



HANDBOOK

GEO® DIAGNOSTIC TERMINAL (DT)

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VERSION: C.1

Siemens Industry, Inc.

9568 Archibald Ave., Suite 100

Rancho Cucamonga, CA 91730

1-800-793-SAFE

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DT 4.6.0

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9568 ARCHIBALD AVE., SUITE 100
RANCHO CUCAMONGA, CALIFORNIA 91730
TELEPHONE: (909) 532-5300
TOLL FREE: 1-800-793-7233
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Minimum System Requirements for Host PC

- 800 MHz Pentium®-class processor
- 256 Mb RAM
- CD drive
- Microsoft® Windows 98SE, NT 4.0 SP6, 2000 or XP operating system
- Microsoft® Internet Explorer 5.5 or later

First Time Installation Procedure

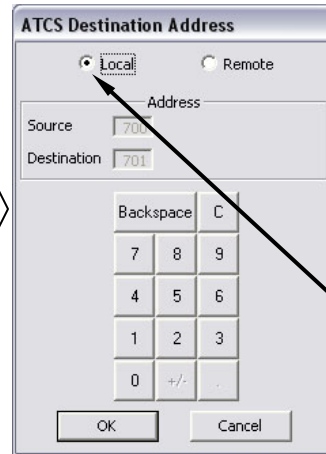
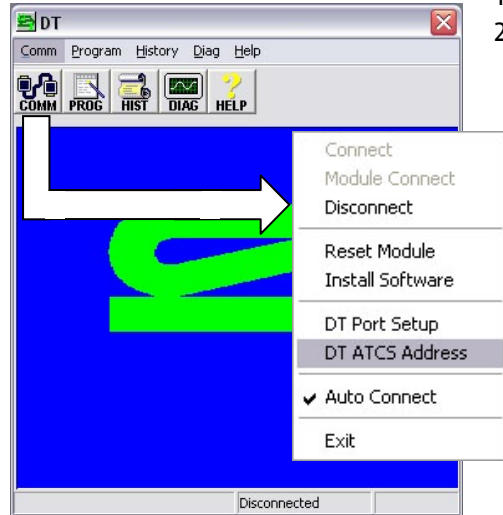
- 1) Insert the Safetran Diagnostic Terminal (DT) software CD in the CDROM drive.
- 2) If autorun does not operate, select the CD drive and run the DT Setup.exe program.
- 3) When the Diagnostic Terminal setup wizard comes up, follow the instructions.
- 4) Check for any Release Notes before clicking Finish.

DT Previously-Installed Installation Procedure

- 1) Follow the First Time Installation Procedure provided above.
- 2) When the DT installation program detects a previous version of the DT software, a prompt will ask if you want to upgrade or instruct you to remove a previous version of DT by using 'Add/Remove Programs'. If upgrading, select Yes and continue at step 3 of the First Time Installation Procedure. If removing DT, restart the First Time Installation Procedure after the removal process.

ATCS Address Selection:

1. Click **COMM** button or menu.
2. Select **DT ATCS Address**.



3. Two ATCS addressing options are available:
 - **Local** – use if DT is to communicate only with the local GEO unit that the host PC is connected to via the serial cable.
 - **Remote** – use if DT is to communicate with a remote GEO unit via another device on a common LAN.
4. If Local addressing to be used, click **Local** radio button (default), then click **OK**.

ATCS Address Selection: (continued from previous page)

The image shows two screenshots of the 'ATCS Destination Address' dialog box. The top screenshot shows the 'Local' radio button selected, with 'Source' address 700 and 'Destination' address 701. The bottom screenshot shows the 'Remote' radio button selected, with 'Source' address 7000000000 and 'Destination' address 7000000001. A blue box highlights the address fields in the bottom screenshot, and an arrow points from step 7 to it.

5. If Remote addressing is to be used, click the **Remote** radio button.

6. Two sets of ATCS address fields are displayed:

- **Source** – this is the ATCS address of the device the host PC (running the DT software) is connected to.
- **Destination** – this is the address of the remote GEO unit the DT will communicate with via the source device and the LAN.

7. Use the PC **Tab** key or mouse to highlight address fields to change.

8. Enter addresses using PC keyboard or display keypad.

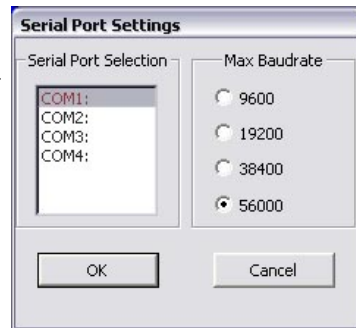
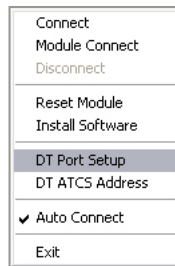
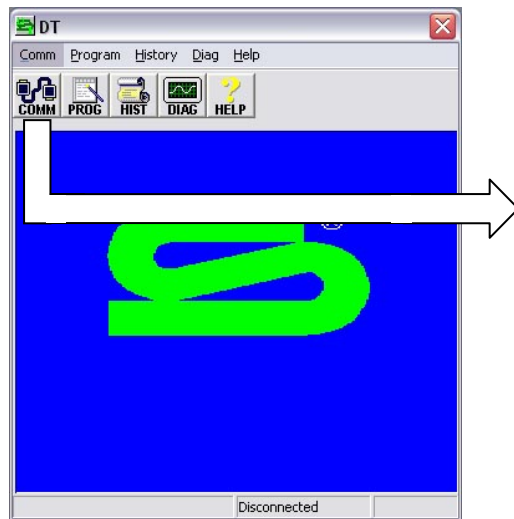
9. Click **OK** to accept address entries.

