SAFETRAN *systems*

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USER'S HANDBOOK

GEO DIAGNOSTIC TERMINAL (GDT)
(FOR USE WITH LAPTOP OR DESK-TOP PC)

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

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NOTES, CAUTIONS, AND WARNINGS

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

NOTE

Generally used to highlight certain information relating to the topic under discussion.

CAUTION

REFERS TO PROPER PROCEDURES OR PRACTICES WHICH IF NOT STRICTLY OBSERVED, COULD RESULT IN A POTENTIALLY HAZARDOUS SITUATION AND/OR POSSIBLE DAMAGE TO EQUIPMENT. CAUTIONS TAKE PRECEDENCE OVER NOTES AND ALL OTHER INFORMATION, EXCEPT WARNINGS.

WARNING

INDICATES A POTENTIALLY HAZARDOUS SITUATION WHICH, IF NOT AVOIDED, COULD RESULT IN DEATH OR SERIOUS INJURY. WARNINGS ALWAYS TAKE PRECEDENCE OVER NOTES, CAUTIONS, AND ALL OTHER INFORMATION.

If there are any questions, contact Safetran Application Engineering.

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GLOSSARY

CIC: Chassis ID Chip – A serial memory devcice physically located on the GEO™ chassis and used to store the UCN, SIN, and site/module parameters.

CRC: Cyclic Redundancy Check – The CRC data is calculated and appended to a file so that it can be verified that no data is lost or corrupted.

DT: Diagnostic Terminal – A PC (usually a laptop or Pocket PC) that is used to configure the GEO™ system via the DT port(s) on the CPU/CPU2 module. The GDT utility software must be installed.

Echelon® LAN: A local twisted pair network implemented using the Neuron network chip.

ECD: External Configuration Device – A removable memory device used for storing the module configuration data.

LAN: Local Area Network – A limited network where the data transfer media is generally wires or cable.

MCF: Module Configuration File – The site-specific configuration data which is downloaded into the HD/LINK Module or GEO™ unit.

MCF CRC: Module Configuration File Cyclic Redundancy Check – A configuration validation number calculated from the contents of an approved MCF and issued to be stored in the CIC for the purpose of verifying proper configuration.

MEF: Module Executable File – The HD/LINK or GEO™ unit executable software.

SIN: Site (Subnode) Identification Number – A twelve-digit ATCS address representing the module as a subnode on the network.

UCN: Unique Check Number – A configuration validation number calculated from the contents of an approved MCF and MEF and issued to be entered into an HD/LINK module or GEO™ unit for the purpose of verifying proper configuration.

VLO: Vital Lamp Output – A software-driven vital hardware output which drives a lamp on a Colorlight Signal or Search Light Signal to display a commanded aspect, and verifies the lamp is operational (not shorted or out).

GLOSSARY (concluded)

VPI:	Vital Parallel Input – A module input the function of which affects the safety of train operation.
VRO:	Vital Relay Output – A module output the function of which affects the safety of train operation.

SECTION I
INTRODUCTION

1.0 GENERAL

The GEO™ Diagnostic Terminal (GDT) utility is a software tool that may be used for analysis and maintenance of GEO™ units. The GDT utility may be installed on either a laptop (or desktop) PC, or a Pocket PC, and transported to a field site where the GDT can be used to perform the following functions:

- Monitoring GEO™ equipment
- Diagnostics for fault isolation and maintenance
- Setting Vital and Non-vital User Options
- Setting Vital and Non-vital User I/O
- Setting Vital and Non-vital User Timers
- Setting I/O card Configuration Parameters
- Setting I/O card Operating Parameters
- Downloading a new MEF (module executive file)
- Downloading a new MCF (module configuration file)
- Setting the MCF CRC (module configuration file cyclic redundancy check number)
- Setting the UCN (configuration unique check number)
- Setting the SIN (ATCS site identification number)

The GDT is generally connected to the DT port on the CPU module or the CP DT port on the CPU2 module for equipment monitoring. It is capable of connecting directly to the DT ports on the I/O modules or VLP on the CPU2 module to download new MEFs or to obtain event logs.

NOTE

This handbook describes the GDT utility for use on the laptop PC (or desktop PC) platform only. For the GDT utility for use on the Pocket PC platform, refer to document number SIG-00-01-13.

1.1 FUNCTIONAL ELEMENTS

The GDT consists of three functional elements:

- Configuration Controller
- Dynamic Configuration Display
- Text Screen

The relationships between each of these elements, the field ATCS database, and a GEO™ field unit are shown in figure 1-1.

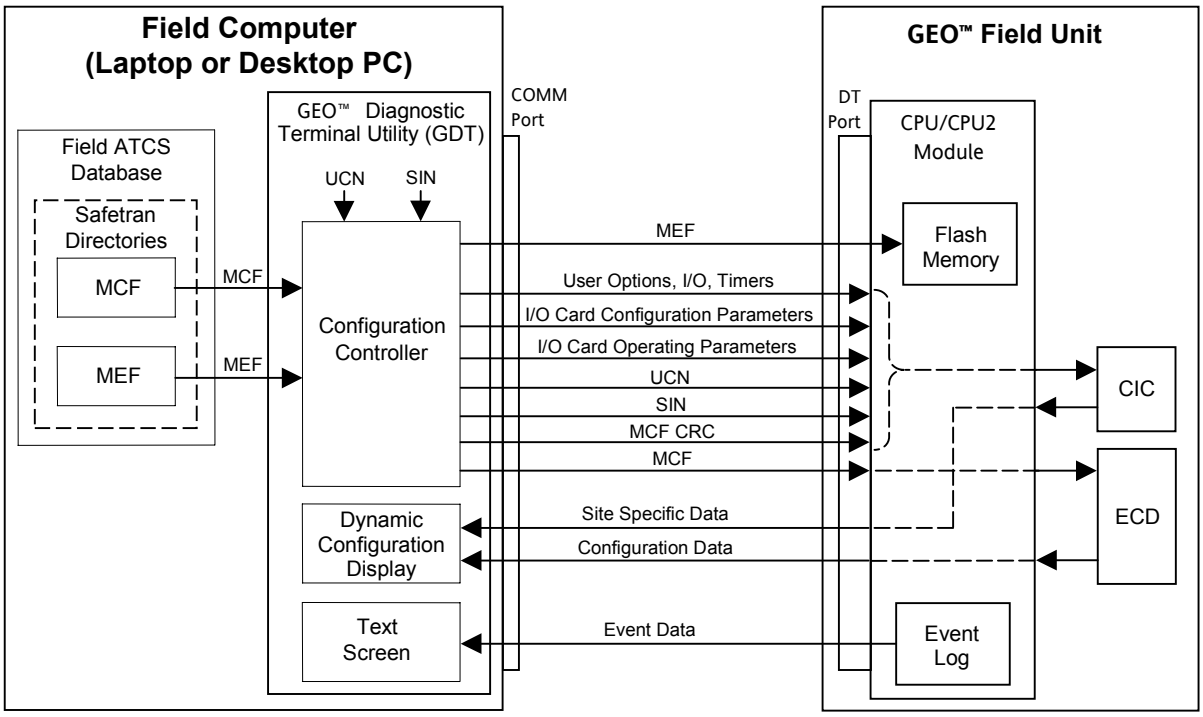

Figure 1-1
GDT Functional Elements

The Configuration Controller enables transfer of an MCF to the external configuration device (ECD) of the GEO™ field unit. The Configuration Controller also allows the module configuration file cyclic redundancy check (MCF CRC) number, the unique check number (UCN), and the site identification number (SIN) to be entered and transferred to the CIC (chassis identification chip) on the GEO™ unit. These numbers are obtained either from the unit MCF Installation Listing printout or from the unit MCF Approval Listing printout.

The Configuration controller also enables MEF updates to be downloaded to flash memory within the field unit.

The Dynamic Configuration Display presents a dynamic graphic display of the field unit configuration, while the Text Screen displays the field unit Event Log. Together, these displays may be used to analyze the operation of the field unit.

1.2 GDT VERSIONS

There are two different versions of the GDT: Installer version and Maintainer version. Only authorized railroad personnel are issued the Installer version. The Installer version allows the user

to request that the GEO™ unit calculate the new UCN for the new parameters to be stored in the CIC. The Maintainer must be issued the new UCN.

WARNING

CARE SHOULD BE EXERCISED IN THE DISTRIBUTION AND USE OF THE INSTALLER VERSION OF THE GDT. BECAUSE THE INSTALLER VERSION CAN CALCULATE THE UCN FOR ANY CHANGES IN VITAL OPTIONS, THE POTENTIAL EXISTS FOR IMPROPER OR UNSAFE VITAL OPTION INPUT TO THE SYSTEM.

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SECTION II
GDT SOFTWARE INSTALLATION FOR LAPTOP PC

2.0 GENERAL

The GDT is available for use on two computer platforms: Laptop (or Desktop) PC, and Pocket PC. In addition, two user versions are available for each platform: Installers version and Maintainers version. This manual describes the GDT for the laptop (or desktop) computer.

NOTE

The Safetran GEO™ Diagnostic Terminal PC software is available in two user versions: Installer and Maintainer. Make certain that the version to be installed on the PC is appropriate for the intended user.

WARNING

CARE SHOULD BE EXERCISED IN THE DISTRIBUTION AND USE OF THE INSTALLER VERSION OF THE GDT. BECAUSE THE INSTALLER VERSION CAN CALCULATE THE UCN FOR ANY CHANGES IN VITAL OPTIONS, THE POTENTIAL EXISTS FOR IMPROPER OR UNSAFE VITAL OPTION INPUT TO THE SYSTEM.

NOTE

The following Installation procedure is for the Installers version, however the Maintainers version installs the same way, except that the installation splash screen displays: *(Maintainer Version)*. Refer to figure 2-4 for a typical installation splash screen.

2.1 SYSTEM REQUIREMENTS

- 200 MHz Pentium processor
- 64 MB RAM
- CD drive
- Microsoft® Windows 95® , 98®, or NT 4.0® Operating System with latest Service Pack
- Microsoft® Explorer 5.0 or later

2.2 INSTALLATION PROCEDURE

NOTE

The following installation procedure is for a Laptop (or desktop) PC only. Make certain the CD ROM is the correct version for this installation.

1. Insert the Safetran GEO™ Diagnostic Terminal PC software CD in the CD-ROM drive.

2. Select the CD drive and run the GDT Setup.exe program (see icon below).

3. The "GEO Diagnostic Terminal Installation Wizard" window is displayed (figure 2-1).

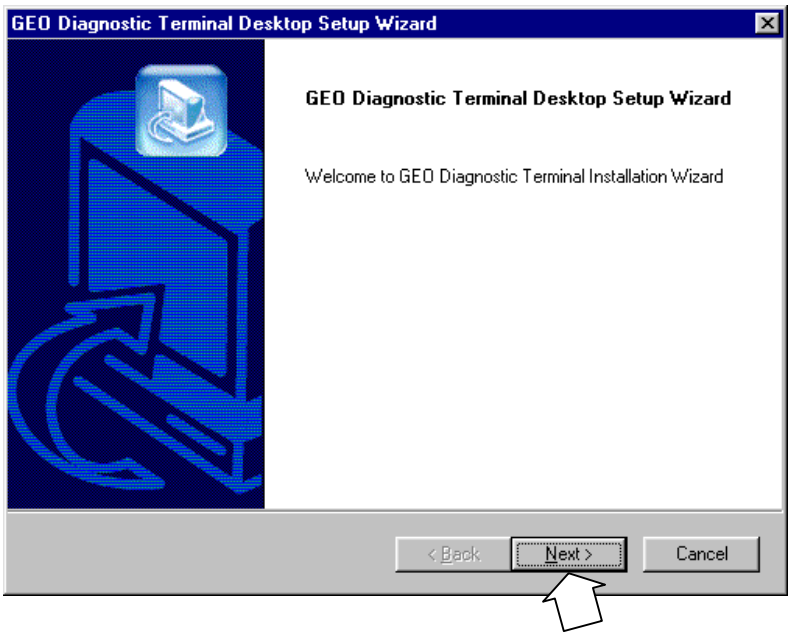


Figure 2-1
GEO™ Diagnostic Terminal Installation Wizard Window

4. Click on **Next >** to continue.

NOTE

At any time during the installation, the user can click on the **< Back** button (if active) of a displayed window to return to the previously displayed window for the purpose of making changes or repeating a step.

2.2.1 First Time Installation

1. If this is a first time installation of the GDT utility on this computer, the "License Agreement" window is displayed (figure 2-2).

NOTE

If a version of this software has been previously installed, the Installation Wizard detects the fact and displays the "Modify, Repair, or Remove the Program" window (figure 2-10) instead of the "License Agreement" window. Proceed to paragraph 2.2.2 for modifying, repairing, or removing a previously installed version of this software.

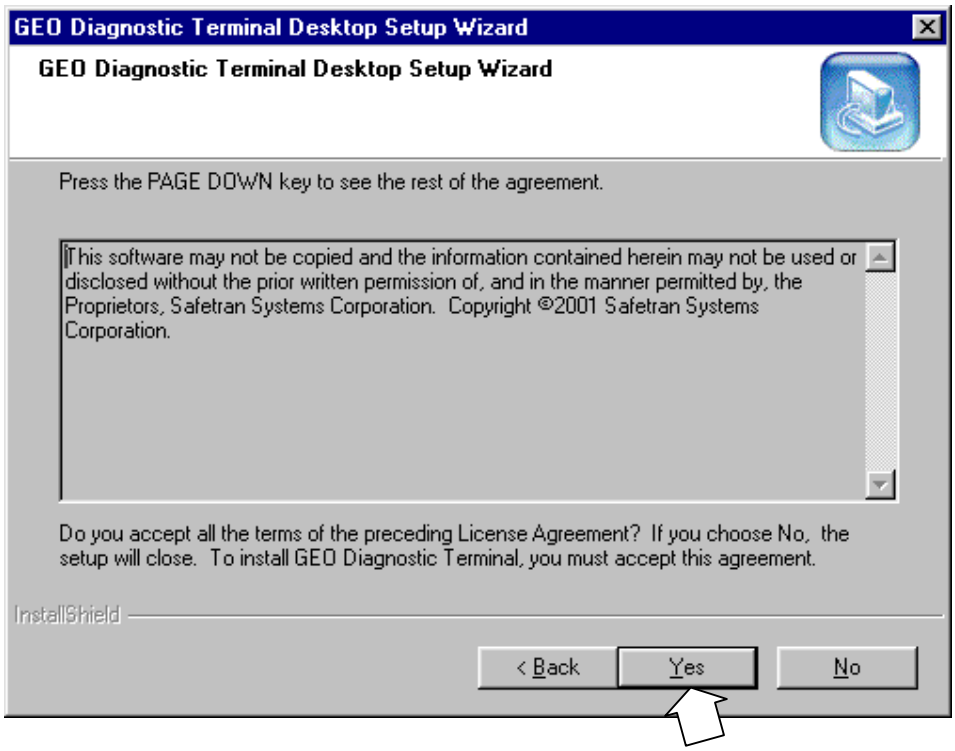


Figure 2-2
GEO™ License Agreement Window

2. Click on **Yes** in the "License Agreement" window to continue with the installation.

3. The "Installation Destination" window is displayed (figure 2-3).

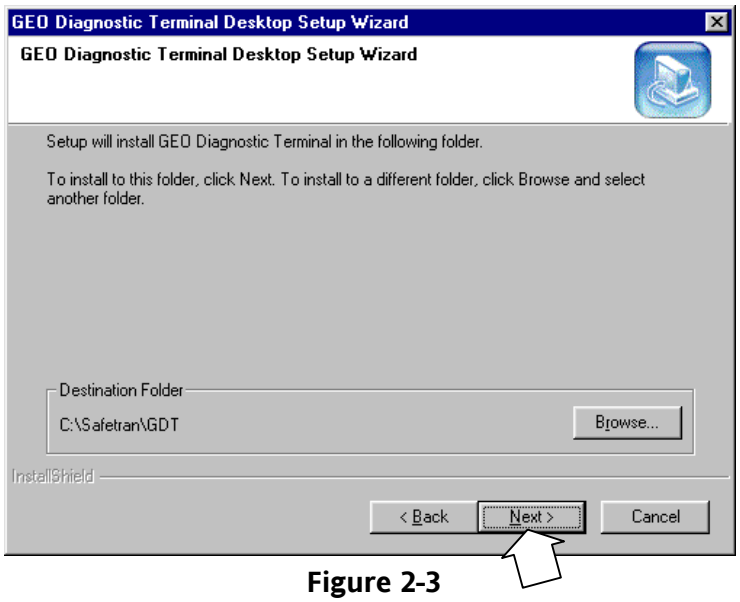


Figure 2-3
Installation Destination Window

4. The destination for installation of the software is displayed in the **Destination Folder** box of the "Installation Destination" window. If a different destination is desired, click on the **Browse...** button, then select a different destination. When the correct destination for installation is displayed, click on the **Next >** button.

5. The Program Folder Selection window is displayed (figure 2-4). Verify that the correct software version (e.g., **1.1.6**) and user version (**Installer** or **Maintainer**) are displayed in the upper left corner of the screen.

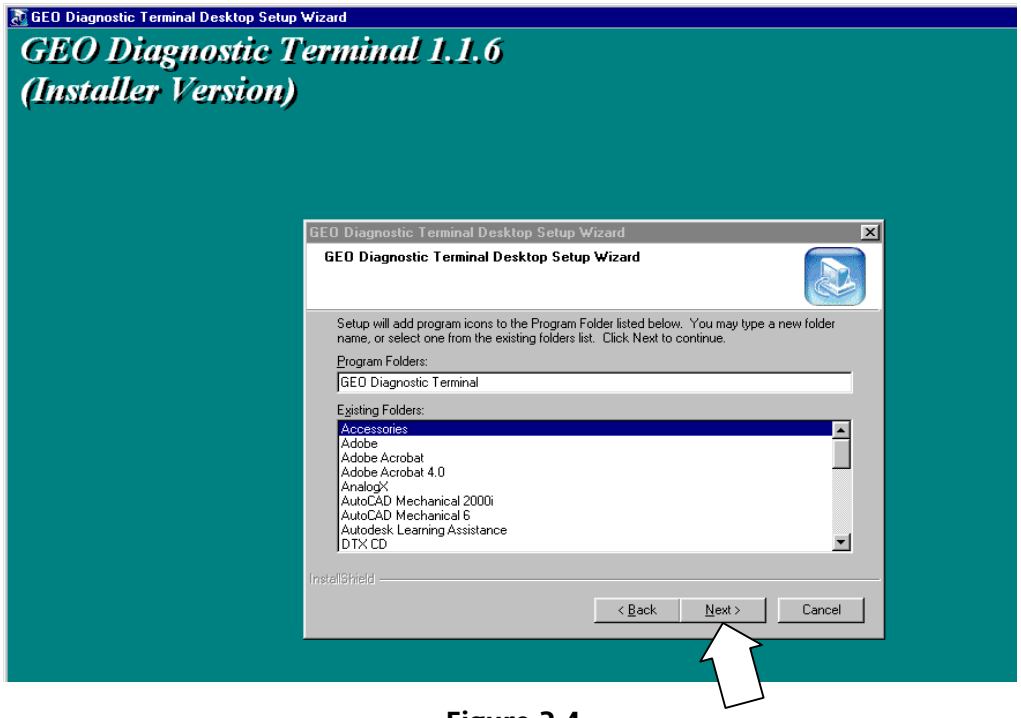


Figure 2-4
Program Folder Selection Window

6. The folder where the program icons will be added is displayed in the **Program Folders:** box. If a different folder is desired, scroll through the **Existing Folders:** box and select the desired folder, then click on the **Next >** button in the Installation Splash Screen.

7. The "Installation Summary" window appears (figure 2-5).

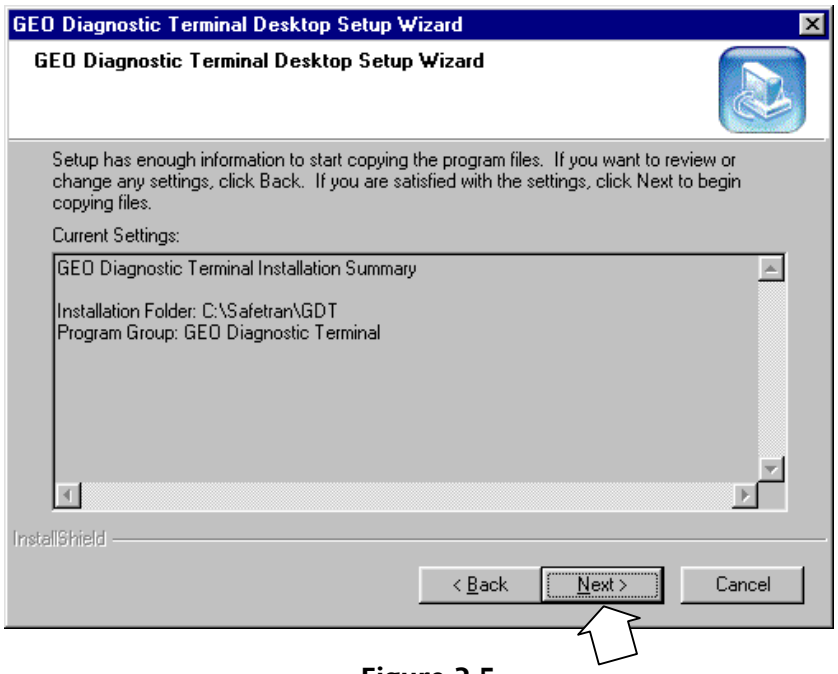


Figure 2-5
Installation Summary Window

8. Inspect the **Current Settings:** box of the "Installation Summary" window to verify that the software is about to be added to the correct installation folder and program group. If the settings are correct, click on the **Next >** button.

NOTE

If the settings in the "Installation Summary" window are not the desired ones, click on the **< Back** button to change the settings.

9. The Installation Wizard begins loading some of the applications needed to run with the GDT utility (a number of splash screens appear as files are installed).

10. When the Installation Wizard has finished loading a portion of these files, the "Microsoft XML Parser Setup" window is displayed (figure 2-6). Click on **Next >** to continue.

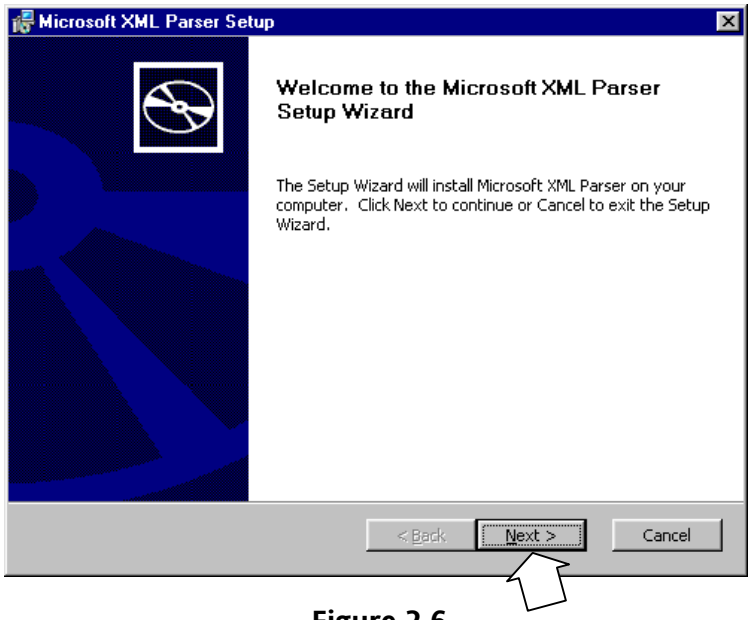


Figure 2-6
Microsoft® XML Parser Setup Window

11. Follow the instructions for the Microsoft® installation windows as they are displayed to install Microsoft® XML Parser.

12. After Microsoft® XML Parser is installed, the GDT Installation window is displayed as the GDT utility files are loaded (figure 2-7).

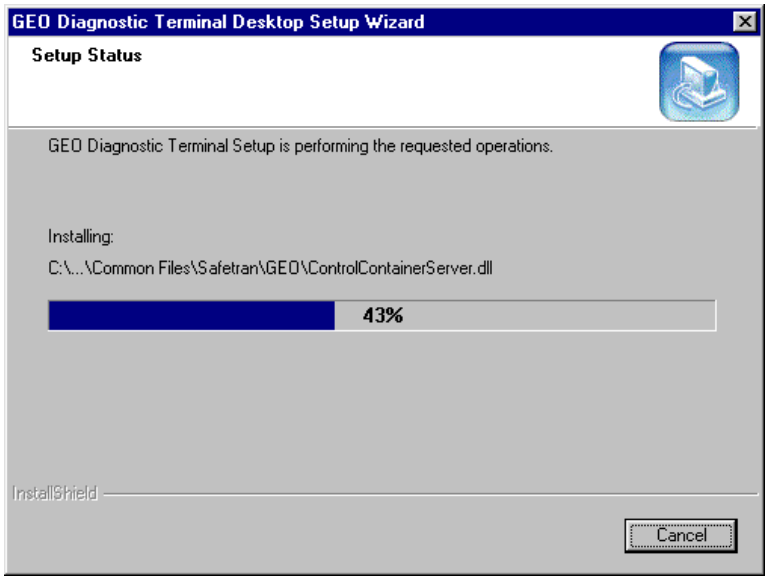


Figure 2-7
GDT Installation Window

13. The "GDT Release Notes" window (figure 2-8) is displayed after the files are loaded. To review the release notes, verify the box is checked (or uncheck box to not review release notes), and click on **Finish**.

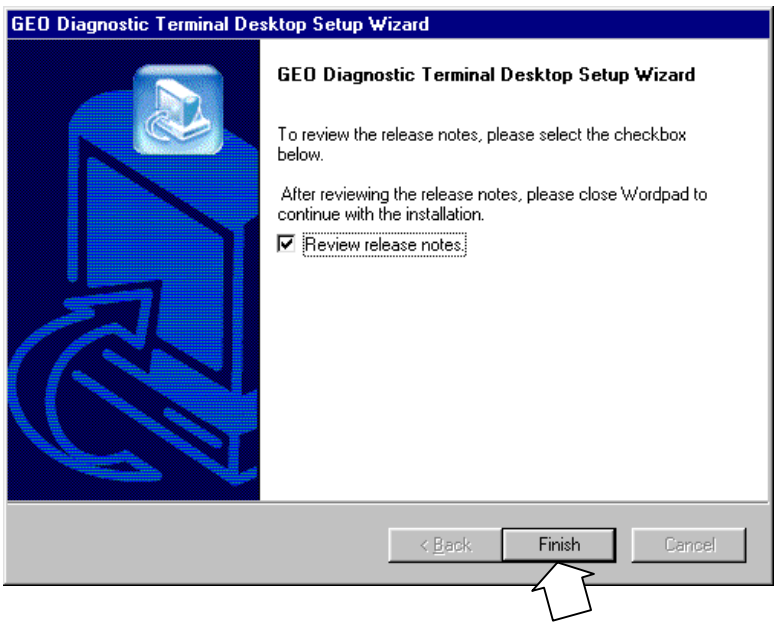


Figure 2-8
GDT Release Notes Window

14. The "GDT Restart" window (figure 2-9) is displayed. Select the radio button desired for rebooting and click on **Finish** (normally, the computer should be restarted now, if installation is finished).

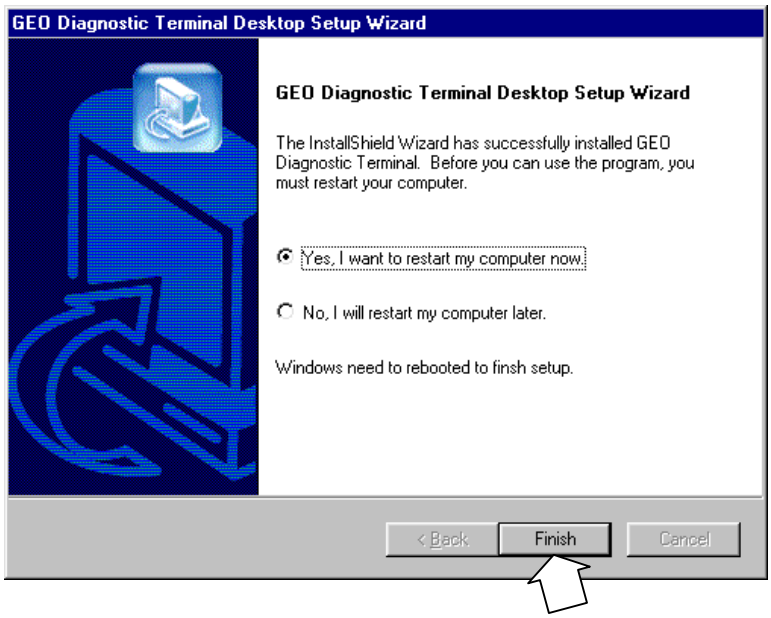


Figure 2-9
GDT Restart Window

15. When the GDT Installation Wizard has finished installing files, the installation utility is closed and the computer is rebooted (if the radio button was selected for restarting now).

2.2.2 GDT Utility Previously Installed

If a version of the GDT utility has been previously installed on the computer, the Installation Wizard displays the "Modify, Repair, or Remove the Program" window (figure 2-10).

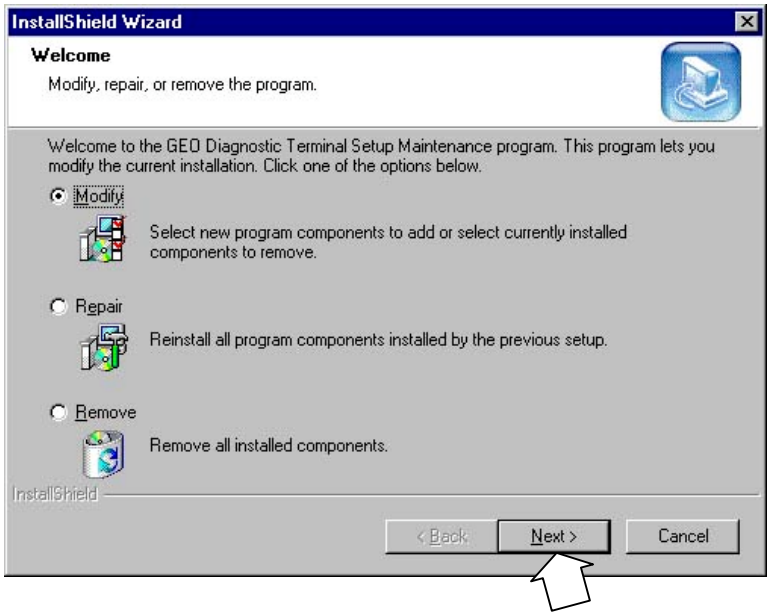


Figure 2-10
"Modify, Repair, or Remove the Program" Window

The user has three options when a version of the GDT utility has been previously installed: modify, repair, or remove the currently installed version of the GDT utility.

2.2.2.1 Modify the GDT Utility Previously Installed

NOTE

Currently, the **Modify** function should not be used, since there is only one selectable component in the "Select Components" window (Desktop PC). **Modify** is not the same function as **Repair** in this instance, since it does not necessarily reinstall all needed components. The following procedure is included because the function exists for future versions.

To add or delete specific components of a currently installed version of the GDT utility, select the **Modify** radio button and click on the **Next >** button. The "Select Components" window is displayed (figure 2-11). Place a checkmark next to the components to reinstall and remove the checkmark from components to be removed, then click on the **Next >** button.

NOTE

The amount of disk space required for installation as well as the amount of disk space available for installation is displayed on the "Select Components" window.

The Installation Wizard performs the required operations then displays the "Maintenance Complete" window (figure 2-12). Click on **Finish** in the "Maintenance Complete" window to close the Installation Wizard.

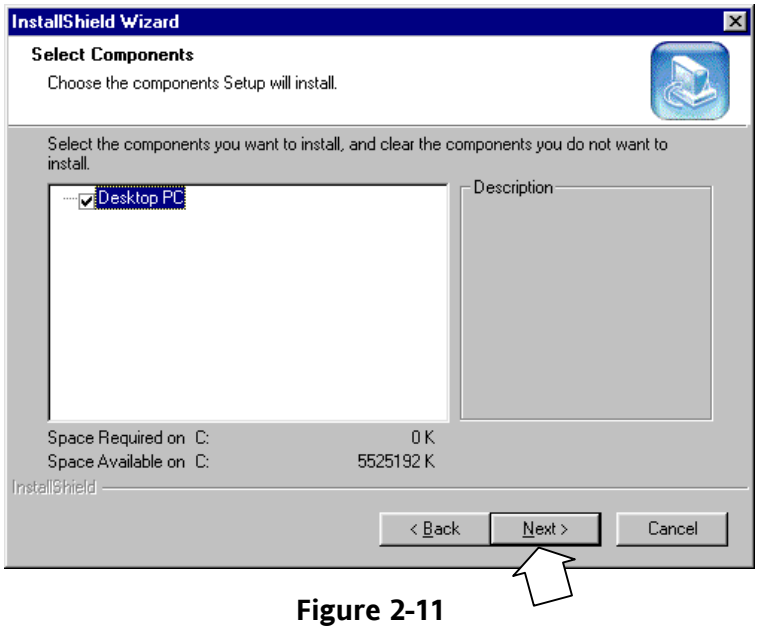


Figure 2-11
Select Components Window

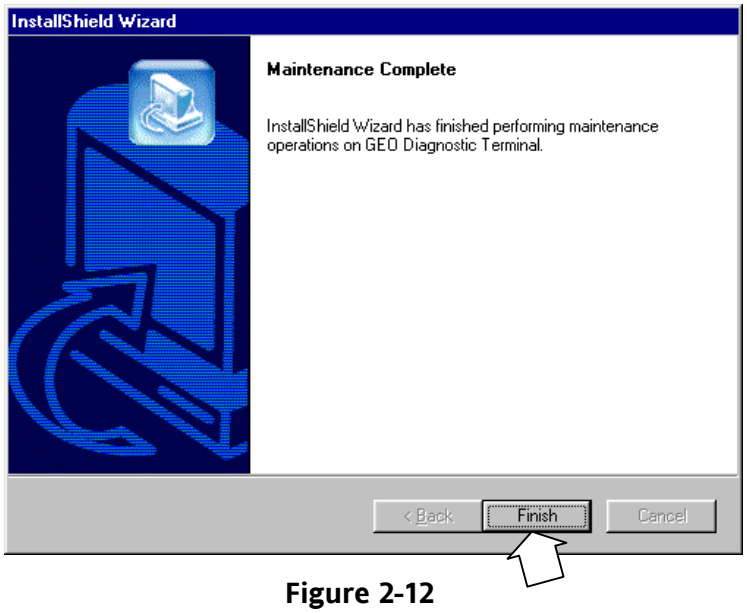


Figure 2-12
Maintenance Complete Window

2.2.2.2 Repair the Previously Installed GDT Utility

To reinstall all components of a currently installed version of the GDT utility, select the **Repair** radio button and click on the **Next >** button. The Installation Wizard performs the required operations, then displays the "Maintenance Complete" window (refer to figure 2-12). Click on **Finish** in the "Maintenance Complete" window to close the Installation Wizard.

2.2.2.3 Remove the Previously Installed GDT Utility

NOTE

Before installing the GDT utility, it is preferable to completely remove an old version.

To remove all installed components of a currently installed version of the GDT utility, select the **Remove** radio button and click on the **Next >** button. The "Confirm File Deletion" window is displayed (figure 2-13).

