen appears.
    - ▪ Select the Download all events check box at the top of the screen or
    - ▪ Edit Start and End dates, if desired, by selecting the browse button located to the right of the date field.
    - ▪ Edit Start and End times, if desired, by selecting the up and down arrows located to the right of the time field.
  - ♦ Press the **OK** button.





- The default file name for the selected report type appears in the **File:** field on the report select screen. (Edit if necessary.)
- Press **SAVE** button

Saving Miscellaneous SEAR Report and History Files

The process for saving the following reports and history files is the same.

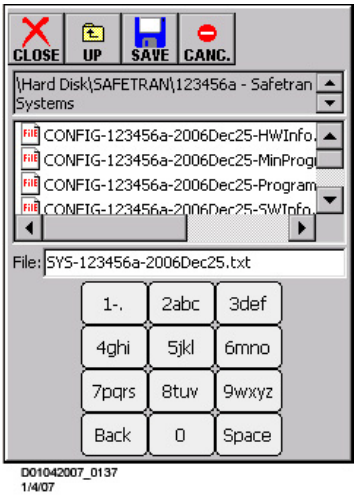
• **Configuration Report**	• **Exec S/W History**
• **System report**	• **UDT S/W History**
• **Reset Report**	• **Factory History**
• **Inspection Report**	• **Module History**
• **Version Report**	• **Initial Repair History**
• **Application S/W History**	• **Manual (Repair History) Report**
• **Slot 1 – Slot 5 Incident Report**	• **RTC (Real Time Clock) History**

- Select desired report or history entry (see list above) from SEAR report screen.
- Press the **NEXT** button.
- The report file name displays automatically in the **File**: field on the report/history file select screen.

NOTE

The names of previously saved report files are listed in the area above the **File**: field.

- Press **SAVE** button.

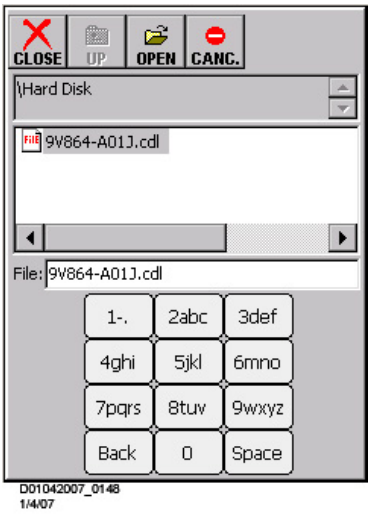


Uploading Software From the USB Drive

The process for uploading the following software from the USB drive is the same.

CDL File	LLB File	LLW File

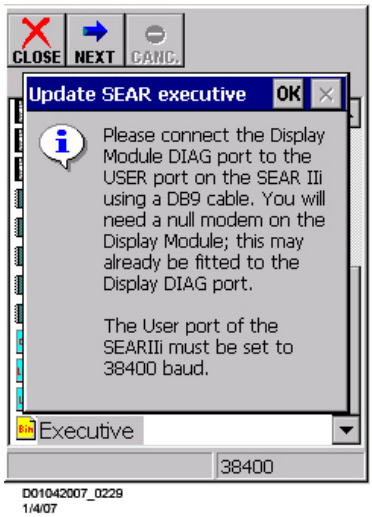
- Select desired software file entry (see list above) from SEAR report screen.
- Press the **NEXT** button.
- On the software file select screen (see typical below), touch the desired file name in the upper window.
- The file name appears in the **File:** field.



- Press **OPEN** button to upload the file.

Uploading SEAR Executive (.bin file)

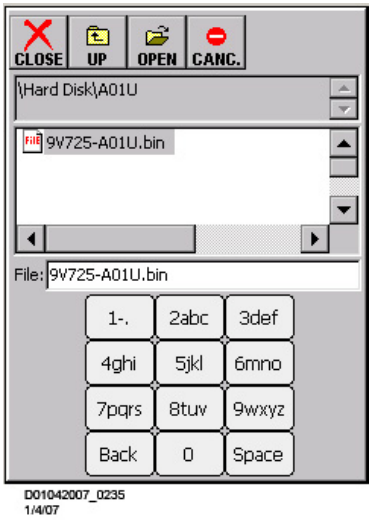
- Select **SEAR** from USB Wizard menu.
- Press **NEXT**. The SEAR report screen appears.
- Scroll to the end of the menu and select **Executive**.
- Press **NEXT**.
- Verify that Null Modem adapter is attached to the DIAG port on the Display Module. Connect the DB9 cable between the Display Module and the SEAR USER port.



NOTE

Verify that the SEAR USER port baud rate is set to 38,400 bits per second.

- Press **OK**.
- On the software file select screen (see typical below), touch the desired **bin** file name in the upper window.
- The file name appears in the **File:** field.

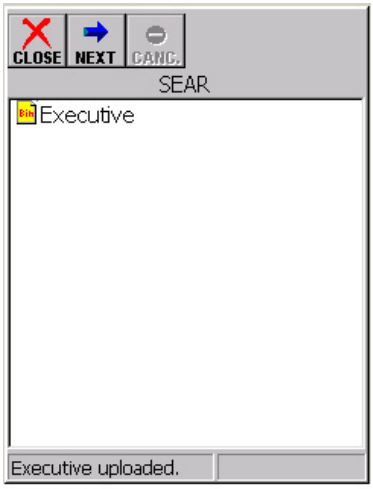


D01042007_0235
1/4/07

- Press **OPEN** button to upload the file.
- Confirm the correct bin file selection by pressing **Yes**.

D01042007_0241
1/4/07

- The SEAR resets and then the new executive file is sent to the SEAR (status appears at bottom of screen).
- When the upload is complete the following screen appears. Press **CLOSE**.