Changing Serial Port Settings:

1. Click **COMM** button or menu
2. Select **DT Port Setup**

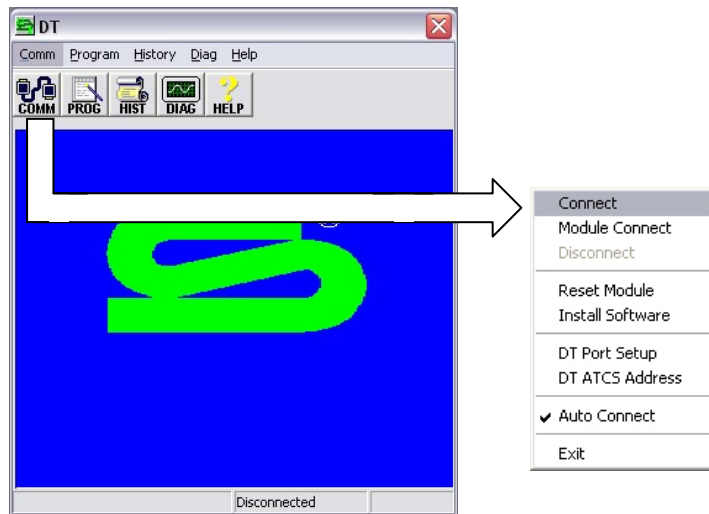
NOTE:

Serial port listing will only include serial ports available on host PC.



Connecting to GEO:

1. Connect the PC with a standard (non-null) DB9 serial cable to the CPU module DIAG port. Start the DT.
DT will automatically connect if **Auto Connect** is checked (as shown below).
2. When DT indicates **Disconnected** in status bar, click **COMM** button or menu, then select **Connect**.



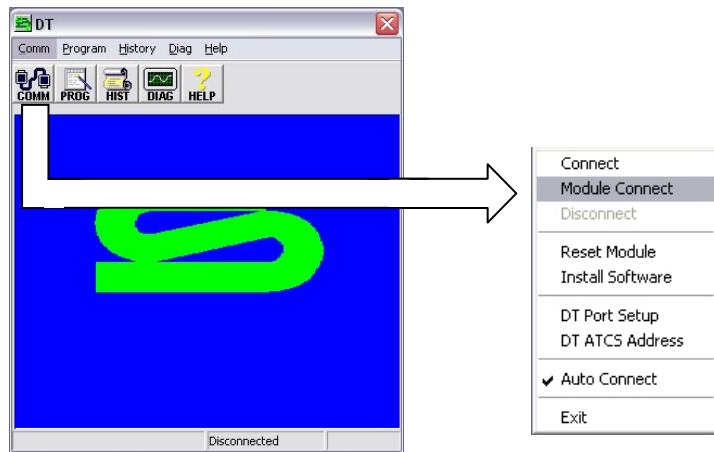
NOTE:

DT will not connect while GEO is booting.

CONNECTING DT

Connecting to other GEO I/O Module or VLP on CPU II+:

1. Connect the PC with a standard DB9 serial cable to the I/O module DIAG port or CPU II+ VLP port.
When DT indicates **Disconnected** in status bar, click **COMM** button or menu, then select **Connect**:
2. Click **COMM** button or menu, then select **Module Connect**.