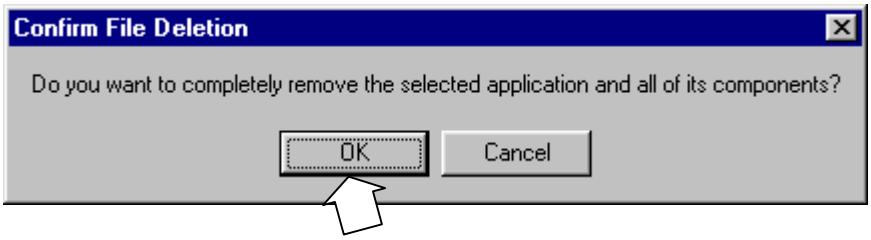


Figure 2-13
Confirm File Deletion Window

Click on **OK** to delete the GDT software including all of its components. The Installation Wizard performs the required operations, then displays the "Maintenance Complete" window (refer to figure 2-12). Click on **Finish** in the "Maintenance Complete" window to close the Installation Wizard.

SECTION III
GDT OPERATION FOR LAPTOP PC

3.0 STARTING THE GDT PROGRAM

Follow the steps outlined below to start the GEO™ Diagnostic Terminal program.

1. Connect the PC serial port to the appropriate DT port on the GEO™ wayside unit using an RS-232 serial cable. The GDT is generally connected to the single DT port on the CPU module, or to the CP DT port (one on the right side) on the CPU2 module.

2. Apply power to the PC.

1. On the PC desktop, double click on the GDT icon (or double click on the Gdt.exe file in the Gdt folder in the Safetran directory). The GDT initialization display appears (figure 3-1) as the GDT attempts to communicate with the GEO™ unit (refer to Section IV for Session Protocol).

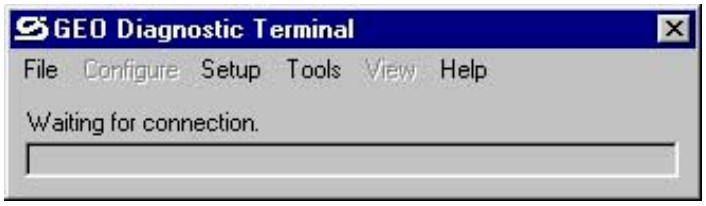


Figure 3-1
GDT Initialization Display

4. When the GDT establishes communication with the GEO™ unit, the screen changes to one similar to figure 3-2 as data is downloaded from the GEO™ wayside unit. Just above the progress bar is a message field that indicates the task currently being performed (e.g., Waiting for connection, File Updated, etc.).

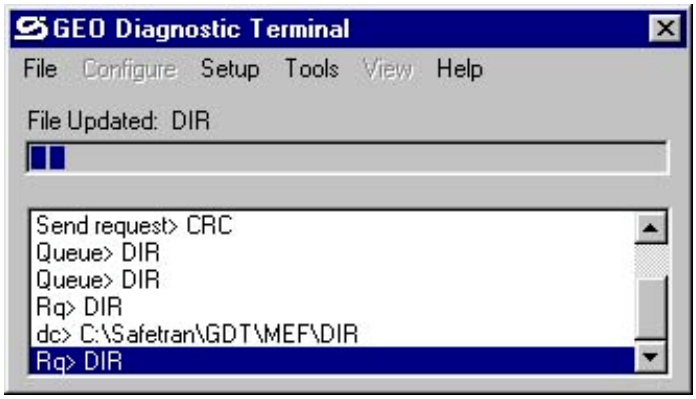


Figure 3-2
GDT Data Download Display

NOTE

The first time the PC is connected to a particular GEO™ unit, or if the GEO™ unit has been updated using a different PC, the PC will have to download files from the GEO™ unit. This may take a minute or longer.

5. When the data download is complete, a module assignment display similar to the one shown in figure 3-3 appears on the screen. The module assignment display is a graphic representation of the modules installed in the GEO™ wayside unit and indicates their corresponding slots in the card cage. The number of slots displayed and the module assignments will vary depending on GEO™ wayside equipment configuration. Each module is identified by a label.

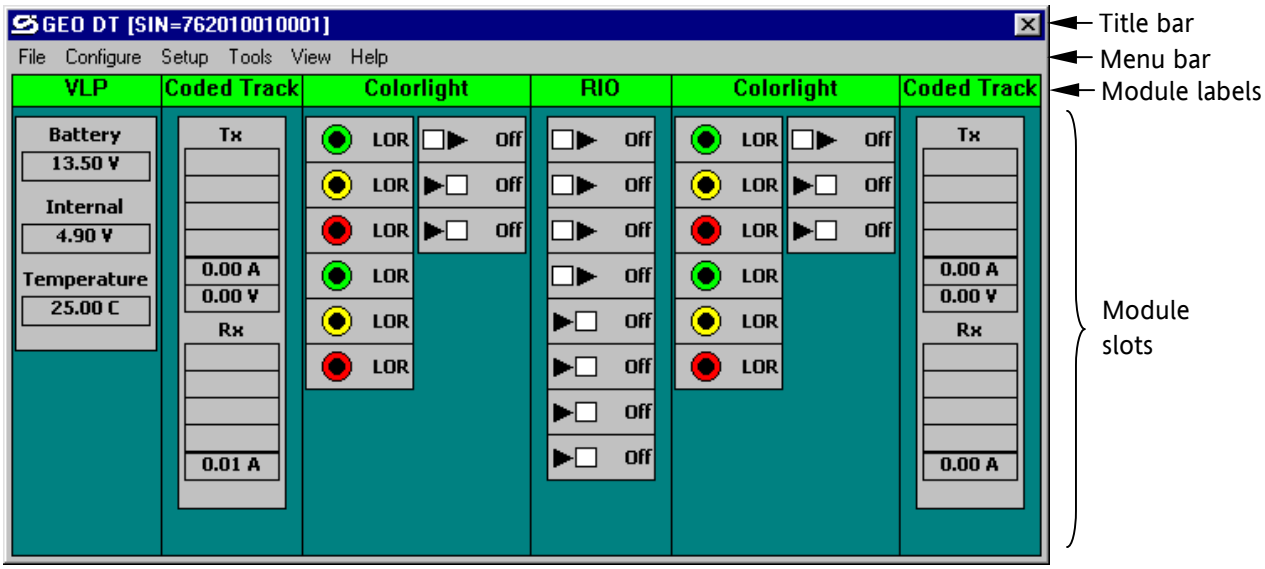


Figure 3-3
Example of GDT Module Assignment Display

Refer to table 3-1 for descriptions of the components of the Module Assignment Display. Descriptions of the menu system are provided in paragraphs 3.1 through 3.6 as indicated in table 3-1.

NOTE

If the GEO™ unit to be communicated with is not the local unit the GDT is connected to, select the remote destination address (refer to paragraph 3.3.2).

Table 3-1
Module Assignment Display Components

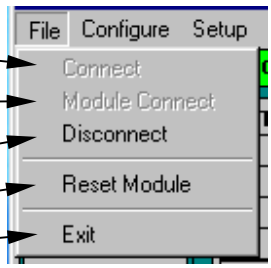
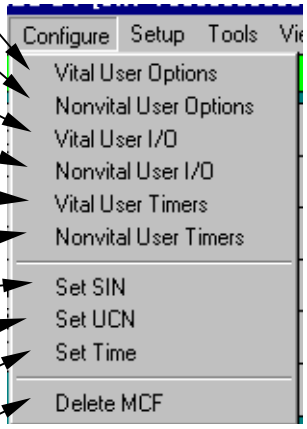
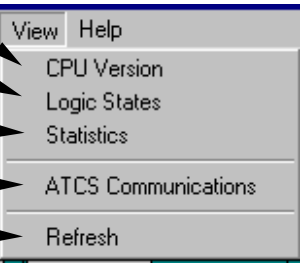
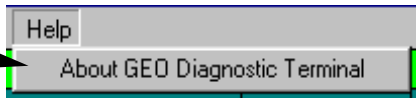
Component	Description
Title Bar	The Title Bar identifies the GEO™ Diagnostic Terminal utility, and identifies the SIN of the GEO™ unit the GDT is communicating with.
Menu Bar	The Menu Bar provides pull-down menus as follows: File Menu  **Connect**: establish communication with a GEO™ unit (para. 3.1.1) **Module Connect**: establish communication with a GEO™ module (para. 3.1.2) **Disconnect**: break communication with GEO™ unit or module (para. 3.1.3) **Reset Module**: reboot the CPU module in the GEO™ unit (para. 3.1.4) **Exit**: break communication and close the GDT utility (para. 3.1.5) Configure Menu  **Vital User Options**: view/change Vital Options (para. 3.2.1) **Non-Vital User Options**: view/change Non-vital Options (para. 3.2.2) **Vital User I/O**: view/change Vital I/O (para. 3.2.3) **Non-Vital User I/O**: view/change Non-vital I/O (para. 3.2.4) **Vital User Timers**: view/change Vital Timers (para. 3.2.5) **Non-Vital User Timers**: view/change Non-vital Timers (para. 3.2.6) **Set SIN**: view/change SIN (para. 3.2.7) **Set UCN**: view/change UCN (para. 3.2.8) **Set Time**: view/change date and time (para. 3.2.9) **Delete MCF**: disable the GEO™ unit (invalidate the MCF) (para. 3.2.10) Setup Menu  **Communication**: view/change serial port settings (para. 3.3.1) **Destination Address**: select location of GEO™ unit (para. 3.3.2) Local = communicate with local GEO™ using serial DT port Remote = communicate with remote GEO™ unit using LAN Tools Menu  **Sniffer**: monitor ATCS message activity (para. 3.4) View Menu  **CPU Version**: display GEO™ unit information (para. 3.5.1) **Logic States**: display GEO™ unit logic states (para. 3.5.2) **Statistics**: display GEO™ unit statistics (para. 3.5.3) **ATCS Communication**: update GEO™ unit diagnostic data (para. 3.5.4) **Refresh**: update GEO™ unit diagnostic data (para. 3.5.5) Help Menu  **About GEO Diagnostic Terminal**: display GDT information (para. 3.6)

Table 3-1 Concluded

Component	Description
Module Labels	The module label identifies the module type assigned to each slot. In addition, the module labels use color to indicate operational status as follows: CPU modules: red = CPU module not configured or inoperative green = CPU module configured and fully operational I/O modules: red = I/O module missing, inoperative or unable to communicate with CPU via serial bus green = I/O module operational and communicating with CPU via serial bus By right clicking on a module label, a pop-up menu appears that provides access to information relative to that module only. This process is discussed in detail later in this section starting at paragraph 3.7, *Individual Module Setup*.
Module Slots	The module slots simulate the modules configured for the GEO™ unit, and provide functional displays of status for each of the modules.

3.1 FILE MENU

The File menu contains the functions listed below and described in the paragraphs that follow.

- Connect
- Module Connect
- Disconnect
- Reset Module
- Exit

3.1.1 Connect

When the GDT program is launched, it immediately attempts to communicate with the GEO™ unit. Once the GDT has established communication with the GEO™ wayside unit, the **Connect** menu option is disabled (see figure 3-4). If communication should be lost, the **Connect** option becomes enabled, and the option can be clicked on to reestablish the connection between the GEO™ unit and the GDT.

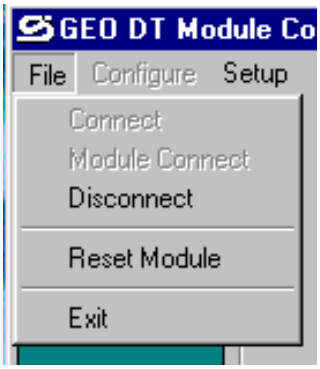


Figure 3-4
Active File Menu Options When Communication Has Been Established

3.1.2 Module Connect

The Module Connect function allows direct communication with an individual GEO™ module. When the DT is connected to an individual GEO™ module through its serial DT port, the GDT can communicate with that I/O module regardless of whether a controller module (CPU/CPU2) is installed in the GEO™ unit. This allows the user to install module operating software, view the module event log, reset the module, set the module verbosity level, etc. Clicking on the **Module Connect** option from the **File** menu presents the display of figure 3-5.

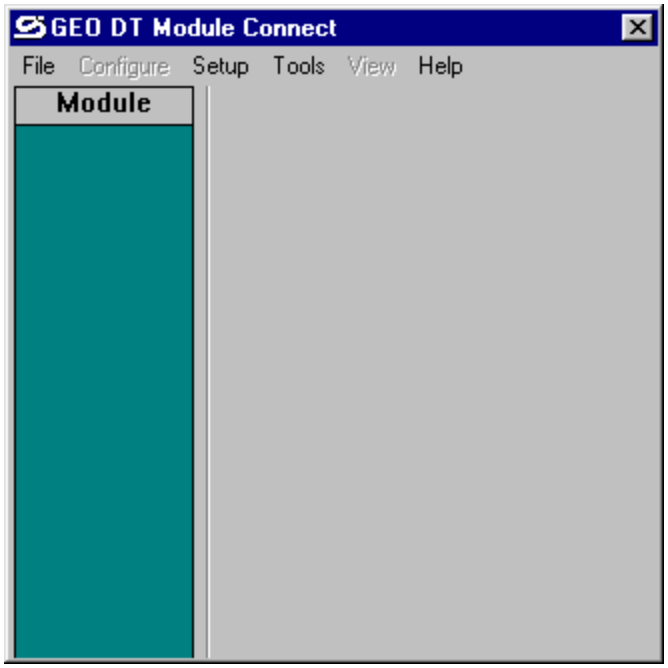


Figure 3-5
Module Connect Display

NOTE

The CPU2 module has two DT ports for loading operating software: VLP and CP. For event logs, module verbosity, etc., use the CP port.

Once the GDT has established communication with a GEO™ module, the **Module Connect** menu option is disabled (similar to the **Connect** function of figure 3-4). If communication should be lost, the **Module Connect** and the **Connect** options become enabled, and the **Module Connect** option can be clicked on to reestablish the connection between the GDT and an individual GEO™ module (communication between the GDT and the GEO™ unit can be made by connecting the DT to the CPU/CPU2 DT serial port and clicking on the **Connect** option).

The Title Bar for the **Module Connect** display (refer to figure 3-5) identifies the GEO™ Diagnostic Terminal utility, but does not identify the SIN of the GEO™ unit the module is installed in.

The Menu Bar for the **Module Connect** display (compare figure 3-5 to figure 3-3) provides the same pull-down menus as the **Connect** function display (refer to paragraphs 3.1 through 3.6 as indicated in table 3-1 for descriptions of the menu options), except that the "Configure" option and the "View" option are disabled.

The Module Slot area for the **Module Connect** display (refer to figure 3-5) only identifies that a module is being communicated with, and does not display any status indicators for the slot. Right-clicking on the module label displays the module menu options: Configuration Parameters, Operating Parameters, Event History, Reset, Set Verbosity, Card Information (same as for the **Connect** function display), except that the "Configuration Parameters", "Operating parameters", and "Card information" options are disabled). Refer to paragraphs 3.7.1.1 through 3.7.1.6 for descriptions of the menu options.

3.1.2.1 Loading a New Module MEF

A Module Executable File (MEF) can be changed or reloaded when necessary. Instances would be when the hardware and the MEF are not compatible, or when a later version MEF is desired.

NOTE

For the following example, the VLP will be loaded on a CPU2 module.

The procedure for loading the module MEF is as follows:

1. To access the Setup Program, right-click on the module label and select "Reset" from the options, or select "Reset Module" from the **File** menu for a CPU/CPU2 module.

2. A confirmation prompt appears (figure 3-6).

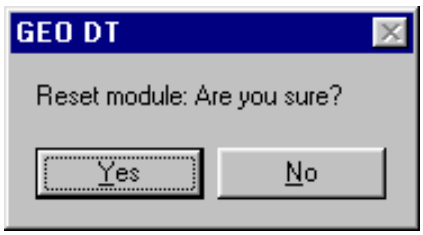


Figure 3-6
Reset Module Confirmation Prompt

3. Click on **Yes** to proceed with the reboot. The text terminal screen is displayed (figure 3-7), scrolling data in the text field as it is received from GEO™ module.

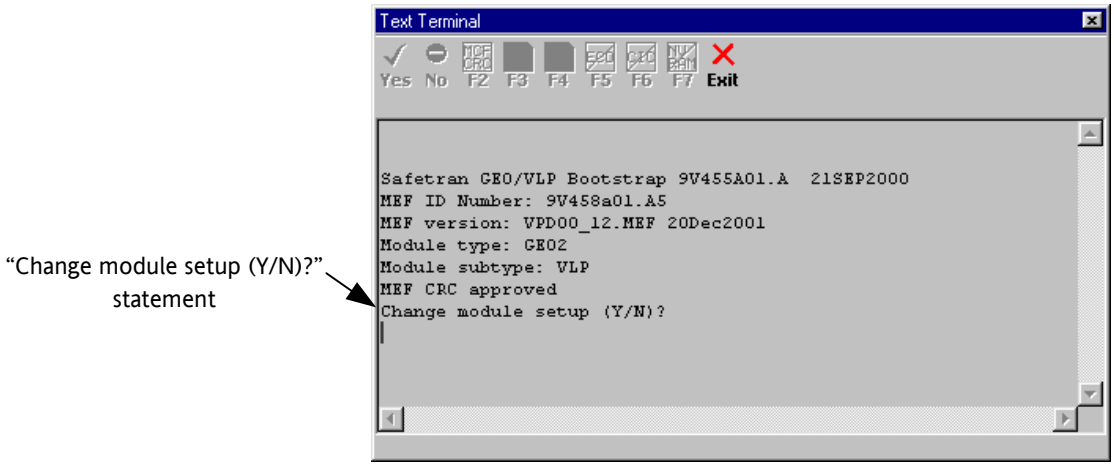


Figure 3-7
Typical Module Boot Screen

4. When the "Change module setup (Y/N)?" prompt appears in the text terminal screen (refer to figure 3-7), quickly click on the **Yes** button at the top of the screen (before the watchdog timer can time out and continue with bootup).

5. A boot screen similar to figure 3-8 appears. Notice that all Function Key options are disabled except for **F4** (Change MEF) and the **Exit** button (F8).

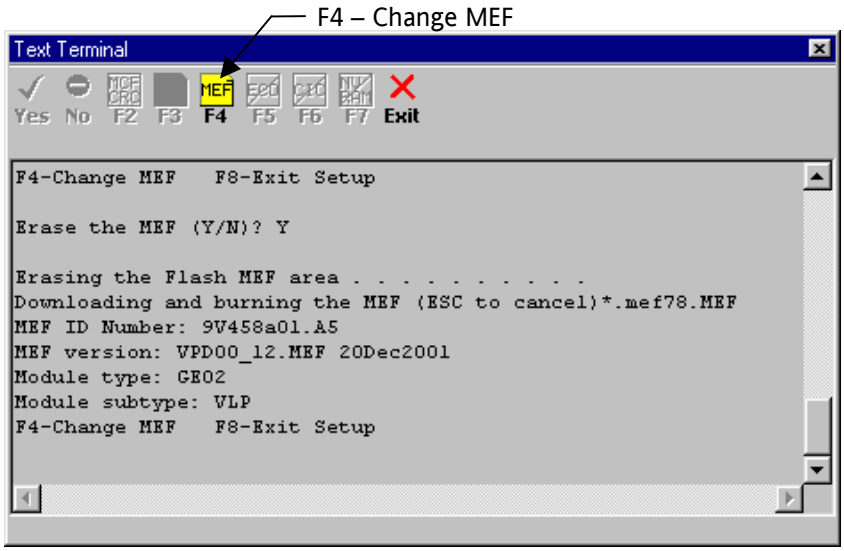


Figure 3-8
Selecting the "Change MEF" (F4) Function Key

6. From the Function Key options, select **F4** (Change MEF).

7. The prompt "Erase the MEF (Y or N)?" is displayed (figure 3-9). Select the **Yes** button.

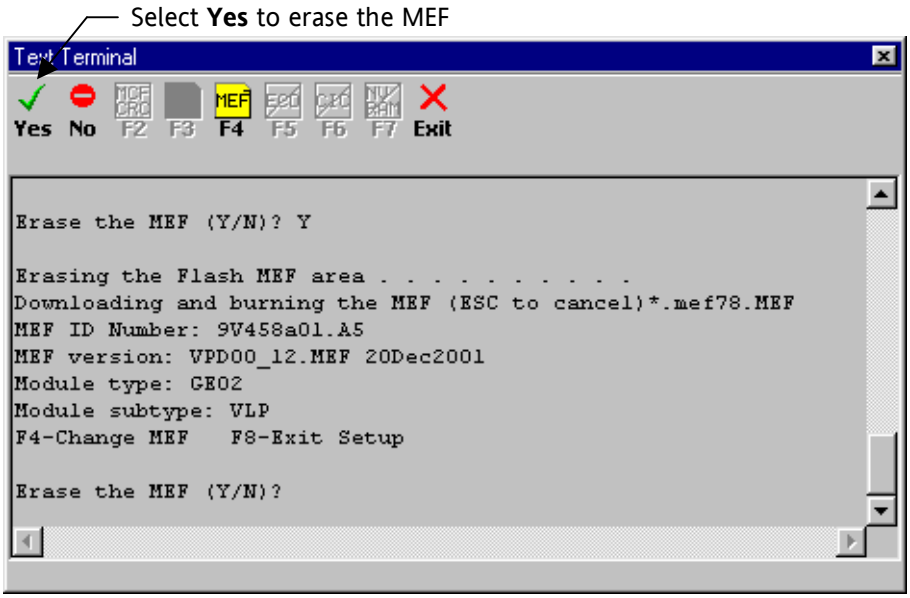


Figure 3-9
Responding to the "Erase the MEF (Y/N)?" Prompt

8. The **Open** window is displayed to select the path and filename to the desired MEF for loading (figure 3-10).

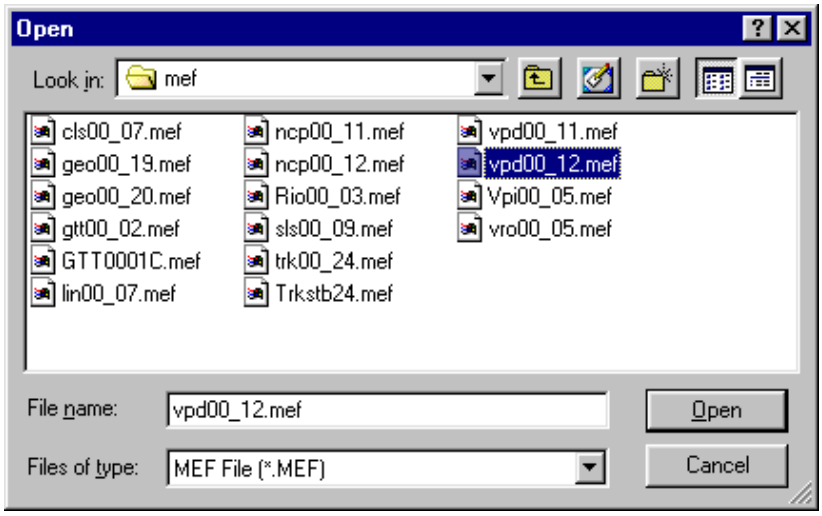


Figure 3-10
Selecting the MEF to Load

9. Select the MEF to load (**.mef** extension) and select **Open**.

10. The Text Terminal screen displays "Erasing the Flash MEF area..." followed by "Downloading and burning the MEF (ESC to cancel)", and refreshes the screen with the current configuration data (figure 3-11). Notice that all Function Key options are disabled except for **F4** (Change MEF) and the **Exit** button (F8).

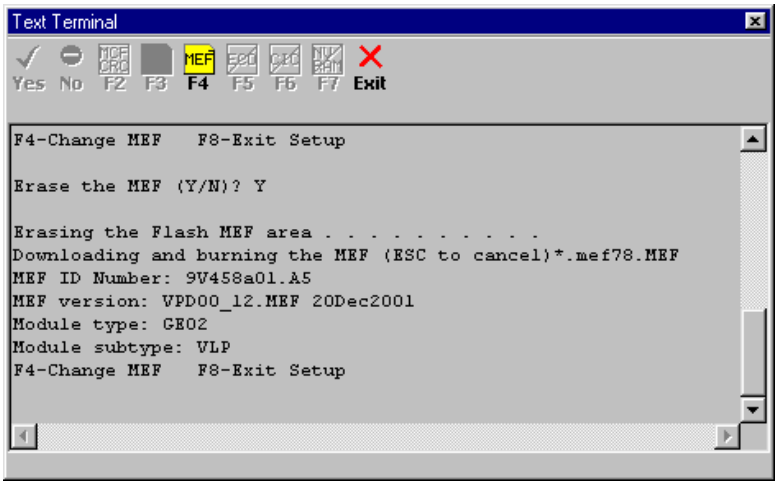


Figure 3-11
Erasing, Downloading and Burning the MEF

11. Select the **Exit** button to exit setup. "Setup Finished" is displayed in the Text Terminal screen (see figure 3-12), then the screen refreshes with the current configuration data, then the CPU/CPU2 module reboots.

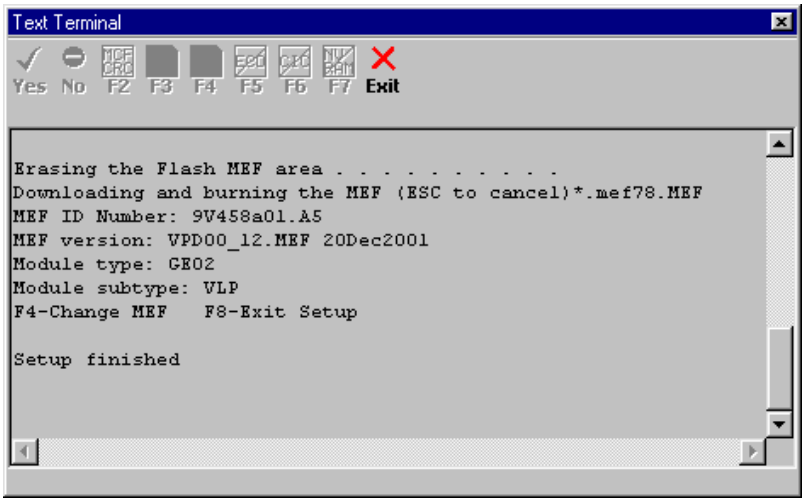


Figure 3-12
Setup Finished Screen

12. Select the **Exit** button again to close the Text Terminal screen. The main GDT screen refreshes.

Optional: To verify that the proper MEF is loaded in the GEO™ module, select the "Card Information" option for the slot during a normal DT session using the CPU/CPU2 module DT serial port (when using the **Connect** function). Note that Card Information is only available when the GDT is communicating with the GEO™ unit through the VLP serial DT port of the CPU module or the CP serial DT port of the CPU2 module, and not by using the I/O **Module Connect** function.

3.1.2.2 Viewing the Module Event Log

Each GEO™ module records its functional events in its own event log. Selecting the "Event History" function from the pop-up menu for a slot (by right-clicking on the label for the module) provides a display of the Online log from the GEO™ unit similar to that in figure 3-13.

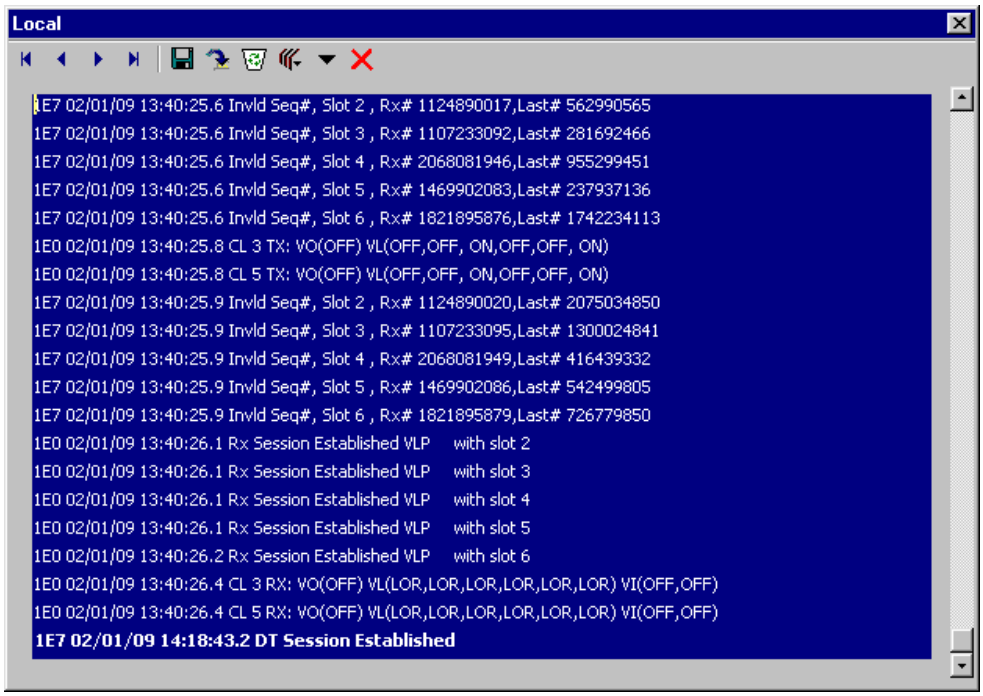


Figure 3-13
Typical Online Module Event History Display

NOTE

When the DT is in session directly with a GEO™ module (using **Module Connect**), the Title Bar for the display reads "Local" (refer to figure 3-13).

All of the usual Navigation, Save, Download, Delete, Source and Format buttons for viewing and managing history logs are active. Refer to paragraph 3.7.1.3, *Event History*, for a description of Online and Offline logs and downloading, filtering, editing, saving and deleting of logs.

3.1.2.3 Setting Module Verbosity

Setting a module's verbosity level directly while using the **Module Connect** function is almost the same as setting it while communicating normally through the CPU/CPU2 module DT serial port (using the **Connect** function). The only difference is that the current value of verbosity is not available when the DT is in direct session with a module. When "Set Verbosity" is selected in this

case, a warning screen is displayed (figure 3-14) to remind the user that the current setting cannot be viewed.

Figure 3-14
Verbosity Warning Screen

Click on **OK** to proceed. The **Module Verbosity** screen is displayed identifying the slot number (figure 3-15).

NOTE

The displayed position of the slider (Min) probably does not represent the current setting when using the **Module Connect** function.

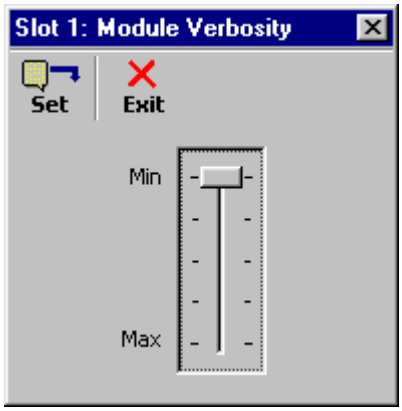


Figure 3-15
Module Verbosity Screen

If it is decided not to change or set the verbosity level, click on the **Exit** button (unless the **Set** button is clicked on, the current verbosity levels will not be changed).

To set the verbosity level, move the slider to the desired position. The “Min” position relates to level 1 and the “Max” position relates to level 5. Detents are provided on the slider for the intermediate positions. When the slider is at the desired level, click on the **Set** button to activate the setting. Click on the **Exit** button to close the screen.

3.1.3 Disconnect

When GDT communication has been established (either with a GEO™ unit or with an individual GEO™ module), the **Disconnect** function becomes enabled on the options of the File menu on the GDT screen (see figure 3-4) and can be clicked on to break the connection between the GDT and the GEO™ unit or an individual module. The **Disconnect** function is disabled once communication is lost, and the module assignment display of figure 3-3 is replaced with the screen of figure 3-16.

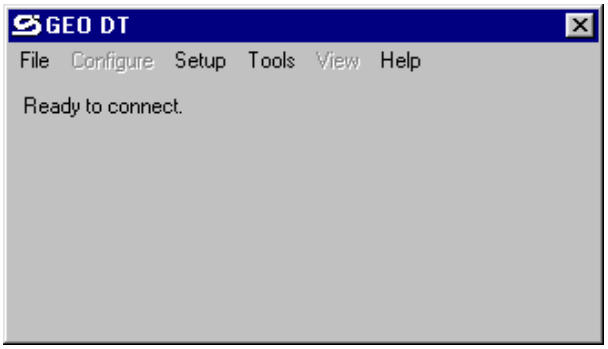


Figure 3-16
DT Screen When Communication Is Broken

From the **File** menu, use either the **Connect** option (communicate with a GEO™ unit) or the **Module Connect** option (communicate with a GEO™ module) to reconnect. If the utility fails to re-establish communication, the screen changes to that of figure 3-17. Notice that the **Configure** and **View** menus are disabled when there is no communication.

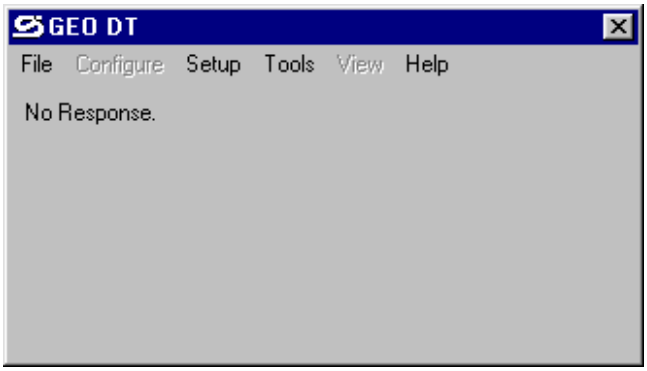


Figure 3-17
DT Screen When Communication Cannot Be Re-established

3.1.4 Reset Module

The CPU/CPU2 module may be reset at any time by the user via the GDT **Reset** function (or by recycling power to the GEO™ unit). A reset may be done to force a reboot, or to allow the user to enter the setup program from the Bootstrap Text Terminal screen.

NOTE

During the reboot, communication is terminated between the GDT and the GEO™ CPU, and "Rebooting" appears on the GDT screen. If the GDT times out during the reboot, "No Response" appears on the GDT screen (refer to figure 3-17). After the CPU returns to normal operation, reestablish communication as described in paragraph 3.1.1.

To reboot the CPU module in the GEO™ wayside unit, click on the **Reset Module** function of the **File** menu (or right-click on the label for the VLP/VLP2 module in slot 1 and select **Reset**). A confirmation prompt appears (figure 3-18).

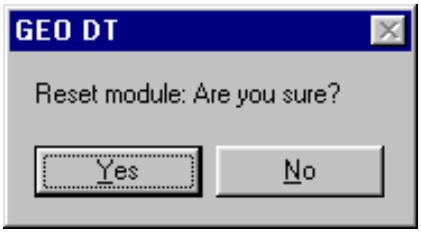


Figure 3-18
Reset Module Confirmation Prompt

Click on **Yes** to proceed with the reboot. A bootstrap text terminal screen similar to figure 3-19 appears. The information displayed in the text field scrolls as data is received from the GEO™ unit.