D01042007_0246
1/4/07

WARNING

- **UPLOADING A NEW 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 VEHICLES IN THE AREA UNTIL PROPER SYSTEM OPERATION IS VERIFIED.**
- **TESTS MUST BE PERFORMED TO VERIFY PROPER OPERATION OF GCP PRIOR TO PLACING THE SYSTEM BACK IN SERVICE**

CAUTION

TO MINIMIZE THE TIME THAT SIGNALS ARE IN A RESTRICTIVE STATE, IF THE EXISTING CONFIGURATION NEEDS TO BE SAVED, SAVE IT PRIOR TO SELECTING "UPLOAD CONFIGURATION" FROM THE USB WIZARD MENU. REFER TO PAGE 176.

NOTE

Display-based DT to module interface baud rate is 38,400 bits/Sec. PC-based DT to module interface baud rate is 56,000 bits/Sec. Therefore, uploading files via the Display DT will take approximately 50% longer that uploading from a PC.

Uploading Configuration (PAC file)

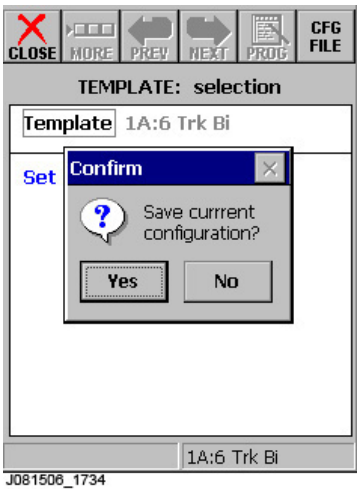
- Select **Upload Configuration** in the USB Wizard menu.
- Press the **NEXT** button.
- The Main Program Menu screen appears.
- An **Upload Warning** is displayed.

J081506_1729
8-15-06

WARNING

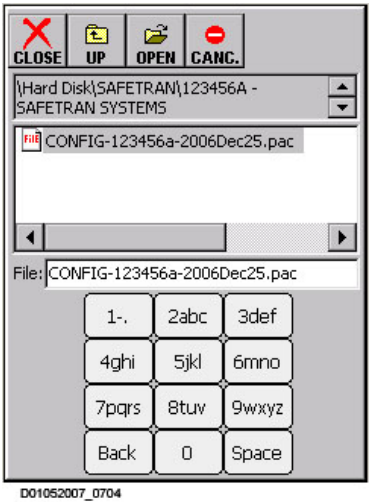
- **UPLOADING A NEW CONFIGURATION WILL PLACE THE GCP IN A RESTRICTIVE STATE AND ACTIVATE THE CROSSING WARNING SYSTEM.**
- **BEFORE UPLOADING BEGINS, TAKE ADEQUATE PRECAUTIONS TO WARN ANY PEDESTRIANS, PERSONNEL, TRAINS, AND VEHICLE IN THE AREA UNTIL PROPER SYSTEM OPERATION IS VERIFIED.**
- **TESTS MUST BE PERFORMED TO VERIFY PROPER OPERATION OF GCP PRIOR TO PLACING THE SYSTEM BACK IN SERVICE**

- Press **YES** to continue
- A prompt to save the current configuration is displayed.
  - ♦ Select **YES** to save the current configuration (see **Save Configuration** on page 176).
  - ♦ Select **NO** to continue without saving the current configuration.



J081506_1734
8-15-06

When the PAC file select screen appears, select the Configuration PAC File that is to be copied by touching the name on the display. The name will appear in the **File:** field.

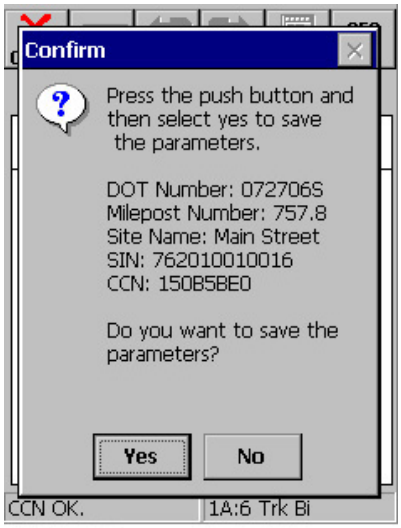


D01052007_0704
1/5/07

- Press the **OPEN** button to upload the file.

Saving the new PAC file is a two step process.

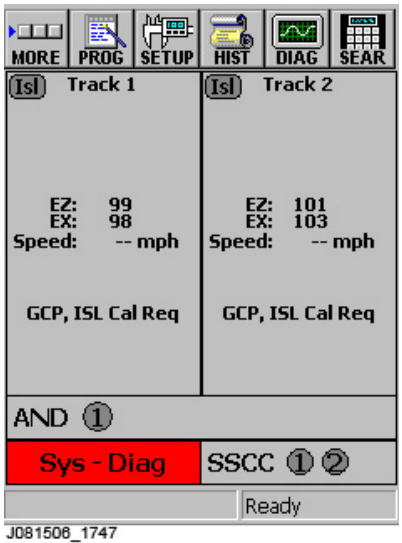
- Press the **SEL** push button on the active CPU module. This step must be completed within 5 minutes, or the process must be repeated.
- Next, press **Yes** on the **Confirm** screen to save the PAC file parameter.



D01042007_0331
1/4/07

NOTE

After the PAC file parameters are saved, the Main Status Screen may appear and indicate that track circuit calibration may be required.