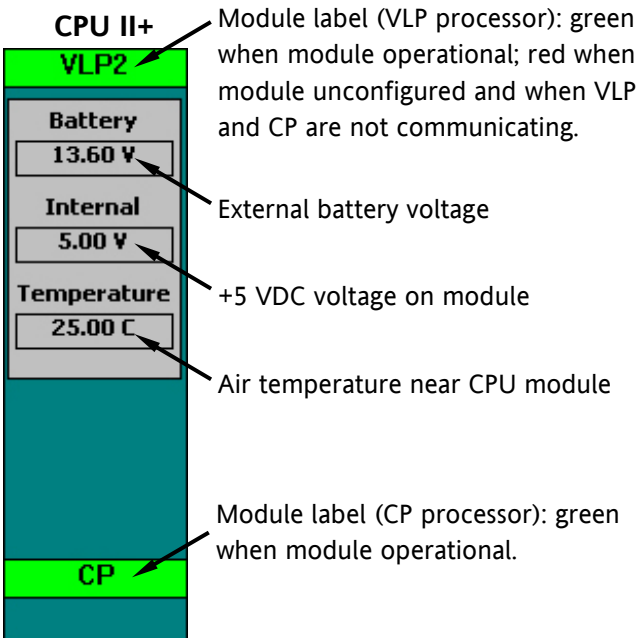


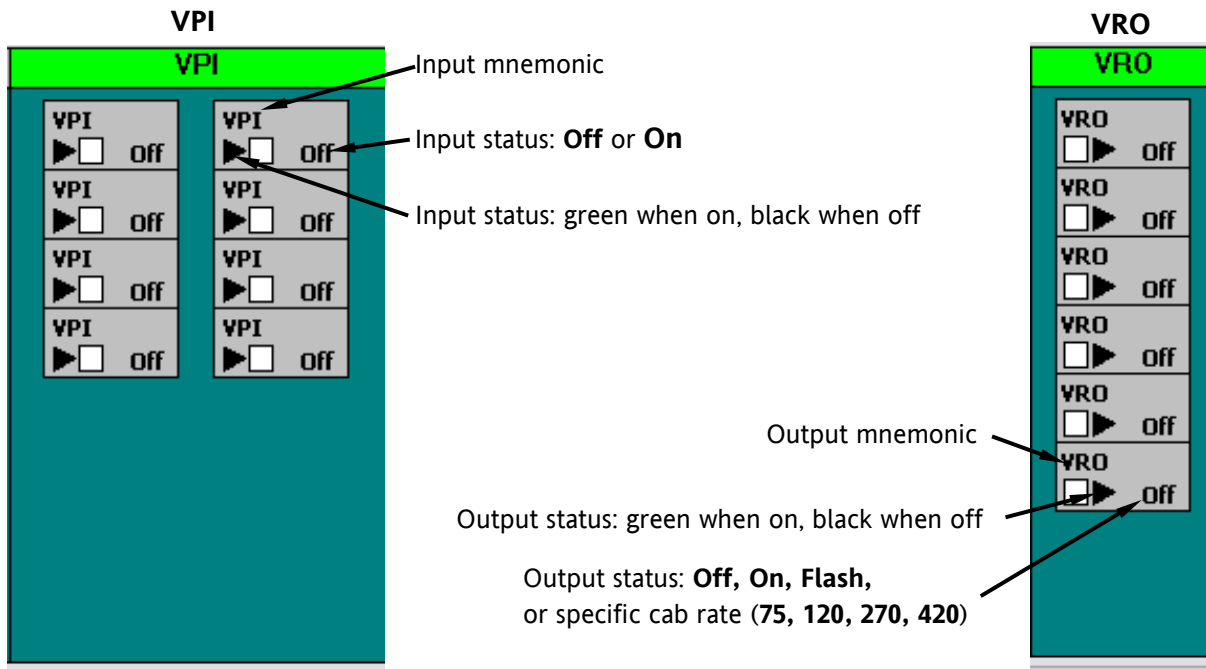
VIEWING MODULE I/O (MAIN DISPLAY)

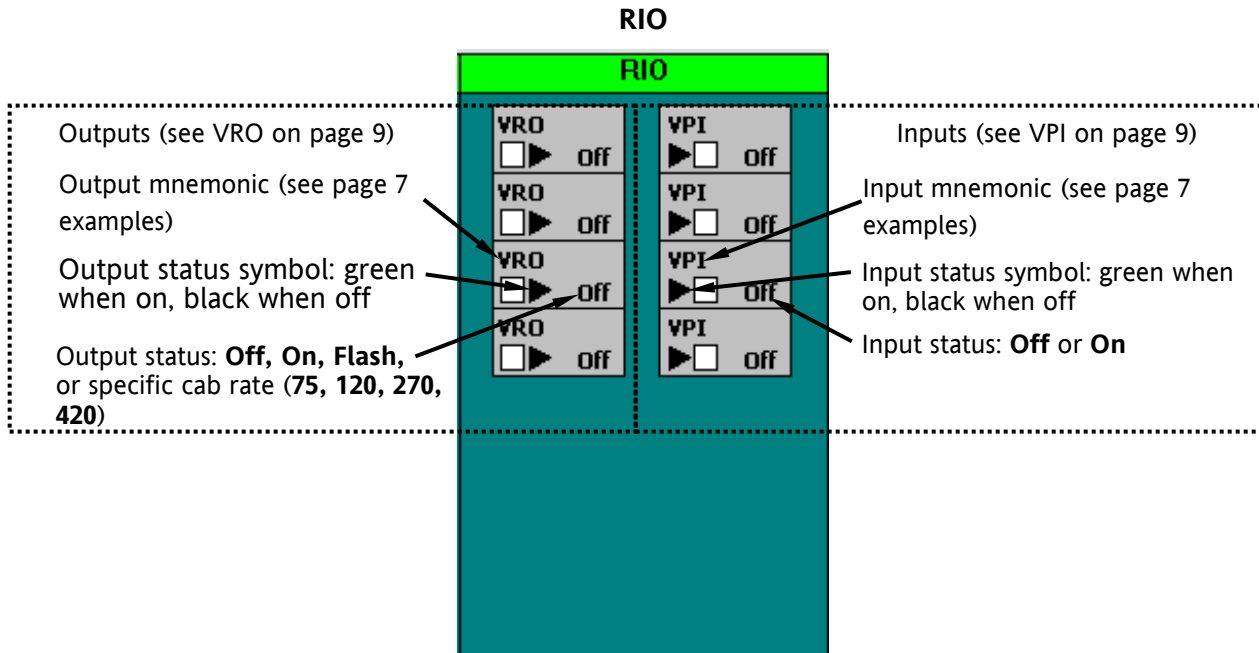
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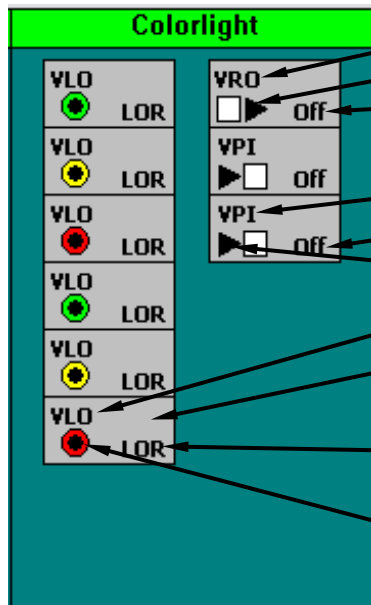
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CLS



Output mnemonic

Output status: green when on, black when off

Output status: **Off, On, Flash,**
or specific cab rate (**75, 120, 270, 420**)

Input mnemonic

Input status: **Off** or **On**

Input status: green when on, black when off

Lamp mnemonic (see page 7 examples)

Yellow background when foreign energy detected

Lamp status: **On, Off, Flash,** or **LOR**

Lamp status: black when off; green, yellow, red, or lunar when on;
or ● when LOR.

Lamp status: dark when off; color indicates mechanism position, or  when **LOR**.