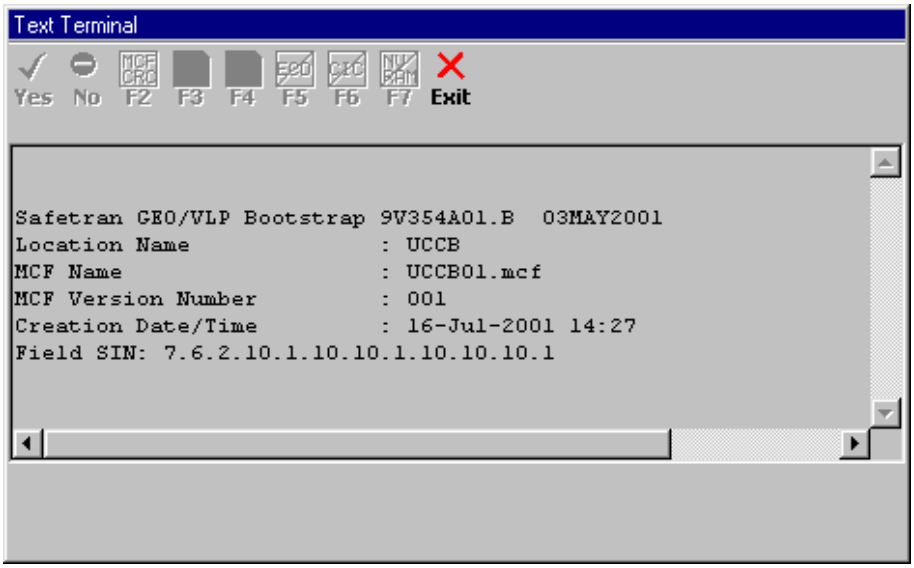


Figure 3-19
Initial Bootstrap Text Terminal Screen

The scrolling pauses briefly when the SIN is displayed, then the screen changes to that of figure 3-20 as current setup data is displayed.

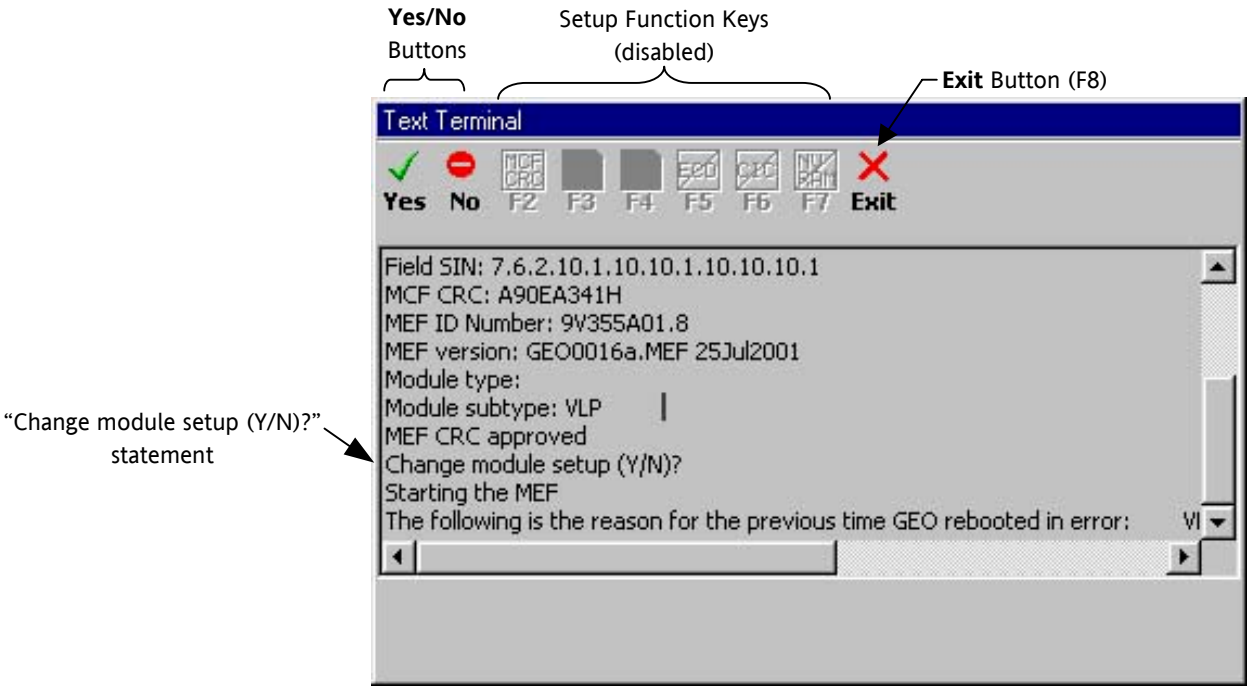


Figure 3-20
Typical CPU Boot Screen

When the "Change module setup (Y/N)?" statement appears (see figure 3-20), the display pauses again and the **Yes** and **No** buttons at the top left corner of the display are enabled. If setup needs to be changed, be ready to click on the **Yes** button as soon as the statement appears (before the watchdog timer can time out). Make setup changes as described in the following paragraphs.

If **No** is clicked on (or if neither button is clicked on), the setup watchdog timer times out (in 4 to 5 seconds) and the CPU assumes the current setup values (shown in figures 3-19 and 3-20) and finishes rebooting using these values. Wait for the display to stop scrolling, then click on the **Exit** button to close this display.

If the **Yes** button is clicked on, the screen changes to the Change Setup Screen displaying the list of edit options (see figure 3-21), and the function keys at the top of the display (labeled F2 through F7) become enabled. These options and their corresponding buttons are listed below.

Change MCF CRC

Change MCF

Change MEF

Erase ECD

Erase CIC

Erase NVRam

NOTE

The "F8 – Exit setup" function key corresponds to the **Exit** button.

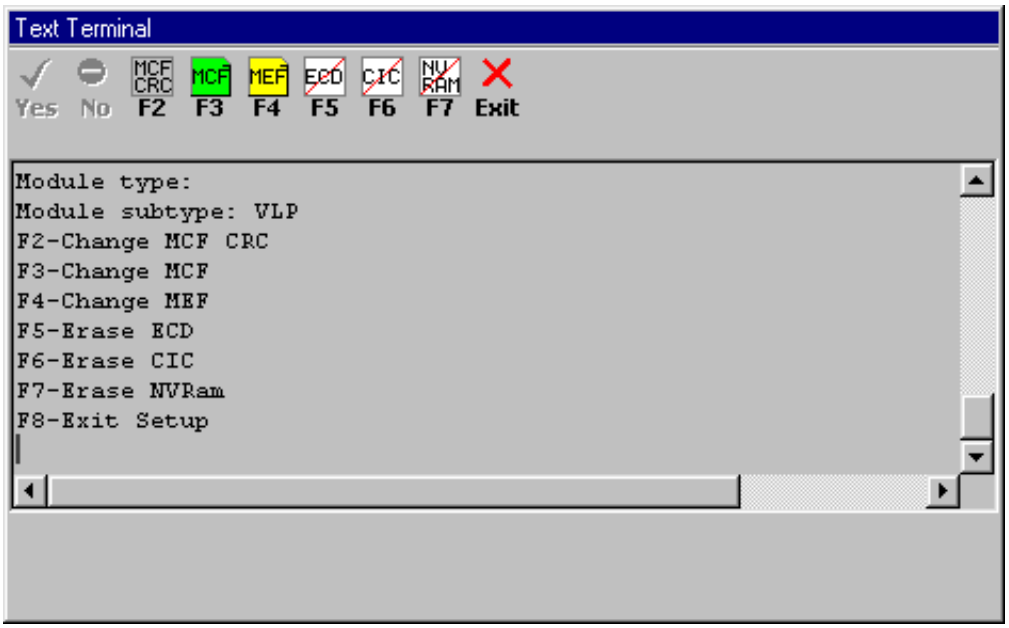


Figure 3-21
Change Setup Screen

Following any setup editing, the system will reboot. Refer to paragraphs 3.1.4.1 through 3.1.4.6 for using the setup editing function keys, or refer to paragraph 3.1.4.7 for exiting the setup program.

3.1.4.1 Loading a New MEF (F4)

The CPU/CPU2 Module Executable File (MEF) can be changed or reloaded when necessary. Instances would be when the hardware and the MEF are not compatible, or when a later version MEF is desired.

The procedure for loading the MEF is as follows:

1. To access the Setup Program, reset the CPU/CPU2 module (refer to paragraph 3.1.4 for the reset module procedure).

2. When the "Change module setup (Y/N)?" prompt appears in the text terminal screen (refer to figure 3-20), quickly click on the **Yes** button at the top of the screen (before the watchdog timer can time out and continue with bootup).

3. A boot screen similar to figure 3-22 appears. From the Function Key options, select **F4** (Change MEF).

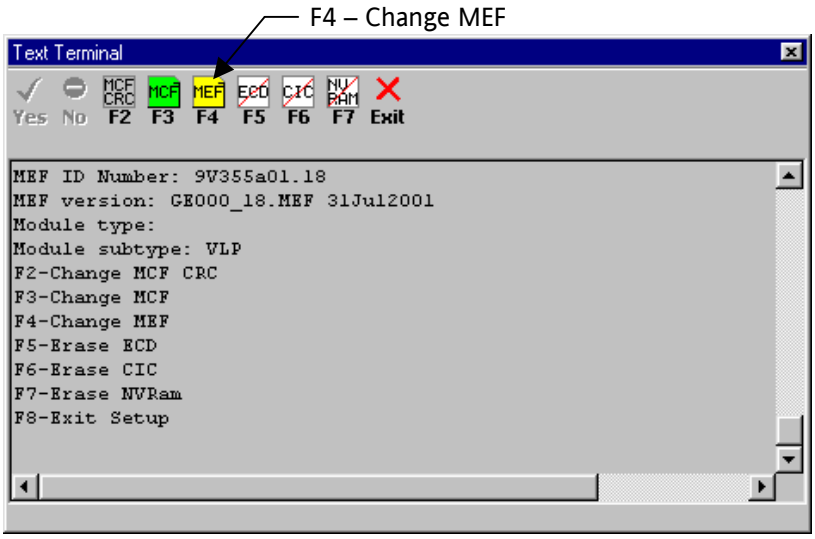


Figure 3-22
Selecting the "Change MEF" (F4) Function Key

4. The prompt "Erase the MEF (Y or N)?" is displayed (figure 3-23). Select the **Yes** button.

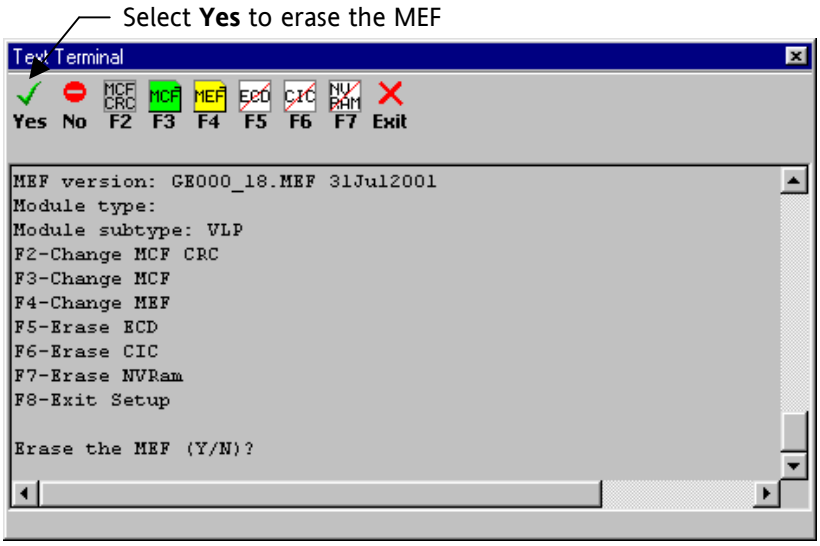


Figure 3-23
Responding to the "Erase the MEF (Y/N)?" Prompt

5. The **Open** window is displayed to select the path and filename to the desired MEF for loading (figure 3-24).

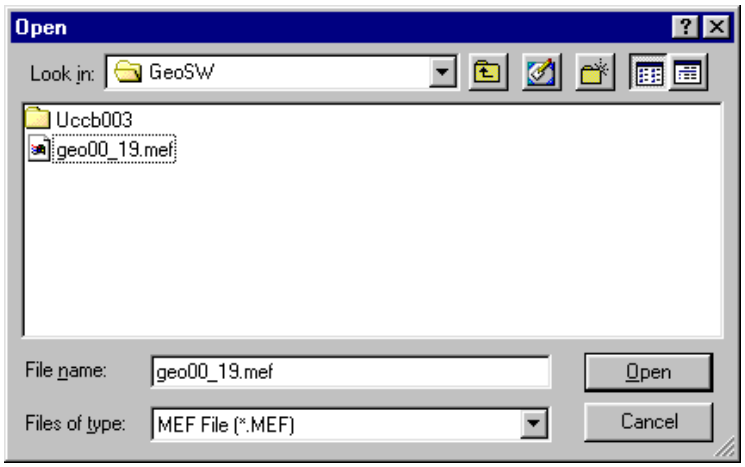


Figure 3-24
Selecting the MEF to Load

6. Select the MEF to load (**.mef** extension) and select **Open**.

7. The Text Terminal screen displays "Erasing the Flash MEF area..." followed by "Downloading and burning the MEF (ESC to cancel)", and refreshes the screen with the current configuration data (figure 3-25) (note that the F2 and F3 Function Keys are disabled for the GDT).

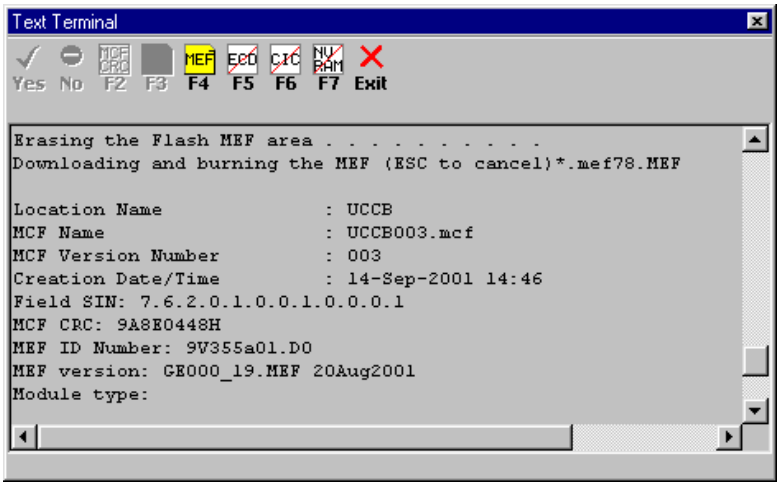


Figure 3-25
Erasing, Downloading and Burning the MEF

8. Select the **Exit** button to exit setup. "Setup Finished" is displayed in the Text Terminal screen, the screen refreshes with the current configuration data, and the CPU/CPU2 module reboots.

9. Select the **Exit** button again to close the Text Terminal screen. The main GDT screen refreshes.

Optional: To verify that the proper MEF is loaded in the GEO™ unit, from the **View** menu, select "CPU Version", or right-click on the VLP/VLP2 label and select "Card Information".

3.1.4.2 Loading a New MCF (F3)

The procedure for loading the MCF is as follows:

1. To access the Setup Program, reset the CPU/CPU2 module (refer to paragraph 3.1.4 for the reset module procedure).

2. When the "Change module setup (Y/N)?" prompt appears in the text terminal screen (refer to figure 3-20), quickly click on the **Yes** button at the top of the screen (before the watchdog timer can time out and continue with bootup).

3. A boot screen similar to figure 3-26 appears listing the Function Key options.

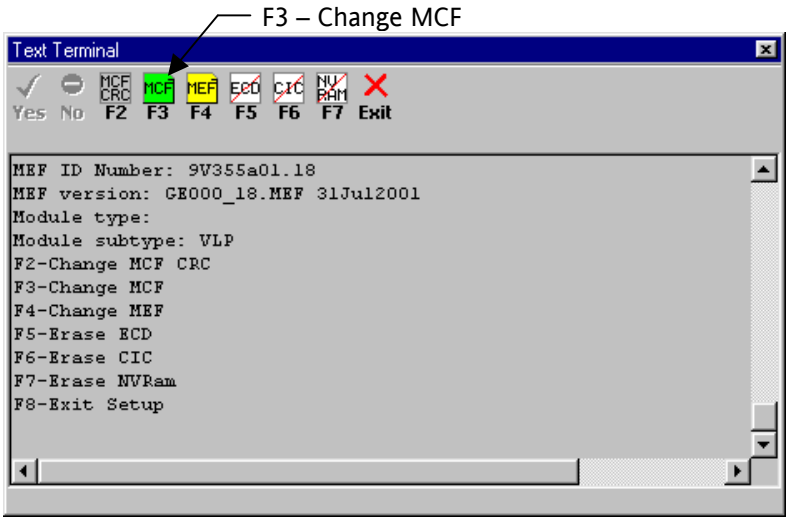


Figure 3-26
Selecting the "Change MCF" (F3) Function Key

4. Select **F3** (Change MCF). The **Open** window is displayed to select the path and filename to the desired MCF (figure 3-27). The .mcf file may be stored on the PC, or it may be on CDROM, floppy diskette, etc. Be sure to locate the proper MCF CRC for the MCF to be loaded (required after loading an MCF).

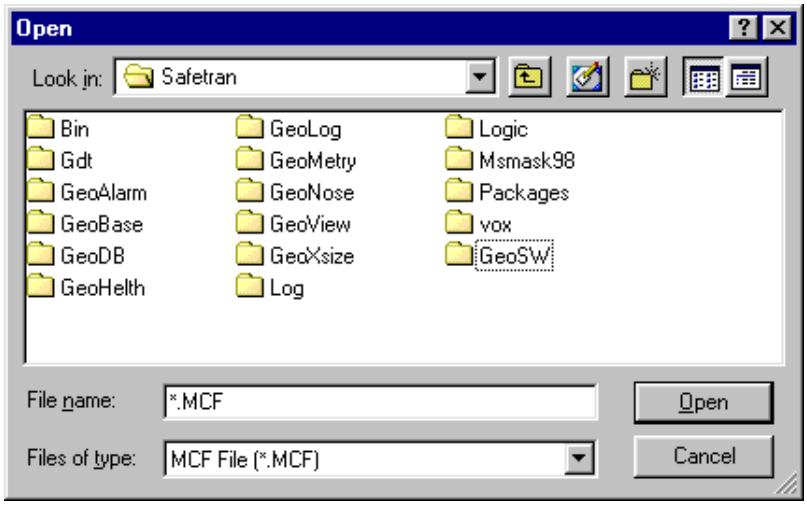


Figure 3-27
Browsing for the MCF to Load

5. Select the MCF to load (**.mcf** extension) and select **Open**.

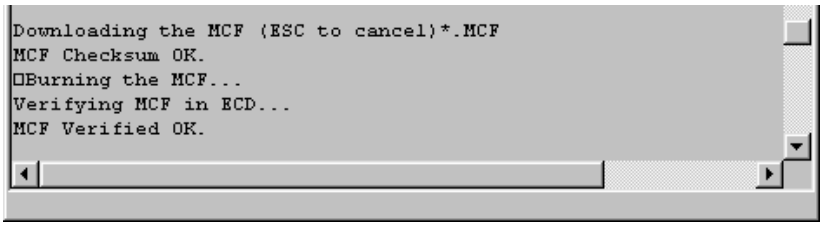
6. The Text Terminal screen displays "Downloading the MCF (ESC to cancel)" as the 4-character display on the GEO™ unit CPU/CPU2 module reads "BOOT" (refer to the Text Terminal screen detail below). Wait as the Checksums are compared.

7. The Text Terminal screen displays "MCF Checksum OK" (refer to the Text Terminal screen detail below) as the 4-character display on the GEO™ unit CPU/CPU2 module sweeps a zero back and forth. Wait as the Setup Program prepares to burn the MCF in the ECD.

8. The Text Terminal screen displays "Burning the MCF..." (refer to the Text Terminal screen detail below) as the 4-character display on the GEO™ unit CPU/CPU2 module reads "BOOT".

9. The Text Terminal screen displays "Verifying MCF in ECD..." (refer to the Text Terminal screen detail below) as the 4-character display on the GEO™ unit CPU/CPU2 module reads "BOOT".

10. The Text Terminal screen displays "MCF Verified OK." (refer to the Text Terminal screen detail below) as the 4-character display on the GEO™ unit CPU/CPU2 module reads "BOOT".



11. The Text Terminal screen refreshes and displays the Function Key options (refer to figure 3-26) as the 4-character display on the GEO™ unit CPU/CPU2 module reads "BOOT".

12. At this point the MCF CRC must be set. Proceed to paragraph 3.1.4.3 for MCF CRC setup.

3.1.4.3 Setting the MCF CRC (F2)

The procedure for setting the MCF CRC is as follows:

1. After the MCF was downloaded and verified (paragraph 3.1.4.2), the function keys are again displayed (refer to figure 3-26). The boot up of the GEO™ unit cannot complete until the MCF CRC is entered.

2. The current MCF CRC is invalidated after downloading a new MCF, and the MCF CRC supplied with the new MCF must be entered. However, if the same MCF was reloaded, the MCF CRC does not change, but it must still be entered using this procedure.

NOTE

The MCF CRC is supplied with the MCF. If the previous MCF was reloaded, the same MCF CRC can be entered. The previously loaded MCF CRC can be viewed by using the scroll bar on the Text Terminal screen to scroll up until the MCF CRC is viewable (figure 3-28).

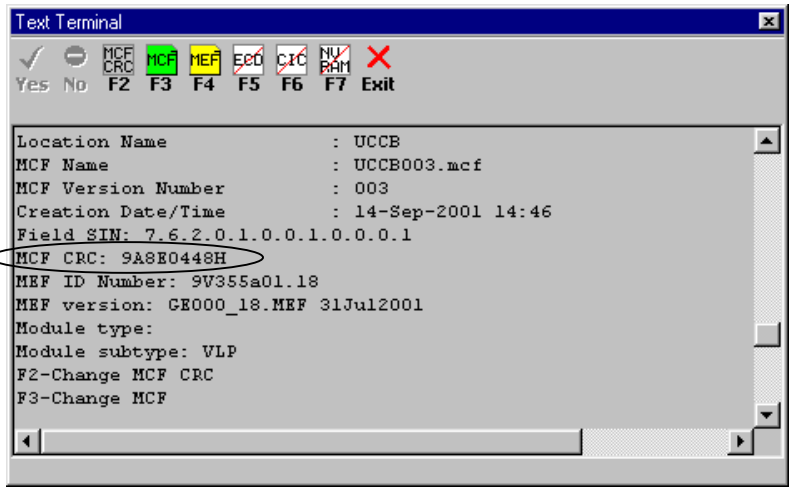


Figure 3-28
Scrolling up to View the Previous MCF CRC

3. On the Text Terminal screen, select **F2** (Change MCF CRC).

4. The **MCFCRC** window is displayed (figure 3-29).

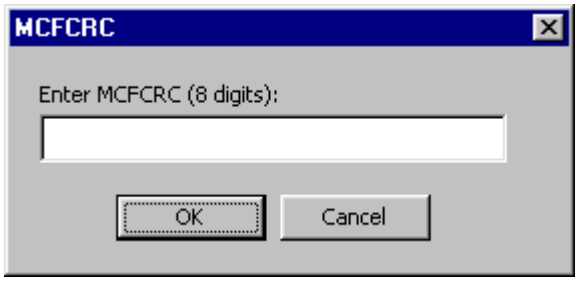


Figure 3-29
MCFCRC Window

5. Type in the correct 8-digit hexadecimal number for the MCF CRC and select **OK**.

6. The Text Terminal screen displays "Enter the field CRC in hex (ESC to cancel):" followed by the 8 digit hexadecimal number just entered, then the Text Terminal screen refreshes once again.

7. Select the **Exit** button (F8) to finish setup. The Text Terminal screen displays "Setup Finished" (figure 3-30), and then refreshes to display configuration data followed by the Function Key options.

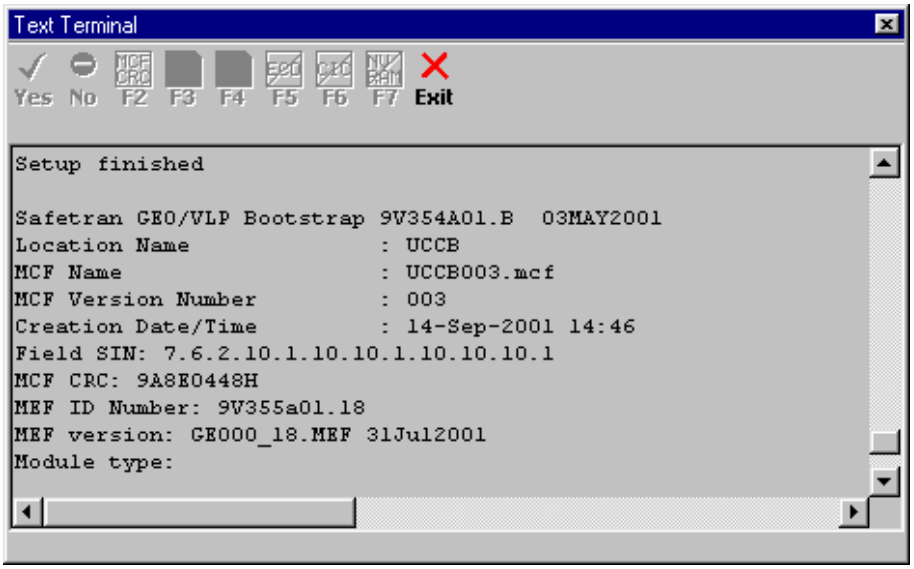


Figure 3-30
Setup Finished Window

8. Select the **Exit** button (F8) again to close the Text Terminal window. The GEO™ unit continues with the bootup process, displaying in order: BOOT, INIT, LMCF, ICHK, and then scrolling the MCF version unless error messages are displayed (if a different MCF was loaded, error messages will most likely be displayed. Refer to figure 3-85 later in this section for a flow diagram for resolving setup errors).

3.1.4.4 Erasing the ECD (F5)

NOTE

This function is only to be used for recovery in the event that corruption occurs in the ECD. A loss of MCF will result by erasing the ECD.

The procedure for erasing the ECD is as follows:

1. To access the Setup Program, reset the CPU/CPU2 module (refer to paragraph 3.1.4 for the reset module procedure).

2. When the "Change module setup (Y/N)?" prompt appears in the text terminal screen (refer to figure 3-20), quickly click on the **Yes** button at the top of the screen (before the watchdog timer can time out and continue with bootup).

3. A boot screen similar to figure 3-31 appears. From the Function Key options, select **F5** (Erase ECD).

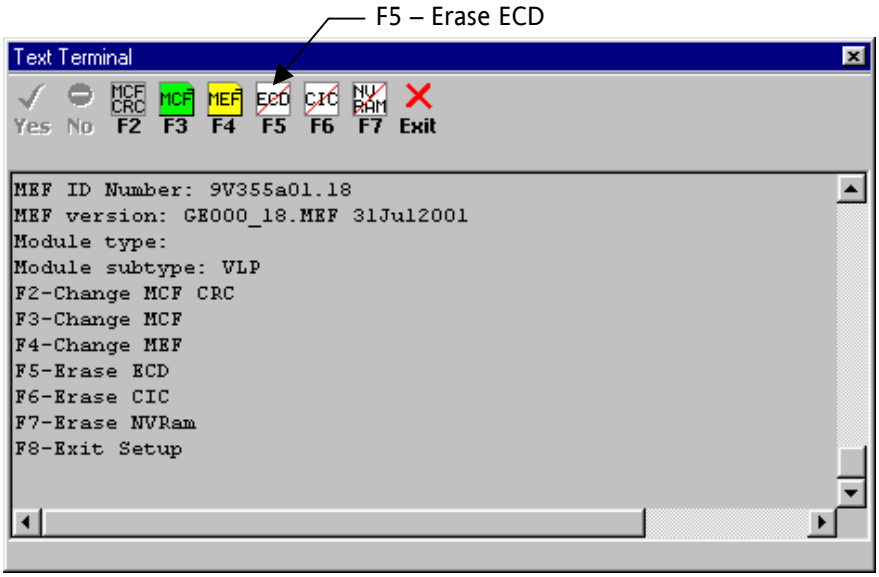


Figure 3-31
Selecting the "Erase ECD" (F5) Function Key

4. The prompt "Erase the ECD (Y or N)?" is displayed (figure 3-32). Select the **Yes** button.

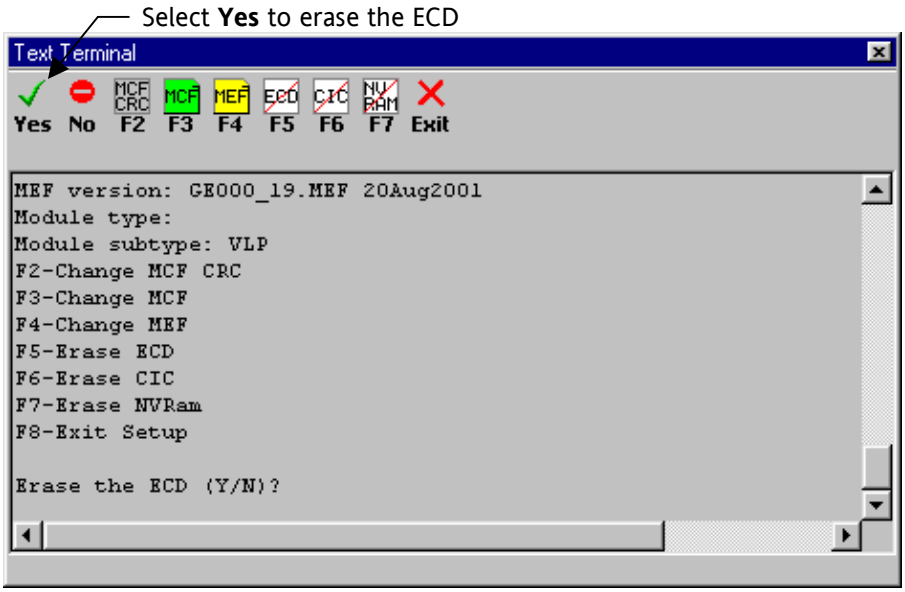


Figure 3-32
Responding to the "Erase the ECD (Y/N)?" Prompt

5. The system responds by displaying "Erasing the ECD" (refer to figure 3-33), as the CPU/CPU2 module in the GEO™ unit sweeps a zero back and forth across the 4-character display.

6. When the ECD has been erased, the message "ECD Cleared" (refer to figure 3-33) is displayed on the Text Terminal screen as the 4-character display on the GEO™ unit CPU/CPU2 module reads "BOOT".

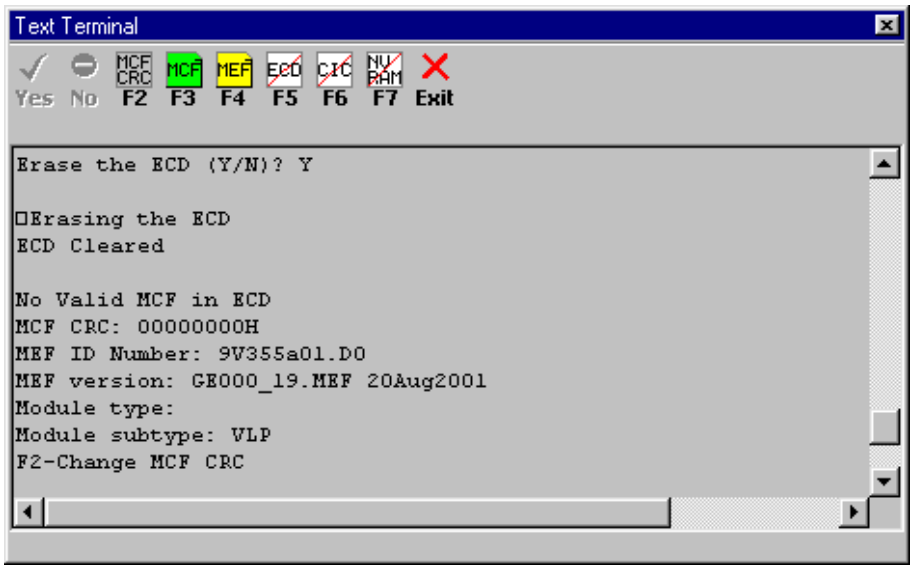


Figure 3-33
ECD Cleared

7. The Text Terminal screen refreshes and displays the Function Keys.

8. At this point the system is without an MCF. Select **F3** (Change MCF) from the Function Key options to reload the MCF, and follow the procedure in paragraph 3.1.4.2, *Loading a New MCF*.

3.1.4.5 Erasing the CIC (F6)

NOTE

This function is only to be used for recovery in the event that corruption occurs in the CIC. A loss of Operating Parameters, UCN, MCF CRC, and SIN will result by erasing the CIC.

The procedure for erasing the CIC is as follows:

1. To access the Setup Program, reset the CPU/CPU2 module (refer to paragraph 3.1.4 for the reset module procedure).

2. When the "Change module setup (Y/N)?" prompt appears in the text terminal screen (refer to figure 3-20), quickly click on the **Yes** button at the top of the screen (before the watchdog timer can time out and continue with bootup).

3. A boot screen similar to figure 3-34 appears. From the Function Key options, select **F6** (Erase CIC).

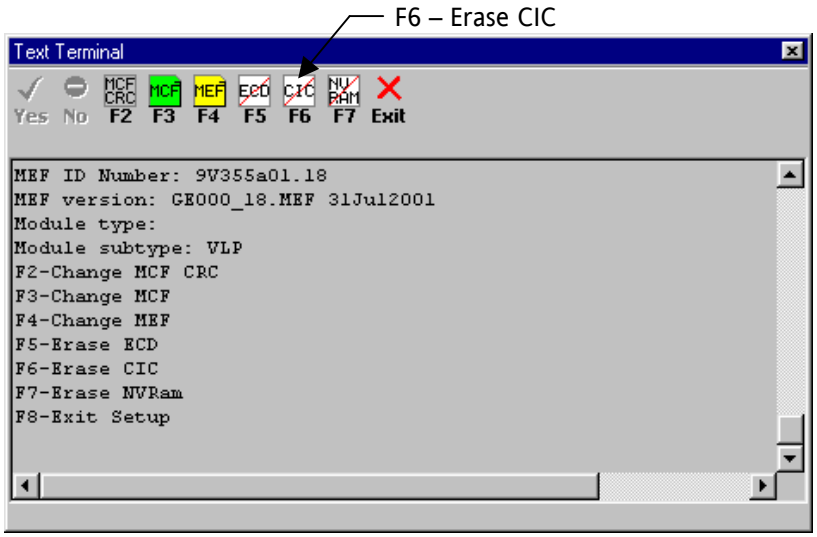


Figure 3-34
Selecting the "Erase CIC" (F6) Function Key

4. The prompt “Erase the CIC (Y or N)?” is displayed (figure 3-35). Select the **Yes** button.

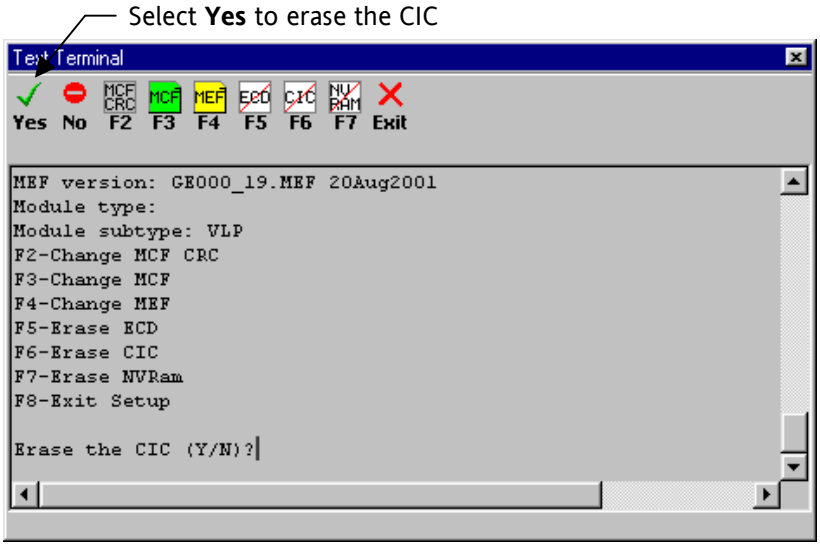


Figure 3-35
Responding to the “Erase the CIC (Y/N)?” Prompt

5. The system responds by displaying “Clearing CIC” (refer to figure 3-36), as the CPU/CPU2 module in the GEO™ unit sweeps an asterisk back and forth across the 4-character display.