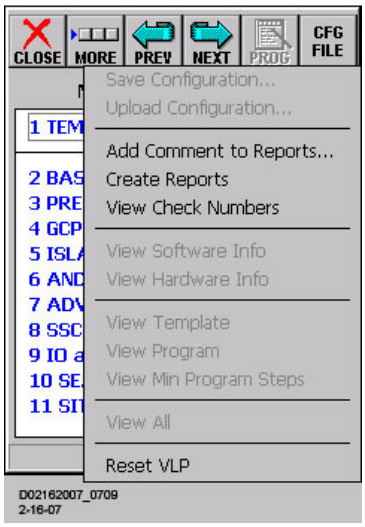


J081506_1747
8-15-06

Checking CCN and OCCN

After uploading a new Configuration (PAC file), check the CCN and OCCN as follows:

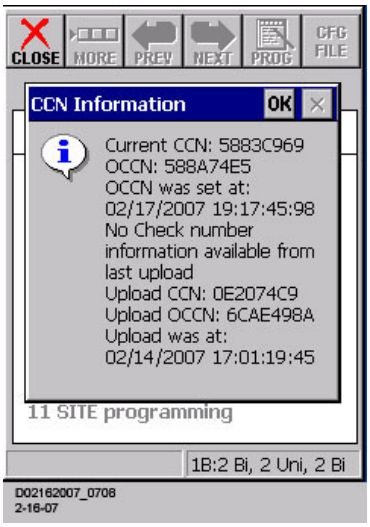
- Press the **PROG** button at the top of the Main Status screen.
- Press the **CFG FILE** button at the top of the MAIN PROGRAM menu screen.
- Select '**View Check Numbers**' from the menu.



NOTE

CCN and OCCN calculation takes approximately 80 seconds. Calculation status is displayed in the left half of the DT status bar.

- When the **CCN Information** screen appears, compare the current CCN and OCCN values to the ones presented in the Minimum Program Steps report. They should be the same.

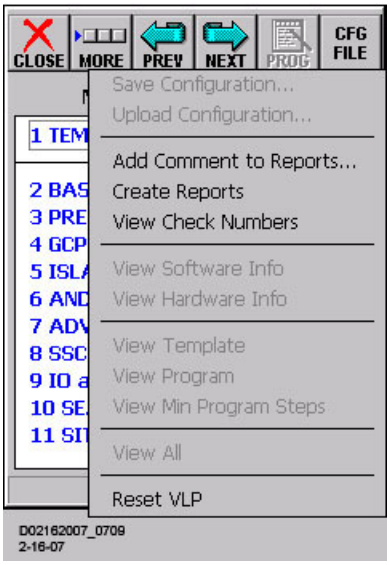


- Press **OK** to return to the MAIN PROGRAM menu screen.

NOTE

To generate and view the Minimum Program Steps report, use the following procedure.

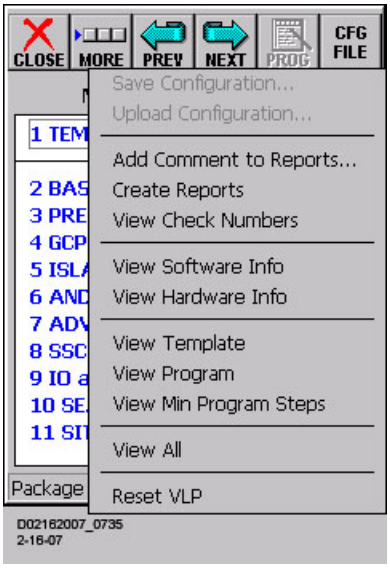
- Press the **CFG FILE** button at the top of the MAIN PROGRAM menu screen.
- Select '**Create Reports**' from the menu.



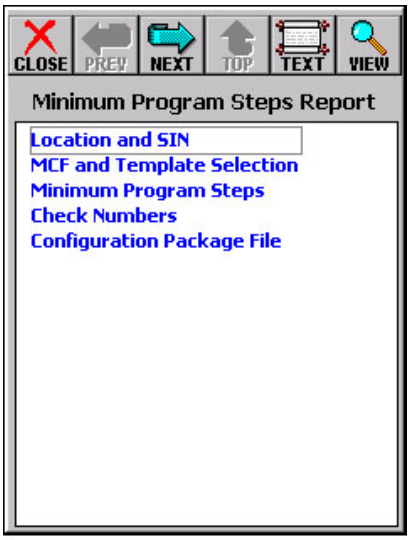
NOTE

Report generation may take 3 or 4 minutes. Status is displayed in the left half of the DT status bar. When the reports are ready, 'Reports created' appears at the left end of the DT status bar.

- Press the **CFG FILE** button at the top of the MAIN PROGRAM menu screen.
- Select '**View Min Program Steps**' from the menu.

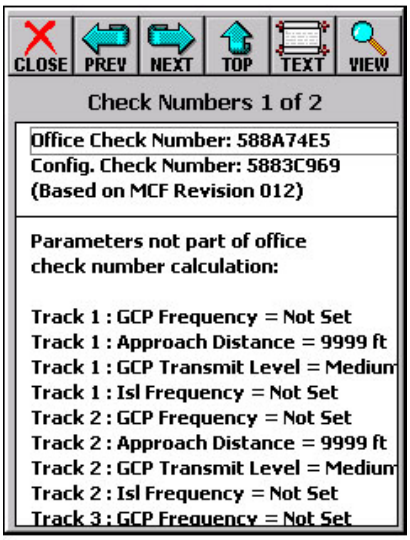


- The **Mininum Program Steps Report** menu appears.



D02162007_0748
2-16-07

- Select '**Check Numbers'** from the menu.
- The OCCN and CCN are displayed at the top of the Check Numbers screen.