Current armature position: **RG**, **HG**, **DG**, or **??** when invalid

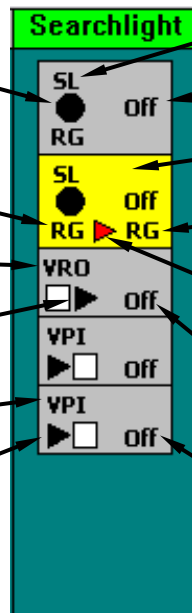
Output mnemonic

Output status: green when on, black when off

Input mnemonic

Input status: green when on, black when off

SLS



Searchlight mechanism mnemonic

Lamp status: **Off**, **On**, **Flash**, or **LOR**

Yellow when foreign energy detected

Commanded armature position: **RG**, **HG**, or **DG**

Armature status: white while moving; red when failed

Output status: **Off**, **On**, **Flash**, or specific cab rate (**75**, **120**, **270**, **420**)

Input status: **Off** or **On**

TRACK

Coded Track

CTR1	
Tx	
①	②
③	④
0.00 A	
0.00 V	
Rx	NC
①	②
③	④
0.00 A	
LED	
○	Off
VRO	
◻▶	Off

Track mnemonic

Tx status: blank (OK) or **Fail**

Output current

Output voltage

Rx status: **NC** when no code present;
CP when code present; **VCP** when vital code present

Input current

Stick LED mnemonic

Stick LED status: **On** or **OFF**

Stick LED status: green when on; gray when off

Output status: **Off**, **On**, **Flash**, or specific cab rate (**75**, **120**, **270**, **420**)

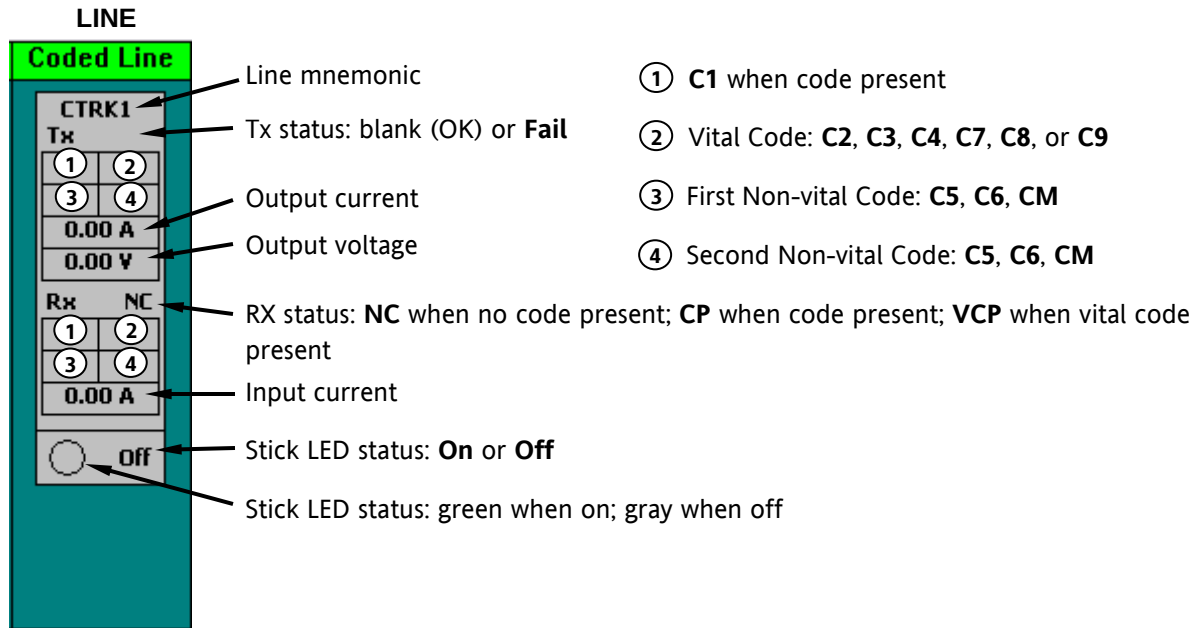
Output status: green when on, black when off

① **C1** when code present

② Vital Code: **C2**, **C3**, **C4**, **C7**, **C8**, or **C9**

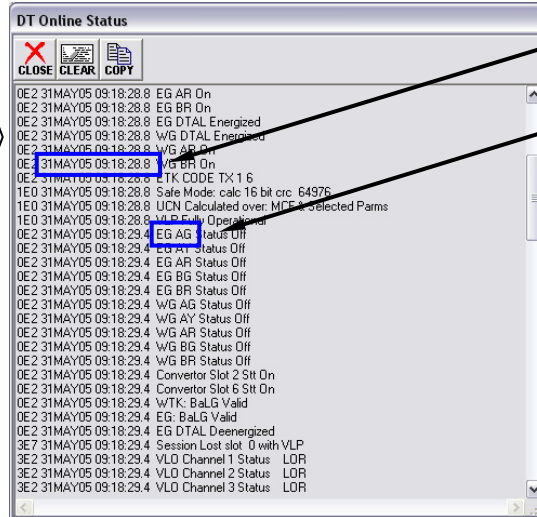
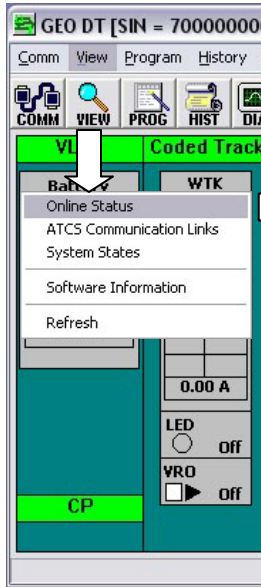
③ First Non-vital Code: **C5**, **C6**, **CM**

④ Second Non-vital Code: **C5**, **C6**, **CM**



Viewing GEO Online Status:

1. Click **VIEW** button or menu
2. Select **Online Status**



The On-line Status function provides a real-time view of the internal GEO status log. This listing only includes events for the current DT session.