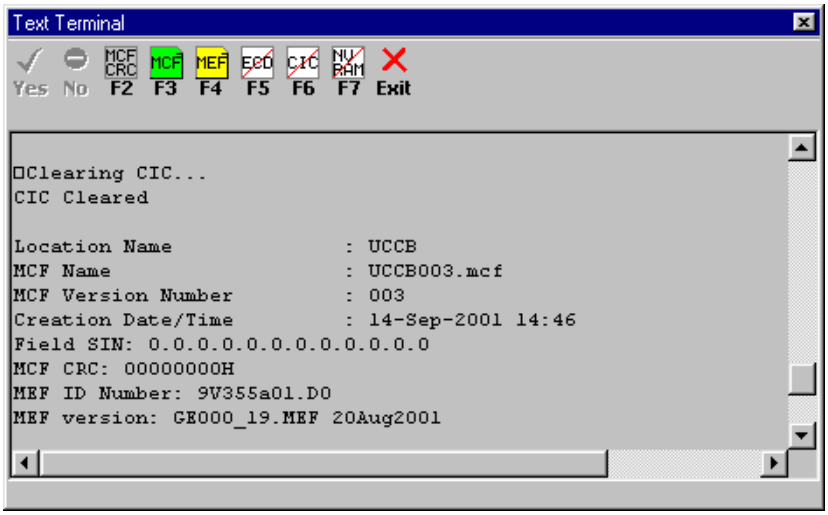


Figure 3-36
CIC Cleared

6. When the CIC has been erased, the message “CIC Cleared” (refer to figure 3-36) is displayed on the Text Terminal screen as the 4-character display on the GEO unit CPU/CPU2 module reads “BOOT”.

7. The Text Terminal screen refreshes and displays the Function Keys.

8. Click on **Exit** to exit the Setup program and allow the system to continue with bootup.

9. After bootup completes, perform module setup procedures to clear error messages for Configuration parameters (paragraph 3.7.1.1), Operating Parameters (paragraph 3.7.1.2), Vital User Options (paragraph 3.2.1), Non-vital User Options (paragraph 3.2.2), Vital User I/O (paragraph 3.2.3), Non-vital User I/O (paragraph 3.2.4), Vital User Timers (paragraph 3.2.5), Non-vital User Timers (paragraph 3.2.6), CRC (paragraph 3.1.4.3), and UCN (paragraph 3.2.8).

3.1.4.6 Erasing the NVRAM (F7)

NOTE

This function is only to be used for recovery in the event that corruption occurs in the Non-volatile RAM. A loss of Event Log will result by erasing the NVRAM.

The procedure for erasing the NVRAM is as follows:

1. To access the Setup Program, reset the CPU/CPU2 module (refer to paragraph 3.1.4 for the reset module procedure).

2. When the "Change module setup (Y/N)?" prompt appears in the text terminal screen (refer to figure 3-20), quickly click on the **Yes** button at the top of the screen (before the watchdog timer can time out and continue with bootup).

3. A boot screen similar to figure 3-37 appears. From the Function Key options, select **F7** (Erase NVRAM).

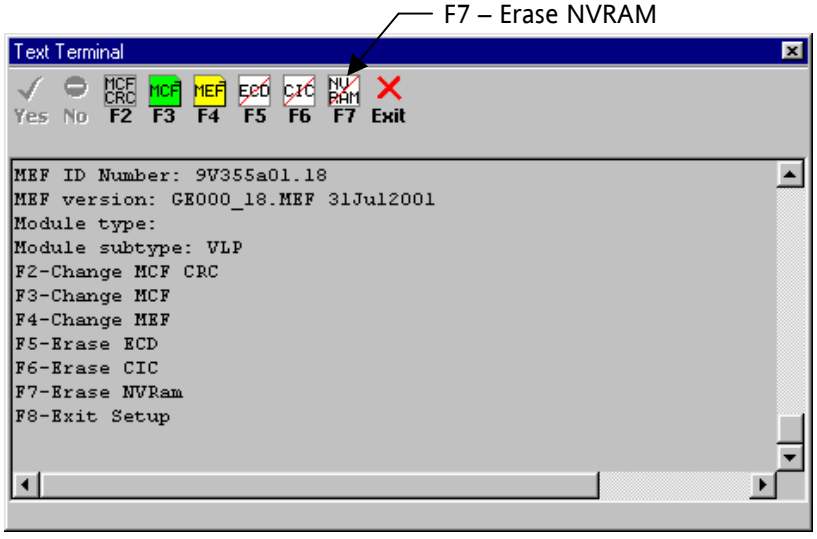


Figure 3-37
Selecting the "Erase NVRAM" (F7) Function Key

4. The prompt “Erase the NVRAM (Y or N)?” is displayed (figure 3-38). Select the **Yes** button.

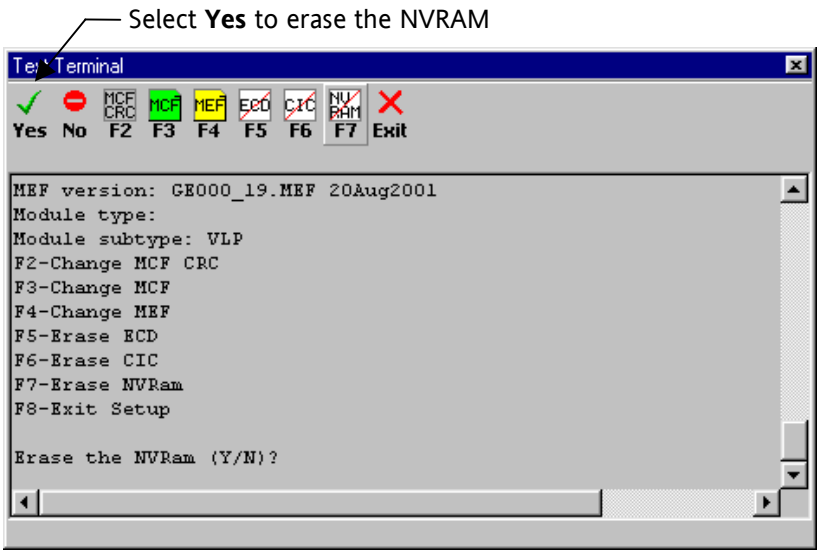


Figure 3-38
Responding to the “Erase the NVRAM (Y/N)?” Prompt

5. When the NVRAM has been cleared, the Text Terminal screen displays “NVRam Cleared” (refer to figure 3-39).

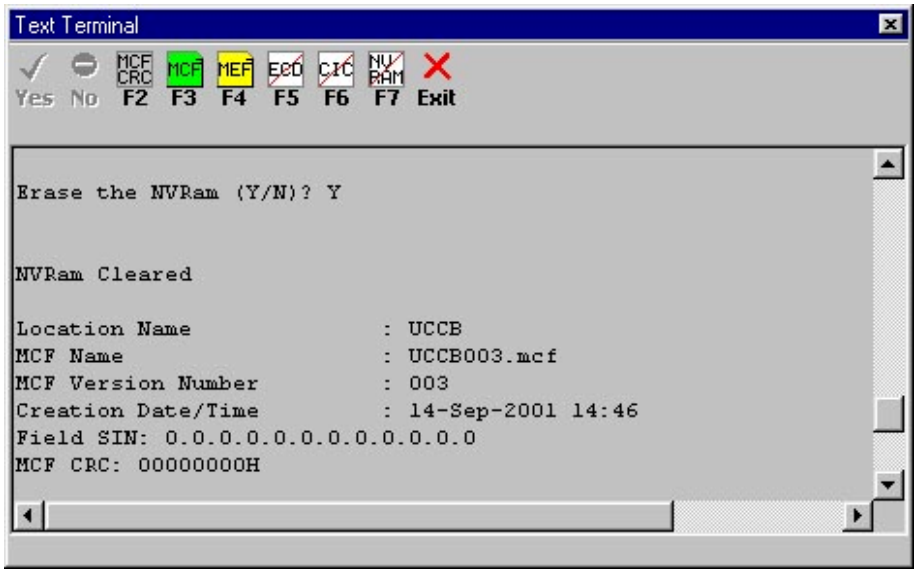


Figure 3-39
Clearing the NVRam

6. The Text Terminal screen refreshes and displays the Function Key options as the 4-character display on the GEO™ unit CPU/CPU2 module reads “BOOT”.

7. Click on **Exit** to exit the Setup program and allow the system to continue with bootup.

3.1.4.7 Exiting the Setup Program (F8)

Select the **Exit** button to close the setup program. A screen similar to figure 3-40 is displayed as the data is refreshed.

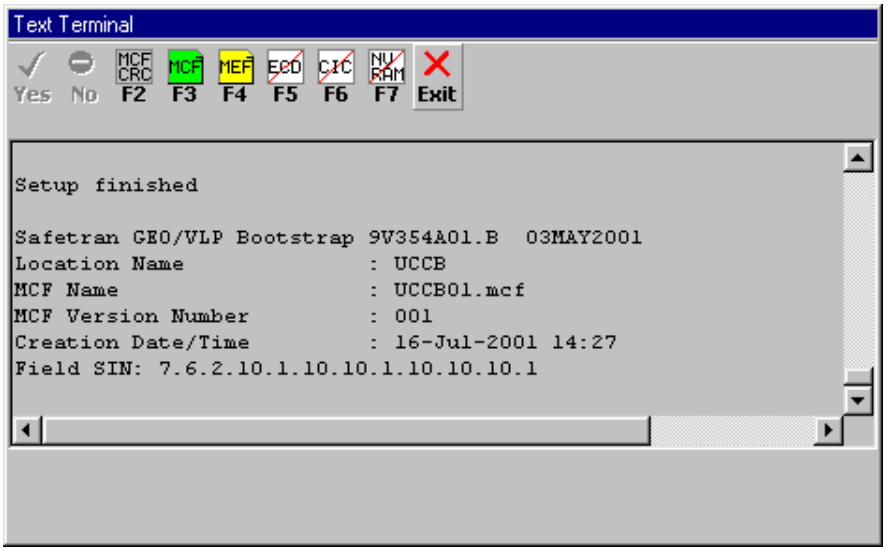


Figure 3-40
Setup Finished Screen

The data in the Setup Finished screen is identical to the data that will appear in the initial Bootstrap Text Terminal screen the next time the CPU/CPU2 module is reset.

3.1.5 Exit

Click on the **Exit** function to exit the GDT utility. Communication with the GEO™ wayside unit or with an individual GEO™ module is broken.

3.2 CONFIGURE MENU

The Configure menu contains the functions listed below and described in the following paragraphs.

- Vital User Options
- Nonvital User Options
- Vital User I/O
- Nonvital User I/O
- Vital User Timers
- Nonvital User Timers
- Set SIN
- Set UCN
- Set Time
- Delete MCF

3.2.1 Vital User Options

NOTE

Vital User Options can only be viewed or changed by using the GDT utility.

If a Vital User Option is not confirmed on startup or after a change of MCF, the system stays unconfigured and an **ERR: VOP** is displayed until corrected (vital option error). The system becomes fully operational after the VOP error is cleared and the system is reset. An example of a Vital User Option is an MCF that allows selecting either a steady yellow or a flashing yellow aspect.

The user can choose which aspect is applicable for the location and set it in the field.

Vital User Options are protected by the UCN (Unique Check Number), therefore, if the Vital User Options are changed, the Installer/Maintainer must enter the applicable UCN for these options and then reboot. If the UCN is incorrect, the GEO™ system boots up unconfigured.

WARNING

SETTING VITAL USER OPTIONS INCORRECTLY COULD RESULT IN A HAZARDOUS EVENT. ALWAYS VERIFY VITAL OPTION CHANGES AFTER COMPLETING THE VITAL OPTION CHANGE PROCESS. THE IMPLEMENTATION OF VITAL USER OPTION CHANGES AND THEIR EFFECTS ON RAILROAD SAFETY ARE THE RESPONSIBILITY OF THE GDT USER.

WARNING

WHEN CHANGING VITAL USER OPTIONS, THE ENTIRE LOCATION AND ANY FUNCTIONS AFFECTED BY THAT CHANGE MUST BE THOROUGHLY RETESTED IN ACCORDANCE WITH FRA REGULATIONS.

WARNING

A SYSTEM REBOOT COULD OCCUR AT ANY TIME DURING THE VITAL USER OPTION CHANGE PROCESS. CAREFULLY MONITOR USER INTER-FACE INDICATORS TO DETECT A REBOOT. IF A REBOOT OCCURS BEFORE THE CHANGE PROCESS IS COMPLETE, THE ORIGINAL VITAL OPTION VALUES WILL REMAIN IN EFFECT UNLESS CHANGES WERE UPLOADED TO THE CIC.

NOTE

If a reboot occurs during reprogramming of the CIC, option value changes could be corrupted. This will be detected by the UCN check performed by the GEO™ unit during reboot.

NOTE

There are two phases to the process of changing Vital User Options; 1) entering the change, and 2) providing a valid UCN to enable uploading the change to the CIC and rebooting the GEO™ unit to allow the changes to take effect.

The GDT procedure for changing the Vital User Options is as follows:

1. Bring up the **Vital User Options** screen (Configure menu/Vital User Options). The display will be similar to the one shown in figure 3-41.

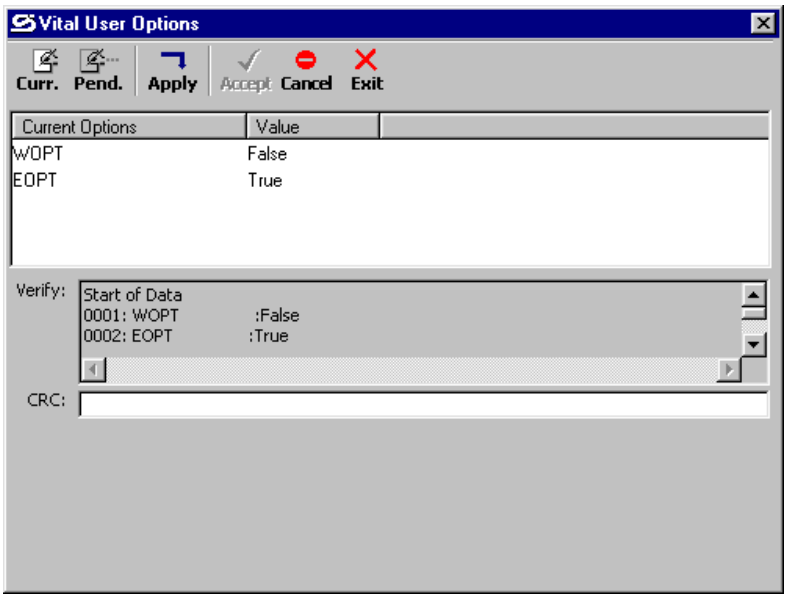


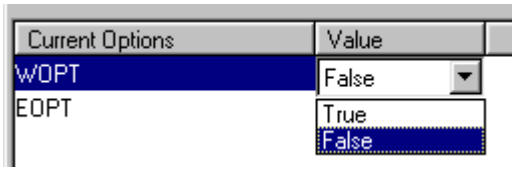
Figure 3-41
Typical Vital User Options Configuration Display With Current Values

2. The current settings of the parameters are listed in the **Value** column (click on the **Current Options** button at the top of the screen to refresh the current options). The current values are also displayed in the "Verify" list box immediately below the options box. The values in the **Value** field must match the values in the "Verify" list box.

NOTE

If the current values do not appear on the "Vital User Options" display, select the **Cancel** button to enable the **Current** button, and then select the **Current** button to display the current values. The current values are what the GEO™ unit is currently operating with and are stored in the CIC.

3. Click on the **Value** field of the desired option to display the drop-down list control box (see detail below).



4. In the control box, click on the down arrow button (▼) to display the options list. The current selection is highlighted.

5. Click on the desired option from the drop-down list (e.g., **True**, **False**) to highlight it.

NOTE

The available values for the Vital User Options depend on the type of Vital User Option selected (established in MCF).

6. The drop-down list closes. Verify that the desired option is now displayed in the **Value** field.

7. Make any other option changes as desired.

8. After all value changes are completed using the process just described, click on **Apply** at the top of the **Vital User Options** screen. The GDT sends the changes to the GEO™ unit which processes the changes and then returns data that is displayed in the GDT "Verify" list box (see figure 3-42). Note that the **Apply** button is disabled after being clicked on.

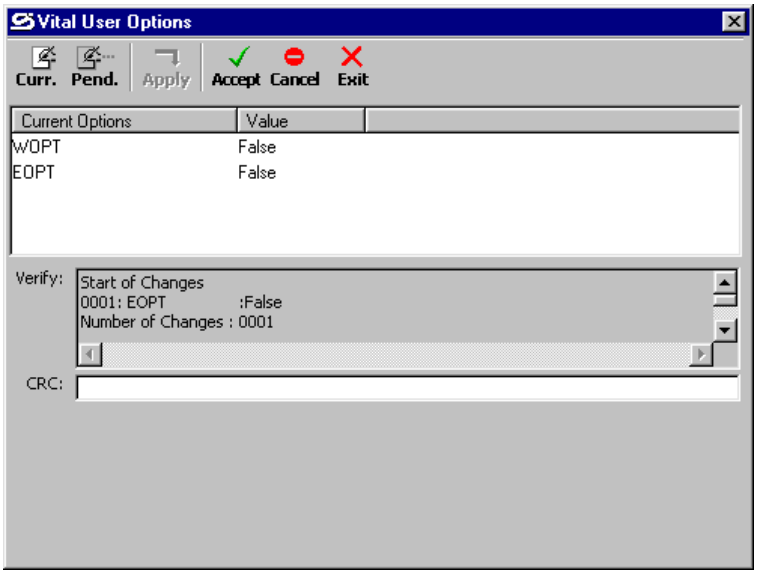


Figure 3-42
Typical Vital User Options Configuration Display After Initial Changes

WARNING

COMPARE THE NEW VALUES IN THE "VALUE" COLUMN WITH THE CORRESPONDING VALUES IN THE "VERIFY" LIST BOX; THEY MUST MATCH AND ONLY THE DESIRED CHANGES SHOULD BE LISTED. ALSO VERIFY THAT THE "NUMBER OF CHANGES" CORRESPONDS TO THE NUMBER OF OPTION VALUES CHANGED. IF ANYTHING IS INCORRECT, CANCEL THE PROCESS SINCE AN ERROR HAS OCCURRED.

NOTE

Number of changes refers to the number of current values held by the CPU (CIC) that have been changed in the "Value" column.

9. To prepare the changes for acceptance, scroll down the information in the "Verify" list box and check the listed changes to verify that they are correct. If the changes are not correct, select the **Cancel** button and reenter the changes.

10. If the changes are correct, scroll down until the Confirmation CRC value is displayed and then enter this value in the "CRC" text box immediately below the "Verify" list box (figure 3-43). Entering the CRC ensures that the changes are confirmed with the GEO™ unit. This entry is not case sensitive.

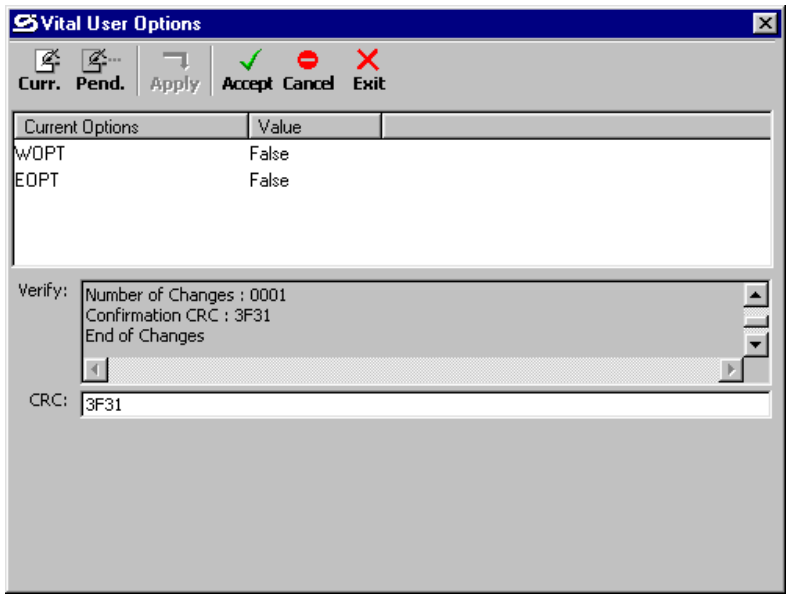


Figure 3-43
Typical Vital User Options Configuration Display
With Confirmation CRC Entered

11. Click on the **Accept** button at the top of the display to finalize the changes. After the changes are accepted, the phrase "Changes succeeded" appears below the CRC text box (see figure 3-44). The changes are now held internally by the GEO unit but have not been applied and have not been enforced in the CIC. Note that the **Accept** button is disabled after being clicked on.

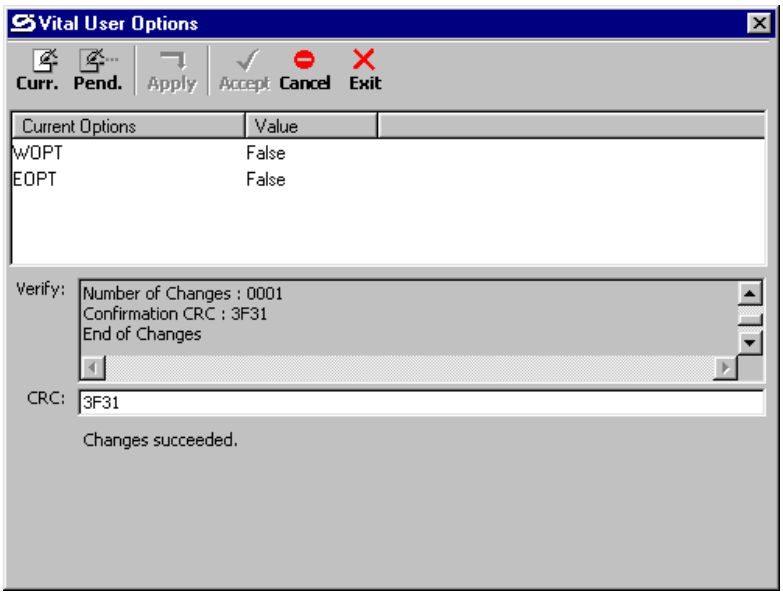


Figure 3-44
Typical Vital User Options Configuration Display
With "Changes succeeded" Statement

NOTE

At this point in the change process, changes have not yet been uploaded to the GEO™ CIC, and additional changes can be made. If the **Cancel** button is selected at any time during this first phase, the pending changes are erased.

NOTE

If "Changes failed" appears when the **Accept** button is selected, verify that the correct CRC was entered. If not, correct the CRC and select **Accept** again. If "Changes failed" is displayed again, cancel the changes and repeat the change process. If the changes fail again, reset the CPU and repeat the change process.

12. The changes that were made are now in the "pending" state, and will not become active until a new UCN has been entered and the system rebooted.

NOTE

Do not select the **Cancel** button unless the changes just entered on this display are to be cancelled. If the **Cancel** button was selected at any time during the first phase of the change process after new values were entered (effects value changes on current display only), no pending values will be displayed when the **Pending** button is selected and the statement "No Changes Pending" will appear in the "Verify" list box (see figure 3-45).

NOTE

Pending changes are the changes made to the current values. To view pending changes before proceeding, select the **Pending** button at the top of the display. If Vital User Options are pending, they are listed in the "Pending Options" column, and their values are displayed in the "Value" column (refer to figure 3-45).

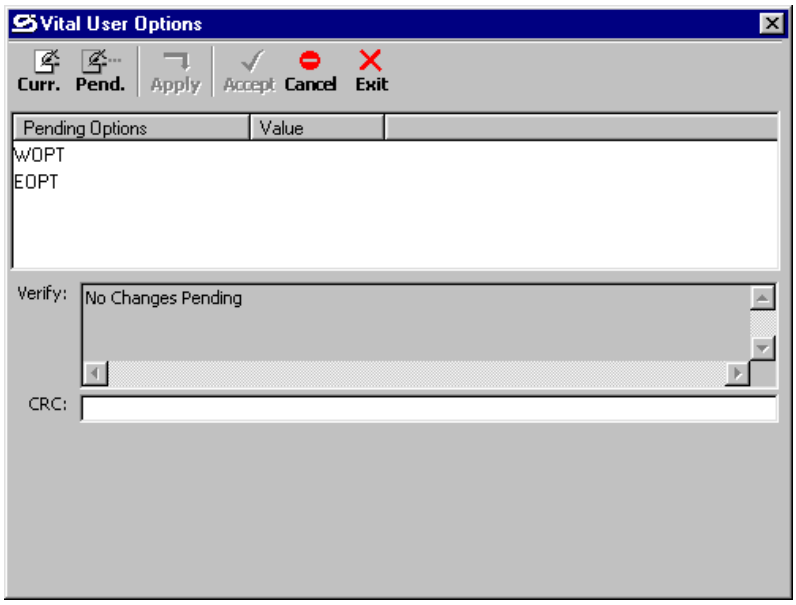


Figure 3-45
Typical Vital User Options Configuration Display With "No Changes Pending" Statement

13. To make the Vital User Option changes valid, it is necessary to enter a valid UCN and then reboot the system to enable the upload of the changes to the GEO™ CIC. Refer to paragraph 3.2.8 for instructions on setting the UCN and rebooting the CPU/CPU2 module.

NOTE

When Vital Configuration Parameters are changed or a confirmation CRC is entered, a 30 minute timer is started. If the timer times out (by not setting the UCN and rebooting), the changes are discarded. This timer prevents a user from making changes and leaving them in the pending state for an extended period of time. While in the pending state, the changes are not acted upon by the GEO™ unit.

3.2.2 Non-vital User Options

An example of a Non-vital User Option is the ability to change how a track Code 5 is sent (refer to table 3-2 for a typical example).

CAUTION

SETTING NON-VITAL USER OPTIONS INCORRECTLY COULD RESULT IN A SYSTEM THAT IS NOT FULLY OPERATIONAL. THE RAILROAD ASSUMES RESPONSIBILITY FOR ITS FIELD-CONFIGURED NON-VITAL USER OPTIONS.

Table 3-2
Field Configurable Non-vital User Options - Typical Example

Option	Option Label EC5[1]	Description		Option Label WC5[1]	Description
Repeat	**RPT**	Repeat Code 5 Eastbound when a Code 5 is received from the West		**RPT**	Repeat Code 5 Westbound when a Code 5 is received from the East
On C1	**C1**	Send a Code 5 Eastbound when a Code 1 is received from the West		**C1**	Send a Code 5 Westbound when a Code 1 is received from the East
Off	**OFF**	Never send a Code 5 East		**OFF**	Never send a Code 5 West
On	**ON**	Always send a Code 5 East		**ON**	Always send a Code 5 West

[1] These labels are seen on the 4-character display of the CPU/CPU2 module when viewing or changing OPT# using the Sel and Nav push buttons.

If a Non-vital User Option is not confirmed on startup or after a change of MCF, the system becomes operational using the default values of the options set by the MCF, but an **ERR: NOP** is displayed (non-vital option error) until changed or confirmed. Non-vital User Options can be changed during normal operation without requiring confirmation, UCN entry, or rebooting the CPU/CPU2 module as is required with changing Vital User Options (refer to paragraph 3.2.1 for Vital User Options).

NOTE

Non–vital User Options may be set up by using either the GDT or the Maintainers Interface.

The GDT procedure for setting the **Non-vital User Options** is as follows:

1. Bring up the **Non-vital User Options** screen (Configure menu/Non-vital User Options). Figure 3-46 presents a typical **Non-vital User Options** screen. This display enables the user to initiate a change of the Non-vital User Options defined in the MCF and stored in the CIC.

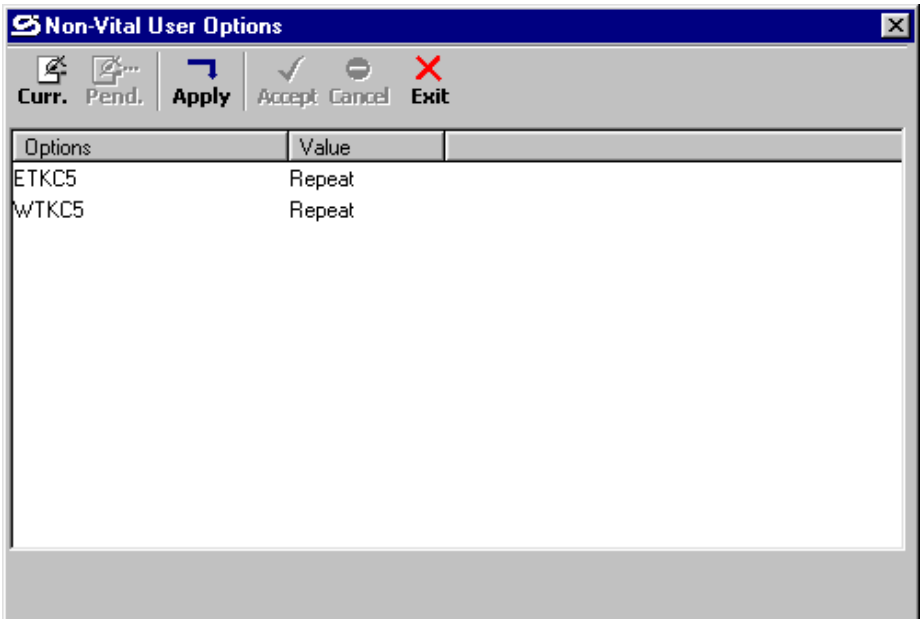


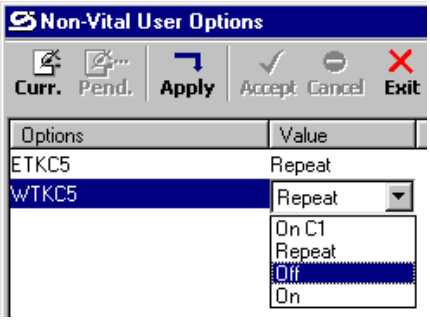
Figure 3-46
Typical Non-vital User Options Configuration Display With Current Values

2. The current settings of the parameters are listed under the **Value** column (click on the **Current Options** button at the top of the screen to refresh the current options).

NOTE

The current values are what the GEO™ unit is currently operating with and are stored in the CIC.

3. To change a value, select that field in the "Value" column. A drop-down option box appears in place of the selected value (see drop-down option box at right). Select the down arrow (▼) button in the option box to display the list of available values (current value is highlighted). For the example above, the available values are **On C1**, **Repeat**, **Off** and **On**. The available values depend on the type of Non-vital User Option selected. Select the desired value from the drop-down list. The drop-down list closes and the newly selected value replaces the former value in the "Value" column.



NOTE

When the change field requires a numeric value, spin buttons automatically appear to allow the values to be incremented/decremented by valid amounts (hold down to change continuously).

After all value changes are completed using the process just described, select the **Apply** button at the top of the display. The GDT processes the changes and uploads them to the GEO™ CIC where they become effective immediately. There are no pending values for Non-vital User Options.

3.2.3 Vital User I/O

NOTE

Vital User I/O can only be viewed or changed by using the GDT utility, and changes must be made locally at the site.

An example of a Vital User I/O would be to inject an input to test a crossing controller (e.g., test gates and flashing lights) from the GEO™ unit. The parameters for the test must be established in the MCF.

Vital User I/O are not protected by the UCN (Unique Check Number), therefore, if the Vital User I/O are changed, the Installer/Maintainer is not required to enter the applicable UCN for these options or reboot.

Vital User I/O can only be implemented by the user at the local site. To ensure this, the user must press a push button on the CPU/CPU2 module at the location during the procedure.

WARNING

SETTING VITAL USER I/O INCORRECTLY COULD RESULT IN A HAZARDOUS EVENT. ALWAYS VERIFY VITAL I/O CHANGES AFTER COMPLETING THE VITAL I/O CHANGE PROCESS. THE IMPLEMENTATION OF VITAL USER I/O CHANGES AND THEIR EFFECTS ON RAILROAD SAFETY ARE THE RESPONSIBILITY OF THE GDT USER.

WARNING

AFTER CHANGING VITAL USER I/O, VERIFY THE PROPER STATES OF THE I/O. THE ENTIRE LOCATION AND ANY FUNCTIONS AFFECTED BY THAT CHANGE MUST BE THOROUGHLY RE-TESTED IN ACCORDANCE WITH FRA REGULA-TIONS.

WARNING

A SYSTEM REBOOT COULD OCCUR AT ANY TIME DURING THE VITAL USER I/O CHANGE PROCESS. CAREFULLY MONITOR USER INTERFACE INDICATORS TO DETECT A REBOOT. IF A REBOOT OCCURS BEFORE THE CHANGE PROCESS IS COMPLETE, THE ORIGINAL VITAL I/O VALUES WILL REMAIN IN EFFECT UNLESS CHANGES WERE UPLOADED TO THE CIC.

NOTE

If a reboot occurs during reprogramming of the CIC, option value changes could be corrupted. This will be detected by the UCN check performed by the GEO™ unit during reboot.

The GDT procedure for changing the Vital User I/O is as follows:

1. Bring up the **Vital User I/O** screen (Configure menu/Vital User I/O). The display will be similar to the one shown in figure 3-47.

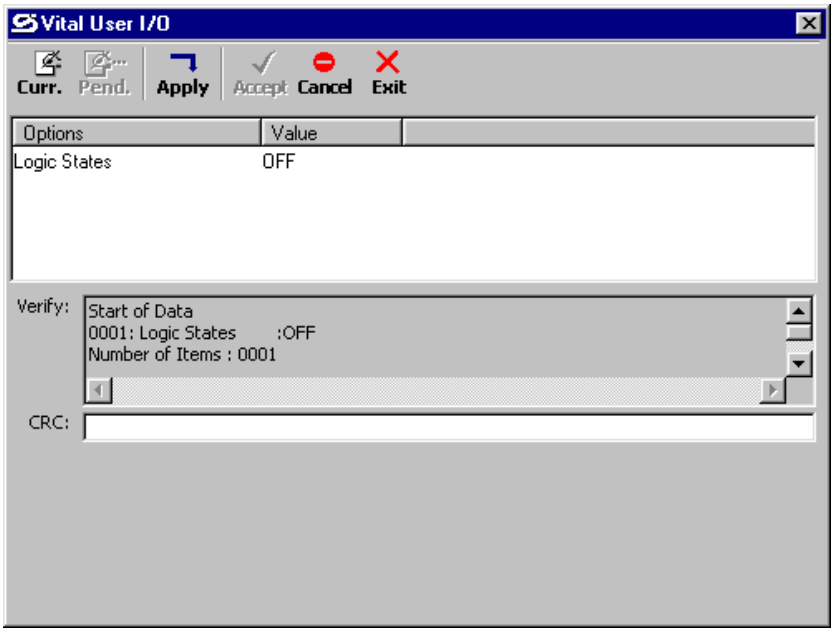


Figure 3-47
Typical Vital User I/O Configuration Display With Current Values

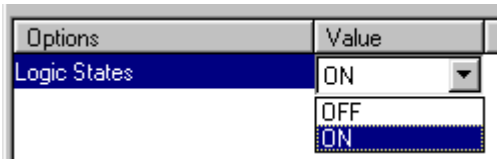
2. The current settings of the parameters are listed in the **Value** column (click on the **Current Options** button at the top of the screen to refresh the current options).