D02162007_0749
2-16-07

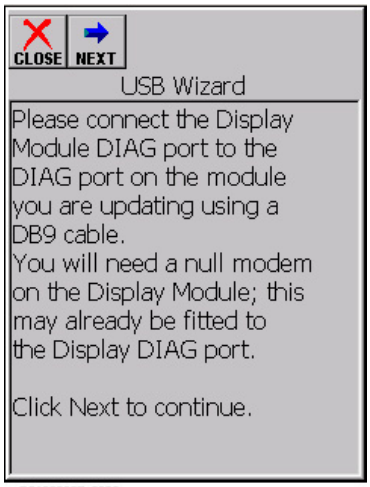
Update MEF

NOTE

Use the following procedure to update the MEF for any module in the system including the SSCCIIIi.

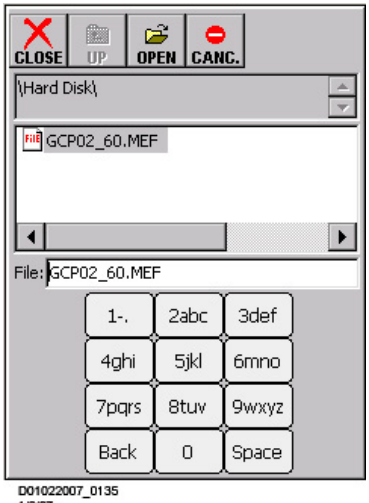
- Select **Update MEF** (or **Update SSCC MEF** if appropriate) in the USB Wizard menu.
- Press the **NEXT** button.
- A prompt screen appears instructing user to connect a DB9 serial cable between the Display Module DIAG port and the DIAG port of the module to be updated.

- Verify that the Null Modem Adapter is attached to the Display Module DIAG port, then make the cable connection.



D01022007_0838
1-2-07

- Press **NEXT.**
- Select the MEF File that is to be copied by touching the name on the display. The name will appear in the '**File:**' box.

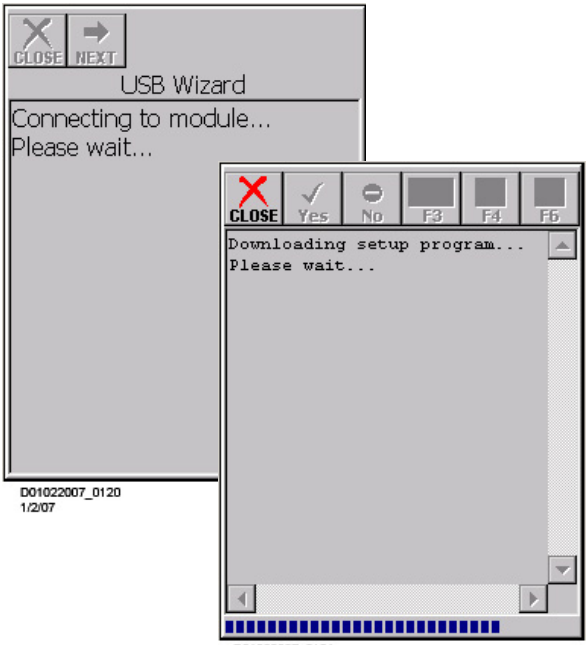


D01022007_0135
1/2/07

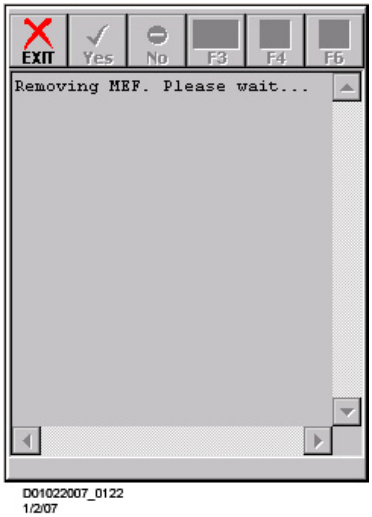
- Press the **OPEN** button.
- Confirm the correct MEF selection by pressing **Yes**.

D01022007_0119
1/2/07

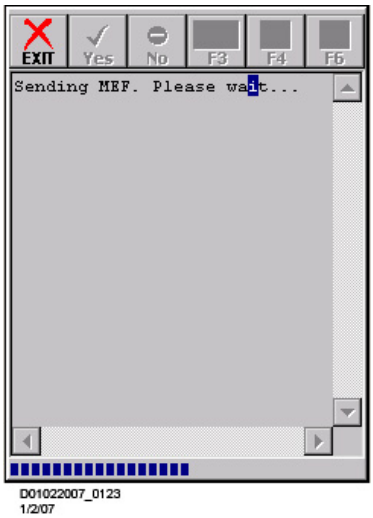
- After the Display connects to the module that the MEF is being downloaded to, the setup program is downloaded.



- The old MEF is removed,



- And the new MEF is sent to the module.

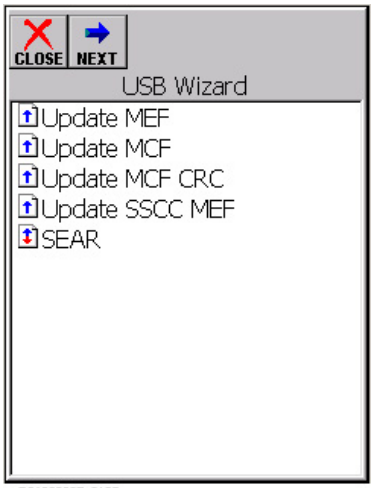


- ♦ The file download may take several minutes and the blue progress bar indicates the download status.

- When the MEF download is complete, the software is updated. Press **EXIT** to continue.

D01022007_0124
1/2/07

- When the USB Wizard screen appears, either select another file type for update or press **CLOSE**.