Date/Time stamp from GEO system

Mnemonic for interface or parameter

The Online Status screen can remain open while performing other DT functions.

To save or print the on-line status log, click the **COPY** button and paste to another application, such as Microsoft® Notepad.

Click **CLEAR** to erase current log contents.

Viewing ATCS Communication Links:

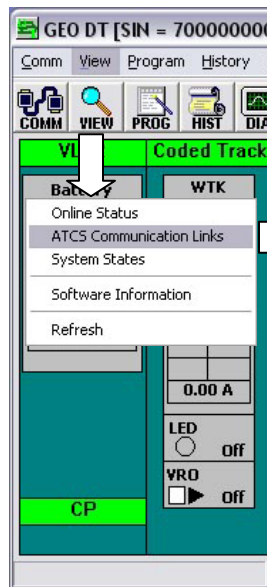
1. Click **VIEW** button or menu
2. Select **ATCS Communication Links**

VIEWING ATCS COMMUNICATION LINKS

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Click arrows to scroll up or down.

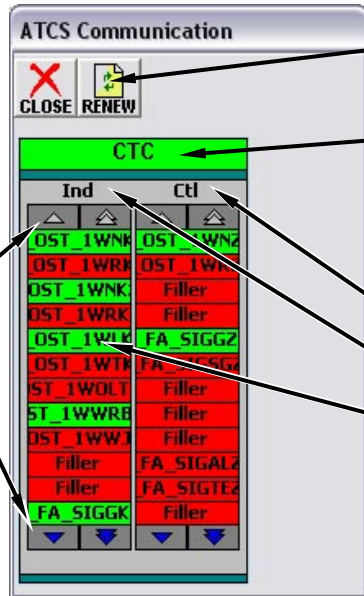
NOTE:



= scroll 1 line per click



= scroll 1 screen (12 lines) per click



Click **RENEW** button to update display.

Link label: green when communication session established; red indicates failure to establish communication session.

Receive

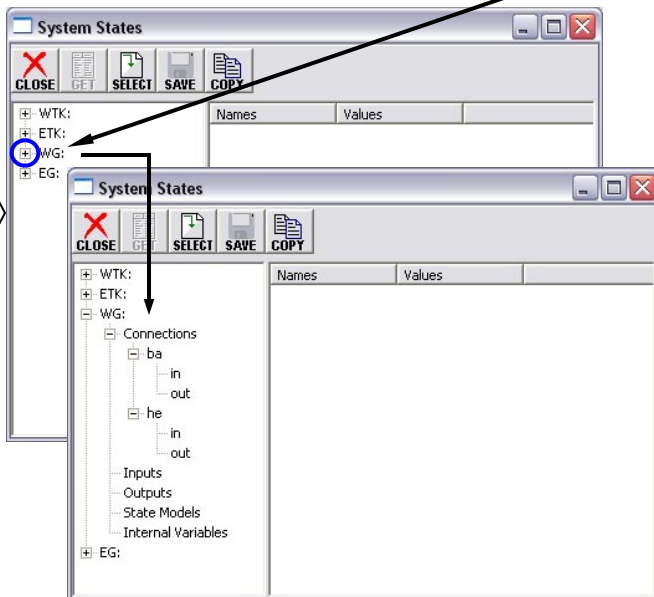
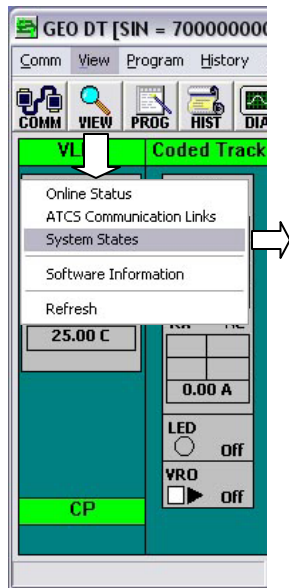
Transmit

Message fields: green when set (non-zero); red when clear (zero).

Viewing System States:

1. Click **VIEW** button or menu
2. Select **System States**

Click '+' symbols to expand view of Geographic Object system state categories.



Use **System States** function to view the current state of the following elements for any Geographic Object in the track layout:

- physical inputs and outputs,
- controls and indications,
- geographic message inputs and outputs,
- state models,
- internal variables.

Continued next page

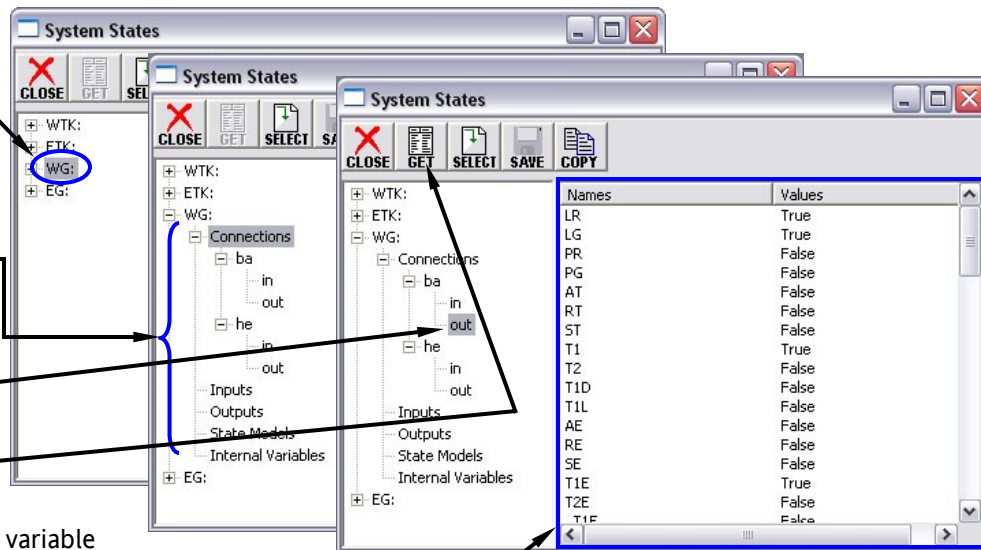
Displaying Current System State Variables for a Geographic Object: (continued from previous page)

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VIEWING SYSTEM STATES

1. Select Geographic Object (click + to expand)
2. Select System State category for selected object (expand as needed)
3. Select (or double click) sub-category as required
4. Click **GET** button when enabled
5. Current system state variable names and values for selected category displayed in right panel.