NOTE

If the current values do not appear on the "Vital User I/O" display, select the **Cancel** button to enable the **Current** button, and then select the **Current** button to display the current values. The current values are what the GEO™ unit is currently operating with and are stored in the CIC.

The current values are also displayed in the "Verify" list box immediately below the options box. The values in the **Value** field must match the values in the "Verify" list box.

3. Click on the **Value** field of the desired option to display the drop-down list control box (see detail below).



4. In the control box, click on the down arrow button (▼) to display the options list. The current selection is highlighted.

5. Click on the desired option from the drop-down list (e.g., **OFF**, **ON**) to highlight it.

NOTE

Available values for the Vital User I/O depend on the type of Vital User I/O selected (established in MCF).

6. The drop-down list closes. Verify that the desired option is now displayed in the **Value** field.

7. Make any other option changes as desired.

8. After all value changes are completed using the process just described, click on **Apply** at the top of the Vital User I/O screen. The GDT sends the changes to the GEO™ unit which processes the changes and then returns data that is displayed in the GDT "Verify" list box (see figure 3-48).

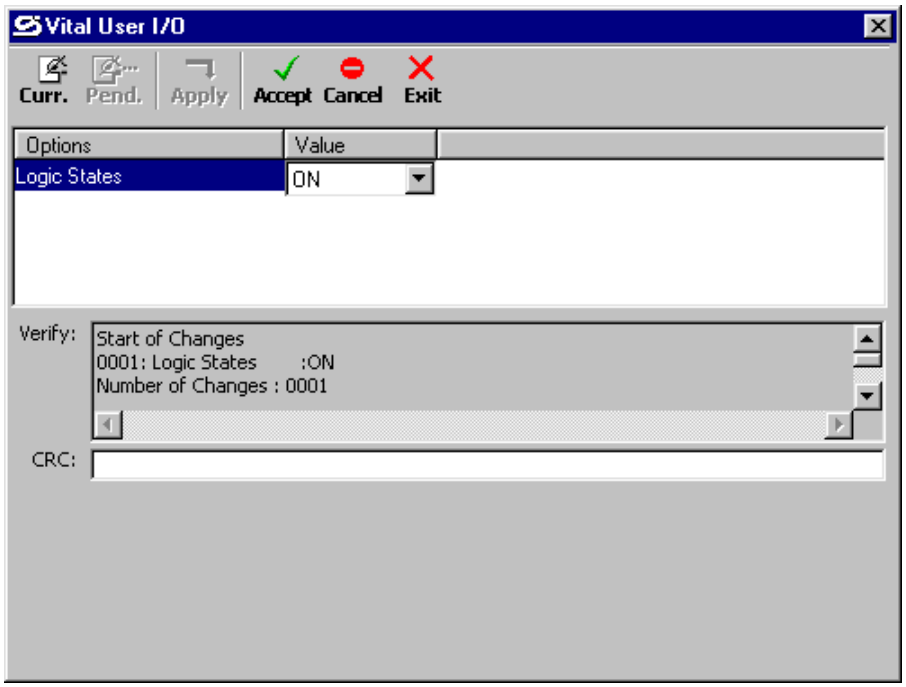


Figure 3-48
Typical Vital User I/O Configuration Display After Initial Changes

WARNING

COMPARE THE NEW VALUES IN THE "VALUE" COLUMN WITH THE CORRESPONDING VALUES IN THE "VERIFY" LIST BOX; THEY MUST MATCH AND ONLY THE DESIRED CHANGES SHOULD BE LISTED. ALSO VERIFY THAT THE "NUMBER OF CHANGES" CORRESPONDS TO THE NUMBER OF OPTION VALUES CHANGED. IF ANYTHING IS INCORRECT, CANCEL THE PROCESS BECAUSE AN ERROR HAS OCCURRED.

NOTE

Number of changes refers to the number of current values held by the CPU (CIC) that have been changed in the "Value" column.

9. To prepare the changes for acceptance, scroll down the information in the "Verify" list box and check the listed changes to verify that they are correct. If the changes are not correct, select the **Cancel** button and reenter the changes.

10. If the changes are correct, scroll down until the Confirmation CRC value is displayed and then enter this value in the "CRC" text box immediately below the "Verify" list box (figure 3-49). Entering the CRC ensures that the changes are confirmed with the GEO™ unit. This entry is not case sensitive.

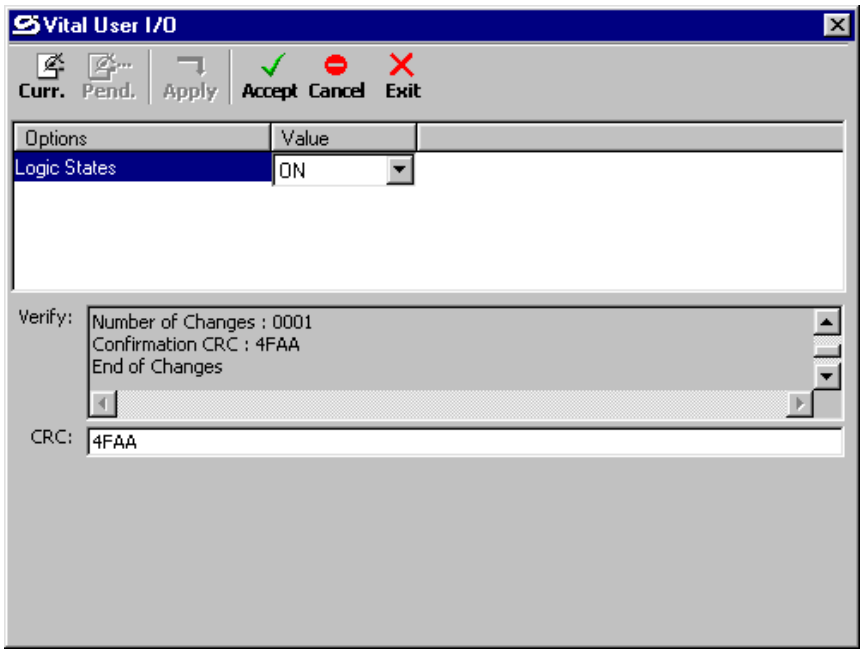


Figure 3-49
Typical Vital User I/O Configuration Display
With Confirmation CRC Entered

11. Press and release any push button on the CPU/CPU2 module and then click on the **Accept** button at the top of the display to finalize the changes. If the user forgets to press a button on the CPU/CPU2 module before clicking on the **Accept** button at the top of the display, a "Press and Release any push button on CPU module" prompt will be displayed near the bottom of the screen (see figure 3-50). If this happens, press any push button on the CPU/CPU2 module and then click on the **Accept** button at the top of the display to finalize the changes.

12. After the changes are accepted, the phrase "Changes succeeded" appears below the CRC text box (see figure 3-51). The changes have now been applied and have been enforced in the CIC. There are no pending values for Vital User I/O.

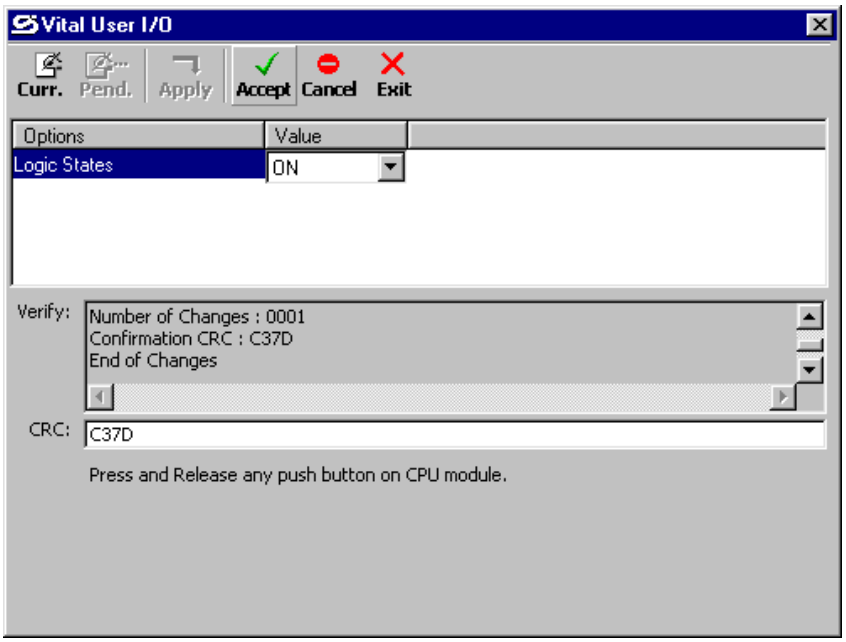


Figure 3-50
Prompt to Press any Push Button

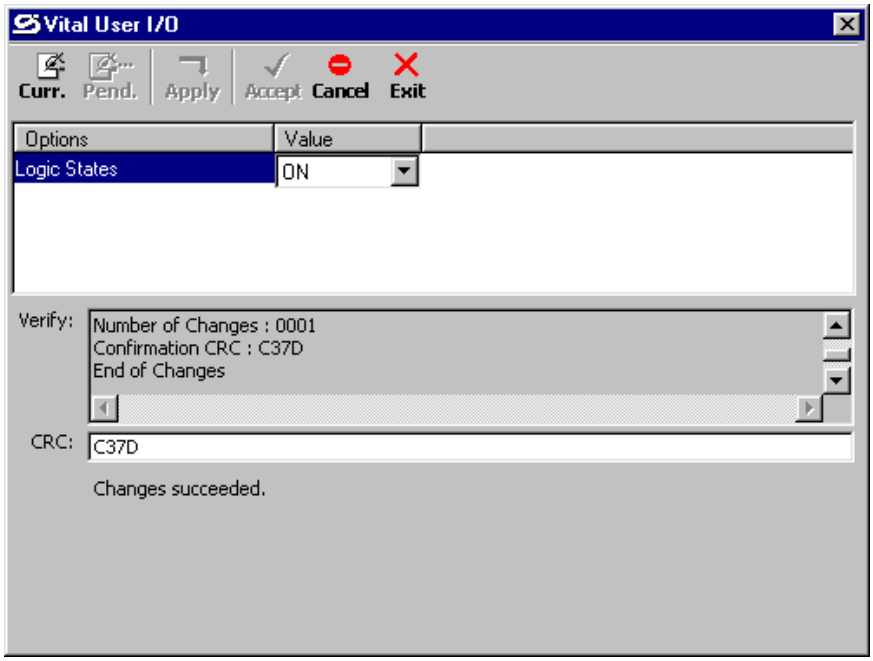


Figure 3-51
Typical Vital User I/O Configuration Display
With "Changes succeeded" Statement

NOTE

If "Changes failed" appears when the **Accept** button is selected, verify that the correct CRC was entered. If not, correct the CRC, press any push button on the CPU/CPU2 module, and select **Accept** again. If "Changes failed" is displayed again, cancel the changes and repeat the change process. If the changes fail again, reset the CPU and repeat the change process.

13. To close the Vital User I/O window, select the **X** button (**Exit**) at the top of the display to return to the GDT module assignment display.

3.2.4 Non-vital User I/O

An example of a Non-vital User I/O would be to inject an input to test a non-vital circuit. The parameters for the test must be established in the MCF.

CAUTION

SETTING NON-VITAL USER I/O INCORRECTLY COULD RESULT IN A SYSTEM THAT IS NOT FULLY OPERATIONAL. THE RAILROAD ASSUMES RESPONSIBILITY FOR ITS FIELD-CONFIGURED NON-VITAL USER I/O.

Non-vital User I/O can be changed during normal operation without requiring confirmation, UCN entry, or rebooting the CPU/CPU2 module.

NOTE

Non–vital User I/O may be set up only by using the GDT.

The GDT procedure for setting the **Non-vital User I/O** is as follows:

1. Bring up the **Non-vital User I/O** screen (Configure menu/Non-vital User I/O). Figure 3-52 presents a typical **Non-vital User I/O** screen. This display enables the user to initiate a change of the Non-vital User I/O defined in the MCF and stored in the CIC.

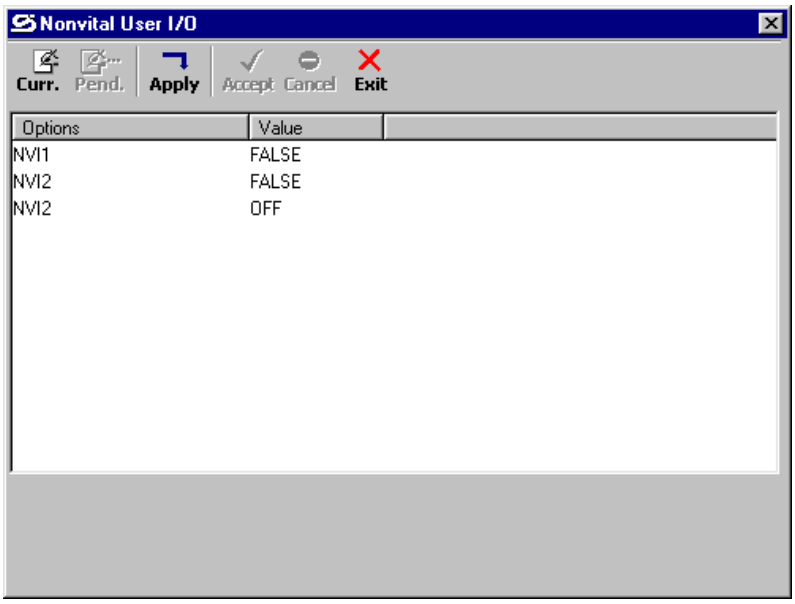


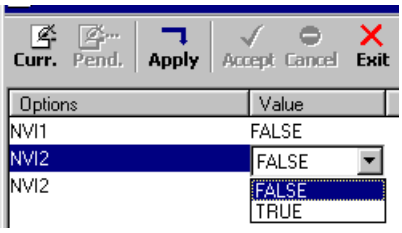
Figure 3-52
Typical Non-vital User I/O Configuration Display With Current Values

2. The current settings of the parameters are listed under the **Value** column (click on the **Current Options** button at the top of the screen to refresh the current options).

NOTE

The current values are what the GEO™ unit is currently operating with and are stored in the CIC.

3. To change a value, select that field in the "Value" column. A drop-down option box appears in place of the selected value (see drop-down option box at right). Select the down arrow (▾) button in the option box to display the list of available values (current value is highlighted). For the example above, the available values are **True/False**, and **On/Off**. The available values depend on the type of Non-vital User I/O selected (established in MCF). Select the desired value from the drop-down list. The drop-down list closes and the newly selected value replaces the former value in the "Value" column.



NOTE

When the change field requires a numeric value, spin buttons automatically appear to allow the values to be incremented/decremented by valid amounts (hold down to change continuously).

4. After all value changes are completed using the process just described, select the **Apply** button at the top of the display (refer to figure 3-53). The GDT processes the changes and uploads them to the GEO™ CIC where they become effective immediately. There are no pending values for Non-Vital User I/O.

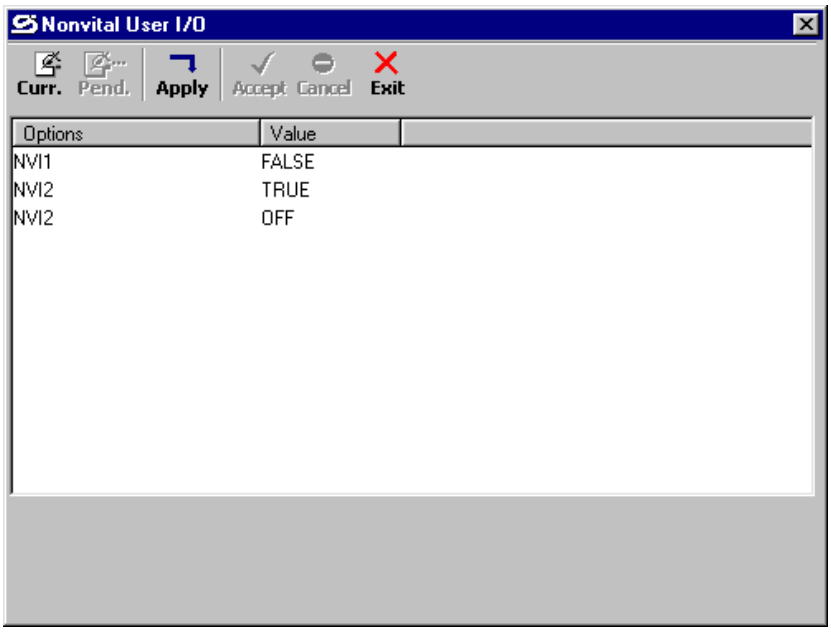


Figure 3-53
Typical Non-vital User I/O Configuration Display After Change

3.2.5 Vital User Timers

NOTE

Vital User Timers can only be viewed or changed by using the GDT utility.

If a Vital User Timer is not confirmed on startup or after a change of MCF, the system stays unconfigured and an **ERR: VTM** is displayed until corrected (Vital Timer error). The system becomes fully operational after the VTM error is cleared and the system is reset. An example of a Vital User Timer is to set the delay for crossing controller gate test. The test parameters must be established in the MCF.

Vital User Timers are protected by the UCN (Unique Check Number), therefore, if the Vital User Timers are changed, the Installer/Maintainer must enter the applicable UCN for these options and then reboot. If the UCN is incorrect, the GEO™ system boots up unconfigured.

WARNING

SETTING VITAL USER TIMERS INCORRECTLY COULD RESULT IN A HAZARDOUS EVENT. ALWAYS VERIFY VITAL USER TIMER CHANGES AFTER COMPLETING THE VITAL USER TIMER CHANGE PROCESS. THE IMPLEMENTATION OF VITAL USER TIMERS CHANGES AND THEIR EFFECTS ON RAILROAD SAFETY ARE THE RESPONSIBILITY OF THE GDT USER.

WARNING

WHEN CHANGING VITAL USER TIMERS, THE ENTIRE LOCATION AND ANY FUNCTIONS AFFECTED BY THAT CHANGE MUST BE THOROUGHLY RETESTED IN ACCORDANCE WITH FRA REGULATIONS.

WARNING

A SYSTEM REBOOT COULD OCCUR AT ANY TIME DURING THE VITAL USER TIMER CHANGE PROCESS. CAREFULLY MONITOR USER INTER-FACE INDICATORS TO DETECT A REBOOT. IF A REBOOT OCCURS BEFORE THE CHANGE PROCESS IS COMPLETE, THE ORIGINAL VITAL USER TIMER VALUES WILL REMAIN IN EFFECT UNLESS CHANGES WERE UPLOADED TO THE CIC.

NOTE

If a reboot occurs during reprogramming of the CIC, option value changes could be corrupted. This will be detected by the UCN check performed by the GEO™ unit during reboot.

NOTE

There are two phases to the process of changing Vital User Timers; 1) entering the change, and 2) providing a valid UCN to enable uploading the change to the CIC and rebooting the GEO™ unit to allow the changes to take effect.

The GDT procedure for changing the Vital User Timers is as follows:

1. Bring up the **Vital User Timers** screen (Configure menu/Vital User Timers) as shown in figure 3-54. The display includes a box for the configured Timers.

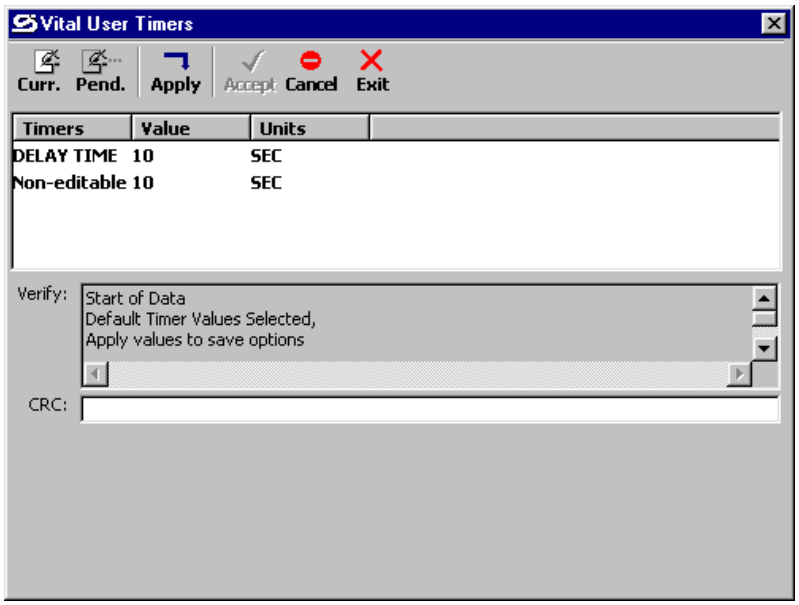


Figure 3-54
Typical Vital User Timers Configuration Display
With Current Values

2. The configured Timers are listed in the **Timers** column and the current settings of the Timer parameters are listed in the **Value** column (click on the **Current Options** button at the top of the screen to refresh the current values). The configured units for the Timer values are indicated in the **Units** column.

NOTE

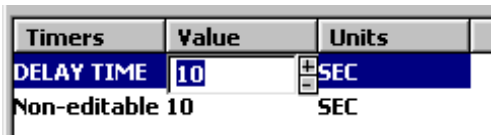
If the current values do not appear on the "Vital User Timers" display, select the **Cancel** button to enable the **Current** button, and then select the **Current** button to display the current values. The current values are what the GEO™ unit is currently operating with and are stored in the CIC.

3. Immediately below the Timers box is the "Verify" list box. The current values are also displayed in the "Verify" list box, unless the default values have been imposed (refer to figure 3-54 for an example of default values). The data in the "Verify" list box is preceded with "Start of Data", and followed by "End of Data". The current values in the **Value** field must match the values in the "Verify" list box. Also, the number of Timer items listed in the "Current" column is indicated in the "Verify" list box.

NOTE

The default Timer values may be confirmed by clicking on the **Apply** button, or they may be changed as described below.

4. To change a Timer value, click on the **Value** field of the desired Timer to highlight it and display the plus (+) and minus (-) spin controls (see detail below).

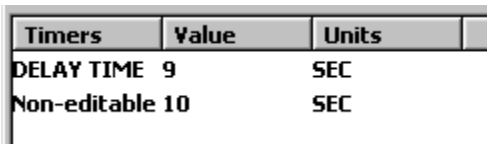


5. In the spin control box, click on the plus spin button to increase the value by valid amounts, or click on the minus spin button to decrease the value by valid amounts.

NOTE

If an invalid value is attempted, an error message similar to the one shown below is displayed.

6. When the desired value is displayed, click anywhere in the display to close the spin box and display the selected value, or select another Timer value for editing (see detail below for an example of a changed value).



NOTE

The value range, units and valid increments for Vital User Timers depend on the type (established by the MCF) of Vital User Timers selected.

7. The spin box closes. Verify that the desired Timer value is now displayed in the **Value** field.

8. Make any other Timer changes as desired.

9. After all value changes are completed using the process just described, click on **Apply** at the top of the **Vital User Timers** screen. The GDT sends the changes to the GEO™ unit which processes the changes and then returns data that is displayed in the GDT "Verify" list box (see figure 3-55). Note that the **Apply** button becomes inactive after being clicked on.

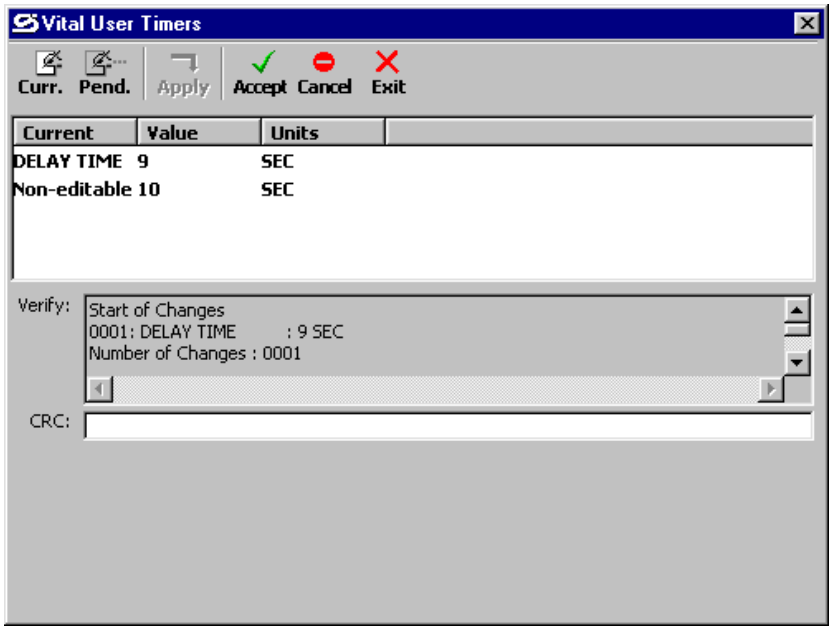


Figure 3-55
Typical Vital User Timers Configuration Display
After Initial Changes

WARNING

COMPARE THE NEW VALUES IN THE "VALUE" COLUMN WITH THE CORRESPONDING VALUES IN THE "VERIFY" LIST BOX; THEY MUST MATCH AND ONLY THE DESIRED CHANGES SHOULD BE LISTED. ALSO VERIFY THAT THE "NUMBER OF CHANGES" CORRESPONDS TO THE NUMBER OF OPTION VALUES CHANGED. IF ANYTHING IS INCORRECT, CANCEL THE PROCESS SINCE AN ERROR HAS OCCURRED.

NOTE

Number of changes refers to the number of current values held by the CPU (CIC) that have been changed in the "Value" column.

10. To prepare the changes for acceptance, scroll down the information in the "Verify" list box and check the listed changes to verify that they are correct. If the changes are not correct, select the **Cancel** button and reenter the changes.

11. If the changes are correct, scroll down until the Confirmation CRC value is displayed and then enter this value in the "CRC" text box immediately below the "Verify" list box (figure 3-56). Entering the CRC ensures that the changes are confirmed with the GEO™ unit. This entry is not case sensitive.

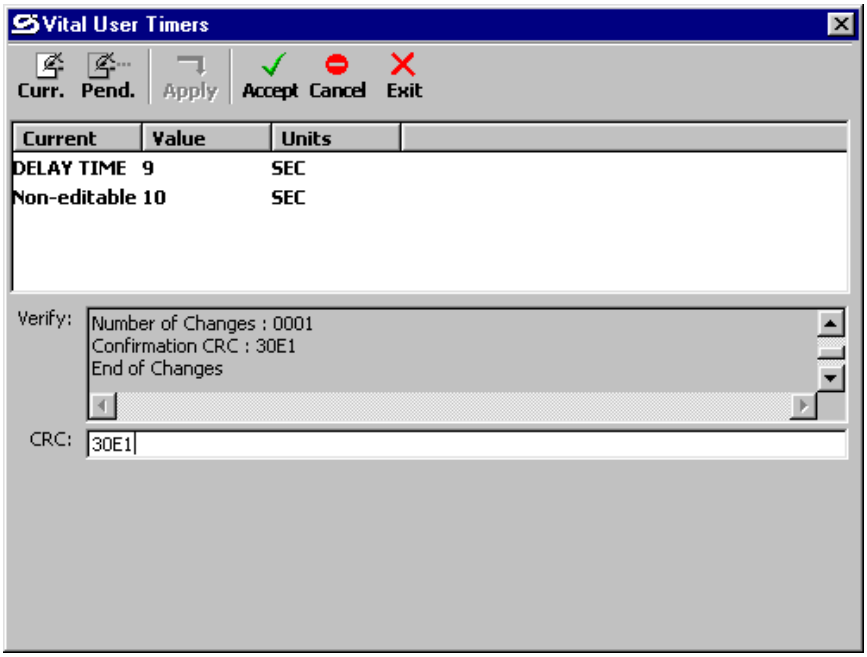


Figure 3-56
Typical Vital User Timers Configuration Display
With Confirmation CRC Entered

12. Click on the **Accept** button at the top of the display to finalize the changes. After the changes are accepted, the phrase "Changes succeeded" appears below the CRC text box (see figure 3-57). Note that the **Accept** button has become inactive. The changes (pending) are now held internally by the GEO unit, but have not been applied and have not been enforced in the CIC.

NOTE

At this point in the change process, changes have not yet been uploaded to the GEO™ CIC, and additional changes can be made. If the **Cancel** button is selected at any time during this first phase, the pending changes are erased.

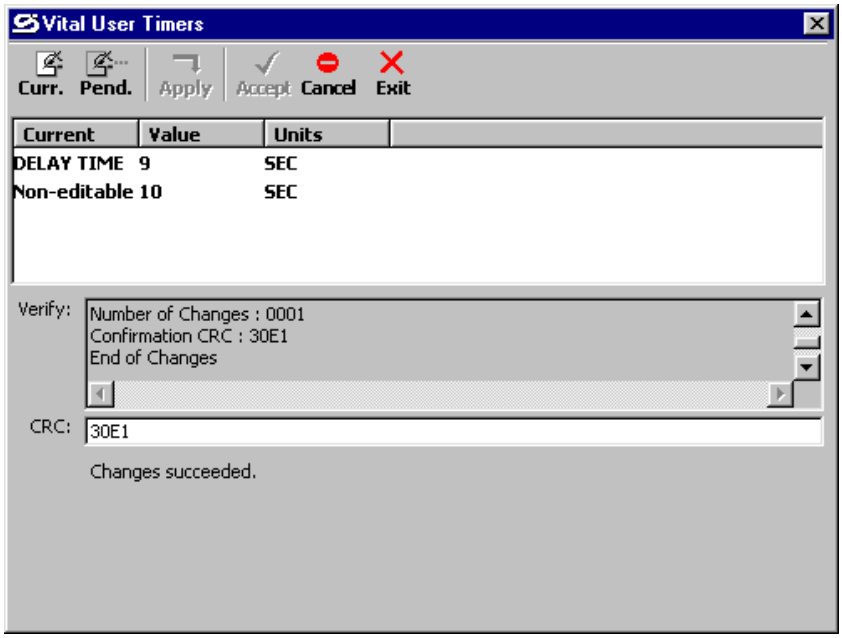


Figure 3-57
Typical Vital User Timers Configuration Display
With "Changes succeeded" Statement

NOTE

If "Changes failed" appears when the **Accept** button is selected, verify that the correct CRC was entered. If not, correct the CRC and select **Accept** again. If "Changes failed" is displayed again, cancel the changes and repeat the change process. If the changes fail again, reset the CPU and repeat the change process.

13. The changes that were made are now in the "pending" state, and will not become active until a new UCN has been entered and the system rebooted.

NOTE

Do not select the **Cancel** button unless the changes just entered on this display are to be cancelled. If the **Cancel** button was selected at any time during the first phase of the change process after new values were entered (effects value changes on current display only), no pending values will be displayed when the **Pending** button is selected and the statement "No Changes Pending" will appear in the "Verify" list box.

NOTE

Pending changes are the changes made to the current values. To view pending changes before proceeding, select the **Pending** button at the top of the display. The Timers that are pending are listed in the "Pending" column, and their values are displayed in the "Value" column (refer to figure 3-58).

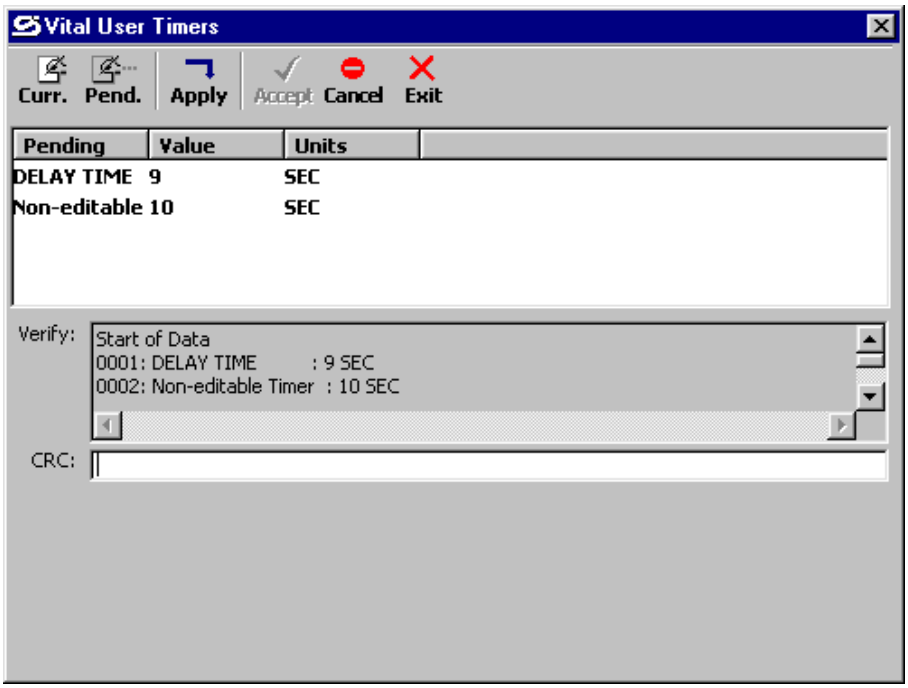


Figure 3-58
Typical Vital User Timers Configuration Display
Showing Pending Timers and Values

14. To continue with the Vital User Timers change process, select the **X** button (**Exit**) at the top of the display to return to the GDT module assignment display.

15. To make the Vital User Timers changes valid, it is necessary to enter a valid UCN and then reboot the system to enable the upload of the changes to the GEO™ CIC. Refer to paragraph 3.2.8 for instructions on setting the UCN and rebooting the CPU/CPU2 module.

NOTE

A valid UCN *must* be set after making Vital User Timer changes. When the Timers were changed and a confirmation CRC entered, a 30 minute timer was started. If the timer times out (by not setting the UCN and rebooting), the changes are discarded. This timer prevents a user from making changes and leaving them in the pending state for an extended period of time. While in the pending state, the changes are not acted upon by the GEO™ unit.

3.2.6 Non-vital User Timers

An example of a Non-vital User Timer is to set delay for testing a non-vital circuit. The parameters for the test must be established in the MCF.

CAUTION

SETTING NON-VITAL USER TIMERS INCORRECTLY COULD RESULT IN A SYSTEM THAT IS NOT FULLY OPERATIONAL. THE RAILROAD ASSUMES RESPONSIBILITY FOR ITS FIELD-CONFIGURED NON-VITAL USER TIMERS.

If a Non-vital User Timer is not confirmed on startup or after a change of MCF, the system becomes operational using the default values of the options set by the MCF, but an **ERR: NTM** is displayed (Non-vital Timer error) until changed or confirmed. Non-vital User Timers can be changed during normal operation without requiring confirmation, UCN entry, or rebooting the CPU/CPU2 module.