D01022007_0125
1/2/07

- When **CLOSE** is pressed, a screen with a **Connect** button is displayed. Press the **Connect** button to reconnect the Display with the system.

D01032007_0807
1/3/07

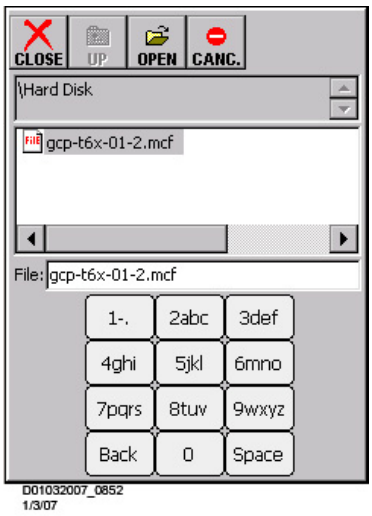
- A message is displayed indicating that the system will reboot and connect with the Display in 3 seconds.

Update MCF

- Select **Update MCF** in the USB Wizard menu.
- Press the **NEXT** button.
- A prompt screen appears instructing user to connect a DB9 serial cable between the Display Module DIAG port and the DIAG port of the CPU module to be updated.
- Verify that the Null Modem Adapter is attached to the Display Module DIAG port, then make the cable connection.

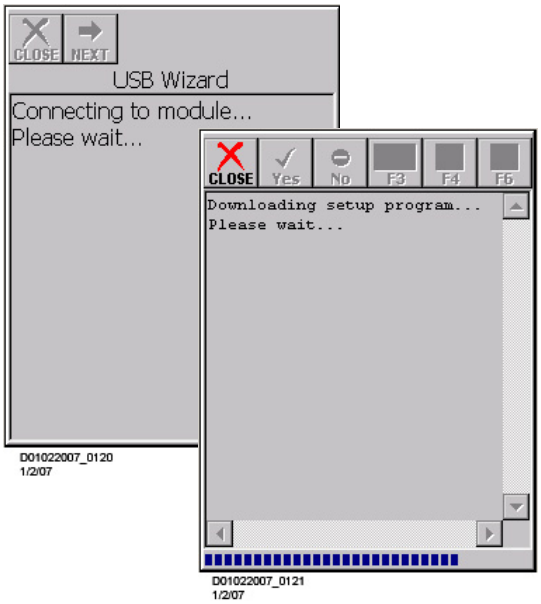
- Press **NEXT.**

- Select the MCF File that is to be copied by touching the name on the display. The name will appear in the '**File:**' box.

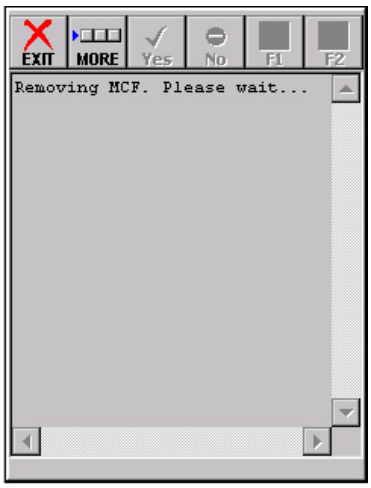


- Press the **OPEN** button.
- Confirm the correct MCF selection by pressing **Yes**.

- After the Display connects to the CPU module that the MCF is being downloaded to, the setup program is downloaded.

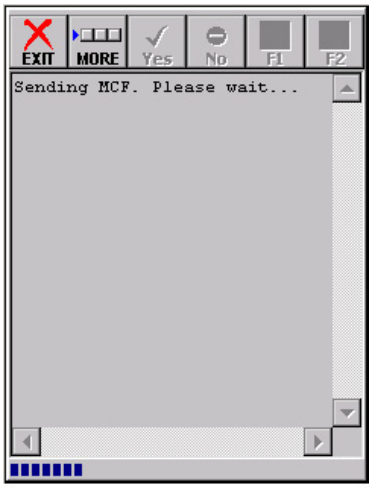


- The old MCF is then removed,



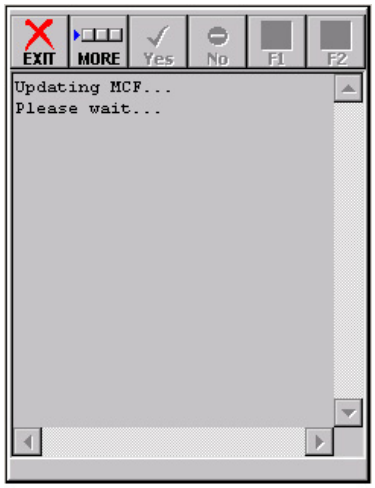
D01032007_0857
1/3/07

- And the new MCF is sent to the CPU module.
  - ♦ The file download may take several minutes and the blue progress bar indicates the download status.



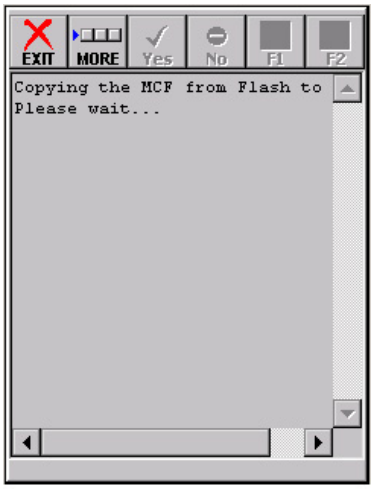
D01032007_0858
1/3/07

- ♦ When the MCF download is complete, the MCF is updated.