System States Display Function Buttons:

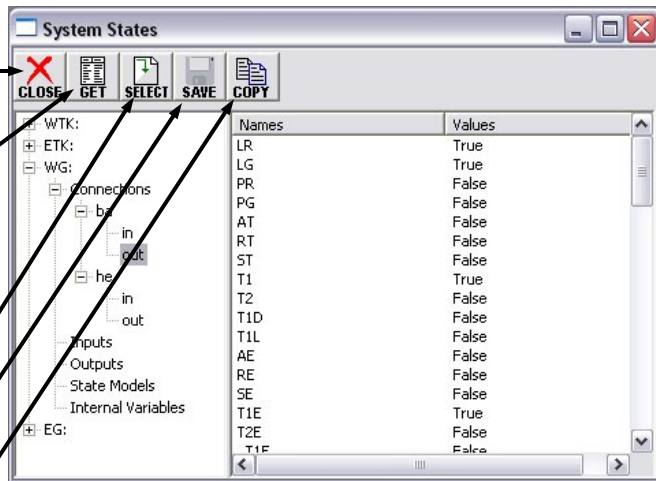
CLOSE – Click to close the System States screen and return to the main display.

GET – This button is enabled when a category containing variables is selected. Click to display the variables on the right half of the screen.

SELECT – See page 20.

SAVE – See page 21.

COPY – Click to copy the currently listed variables and values to the PC clipboard. The variables can then be pasted into another application and saved or printed.



System States Display Function Buttons (SELECT):

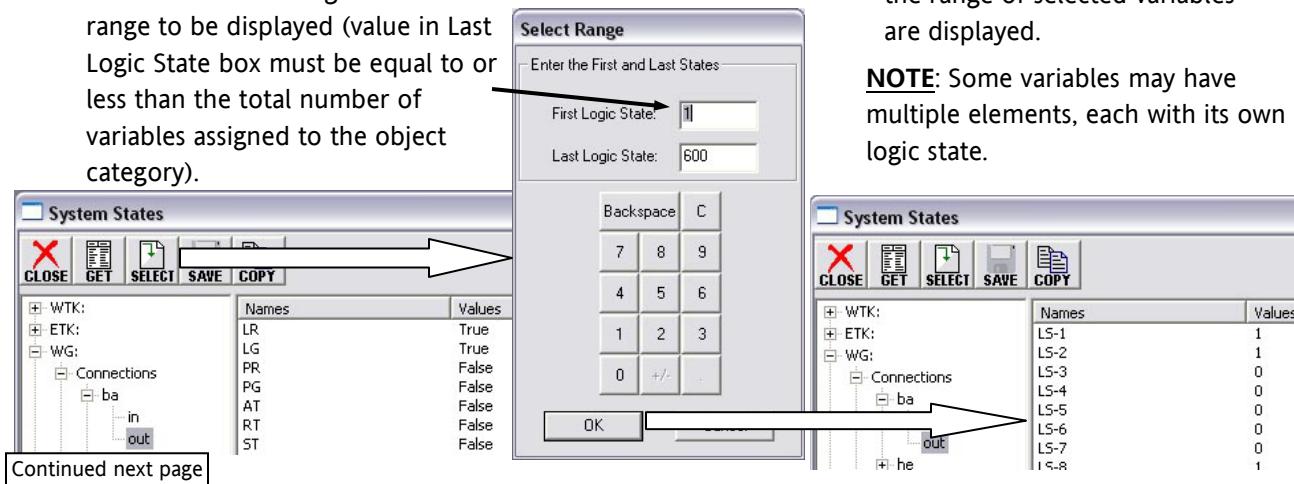
The **SELECT** function allows the user to pick a range of variables from those displayed and display the logic states for those variables.

1. Click **SELECT** ('Select Range' edit box displayed)
2. Enter first and last logic states in the range to be displayed (value in Last Logic State box must be equal to or less than the total number of variables assigned to the object category).

3. Click **OK**

4. The actual logic states assigned to the range of selected variables are displayed.

NOTE: Some variables may have multiple elements, each with its own logic state.