NOTE

Non–vital User Timers may be set up only by using the GDT.

The GDT procedure for setting the **Non-vital User Timers** is as follows:

1. Bring up the **Non-vital User Timers** screen (Configure menu/Non-vital User Timers). Figure 3-59 presents a typical **Non-vital User Timers** screen. This display enables the user to initiate a change of the Non-vital User Timers defined in the MCF and stored in the CIC.

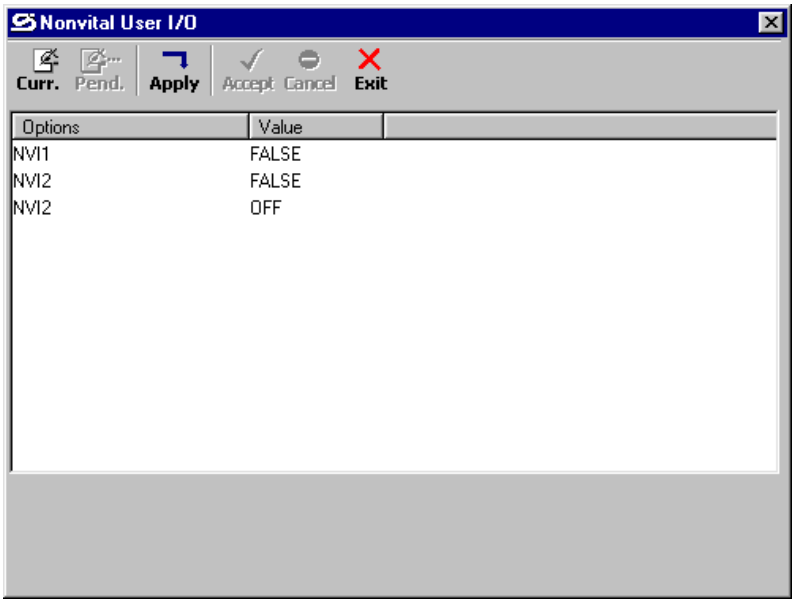


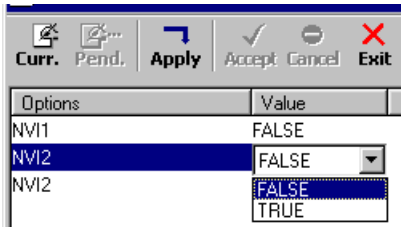
Figure 3-59
Typical Non-vital User Timers Configuration Display With Current Values

2. The current settings of the parameters are listed under the **Value** column (click on the **Current Options** button at the top of the screen to refresh the current options).

NOTE

The current values are what the GEO™ unit is currently operating with and are stored in the CIC.

3. To change a value, select that field in the "Value" column. A drop-down option box appears in place of the selected value (see drop-down option box at right). Select the down arrow (▾) button in the option box to display the list of available values (current value is highlighted). For the example above, the available values are **True**, **False**, **Off** and **On**. The available values depend on the type of Non-vital User Timers selected. Select the desired value from the drop-down list. The drop-down list closes and the newly selected value replaces the former value in the "Value" column.



NOTE

When the change field requires a numeric value, spin buttons automatically appear to allow the values to be incremented/decremented by valid amounts (hold down to change continuously).

3. After all value changes are completed using the process just described, select the **Apply** button at the top of the display (refer to figure 3-60). The GDT processes the changes and uploads them to the GEO™ CIC where they become effective immediately. There are no pending values for Non-Vital User Timers.

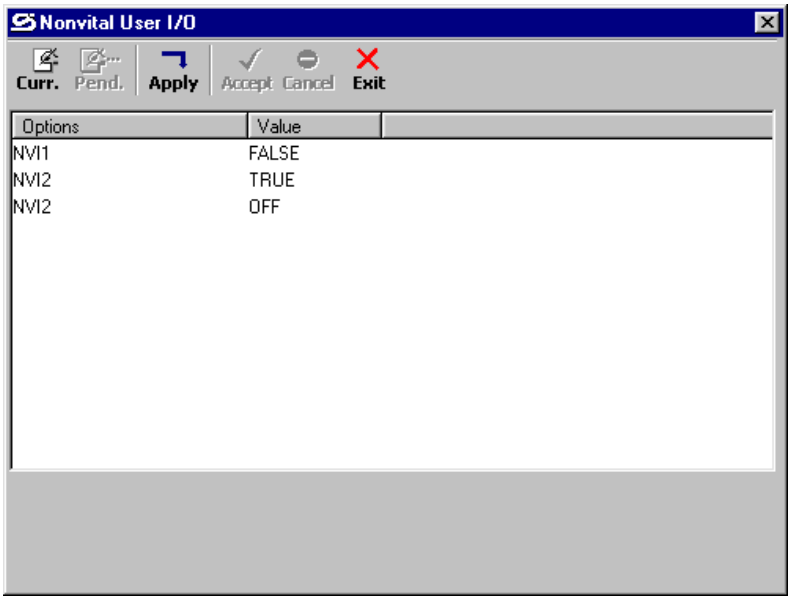


Figure 3-60
Typical Non-vital User Timers Configuration Display After Changes

3.2.7 Set SIN

The current SIN may be viewed from the header of the main GDT screen during a normal session using the DT port of the CPU/CPU2 module, from the SIN screen of the GDT, or from the Bootstrap Text Terminal screen during a reboot. The current SIN may be changed only by using the SIN screen of the GDT.

NOTE

There are two phases to the process of changing the SIN; 1) entering the change, and 2) providing a valid UCN to enable uploading the change to the CIC and rebooting the GEO™ unit to allow the changes to take effect.

The SIN is protected by the UCN (Unique Check Number), therefore, if the SIN is changed, the Installer/Maintainer must enter the applicable UCN for these options and then reboot the CPU/CPU2 module. If the UCN is incorrect, the GEO™ system boots up unconfigured.

The GDT procedure for setting the SIN is as follows:

1. Using the GDT, bring up the **SIN** screen (Configure menu/Set SIN). The **SIN** screen (figure 3-61) is displayed presenting the "Current SIN" in a text box.

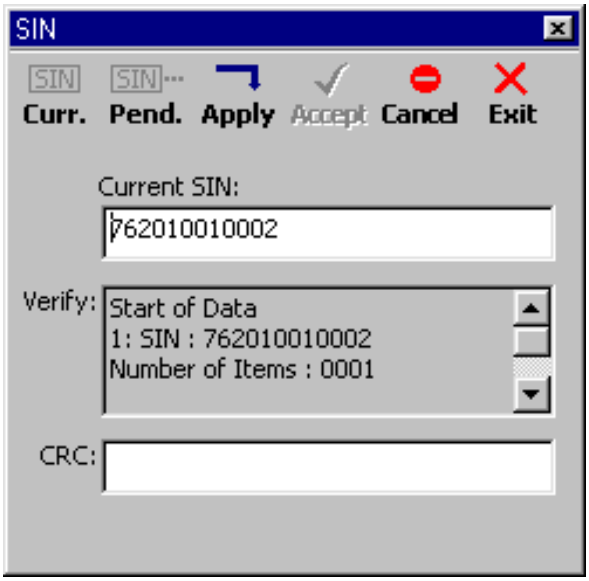


Figure 3-61
Typical Set SIN Display With Current SIN

NOTE

If the SIN does not appear in the "Current SIN" text box on the **SIN** screen, click on the Current (**Curr.**) button to display the SIN.

2. The current SIN is also displayed in a "Verify" list box immediately below the "Current SIN" text box (refer to figure 3-61). The current SIN in the text box must match the SIN in the "Verify" list box.

NOTE

An ATCS address (SIN) is not used in all applications, however, a SIN is generated for the MCF in order to be included with the UCN calculation. This SIN may be changed, but requires a change of UCN.

NOTE

A SIN of all zeros is invalid (a number must be assigned), and in such a case the "Verify" list box indicates that the SIN is "illegal". Assign a valid SIN.

WARNING

CHANGING THE SIN REQUIRES REBOOTING THE GEO™ SYSTEM. BEFORE CHANGING THE SIN, ENSURE THAT ADEQUATE PRECAUTIONS ARE TAKEN TO PROTECT PERSONNEL, TRAINS AND OTHER VEHICLES IN THE AREA UNTIL PROPER SYSTEM OPERATION HAS BEEN VERIFIED.

3. To change the SIN, modify the number in the "Current SIN" text box as required (last digit changed to 1 in this example), and select the **Apply** button at the top of the display. The new SIN is displayed in the "Current SIN" text box.

WARNING

TO ENSURE THAT NO POTENTIAL SAFETY CONFLICTS CAN OCCUR WITH OTHER EQUIPMENT, VERIFY THAT THE NEW SIN IS UNIQUE TO THE GEO™ DEVICE BEING CONFIGURED.

WARNING

A SYSTEM REBOOT COULD OCCUR AT ANY TIME WHILE PERFORMING CHANGES TO THE SIN. PAY CLOSE ATTENTION TO MODULE INDICATORS AND THE FOUR-CHARACTER DISPLAY ON THE CPU/CPU2 MODULE TO MONITOR SYSTEM STATUS. IF A REBOOT OCCURS BEFORE THE CHANGE PROCESS IS COMPLETE, THE ORIGINAL SIN WILL REMAIN IN EFFECT UNLESS CHANGES WERE UPLOADED TO THE CIC.

NOTE

If a reboot occurs during the burning of the CIC, Site Identification Number changes could be corrupted. This will be detected by the UCN check performed by the GEO™ unit during reboot.

4. The **Apply** button is disabled as the GDT sends the changes to the GEO™ unit which processes the changes and then returns data that is displayed in the **SIN** window "Verify" list box (see figure 3-62).

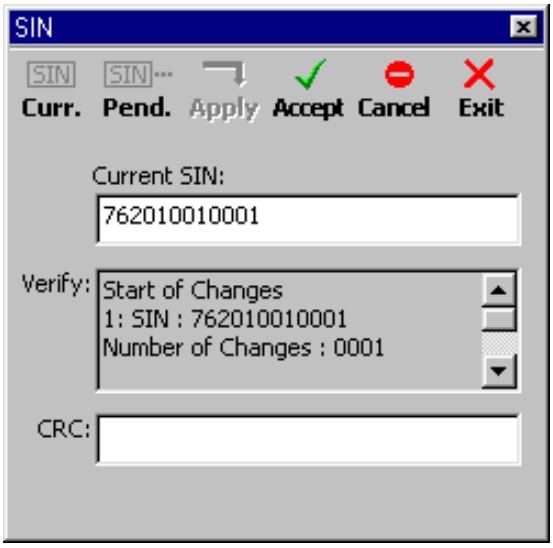


Figure 3-62
Typical Set SIN Display with New SIN

WARNING

COMPARE THE SIN IN THE "SIN" TEXT BOX WITH THE SIN IN THE "VERIFY" LIST BOX; THEY MUST MATCH. ALSO VERIFY THAT THE "NUMBER OF CHANGES" INDICATES 1.

5. To prepare the change for acceptance, scroll down the information in the "Verify" list box until the Confirmation CRC value is displayed. Using the keyboard, enter this value in the "CRC" text box immediately below the "Verify" list box (see figure 3-63). Entering the CRC ensures that the changes are sent to the GEO™ unit. This entry is not case sensitive.

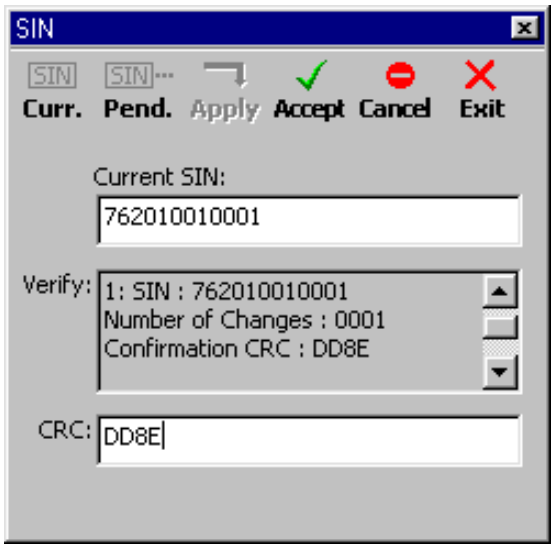


Figure 3-63
Typical Set SIN Display with Confirmation CRC Entered

6. Select the **Accept** button at the top of the display to finalize the changes. After the changes are accepted, the **Accept** button is disabled and the phrase "Changes succeeded" appears below the CRC text box (see figure 3-64).

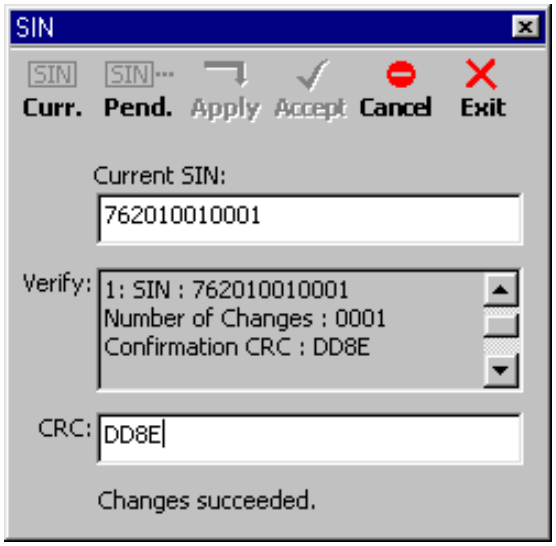


Figure 3-64
Typical Set SIN Display with "Changes succeeded" Statement

7. The changes are now held internally by the GEO™ unit, but have not been applied and have not been burned in the CIC.

NOTE

At this point in the change process, changes have not yet been uploaded to the GEO™ CIC. Additional changes can be made at this time. If the **Cancel** button is selected at any time during this first phase, the pending changes are erased.

NOTE

If "Changes failed" appears when the **Accept** button is selected, verify that the correct CRC was entered. If not, correct the CRC and select **Accept** again. If "Changes failed" is displayed again, cancel the changes and repeat the change process. If the changes fail again, reset the CPU and repeat the change process.

8. To make the SIN change valid, it is necessary to enter a valid UCN and then reboot the system to enable the upload of the changes to the GEO™ CIC. Refer to paragraph 3.2.8 for instructions on setting the UCN and rebooting the system.

WARNING

ALWAYS VERIFY SITE IDENTIFICATION NUMBER CHANGES AFTER COMPLETING THE CHANGE PROCESS.

NOTE

The vital configuration protocol provides a 30 minute timer that starts when parameters are changed or a confirmation CRC is entered. If the timer times out (by not setting the UCN and rebooting), the changes are discarded. This timer prevents a user from making changes and leaving them in the pending state for an extended period of time. While in the pending state, the changes are not acted upon by the GEO™ unit.

3.2.8 Set UCN

The UCN (Unique Check Number) is a configuration validation number calculated from the contents of an approved MCF, MEF and field-configurable CIC options. This number must be entered following any changes to SIN, Vital User Options, or Configuration Parameters (refer to Section IV for information on vital configuration and UCN configuration protocols). Once the UCN is successfully entered, the system must be rebooted for the changes to take effect.

NOTE

It is recommended that the MCF CRC, SIN and vital user options are set before the UCN is set. Once the UCN is set, additional changes cannot be made to parameters protected by the UCN without requiring another change of UCN.

NOTE

The GDT vital configuration protocol provides a 30 minute watchdog timer that starts when parameters are changed or a confirmation CRC is entered. If the watchdog times out (by not setting the UCN and rebooting), the changes are discarded. This timer prevents a user from making changes and leaving them in the pending state for an extended period of time. While in the pending state, the changes are not acted upon by the GEO™ unit.

The process for setting the UCN is different for the Installers version and Maintainers version of the GDT. Only authorized railroad personnel are issued the Installers version. The Installers version allows the user to request that the GEO™ unit calculate the new UCN for the new SIN or Vital User Options to be stored in the CIC. The Maintainer must be issued the new UCN along with detailed change instructions by railroad supervisory personnel.

WARNING

CARE SHOULD BE EXERCISED IN THE DISTRIBUTION AND USE OF THE INSTALLER VERSION OF THE GDT. BECAUSE THE INSTALLER VERSION CAN CALCULATE THE UCN FOR ANY CHANGES IN VITAL OPTIONS, THE POTENTIAL EXISTS FOR IMPROPER OR UNSAFE VITAL OPTION INPUT TO THE SYSTEM.

To initiate the process of uploading changes, select “Set UCN” from the Configure menu. A display similar to the one shown in figure 3-65 appears on the screen.

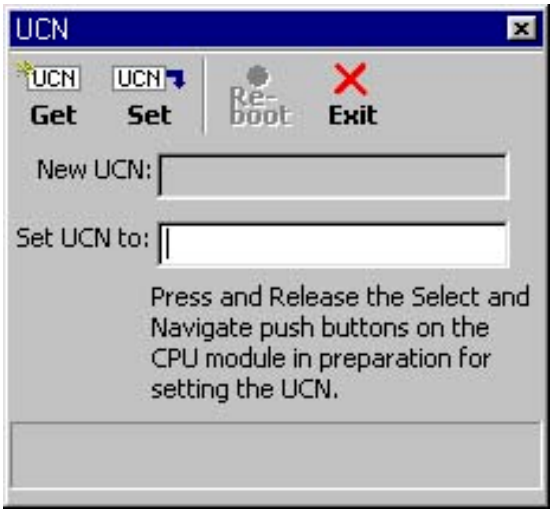


Figure 3-65
Set UCN Display (Installers Version)

NOTE

Only the Installers version has an active **Get UCN** button on the UCN display. With the Maintainers version of the GDT, the **Get UCN** button is disabled on the UCN display.

The Maintainers version and the Installers version of the GDT differ in the way the UCN is obtained and set. The Maintainers version of the GDT does not allow the user to request the GEO™ system to calculate a new UCN for any changes in vital options. The Maintainer must request the new UCN from the proper railroad supervisory personnel. Refer to figure 3-69 for a typical **Set UCN** display for the Maintainers version of the GDT.

NOTE

The Maintainers version of the GDT software is incapable of calculating the UCN for any changes in vital options. Only the Installers version of the GDT can calculate the UCN for any changes in vital options.

3.2.8.1 UCN For Installers Version Only

WARNING

THE GDT INSTALLERS VERSION CAN CALCULATE THE UCN FOR ANY CHANGES IN VITAL OPTIONS. VERIFY THAT ALL VITAL OPTION CHANGES ARE PER RAILROAD SPECIFICATION BEFORE GENERATING THE UCN.

1. For obtaining and entering the UCN for the installers version, click on the **Get UCN** button at the top of the display. A new UCN is generated by the GEO™ wayside unit and displayed in the "New UCN" text box (see figure 3-66).

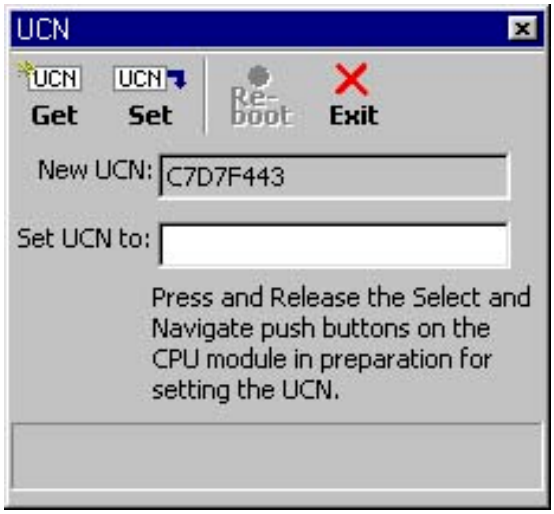


Figure 3-66
Set UCN Display (Installers Version) With Generated UCN

NOTE

The UCN displayed when the **Get UCN** button is clicked on is calculated when the request is made. To view the UCN currently stored in the CIC, select the "CPU Version" option from the View menu (paragraph 3.5.1).

2. Enter this new UCN in the "Set UCN to" text box (this entry is not case sensitive). Verify that the entered UCN matches the generated UCN.

3. Simultaneously press and release the Select and Navigate push buttons on the GEO™ CPU module, then click on the **Set UCN** button at the top of the display. The statement "Changes saved successfully" appears on the GDT display (figure 3-67).

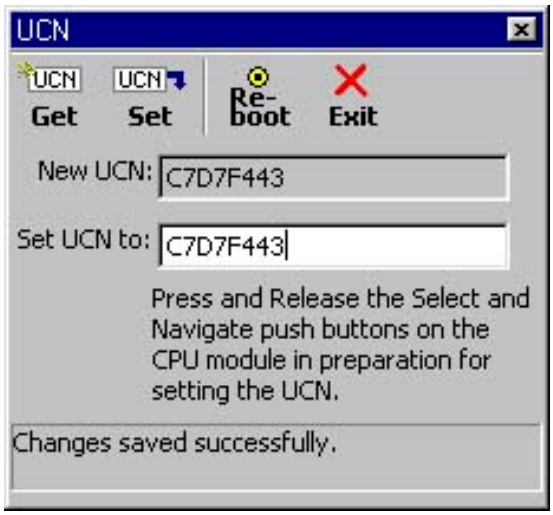


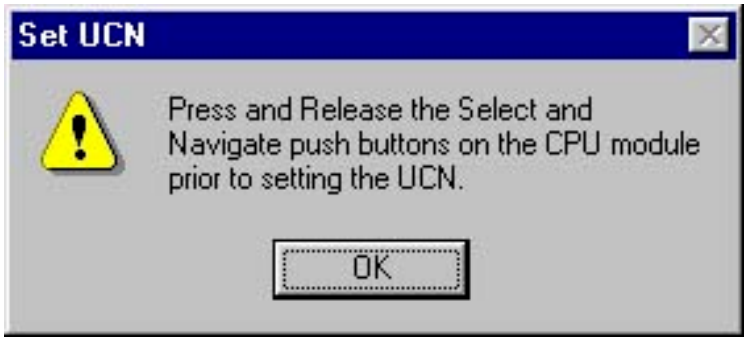
Figure 3-67
Set UCN Display (Installers Version),
"Changes saved successfully"

NOTE

When the Select and Navigate push buttons are pressed, a 1-minute timer provided by the vital configuration protocol is started. The **Set UCN** button must be clicked on before that timer times out. If the timer times out, press and release the Select and Navigate push buttons again before clicking on the Set UCN button. Otherwise, the user is prompted by the Set UCN message shown below.

NOTE

If the **Set UCN** button is clicked on, but the **Select** and **Navigate** push buttons on the GEO™ unit were not pressed as directed (see figure 3-66), the Set UCN message shown at right is displayed. Click on the **OK** button in the message box and then repeat the button sequence.



NOTE

If an incorrect UCN is entered, The statement "Error: UCN incorrect." appears above the "Changes saved successfully" statement as shown in figure 3-68. If this is the result of a mistake, enter the correct UCN, simultaneously press and release the Select and Navigate push buttons and, within 1 minute, click on the **Set UCN** button.

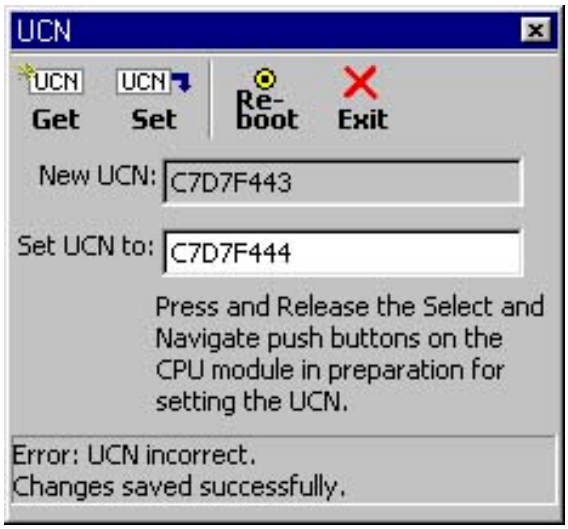


Figure 3-68
Set UCN Display (Installers Version),
"Error: UCN incorrect"

NOTE

An incorrect UCN can be entered deliberately to disable the GEO™ unit.

4. To upload the changes to the GEO™ CIC, click on the **Reboot** button at the top of the GDT display. Observe the four-character display on the CPU module to verify that a reboot sequence has been initiated (reads "SDWN" followed by "BOOT").

NOTE

The GDT vital configuration protocol provides a 5 minute timer that starts when the **Set UCN** button is selected. If the **Reboot** button is not clicked on before the timeout period ends, the system automatically reboots.

WARNING

WHEN THE REBOOT IS COMPLETE, RESTART THE GDT IF NECESSARY, AND VERIFY THAT THE CURRENT VALUES OF THE ITEMS THAT WERE CHANGED AGREE WITH THE CHANGES MADE AND UPLOADED TO THE CIC.

WARNING

FOLLOWING A SUCCESSFUL CHANGE OF UCN, VITAL FUNCTIONS MUST BE TESTED AND VERIFIED PER RAILROAD POLICY.

3.2.8.2 UCN For Maintainers Version Only

1. For entering the UCN for the maintainers version, enter the new UCN provided with the change instructions in the "Set UCN to" text box (this entry is not case sensitive). Verify that the entered UCN matches the UCN provided.

2. Simultaneously press and release the Select and Navigate push buttons on the GEO™ CPU module, then click on the **Set UCN** button at the top of the display. The statement "Changes saved successfully" appears on the GDT display (figure 3-69).

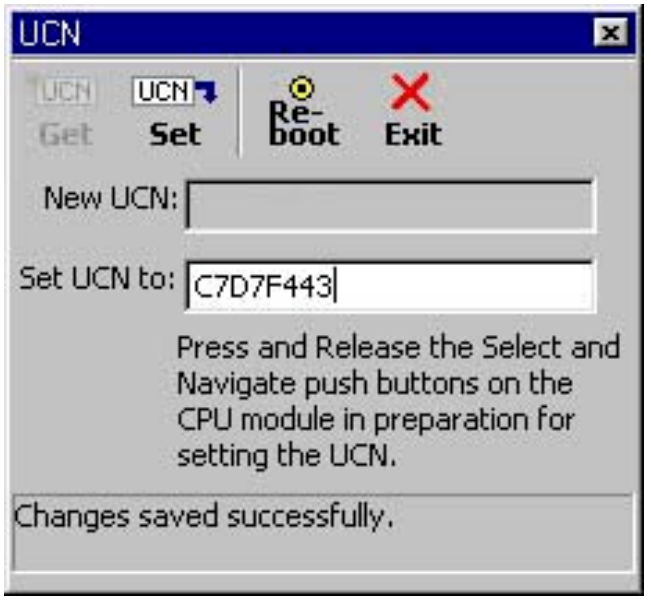


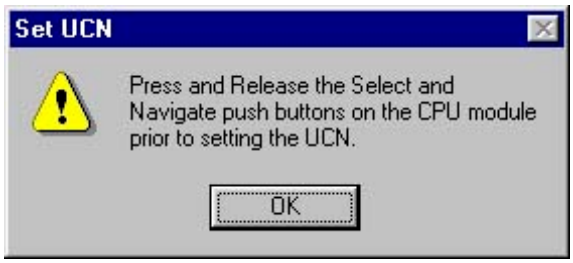
Figure 3-69
Set UCN Display (Maintainers Version), "Changes saved successfully"

NOTE

When the Select and Navigate push buttons are pressed, a 1-minute timer provided by the vital configuration protocol is started. The **Set UCN** button must be clicked on before that timer times out. If the timer times out, perform the press and release sequence on the **Select** and **Navigate** push buttons again before selecting the **Set UCN** button. Otherwise, the Set UCN prompt shown below will be displayed.

NOTE

If the **Set UCN** button is clicked on, but the **Select** and **Navigate** push buttons on the GEO™ unit were not pressed as directed (see figure 3-69), the Set UCN message shown at right is displayed. Click on the **OK** button in the message box and then repeat the button sequence.



NOTE

If an incorrect UCN is entered, The statement "Error: UCN incorrect." appears above the "Changes saved successfully" statement as shown in figure 3-70. If this is the result of a mistake, enter the correct UCN, simultaneously press the **Select** and **Navigate** push buttons and then release them and, within 1 minute, click on the **Set UCN** button.

Figure 3-70
Set UCN Display (Maintainers Version), "Error: UCN incorrect"

NOTE

An incorrect UCN can be entered deliberately to disable the GEO™ unit.

3. To upload the changes to the GEO™ CIC, select the **Reboot** button at the top of the GDT display. Observe the four-character display on the CPU module to verify that a reboot sequence has been initiated (reads “SDWN” followed by “BOOT”).

NOTE

The vital configuration protocol provides a 5 minute timer that starts when the **Set UCN** button is clicked on. If the **Reboot** button is not clicked on before the timeout period ends, the system is automatically reboots.

WARNING

WHEN THE REBOOT IS COMPLETE, RESTART THE GDT IF NECESSARY, AND VERIFY THAT THE CURRENT VALUES OF THE ITEMS THAT WERE CHANGED AGREE WITH THE CHANGES MADE AND UPLOADED TO THE CIC.

WARNING

FOLLOWING A SUCCESSFUL CHANGE OF VITAL USER OPTIONS, VITAL OPTION CONFIGU-RATIONS MUST BE TESTED AND VERIFIED PER RAILROAD POLICY.

3.2.9 Set Time

The Set Time function is used to set the GEO™ real time clock in the CPU module. The output from this clock is provided to the I/O modules for event time stamps. The date and time can be set at any time, by using either the GDT or the Maintainers Interface.

The GDT procedure for setting date and time is as follows:

1. From the GDT main screen, select **Set Time** from the **Configure** menu.

2. The **Time** window is displayed (figure 3-71), with the currently set date and time displayed.

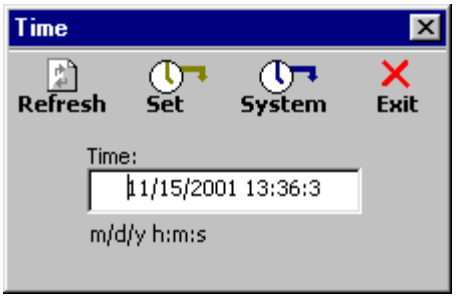


Figure 3-71
Time Window

3. When setting time, select "Refresh" to refresh the display with the current CPU time.

NOTE

To automatically adjust the GEO™ CPU time to the PC system time, select **System**.

4. To change any portion of the date/time, highlight the field to be changed and type in the new value, or alternatively, right-click on the highlighted field to bring up a shortcut menu containing the "Cut", "Copy", "Paste", "Delete", and "Select All" functions.

NOTE

To make it easier to synchronize the time, enter a time that is a few seconds later than the current time and wait for the actual time to arrive before selecting **Set**.

5. When the correct date and time has been entered, or when the set time arrives, select the **Set** button.

NOTE

GEO™ system time is in 24-hour format.

6. Select the **Exit** button to close the **Time** window and return to the GDT main screen.

3.2.10 Delete MCF

The "Delete MCF" function is provided to invalidate the MCF, or as a quick means of disabling the GEO™ unit, and can be done either remotely or locally.

NOTE

Deleting the MCF makes the GEO™ wayside unit inoperative in a fail-safe mode.

NOTE

Deleting the MCF can be done remotely, however, once deleted, the MCF must be reinstalled locally.

The procedure for deleting the MCF is as follows:

1. From the Configure menu of the GDT, select “Delete MCF”.

2. The confirmation prompt shown below is displayed to allow this command to be executed or cancelled.

3. Click on **Yes** to delete the MCF or click on **No** to cancel the function.

4. If **Yes** is clicked on, the GEO™ unit reboots unconfigured, causing the unit to be disabled in a safe mode.

NOTE

Error messages on the 4-character display of the CPU/CPU2 module will include: **ERR: MCF* CRC* MCI* SIN* UCN* NOP* VOP***.

3.3 SETUP MENU

The Setup menu contains the functions listed below and described in the paragraphs that follow.

- Communication
- Destination Address

3.3.1 Communication

Selecting the "Communication" option from the Setup menu produces the Serial Port Settings display shown in figure 3-72. This display is used to select the serial communications port and the baud rate settings for the PC. The default settings are COM1 and 56000 baud.

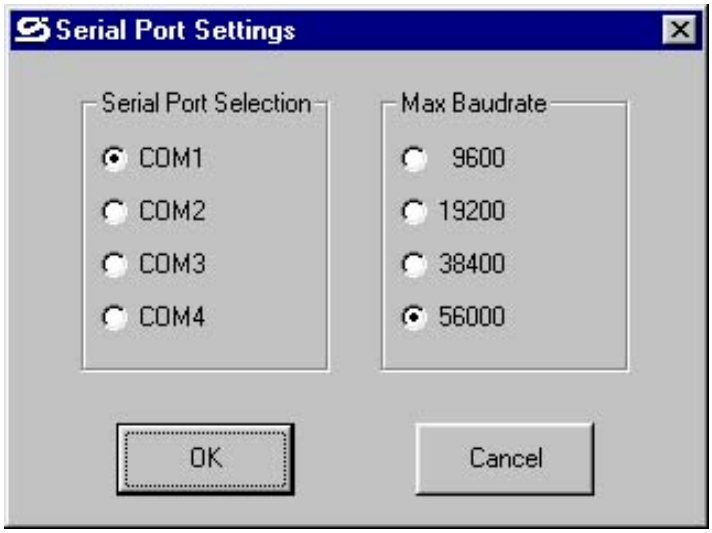


Figure 3-72
Serial Port Settings Display

NOTE

The baud rate setting is dependent on the capabilities of the PC.

Click on the **OK** button to close the display and save the new settings.

Click on the **Cancel** button to close the display without saving new settings.

NOTE

When attempting to establish communications between the GDT and the GEO™ unit, if an error message is displayed indicating that the incorrect serial port is selected, check the Windows® task list for multiple copies of the GDT Diagnostic Terminal application (see figure 3-73). Multiple or phantom copies of the GDT Diagnostic Terminal program can remain if communication is inadvertently lost between the GDT and the GEO™ unit.

NOTE

To remove multiple copies of the GDT (see figure 3-73), press the Ctrl, Alt and Delete keys on the keyboard once to display the task list, then select and end each occurrence of the GDT Diagnostic Terminal application. Close the task list and restart the GDT application.