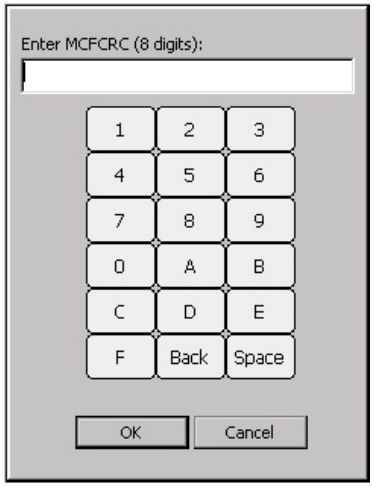
D01032007_0900
1/3/07

♦ Following MCF update, the MCF is copied from Flash memory to the ECD. This may take several minutes. “COPYING MCF TO ECD” scrolls on CPU display during this process.



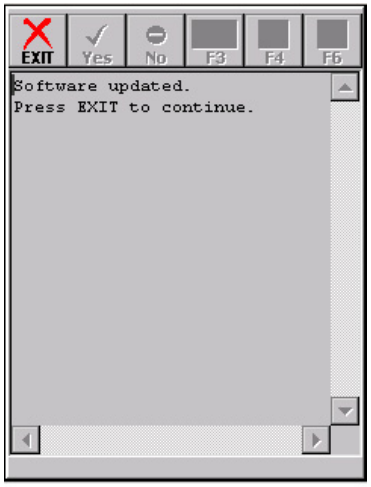
D01032007_0901
1/3/07

- After the MCF is copied to the ECD, enter the MCF CRC to validate the new MCF. Use the stylus to enter the CRC from the displayed keypad. Then press **OK**.



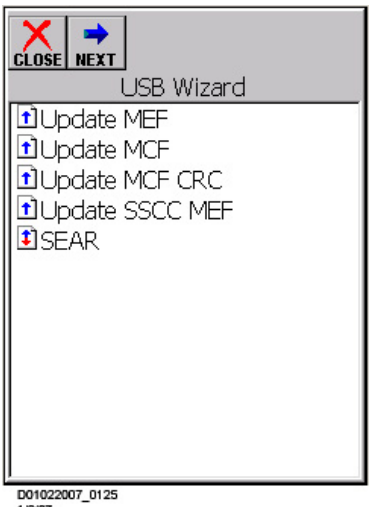
D01032007_0903
1/3/07

- Following entry of a valid MCF CRC, the software is updated. Press **EXIT** to continue.



D01022007_0124
1/2/07

- When the USB Wizard screen appears, either select another file type for update or press **CLOSE**.



D01022007_0125
1/2/07

- When **CLOSE** is pressed, a screen with a **Connect** button is displayed. Press the **Connect** button to reconnect the Display with the system.

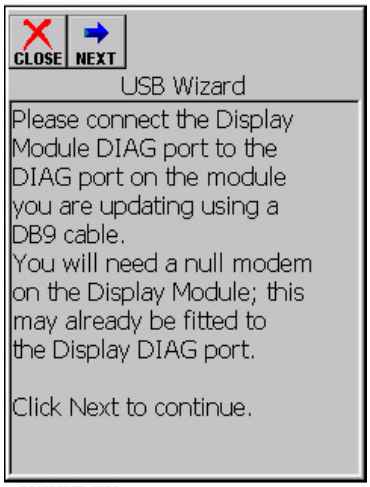
D01032007_0807
1/3/07

- A message is displayed indicating that the system will reboot and connect with the Display in 3 seconds.

D01032007_0907
1/3/07

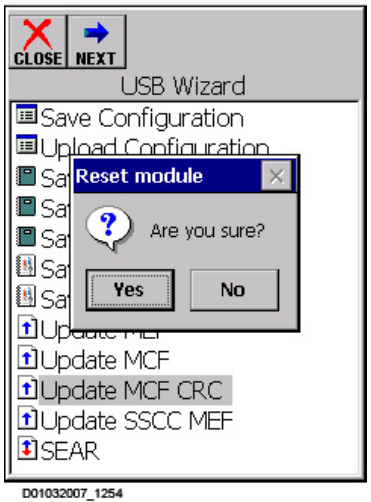
Update MCF CRC

- Select **Update MCF CRC** in the USB Wizard menu.
- Press the **NEXT** button.
- A prompt screen appears instructing user to connect a DB9 serial cable between the Display Module DIAG port and the DIAG port of the CPU module to be updated.
- Verify that the Null Modem Adapter is attached to the Display Module DIAG port, then make the cable connection.



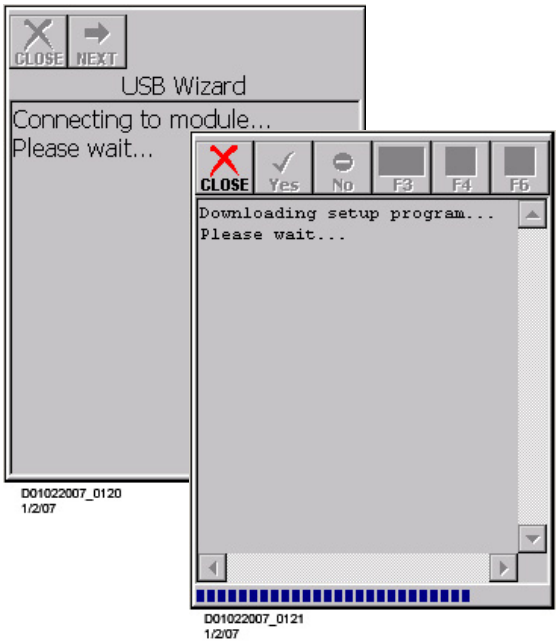
D01022007_0838
1-2-07

- Press **NEXT.**
- At the prompt to “Reset module”, press **Yes**.