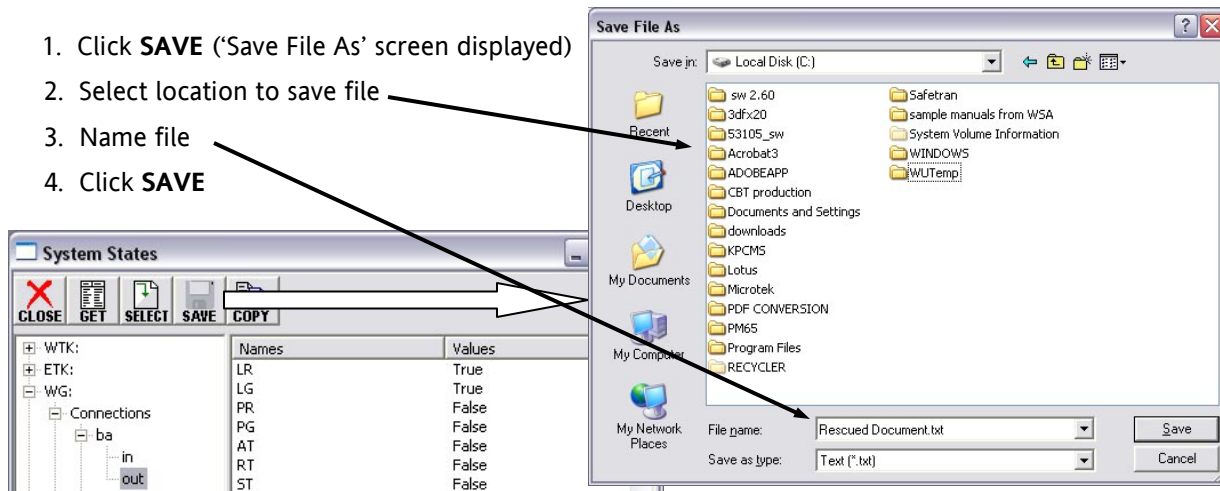


Continued next page

System States Display Function Buttons (SAVE):

The **SAVE** function allows the user to save the currently displayed variables (literal values or logic states) to a designated location.

1. Click **SAVE** ('Save File As' screen displayed)
2. Select location to save file
3. Name file
4. Click **SAVE**



Continued next page

System States 'Connections' Category: (continued from previous page)

The **Connections** category includes all Geographic Messages that are transmitted from and received on each Geographic Object Connection.

In this example, the state of each Geographic Message transmitted from the base (ba) connection of signal WG is displayed.

NOTE: ba = base of signal,
he = head of signal

Names	Values
LR	True
LG	True
PR	False
PG	False
AT	False
RT	False
ST	False
T1	True
T2	False
T1D	False
T1L	False
AE	False
RE	False
SE	False
T1E	True
T2E	False
T1F	False

Geographic Message names

Current message states

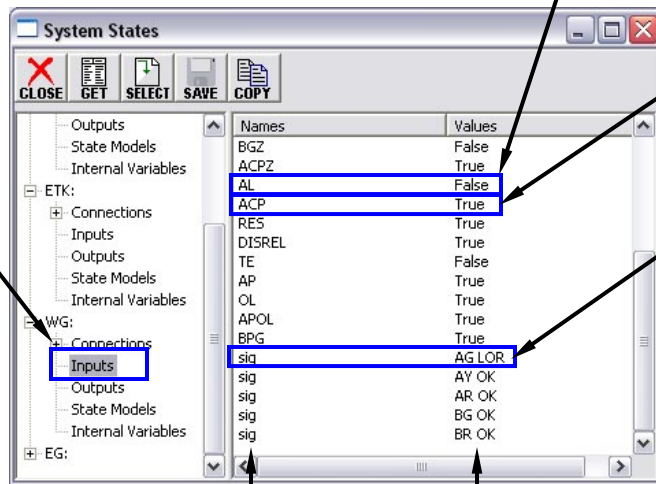
System States 'Inputs' Category: (continued from previous page)

Vital double-track approach lighting (AL) input of signal WG is low.

The **Inputs** category includes all controls and physical inputs associated with each Geographic Object including:

- relay inputs
- searchlight signal mechanism inputs
- coded track inputs

In this example, the state of controls and physical inputs of signal WG are displayed.



Names	Values
BGZ	False
ACPZ	True
AL	False
ACP	True
RES	True
DISREL	True
TE	False
AP	True
OL	True
APOL	True
BPG	True
sig	AG LOR
sig	AY OK
sig	AR OK
sig	BG OK
sig	BR OK

Vital AC power out (ACP) input of signal WG is high.

Green lamp on A head of signal WG is LOR (if foreign energy were present it would be displayed here).

Names of controls and physical inputs

Current state of controls and physical inputs

Continued next page

System States 'Outputs' Category: (continued from previous page)

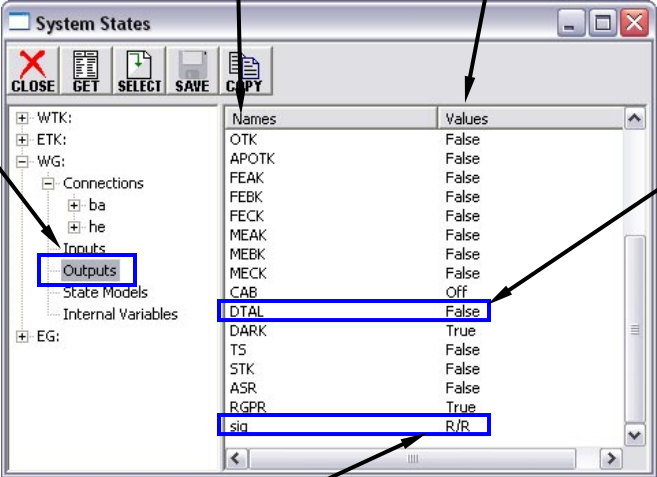
Names of indications and physical outputs

Current state of indications and physical outputs

The **Outputs** category includes all indications and physical outputs associated with each Geographic Object including:

- lamp outputs
- relay outputs
- searchlight signal mechanism outputs
- coded track outputs

In this example, the state of controls and physical outputs of signal WG are displayed.