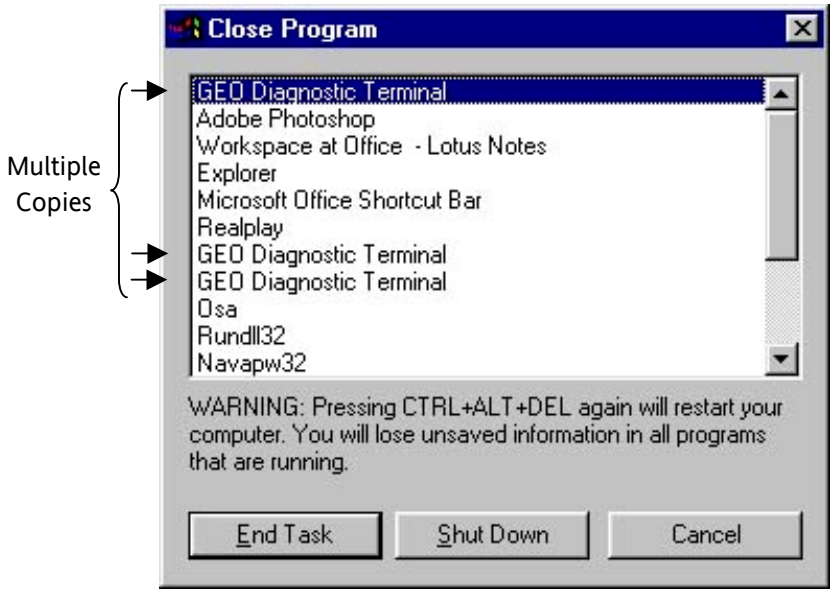


Figure 3-73
Windows® Task List With Multiple GDT Diagnostic Terminal Occurrences

3.3.2 Destination Address

Selecting "Destination Address" from the **Setup** menu produces the menu shown in figure 3-74. This menu contains two options as follows:

- local
- remote

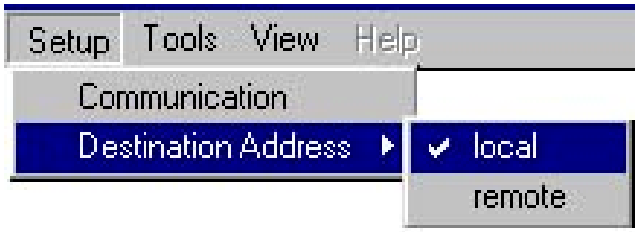


Figure 3-74
Destination Address Menu

Select the "local" option (a checkmark is placed next to the "local" Destination Address in the **Setup** menu) if the GDT is to monitor only the GEO™ unit it is connected to via the serial cable. The display of figure 3-75 appears as the GDT reestablishes the connection with that GEO™ unit.

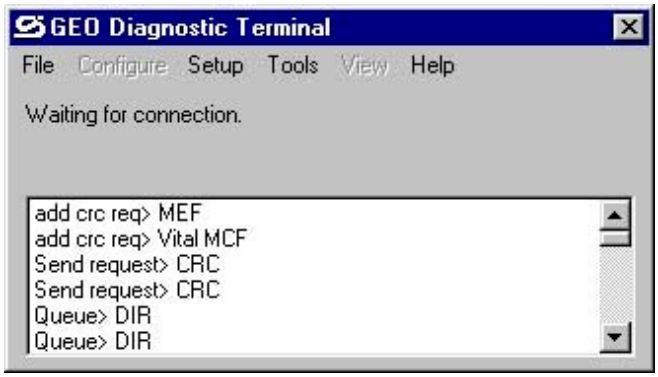


Figure 3-75
GDT Data Download Display (Following Local Destination Address selection)

Select the "remote" option from the Destination Address menu if the GDT is to monitor a GEO™ unit on a LAN other than the unit it is connected to via the serial cable. The display shown in figure 3-76 appears.

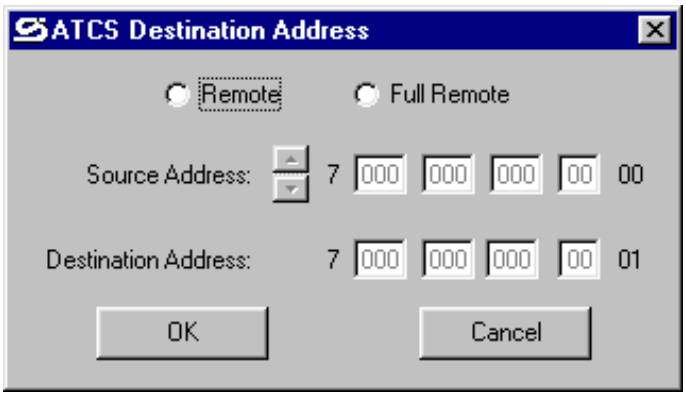


Figure 3-76
Remote Destination Address Entry Display

NOTE

The "Source Address" and "Destination Address" fields in the ATCS Destination Address display are inactive until either "Remote' or "Full Remote" is selected.

The ATCS Destination Address display offers two options for connecting remotely, as follows:

- Remote — Use to communicate with a remote GEO unit (destination address) when the DT is connected to a GEO unit (source address not required)
- Full Remote — Use to communicate with a remote GEO unit (destination address) when the DT is connected to a GEO LAN through another means (source address)

One of the two options above must be selected to communicate remotely. A checkmark is then placed next to the "remote" Destination Address in the **Setup** menu.

For the "Remote" option, enter the ATCS destination address of the remote unit and then select the **OK** button. The GDT connects to the remote unit as previously described for the local unit.

NOTE

Full Remote is not currently implemented.

For the "Full Remote" option, the ATCS source address as well as the ATCS destination address of the remote unit must be identified. The source address field provides spin buttons to select type "7" (ATCS) addressing, or type "2" addressing when required.

WARNING

EXERCISE EXTREME CAUTION WHEN REMOTELY CHANGING VITAL USER OPTIONS OR SAFETY RELATED PARAMETERS. AUTHORIZED RAILROAD PERSONNEL MUST BE PRESENT AT THE REMOTE LOCATION. CHANGING VITAL USER OPTIONS REQUIRES REBOOTING THE GEO™ SYSTEM AND AFFECTS VITAL SYSTEM LOGIC OPERATIONS. ENSURE THAT ADEQUATE PRECAUTIONS ARE TAKEN TO PROTECT PERSONNEL, TRAINS AND OTHER VEHICLES IN THE AREA UNTIL PROPER SYSTEM OPERATION HAS BEEN VERIFIED.

WARNING

FOLLOWING A SUCCESSFUL CHANGE OF VITAL USER OPTIONS OR SAFETY RELATED PARAMETERS, VITAL OPTION CONFIGURATIONS MUST BE TESTED AND VERIFIED PER RAILROAD POLICY.

To cancel the remote address selection before the **OK** button on the **Remote Destination Address Entry** display has been clicked on, select the **Cancel** button on the ATCS Destination Address display (figure 3-76). The "remote" option will remain selected (✓) on the Destination Address menu but the GDT will remain in communication with the local unit.

3.4 TOOLS MENU

The Tools menu contains one entry: “Sniffer”. Select “Sniffer” to display the Sniffer screen depicted in figure 3-77.

NOTE

The Sniffer is provided as a diagnostic tool primarily for use by Safetran Engineering personnel.

The Sniffer monitors ATCS message activity between the GEO™ unit CPU and the GDT and displays the message bytes for evaluation. This is a dynamic display. As new message traffic occurs, it is added to the bottom of the display and the message list scrolls up screen.

Select the **Stop** button to freeze the display so that currently displayed messages may be examined. The button label changes to **Continue**. Select the button again to continue monitoring messages as they occur.

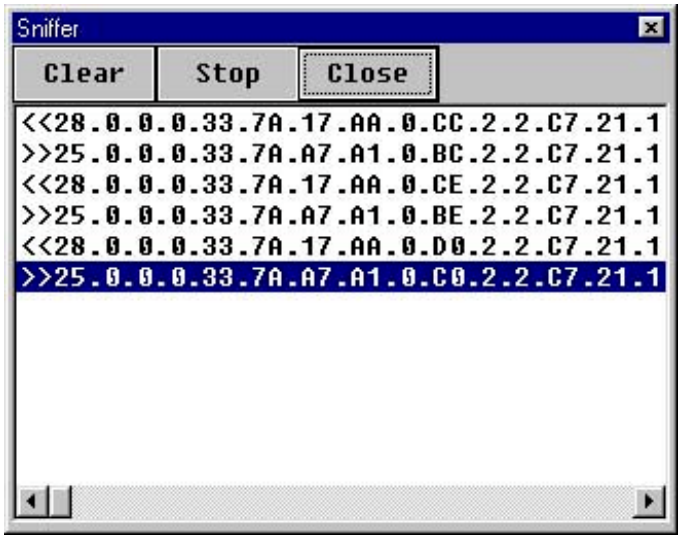


Figure 3-77
Typical Sniffer Display

Select the **Clear** button to remove all currently displayed messages from the screen. New messages will appear on the display as they are sent or received.

Select the **Close** button to exit this display and return to the module assignment display.

3.5 VIEW MENU

The View menu contains the four functions listed below and described in the following paragraphs.

- CPU Version
- Logic States
- Statistics
- Refresh

3.5.1 CPU Version

Selecting "CPU Version" from the View menu produces a display similar to the one in figure 3-78.

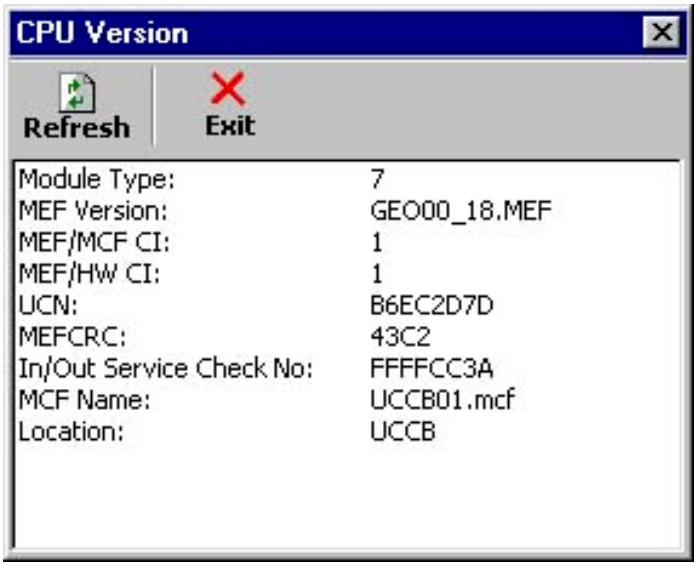


Figure 3-78
Typical GDT CPU Version Display

The following information is provided by this display:

- **Module Type** - number assigned to module in Safetran Peripheral Card Interface Specification (see table 3-3).
- **MEF Version** - the current GEO™ module executable file (MEF).
- **MEF MCF CI** - the MEF to Module Configuration File (MCF) compatibility index (CI). This field is intended for factory use only.
- **MEF HW CI** - the MEF to hardware (HW) compatibility index. This field is intended for factory use only.
- **UCN** - the current unique configuration number (UCN).
- **MEF CRC** – the current MEF cycle redundancy check (CRC) number.
- **In/Out Service Check Number** – the service status number generated by the GEO™ unit.
- **MCF Name** – the file name of the current MCF.
- **Location** – the group location of the current MCF.

Select the **Refresh** button to update the information fields on the display.

Select the **Exit** button to return to the module assignment display.

Table 3-3
Module Type Identification

Type ID	Module Description
01	GEO™ Coded Track module (TRK), compatible with Electro Code®
02	GEO™ Searchlight module (SLS) – supports 2 mechanisms, and has 2 auxiliary VPIs and 1 auxiliary VRO
03	GEO™ Colorlight module (CLS) – supports 6 VLOs, 2 auxiliary VPIs and 1 auxiliary VRO
04	GEO™ Coded Line module (LIN), used to carry track codes on wayside cable, compatible with Electro Code®
05	GEO™ Vital Parallel Input module (VPI) – supports 8 VPIs and 2 NVAI
06	GEO™ Vital Relay Output module (VRO) – supports 6 VROs
07	GEO™ CPU module for use primarily in intermediate signals applications, no Echelon® LAN and no serial communication capability. Supports 8 I/O Cards.
08	GEO™ General purpose I/O module (RIO), supports 4 VPIs, 4 VROs
09	GEO™ CPU2 module vital logic processor (VLP) - supports interface to CP_PROC and 8 I/O modules
10	GEO™ CPU2 module non-vital/communication processor (CP) - supports interface to VLP2_PROC, and Echelon® port and 2 serial ports (RS-232,422, 485).
11	Reserved for future use
12	Reserved for future use
13	Reserved for future use
14	Reserved for future use

3.5.2 Logic States

The “Logic State” window (refer to figure 3-80) is a diagnostic tool that provides viewing capability for up to 600 selected logic states from a maximum of 2046 supported logic states. Selecting “Logic States” from the **View** menu produces a display similar to the one shown in figure 3-79.

NOTE

The Logic States function is provided as a diagnostic tool primarily for use by Safetran Engineering personnel.

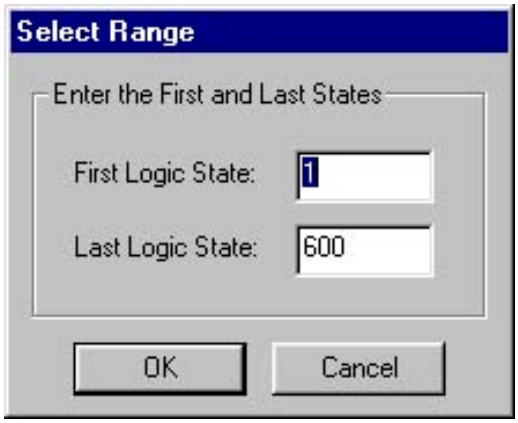


Figure 3-79
Typical GDT Logic States Entry Display

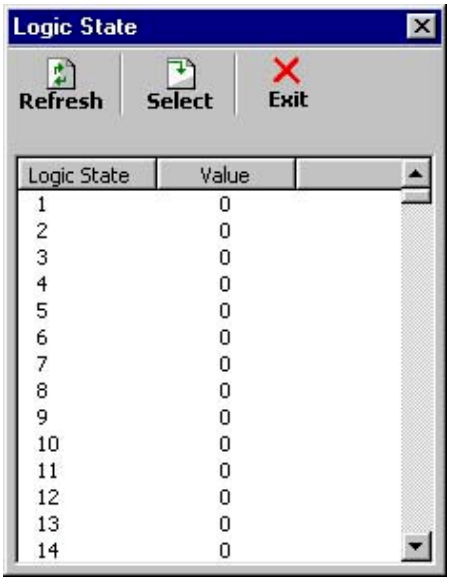


Figure 3-80
Typical GDT Logic States Listing Display

The Logic States menu selection allows the current logic state data for these functions to be retrieved from the GEO™ CPU. The logic states entry display shown in figure 3-79 allows the user to enter a range of logic states to be examined.

NOTE

The value entered in the "First Logic State" text box must be smaller than the value entered in the "Last Logic State" text box.

NOTE

The GDT can download a maximum of 600 logic states per request.

After the range values are entered, select the **OK** button. The GDT retrieves the data and displays it as shown in figure 3-80. This is a snap shot of the current logic states.

Displayed logic state values are 1 and 0 where:

1 = true
0 = false

Select the **Refresh** button to update the logic state "Value" fields on the display. A scroll bar is provided on the right side of the display to enable viewing the entire list.

To return to the logic states entry display (figure 3-79) to enter new range values, use the **Select** button.

Select the **Exit** button to return to the opening display.

3.5.3 DT Statistics

Selecting "Statistics" from the **View** menu displays the "DT Statistics" window (similar to the one shown in figure 3-81).

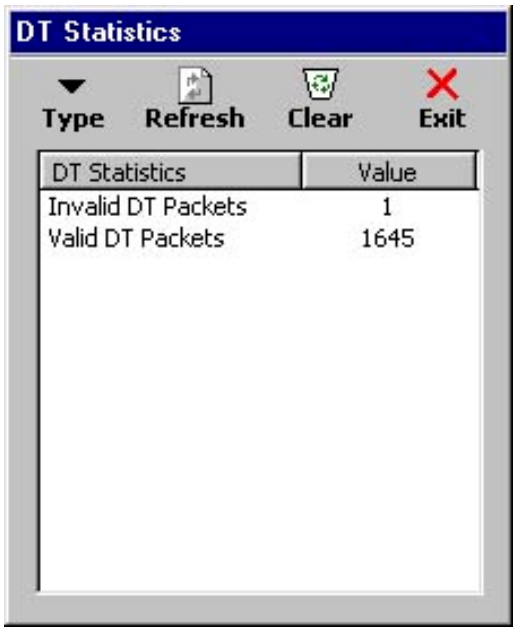


Figure 3-81
Typical GDT Statistics Display

This window provides a snapshot of communications statistics pertaining to the DT port on the CPU/CPU2 module. The data in this display can be refreshed and/or cleared. Some types of data that can be displayed include but are not limited to the following:

- CPU (VLP) reboots
- I/O card Bad CRC's
- I/O card reboots
- Bad SIO packets
- SIO Tx and Rx packets
- I/O card lost sessions
- Valid / Invalid DT packets

To provide access to a pop-up menu (figure 3-82) that permits the user to select the type of statistics to be displayed, click on the **Type** button (▼) in the GDT Statistics display.

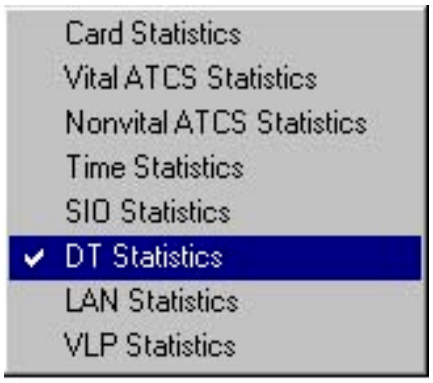


Figure 3-82
GDT Statistics Type Display

The GEO™ equipment configuration determines to some extent the type of statistics that can be viewed. For example, the Vital ATCS, Nonvital ATCS and LAN statistics can only be viewed when the GDT is connected to a CPU2 module. The VLP Statistics apply only to the CPU module and Card Statistics apply only to I/O cards. If a type is selected that is not supported by the GEO™ hardware configuration, the following message appears in place of the statistics: "Statistic Not Supported".

Select the **Refresh** button to update the statistic value fields currently on the display.

Select the **Clear** button to delete the record of the displayed statistic currently stored by the GEO™ system. All values will return to zero.

Select the **Exit** button to return to the opening display.

3.5.4 Refresh

Select "Refresh" to update the module assignment display with current module status.

3.6 HELP MENU

The Help menu contains one entry: "About GEO Diagnostic Terminal". Select "About GEO Diagnostic Terminal" and a display similar to figure 3-83 appears.

Figure 3-83
About GEO™ Diagnostic Terminal Display

This display identifies the GDT software version, whether the application is “Installer” or “Maintainer”, and the software part number.

Select the **OK** button to close the “About GEO Diagnostic Terminal” display and return to the module assignment display.

3.7 INDIVIDUAL MODULE SETUP

The default configuration is specified in the MCF, which was initially created by using the GCS. In order to use the same MCF at multiple locations, some of the configuration items in the MCF may be changed in the field. Of the field-changeable configuration items, some are changed without requiring a new UCN, and others require a UCN change (refer to figure 3-84).

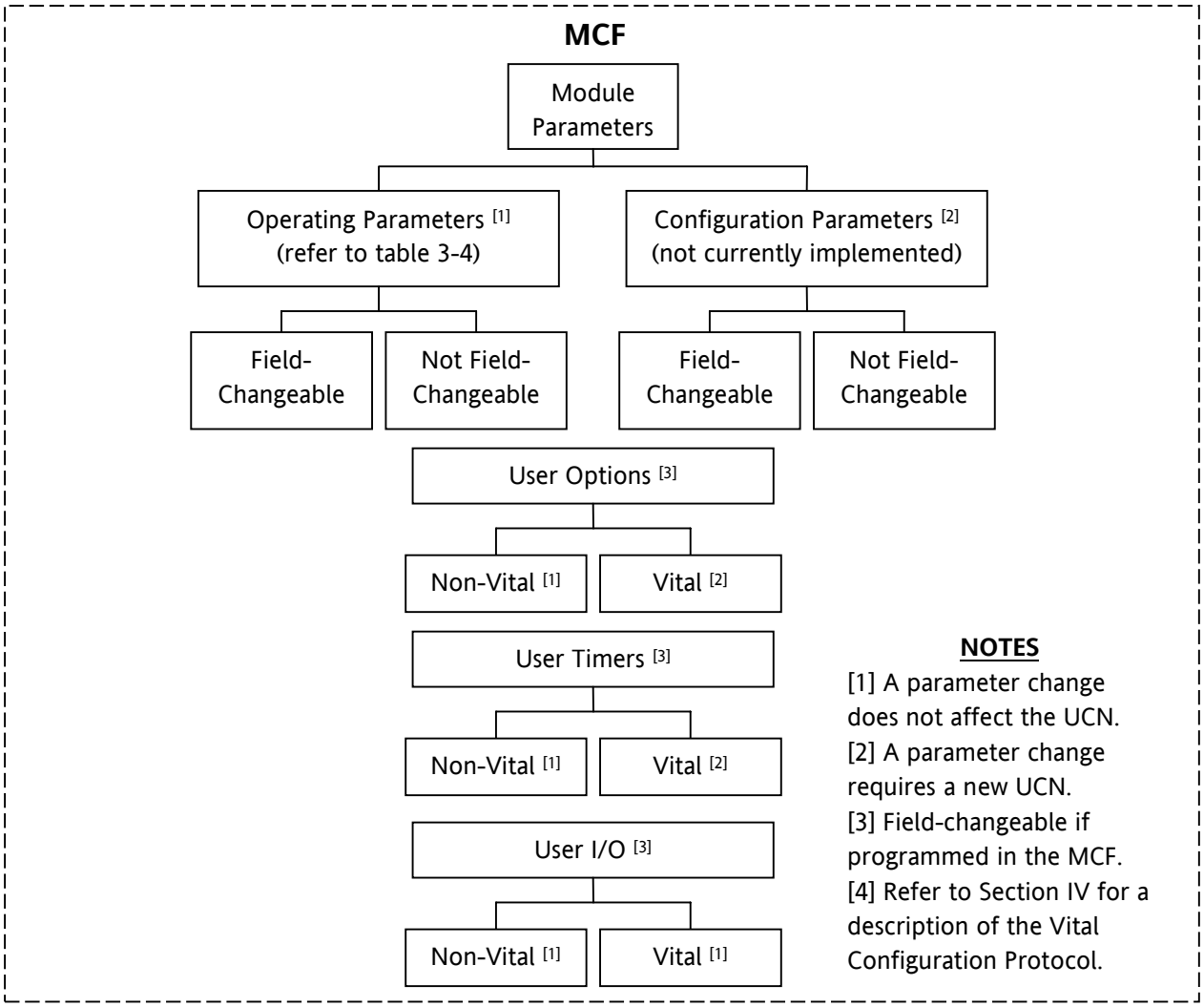


Figure 3-84
Making Configuration Changes

Refer to figure 3-85 for a flow diagram of setup procedures, and refer to the paragraphs indicated in the figure for descriptions of those procedures.

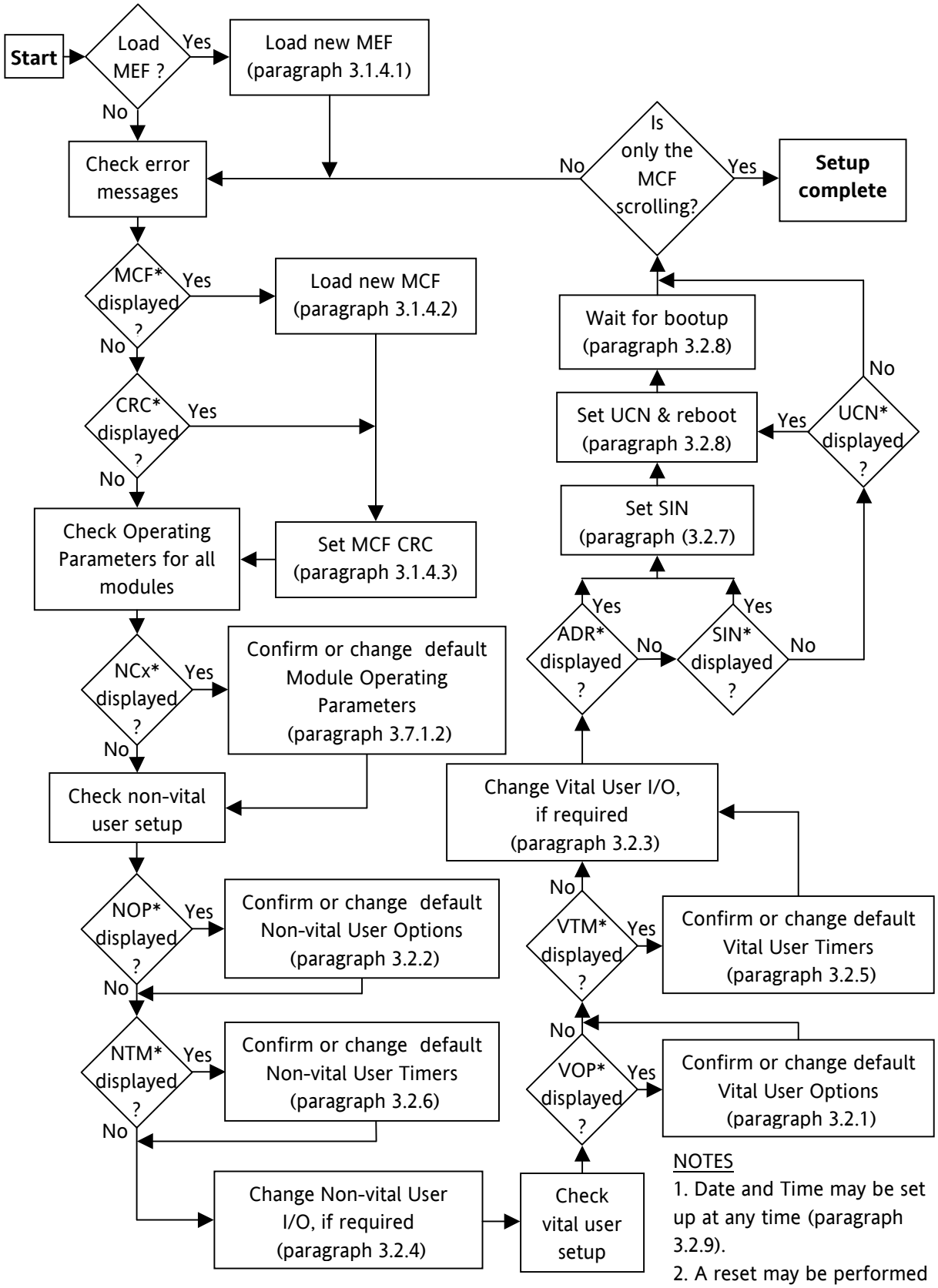


Figure 3-85
Setup Flow Diagram

The module assignment display shown in figure 3-86 is a graphic representation of the modules installed in the GEO™ wayside unit and indicates their corresponding slots in the card cage. The number of slots displayed and the module assignments will vary depending on GEO™ wayside equipment configuration. Each module is identified by a label.

By right clicking on a module label, a pop-up menu appears that provides access to information relative to that module only. The functions available on this menu are described in the following paragraphs.

This display also provides operational and functional status information for each of the modules including lamp status and I/O status, plus some vital and non-vital voltage and current levels.

The module labels also use color to indicate operational status as follows:

CPU modules: red = CPU module not configured or inoperative
green = CPU module configured and fully operational

I/O modules: red = I/O module missing, inoperative or unable to communicate with CPU via serial bus
green = I/O module operational and communicating with CPU via serial bus

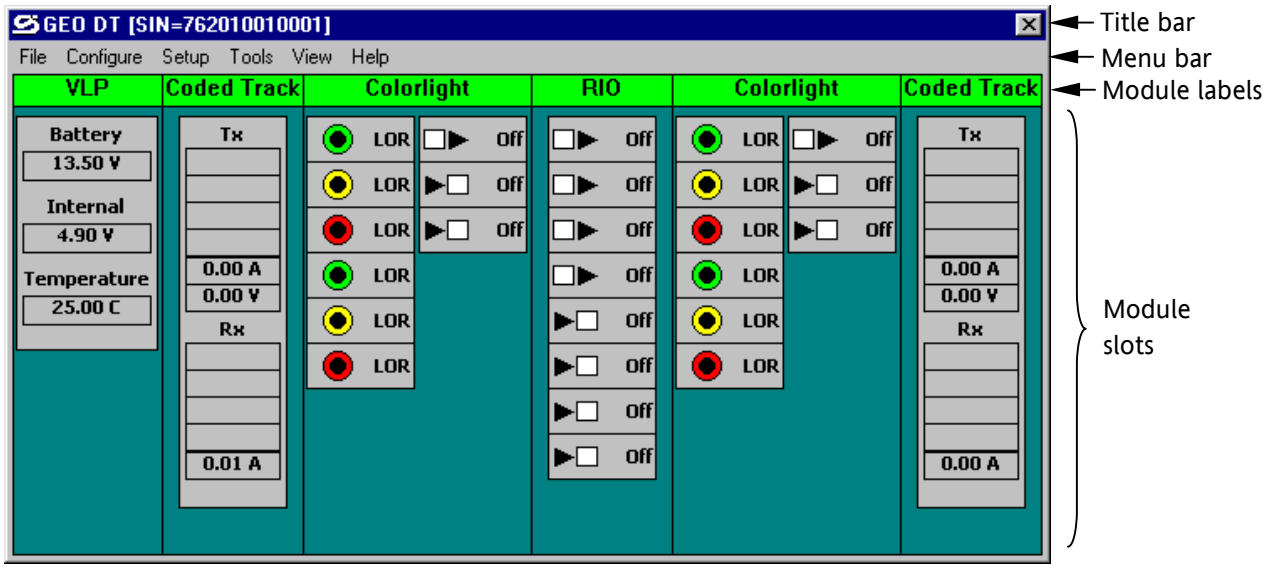


Figure 3-86
Example Of Module Assignment Display

3.7.1 Module Menu

The module menu format (figure 3-87) that appears when a module label is right-clicked, is identical for each module; only the information accessed from the menu is specific to each module. The menu contains six functions which are described in the following paragraphs.

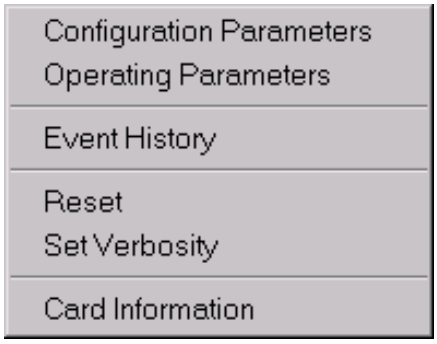


Figure 3-87
Module Pop-up Menu

3.7.1.1 Configuration Parameters

Selecting the "Configuration Parameters" function from the module pop-up menu provides a display similar to figure 3-88. As indicated, there are currently no configurable parameters defined.

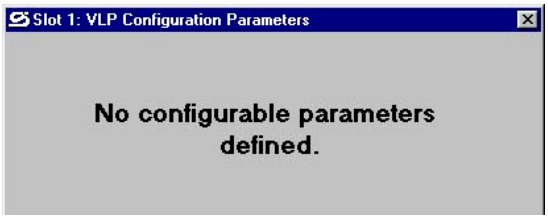


Figure 3-88
Typical Module Configuration Parameters Display

3.7.1.2 Operating Parameters

The default module Operating Parameters are specified in the MCF. Some Operating Parameters are field-changeable and others are not. Changing default Operating Parameters does not require setting the UCN.

WARNING

WHEN CHANGING ANY PORTION OF A GEO™ UNIT'S CONFIGURATION, ANY FUNCTIONS AFFECTED BY THAT CHANGE MUST BE RETESTED, AND OVERALL SYSTEM OPERATION MUST BE CONFIRMED. IF THE UCN IS AFFECTED AS A RESULT OF A CHANGE, THE ENTIRE LOCATION MUST BE THOROUGHLY RETESTED IN ACCORDANCE WITH FRA REGULATIONS.

NOTE

Setup data should be recorded as changes are made. Refer to the GEO™ Hardware manual, document number SIG-00-99-11, Appendix F for setup data sheet masters.

WARNING

THE IMPLEMENTATION OF MODULE OPERATING PARAMETER CHANGES AND THEIR EFFECTS ON RAILROAD SAFETY ARE THE RESPONSIBILITY OF THE GDT USER.

CAUTION

INCORRECT CONFIGURATION OF MODULE OPERATING PARAMETERS COULD RESULT IN A SYSTEM THAT DOES NOT OPERATE AS DESIRED. THE RAILROAD ASSUMES RESPONSIBILITY FOR ITS FIELD-CONFIGURED PARAMETER OPTIONS.

When the Operating Parameters screen is brought up for slot 1 (CPU/CPU2 module), the screen displays “No operating parameters defined”.

NOTE

The CPU/CPU2 module does not currently have any module Operating Parameters or Configuration Parameters. However, it does require setup for date and time, and may require setup for Vital/Non-vital User Options, User Timers, and User I/O.

NOTE

The VRO module does not currently have any module Operating Parameters defined. When the Operating Parameters screen is brought up for a VRO module, the screen displays “No operating parameters defined”.

Table 3-4 lists and describes the Operating Parameters for the different module types.

Table 3-4
Module Operating Parameters

Module Type	Property	Value (range/options)	Units	Description	Field-Changeable?
CPU/CPU2	(n/a)	(n/a)	(n/a)	No Operating Parameters defined for CPU/CPU2	(n/a)
Track	**VCO Voltage**	**0** thru **4000** (by 20's)	**mV**	Set coded track output voltage (millivolts) (adjustable in 20mV increments)	Using GDT or Maintainers Interface
	Receive	**True**/**False**	(n/a)	Enable/Disable receive	Not Field-changeable
	Transmit	**True**/**False**		Enable/Disable transmit	
	Code 5	**Standard**, **Long**, or **Alternating**	(n/a)	Select Code 5 option	Using GDT only
	EC4 Compatibility	**EC4**, or **EC4 Plus**		Select EC4 Compatibility option	
	Non-vital Change	**1 – 3**	**cycles**	Number of code cycles before changing from one non-vital code to another non-vital code	Not Field-changeable
	Vital Change	**1 – 3**	**cycles**	Number of code cycles: • Before changing from one vital code to another vital code, or • Before changing from a non-vital code to a vital code, or • Before changing from a vital code to a non-vital code	
	Shunt Drop	**1 – 8**	**cycles**	Number of code cycles that a code is reported after a shunt is applied	
	Shunt Pick	**1 – 8**	**cycles**	Number of code cycles required after a shunt is picked before a code 1 is reported	
	Current Limit	**1000** thru **10000** (by 50's)	**mA**	Set track output Current Limit (milliamps) (adjustable in 50mA increments)	Using GDT or Maintainers Interface

Continued on the next page

Table 3-4 Continued

Module Type	Property	Value (range/options)	Units	Description	Field-Changeable?
Coded Line	**Transmit Voltage**	**2000** thru **15000** (by 100's)	**mV**	Set line Transmit Voltage (millivolts) (adjustable in 100mV increments)	Using GDT or Maintainers Interface
	Receive	**True/False**	(n/a)	Enable/Disable receive	Not Field-changeable
	Transmit	**True/False**		Enable/Disable transmit	
	Code 5	**Standard**, **Long**, or **Alternating**	(n/a)	Select Code 5 option	Using GDT only
	EC4 Compatibility	**EC4**, or **EC4 Plus**		Select EC4 Compatibility option	
	Non-vital Change	**1 – 3**	**cycles**	Number of code cycles before changing from one non-vital code to another non-vital code	Not Field-changeable
	Vital Change	**1 – 3**	**cycles**	Number of code cycles: • Before changing from one vital code to another vital code, or • Before changing from a non-vital code to a vital code, or • Before changing from a vital code to a non-vital code	
	Shunt Drop	**1 – 8**	**cycles**	Number of code cycles that a code is reported after a shunt is applied	
	Shunt Pick	**1 – 8**	**cycles**	Number of code cycles required after a shunt is picked before a code 1 is reported	
	Receive Threshold	**2000** thru **15000** (by 100's)	**mV**	Set line Receive Threshold voltage (millivoltss) (adjustable in 100mV increments)	Using GDT or Maintainers Interface

Continued on the next page

Table 3-4 Concluded

Module Type	Property	Value (range/options)	Units	Description	Field-Changeable?
Color-light	**Lamp Voltage**	**9000** thru **13500** (by 1's)	**mV**	Set Lamp Voltage (millivolts) (adjustable in 1 mV increments)	Using GDT or Maintainers Interface
	Filament Threshold	**0**	**mA**	(reserved)	Not Field-changeable
	Cold Filament Test	**Yes**	(n/a)	(reserved)	
	VPI Debounce	**20** thru **200** (by 2's)	**ms**	Set VPI Debounce time (milliseconds) (adjustable in 2ms increments)	Using GDT or Maintainers Interface
Search-light	**Lamp Voltage**	**9000** thru **13500** (by 1's)	**mV**	Set Lamp Voltage (millivolts) (adjustable in 1 mV increments)	Using GDT or Maintainers Interface
	VPI Debounce	**20** thru **200** (by 2's)	**ms**	Set VPI Debounce time (milliseconds) (adjustable in 2ms increments)	
	Mech1 Response	**200** thru **2000** (by 10's)	**ms**	Set PCO #1 input mechanism response time (milliseconds) (adjustable in 10ms increments)	Using GDT only
	Mech2 Response	**200** thru **15000** (by 10's)	**ms**	Set PCO #2 input mechanism response time (milliseconds) (adjustable in 10ms increments)	
	Mech Feedback	**Yes/No**	(n/a)	Enable Mechanism Checking	Not Field-changeable
	Filament Threshold	**0**	**mA**	(reserved)	
	Cold Filament Test	**Yes**	(n/a)	(reserved)	
VPI, RIO	**VPI Debounce**	**20** thru **200** (by 2's)	**ms**	Set VPI Debounce time (milliseconds) (adjustable in 2ms increments)	Using GDT or Maintainers Interface
VRO	(n/a)	(n/a)	(n/a)	No Operating Parameters	(n/a)

The GDT may be used to view any Operating Parameter, or to change any field-changeable Operating Parameter. In addition, certain field-changeable Operating Parameters (see table 3-4) may be viewed/changed by using the Maintainers Interface.