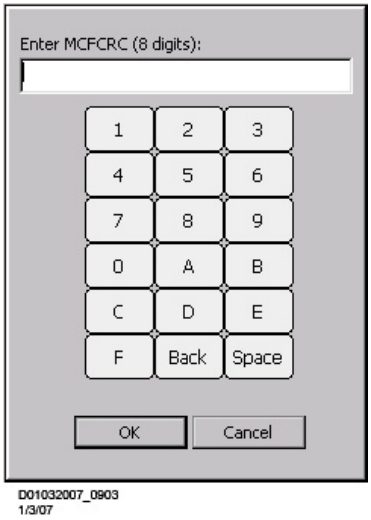


D01032007_1254
1/3/07

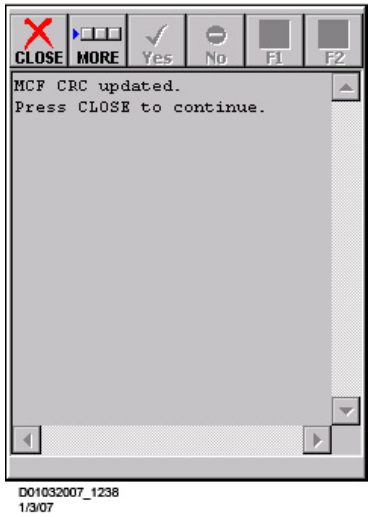
- The Display connects to the CPU module that the MCF CRC is being updated for and the setup program is downloaded.



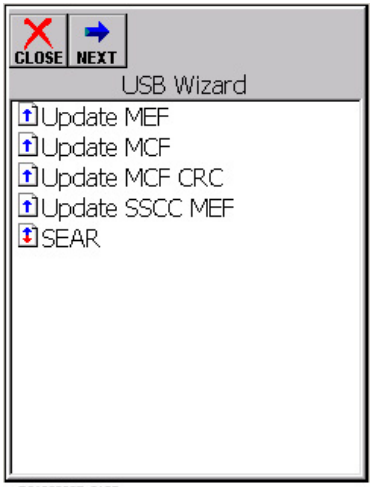
- Enter the new MCF CRC using the stylus and the displayed keypad. Then press **OK**.



- Following entry of a valid MCF CRC, the software is updated. Press **CLOSE** to continue.



- When the USB Wizard screen appears, either select another file type for update or press **CLOSE**.



D01022007_0125
1/2/07

When **CLOSE** is pressed, a screen with a **Connect** button is displayed. Press the **Connect** button to reconnect the Display with the system.

D01032007_0807
1/3/07

- A message is displayed indicating that the system will reboot and connect with the Display in 3 seconds.

D01032007_0907
1/3/07

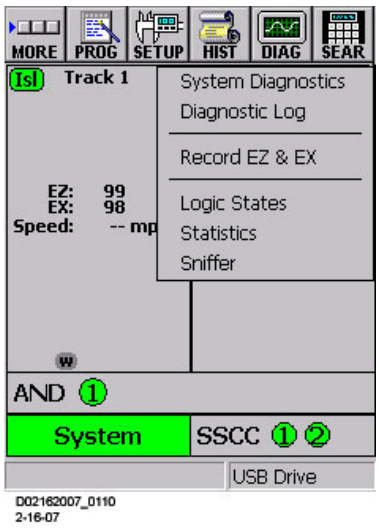
EZ/EX Recording

If the USB drive is left plugged into the USB port on the A80407 Display Module, EZ and EX values can be recorded in real time. To record the EZ and EX values, proceed as follows:

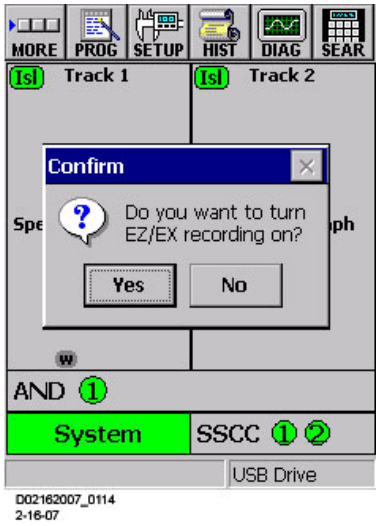
NOTE

This is not a function of the USB Wizard.

- Press the **DIAG** button at the top of the Main Status screen.
- Select '**Record EZ & EX**' from the menu.

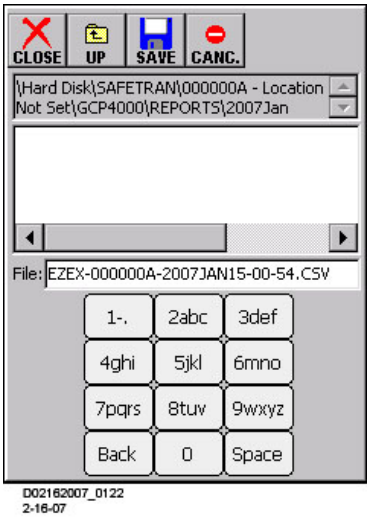


- A prompt screen appears prompting for confirmation. Press **Yes**.

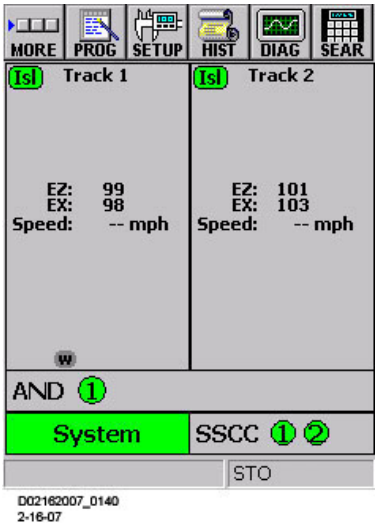


  - On the screen that appears select the tracks to monitor for EZ and EX.