NOTE

The system must be configured in order to use Operating Parameter setup procedures.

Selecting the "Operating Parameters" function from the module pop-up menu provides a display similar to figure 3-89. At the top of the display is a header identifying the slot number, the type of module and the function selected from the menu. The example in figure 3-89 identifies the module in slot 2 as a Coded Track module.

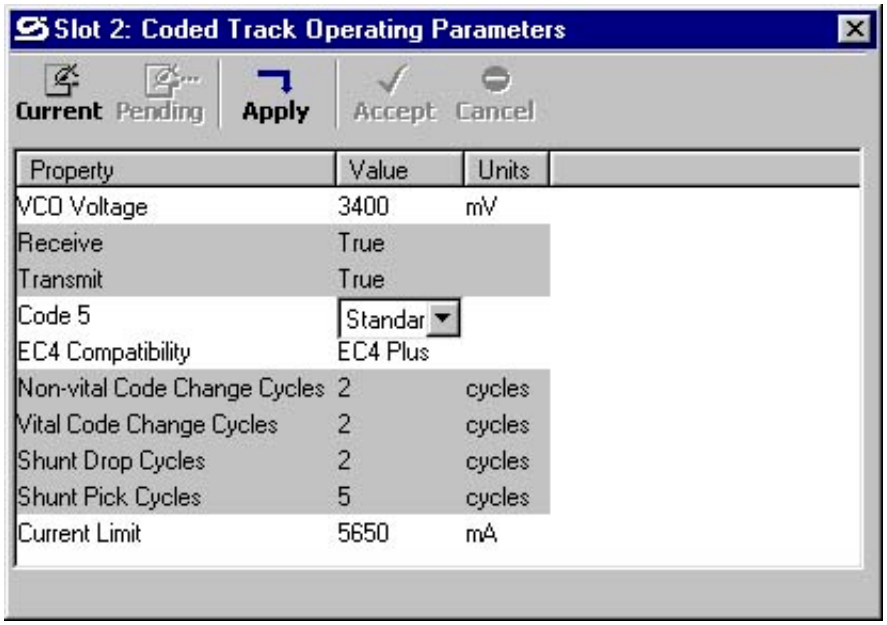


Figure 3-89
Textual Operating Parameter Option Selection

Below the header is a row of buttons for manipulating the module parameters. And below the buttons are three columns that contain the module operating parameters (properties) with corresponding values and units. Only the properties with the white background can be changed.

To view the current values of the listed properties, select the **Current** button at the top of the display. The current values for the listed properties appear in the "Value" column opposite the entries in the "Property" column. Values can be either textual or numerical in nature.

To change a textual value, select that value in the "Value" column. A drop-down list control box appears containing the selected value (see figure 3-89).

Select the down arrow button (▼) on the list control box and a drop-down list of available options appears (current selection highlighted) (figure 3-90).

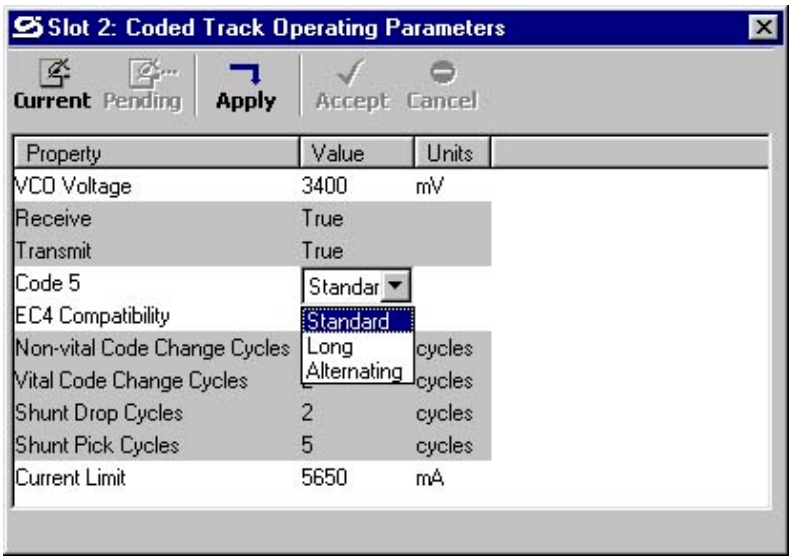


Figure 3-90
Typical Textual Values Drop-Down List

Select the desired option from the list and then select the **Apply** button at the top of the display. The selected option replaces the current value in the "Value" column.

To change a numerical value, select that value in the "Value" column. A box appears around the selected value and plus (+) and minus (–) spin buttons appear (see figure 3-91).

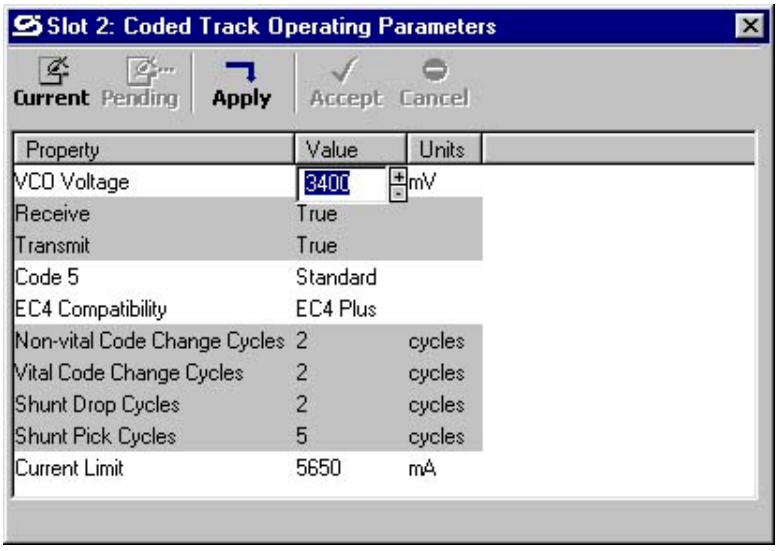


Figure 3-91
Numerical Operating Parameter Option Selection

Select the minus (-) spin button to decrease the value or the plus (+) spin button to increase the value. The current value can also be changed by selecting the value (becomes highlighted) and typing the new value. See table 3-4 earlier in this section for valid range and change increment information.

NOTE

Spin buttons for numeric parameter values automatically increment/decrement by valid amounts when held down.

NOTE

For numerical value changes, the plus and minus buttons permit change increments of one in either direction. Some of the parameters have minimum change increments greater than one (for example: 2, 20 or 50). If a change smaller than the minimum change increment is entered, the value will round down to the next lowest value increment. This also applies if the change value is entered from the keyboard.

Example: Original value is 5500 and minimum change increment is 50. If the value is changed to 5545, the resulting value will round down to 5500. A change value between 5550 and 5599 will result in 5550.

When the desired value is displayed, select the **Apply** button at the top of the display. The new value replaces the previous value in the “Value” column.

NOTE

Several textual and numerical value changes can be made and the **Apply** button selected once to apply all changes at the same time.

Numerical changes that are out of range (see table 3-4) will cause an error message to be displayed (figure 3-92) when the **Apply** button is selected or another property value is selected. Select the **OK** button on the error message display and then reenter the value change.

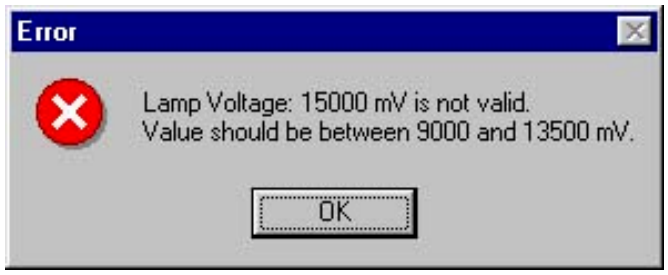


Figure 3-92
Typical Operating Parameter Value "Out Of Range" Error Message

Operational parameter changes become effective immediately when the **Apply** button is selected. There are no pending changes. Therefore, the **Pending**, **Cancel** and **Accept** buttons are not active on this display.

3.7.1.3 Event History

Each GEO™ module records its functional events in its own event log. Selecting the "Event History" function from the pop-up menu for a slot (by right-clicking on the label for the module) provides a display of the Online log from the GEO™ unit similar to that in figure 3-93.

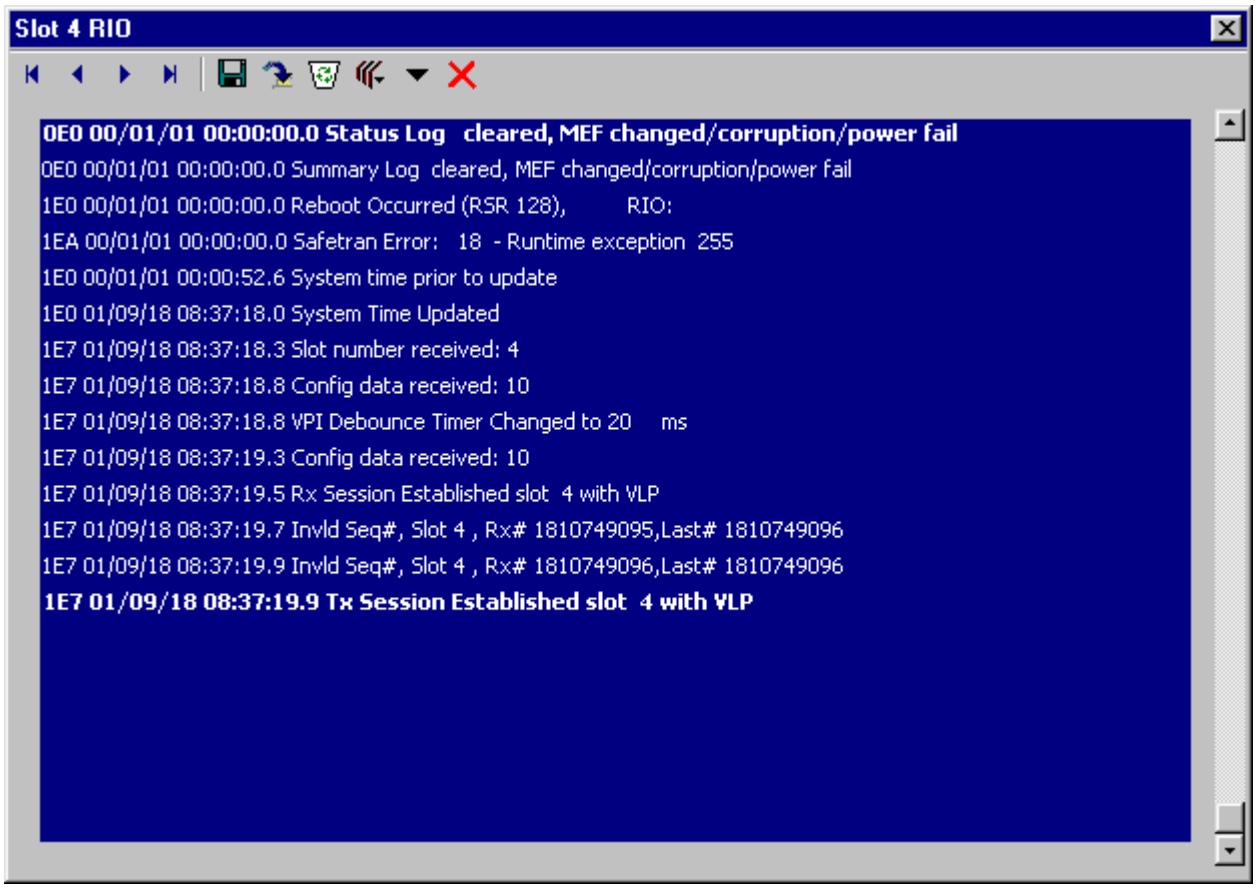


Figure 3-93
Typical Online Event History Display

The data displayed is a date and time-stamped chronological listing of all system activity affecting the selected module with the most current activity appearing at the bottom of the list.

The Online log is displayed in white letters on a blue background. This differentiates it from the Offline Event History display. The title bar includes the slot number and the module name. The example in figure 3-93 identifies the log of the RIO module in slot 4.

Tools are provided to allow the user to scroll through the log to review different portions of the log, or view the logs from other modules.

The data in the Online logs cannot be edited or changed in any way, except completely deleted. However, the Online log can be downloaded to the GDT and filtered by date and time as an Offline log (see figure 3-94). The Offline log presents a more manageable event log for viewing.

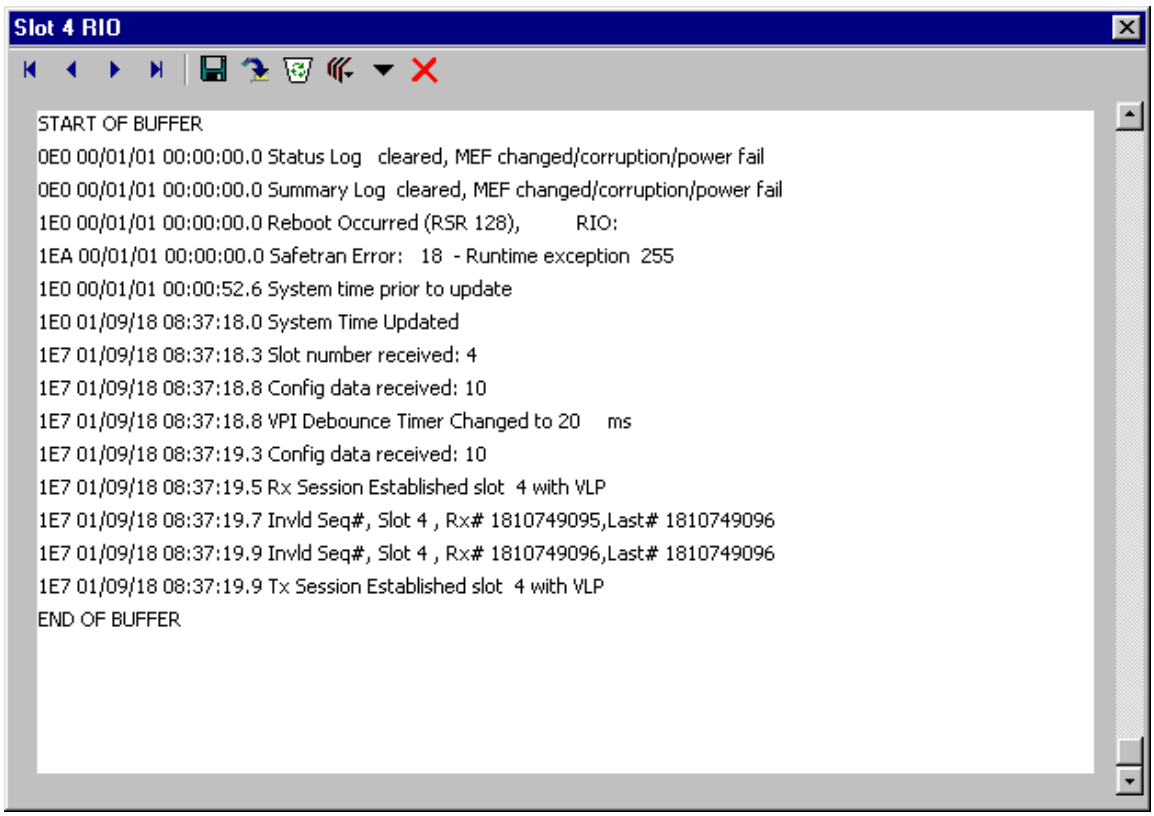


Figure 3-94
Typical Offline Event History Display

NOTE

Downloaded log data is sent to a buffer in the GDT. The start point and end point of this buffered data are identified on the Offline Event History display (see figure 3-94).

The Offline Event History display presents black letters on a white background. This differentiates it from the Online Event History display. The title bar includes the slot number and the module name. Tools are provided to allow the user to scroll through the log to review different portions of the log, or view the logs from other modules.

Both the Online log data and the Offline log data can be saved to files that can be edited for viewing. The Event History Source button on the toolbar selects the slot for the desired log to download, the Download button on the toolbar downloads the current log data to a buffer in the GDT, and the Save button saves it to a specific filename in a location on the PC hard drive. If the log data is saved to a file, the usual text editing tools can be used to edit the downloaded data file as required for display.

Immediately below the header is a row of navigation and display control buttons. The buttons provide the following functions:

Navigation Buttons


Go to first event entry in history log – first event entry shown in bold text


Go to previous event entry in history log


Go to next event entry in history log


Go to last event entry in history log – last event entry shown in bold text

Save Button


Select the Save button and the "Save File As' display shown in figure 3-95 appears. This display allows the event history file to be named and saved to a desired location on the computer. The file is in text format.

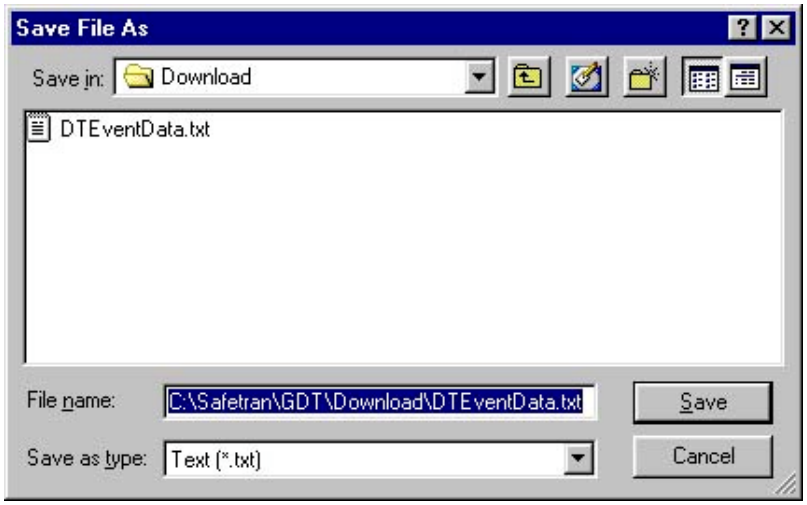


Figure 3-95
Event History "Save File As" Display

Download Button

Select the download button and the Download Options display shown in figure 3-96 appears. This display allows the user to filter the type of events to be displayed. The filter options are “all events” and “events by date”.

Figure 3-96
Event History Download Options Display

To download all events (default selection), verify that the “Download All Events” option is selected and then select the **OK** button. Download activity is indicated in the upper left corner of the Offline Event History display as shown in figure 3-97.

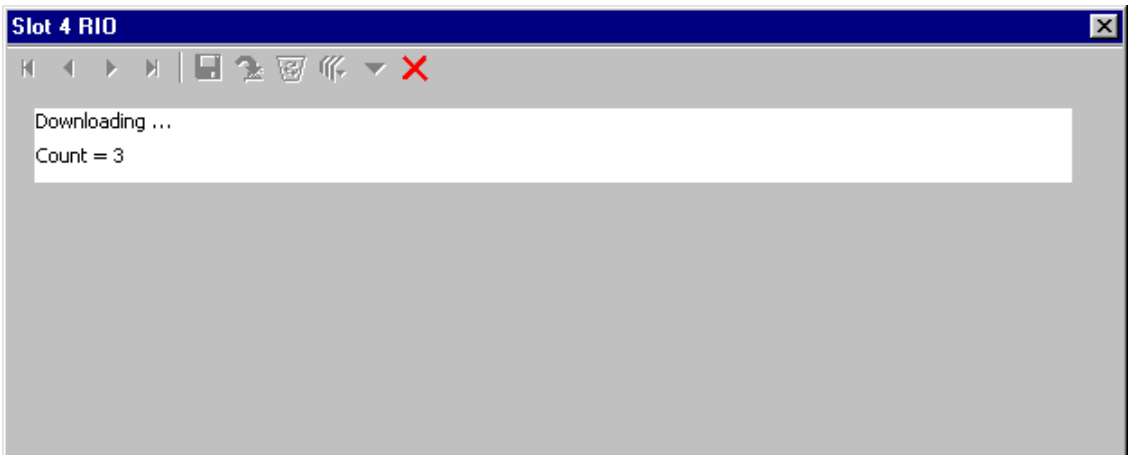


Figure 3-97
Event History Download Activity Indicator

When the download completes, the display will appear similar to the Offline Event History display of figure 3-94.

Selecting the "Download By Date" option allows the user to enter a date range for the events to be viewed. As shown in figure 3-98, "Begin" and "End" date fields are provided. The default "Begin" date is the date of the oldest entry in the history file. The default "End" date is the latest entry to the file.

Figure 3-98
Event History "Download By Date" Option Display

Each date field has a scroll bar for selecting the desired date. Move the scroll bar slider button and within a few seconds the date is displayed in the field above the scroll bar. Use the left and right arrow buttons at the ends of the scroll bar to fine tune the date. The "Begin" date must be earlier than the "End" date.

After the date range is entered, click on the **OK** button. Download activity is indicated in the upper left corner of the Offline Event History display as shown in figure 3-97.

When the download completes, the display will appear similar to the Offline Event History display of figure 3-94.

Delete Event History Button

Select the delete event history button to clear the contents of the module event log. The confirmation prompt shown in figure 3-99 is displayed to allow this command to be executed or cancelled. To clear the module event log, click on the **OK** button on the prompt display. Any currently displayed events are also removed from the Event History displays.

Figure 3-99
Event History "Clear All Events" Prompt

Event History Source Button

Select the event history source button to display the menu shown in figure 3-100. This menu lists every module installed in the GEO™ wayside unit, plus a local option (module event log accessed by directly connecting to the module DT port). The event history of any module in the card cage can be viewed by selecting the proper option from this menu, however only the Local option can be used when the DT is connected directly to an I/O module DT port.

Figure 3-100
Event History Source Menu

Event Log Format Button

Click on the event log format button to display the menu shown in figure 3-101.

Figure 3-101
Event Log Format Menu

The Event Log Format options are: Status Log and Summary Log.

The Status Log menu selection provides a detailed event history including the following types of events:

- Rx and Tx session activity
- Module operating parameter value changes
- Internal command activity
- Session status

The Summary Log menu selection provides a less detailed history but includes major system events such as:

- Reboots
- Critical errors

Close Button

 Select the close button to exit the Event History display (Online or Offline).

3.7.1.4 Reset

To reset a module in the GEO™ wayside unit, click on the "Reset" function from the module pop-up menu. A confirmation prompt appears (figure 3-102).

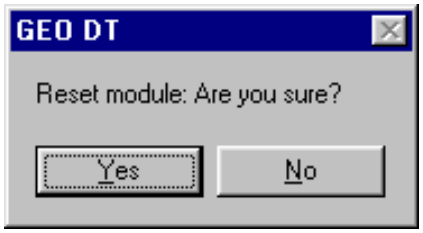


Figure 3-102
Reset Module Confirmation Prompt

Click on **Yes** to proceed with the reboot. The module label is red during the reboot.

NOTE

Select the "Refresh" option from the View menu after the reboot is complete to update the module status display.

NOTE

Besides just resetting a module, the Reset function can also be used to enter the Setup Program (e.g., to load software). To enter setup, wait for the "Change module setup (Y/N)?" prompt, then click on the **Yes** button (refer to paragraph 3.1.4 earlier in this section for information on using the Setup Program).

3.7.1.5 Set Verbosity

Because of the limited storage capabilities for the internal event recorder, the system supports different levels of event recording known as verbosity levels. Verbosity level 1 is the most general and level 5 the most detailed.

To set the verbosity level, perform the following steps:

1. For the module slot to be set, select "Set Verbosity" from the module pop-up menu. A display similar to that shown in figure 3-103 appears (the example presents an RIO module in slot 4).

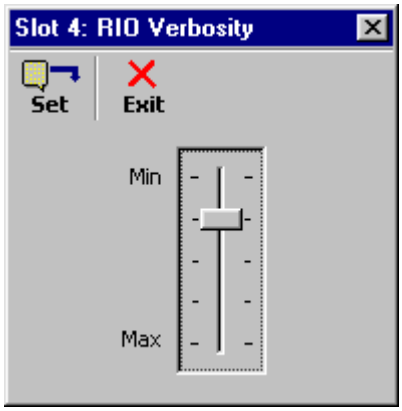


Figure 3-103
Event History Verbosity Level Selector

NOTE

For a normal DT session using the CPU/CPU2 module DT serial port, or remotely using the LAN, the current verbosity setting is displayed (refer to figure 3-103). For a direct module DT session, the current verbosity setting can not be determined and the slider is always shown in the "Min" position.

2. Move the slider to the desired position. The “Min” position relates to level 1 and the “Max” position to level 5. Detents are provided on the slider for the intermediate positions.

3. When the slider is at the desired level, select the **Set** button to activate the setting.

4. Select **Exit** to close the verbosity level selector display.

3.7.1.6 Card Information

Selecting the “Card Information” function from the module pop-up menu provides a display similar to figure 3-104.

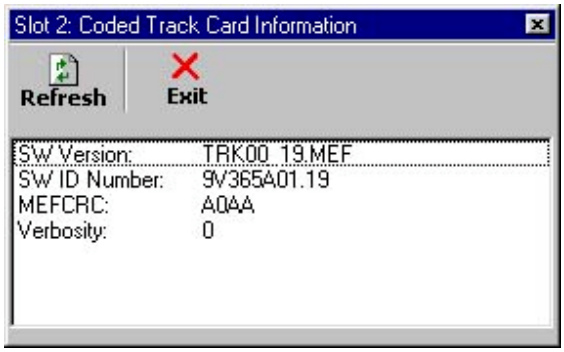


Figure 3-104
Typical Card Information Display

This display identifies the version and ID number of the software assigned to the selected module plus the MEFCRC and the current verbosity level setting.

NOTE

Card information can only be determined during a normal DT session using the CPU/CPU2 module DT serial port, or remotely using the LAN (refer to figure 3-104). For a direct module DT session, card information can not be determined, and the “Card Information” function from the module pop-up menu is disabled.

Select the **Refresh** button to update this display.

Select the **Exit** button to close this display.

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SECTION IV
GDT PROTOCOLS

4.0 GDT PROTOCOL DESCRIPTIONS

There are three main high-level protocols required to support the GDT:

- Session Protocol
- Vital Configuration Protocol
- UCN Configuration Protocol

4.1 SESSION PROTOCOL

The session protocol allows the GDT to establish a session with the GEO™ field equipment. When the session is established, the GDT can detect when the GEO™ unit has stopped communicating or when the user has connected the GDT cable to a different GEO™ unit.

4.2 VITAL CONFIGURATION PROTOCOL

A graphic representation of the vital configuration protocol and the associated change process is provided in figure 4-1.

WARNING

THE IMPLEMENTATION OF VITAL CONFIGURATION CHANGES AND THEIR EFFECTS ON RAILROAD SAFETY ARE THE RESPONSIBILITY OF THE GDT USER.

The vital configuration protocol is used to set vital card configuration parameters, vital user configurable MCF options and the SIN. This protocol is designed in such a way that the GEO™ equipment performs all vital checking. The user is responsible for verifying that the data sent back to the GDT from the GEO™ unit is correct, and confirming correct system operation after reboot.

The user can request data for vital card configuration parameters or vital user configurable MCF options and the GDT sends the request to the GEO™ unit. The GEO™ unit responds to the request and returns the current status data which is displayed on the GDT. The user can make changes to the data and submit the changes to the GEO™ unit. The GEO™ unit replies by confirming the changes and returning a CRC. The user confirms that the changes are as requested and enters the supplied CRC.

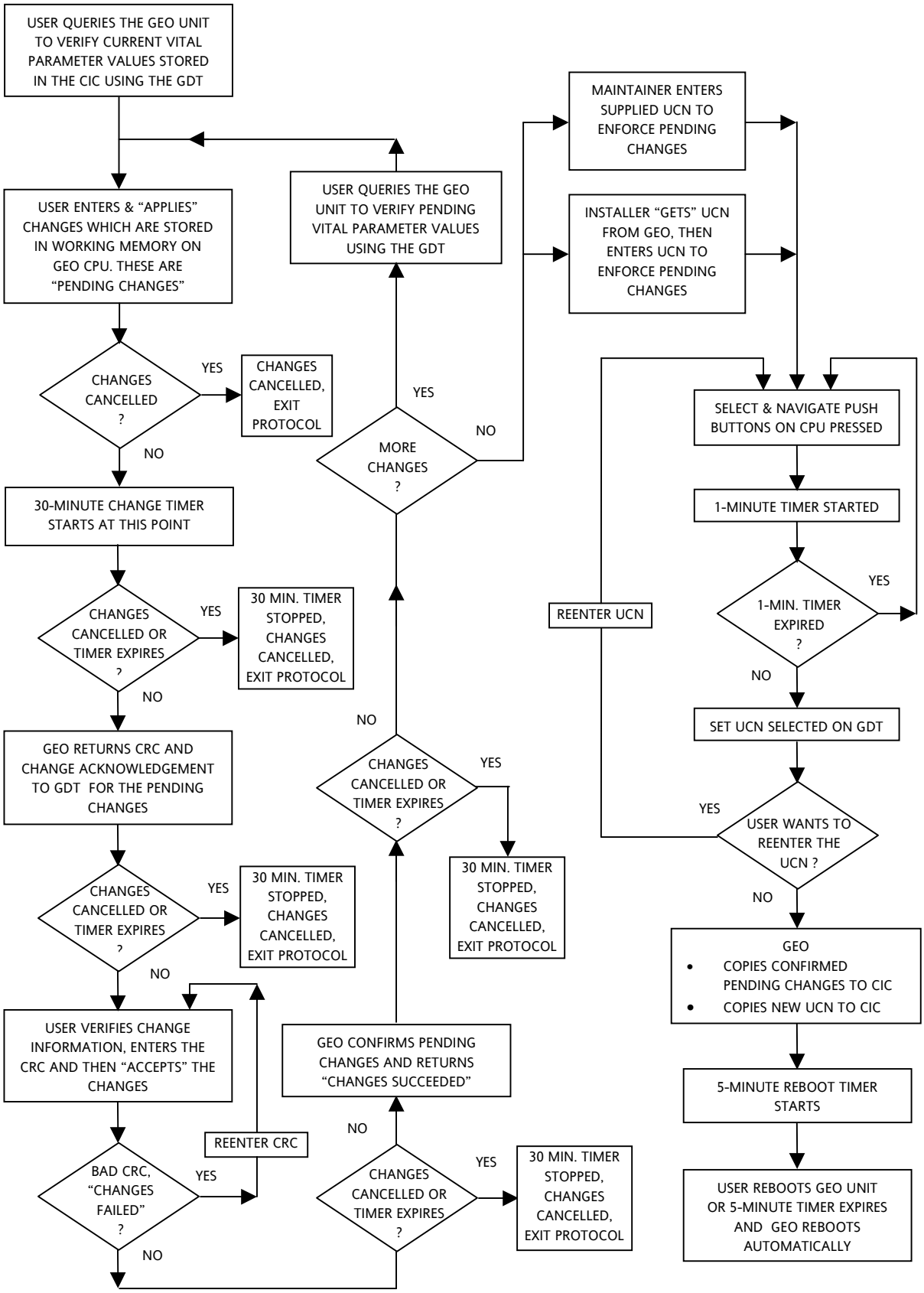

Figure 4-1
Vital Configuration Protocol And Change Process Flow

NOTE

The GEO™ unit does not update the non-volatile version of the data stored in the CIC until the user has entered a new UCN. In this way, changes do not take effect if the GEO™ unit is rebooted before the user enters the UCN.

The vital configuration protocol provides a 30 minute timer that is started when parameters are changed or the confirmation CRC is entered. If the timer is allowed to expire (by not setting the UCN and rebooting), the changes are discarded. This timer prevents a user from making changes without setting the UCN or rebooting the GEO™ unit.

4.3 UCN CONFIGURATION PROTOCOL

After the user has changed configuration parameters, a new UCN must be entered (reference figure 4-1). The source of the UCN depends on the version of the GDT. The available versions are: Installer and Maintainer.

- Maintainer – UCN supplied ahead of time
- Installer – requests the UCN from the GEO™ unit using the GDT

The UCN can only be set if the user is present at the GEO™ wayside location. To ensure this, the GDT requires that push buttons on the CPU/CPU2 module are pressed before entering the UCN to allow the entry to be accepted.

NOTE

When the Select and Navigate push buttons are pressed, a 1-minute timer provided by the vital configuration protocol is started. The UCN must be entered (**Set UCN** button selected) before that timer times out. If the timer times out, the Select and Navigate push buttons must be pressed and released again before selecting the Set UCN button.

When the UCN is received by the GEO™ unit, the UCN is checked. If correct, the GEO™ unit causes the GDT to display “Changes saved successfully”. If not correct, the GEO™ unit causes the GDT to display “Error: UCN incorrect, Changes saved successfully”. The incorrect UCN is stored since it may be desired to enter an invalid UCN to deliberately make the GEO™ unit non-operational.

The GEO™ unit then saves any pending changes in the CIC and updates the UCN in the CIC. After writing the changes, the GEO™ unit reads the CIC back and checks that the data was written

correctly. It then sends a message to the GDT saying whether or not the data was written successfully. The user is then given the option to reboot the GEO™ unit.

When the UCN is set, a 5 minute timer is started. When this timer expires (when a reboot has not been initiated), the GEO™ unit automatically reboots. The purpose of this timer is to guarantee that the unit is rebooted after a user makes a change. Once data has been stored in the CIC, any system reboot will result in that data being used.