- Press **OK**.
- On the report file screen, the name of the file where the EZ and EX values will be recorded is displayed in the **File:** field. Accept or change the name as needed.

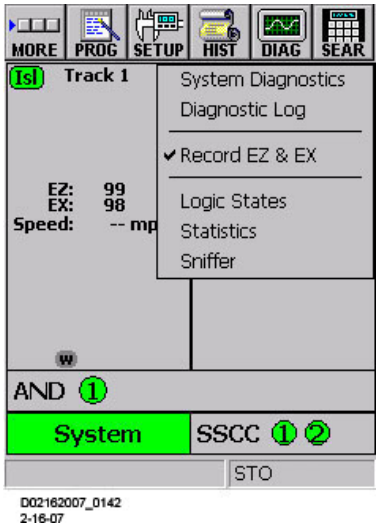


- Press **Save**.



- While EZ and EX values are being recorded, **STO** appears in the status bar to indicate that data is being stored.

- To stop EZ / EX recording, press **DIAG**.
- Select '✓**Record EZ & EX**' from the menu.



- A prompt screen appears prompting for confirmation. Press **Yes**.

- The Main Status screen is displayed.

Using Recorded EZ & EX Files

The recorded values are stored in a .csv file that can be reviewed and graphed in Microsoft® Excel®.

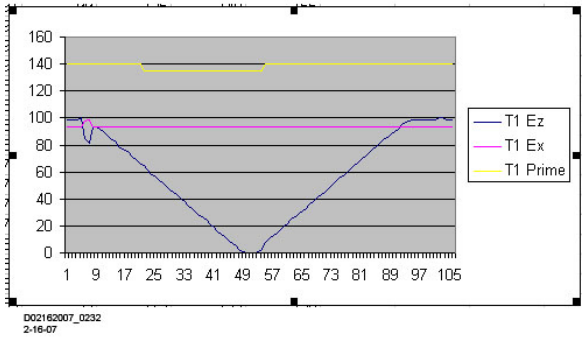
- To view .csv files open Microsoft Excel.
- Select **File \Open.**
- On the **Open** window, select '**Text files (*.prn; *.txt; *.csv)**' in the **Files of type:** field.
- Type of select the file name to be viewed.
- Press **Open.**

- The file data appears in columns similar to the figure below.

	A	B	C	D	E	F	G	H
1	Count	DateTime	T1 Ez	T1 CheckE	T1 Ex	T1 Isl Occ	T1 Prime	AND1 XR
2	0	########	99	99	93	125	140	155
3	1	########	99	99	93	125	140	155
4	2	########	99	99	93	125	140	155
5	3	########	99	100	93	125	140	155
6	4	########	100	99	93	125	140	155
7	5	########	85	91	98	125	140	155
8	6	########	81	97	99	125	140	155
9	7	########	93	94	93	125	140	155
10	8	########	93	92	93	125	140	155
11	9	########	92	90	93	125	140	155
12	10	########	90	88	93	125	140	155
13	11	########	87	85	93	125	140	155

D02162007_0226
2-16-07

- Select a column to graph by clicking on the column header (A through H in the figure above).
- To select multiple columns, click the first column header then hold down the Ctrl key and click the additional column headers. Columns C, E and G selected in the figure above.
- Select **Insert \Chart \ Line Chart.** Select a chart sample and then click **Finish.**
- A chart similar to the one below is displayed.



D02162007_0232
2-16-07

CHANGE NOTICE

The following changes have been incorporated into Revision B of the 4000 GCP Crossing System Maintainer's Handbook, Document No. SIG-00-04-02.

March 2007:

- Update / add following Glossary terms:
  CCN, CDL, DT, OCCN, OCE. Pac file, USB Port, USB Drive
- Add USB Display (80407-03) to figures 2 through 6
- Add RIO option information to tables accompanying figures 2 through 5
- Page 23; Update CPU LED names and descriptions
- Page 25; Update CPU Display Messages
- Page 29; Update Track Module Operational Display Messages
- Page 30; Update Track Module Diagnostic Display Messages
- Page 33; Update SSCC IIIi Module LED Descriptions
- Page 35; Update RIO Module LED Descriptions
- Page 37; Update Transfer Module LED Descriptions
- Page 44; SEAR IIi SITE SETUP – now accessed from Main Status Screen
- Pages 45 – 67; Update SEAR IIi Program and Alarm Configuration tables
- Page 73; Added WARNING to Calibrating A Track Module
- Page 80; Added Island Shunt Distance table to Island Calibration Procedure
- Page 89, 90; Expanded GCP OPERATIONAL CHECKS section, added WARNING
- Pages 91-93; Expanded MAINTENANCE information to include Track Status Window color scheme, Track function indicators, ISL< AND< SSCC and SYSTEM status indicators
- Pages 91-100; MAINTENANCE and DIAGNOSTICS sections include updated screen shots and screen descriptions
- Appendix A, pages 141-156; Reordered TEMPLATE Programming and new scrceen shots, added ADVANCED Programming and SSCC Programming menus
- Page 175; Added Appendix G, DISPLAY DT USB WIZZARD, Covers operations using the USB port on the A80407-03 Display Module

Safetran Systems Corporation
California Division
10655 7th Street
Rancho Cucamonga, California 91730
(909) 532-5300

Safetran Systems Corporation
2400 Nelson Miller Parkway
Louisville, Kentucky 40223
(502) 618-8800