Names	Values
OTK	False
APOTK	False
FEAK	False
FEBK	False
FECK	False
MEAK	False
MEBK	False
MECK	False
CAB	Off
DTAL	False
DARK	True
TS	False
STK	False
ASR	False
RGPR	True
sig	R/R

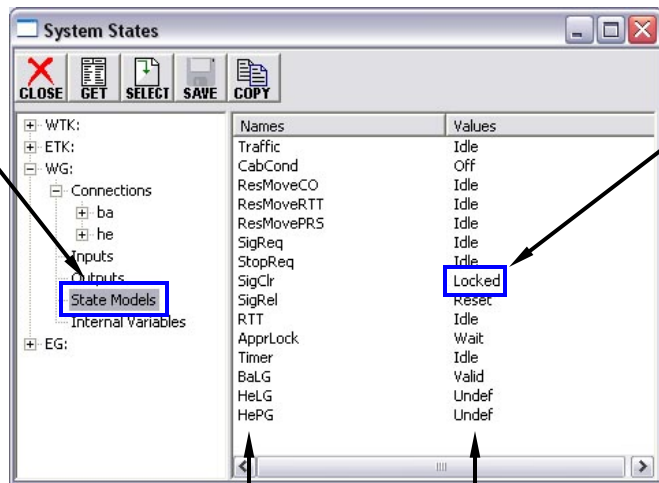
Vital double-track approach lighting (DTAL) output of signal WG is low.

Signal WG is currently displaying R/R.

System States 'State Models' Category: (continued from previous page)

The **State Models** category includes the current state of all state models defined in the Geographic Object Library.

In this example, the current state of the State Models of signal WG are displayed.



The screenshot shows a window titled 'System States' with a toolbar containing 'CLOSE', 'GET', 'SELECT', 'SAVE', and 'COPY'. The left pane shows a tree structure with 'WG' expanded, and 'State Models' highlighted. The right pane displays a table of state models and their current values.

Names	Values
Traffic	Idle
CabCond	Off
ResMoveCO	Idle
ResMoveRTT	Idle
ResMovePRS	Idle
SigReq	Idle
StopReq	Idle
SigClr	Locked
SigRel	Reset
RTT	Idle
ApprLock	Wait
Timer	Idle
BaLG	Valid
HeLG	Undef
HePG	Undef

Signal WG is clear; therefore, SigClr state model of Signal WG is in the Locked state.

List of State Models for Signal WG

Current state of State Models for Signal WG

Continued next page

System States 'Internal Variables' Category: (concluded)

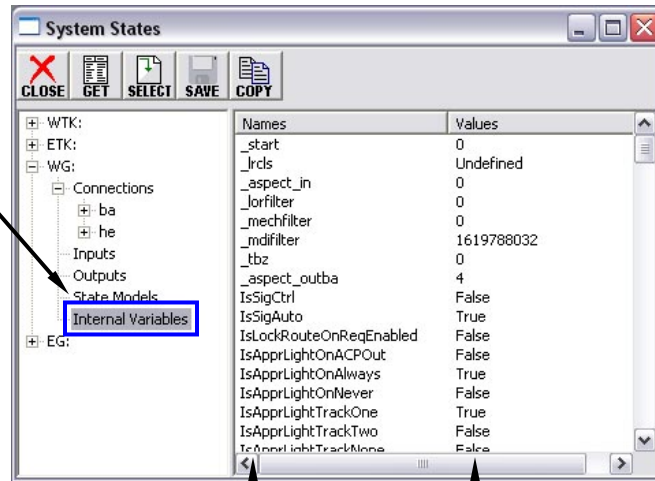
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VIEWING SYSTEM STATES

The **Internal Variables** category includes the current state or value of all other variables defined in the Geographic Object Library.

In this example, the current state or value of the Internal Variables of signal WG are displayed.



List of Internal Variables

Current values of
Internal Variables

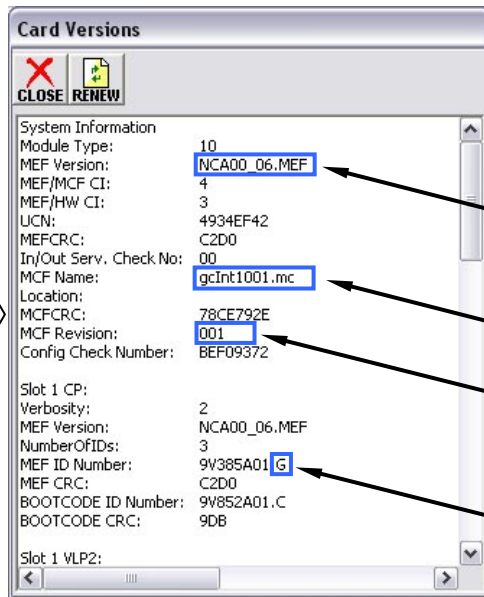
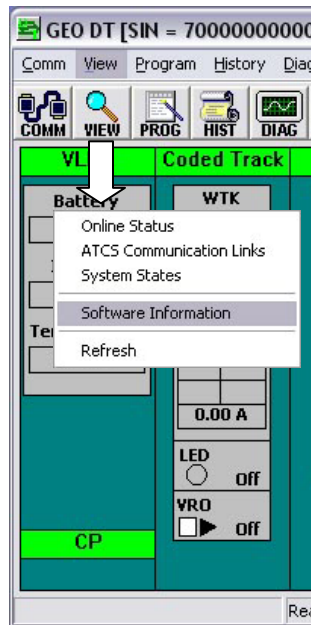
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Viewing Software Information:

VIEWING SOFTWARE INFORMATION

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1. Click **VIEW** button or menu
2. Select **Software Information** to list all modules

Essential Software Information:

MEF Version	This is the name of the Module Executable File installed on the CP processor on the CPU II+ module.
MCF Name	This is the name of the Module Configuration File. It resides on the External Configuration Device (ECD) located on the GEO backplane.
MCF Revision	This is the MCF release level.
MEF Revision	The last letter of the MEF ID Number identifies the MEF release level.

NOTE: GEO modules with different MCFs may have different firmware release levels for the MEFs. If you swap modules in a GEO and the new module has an older, incompatible MEF, and MCI (Module Compatibility Index) error will result as the GEO boots to a non-operational state. Avoid compatibility problems by keeping MEF release levels on your spare modules as up to date as possible.

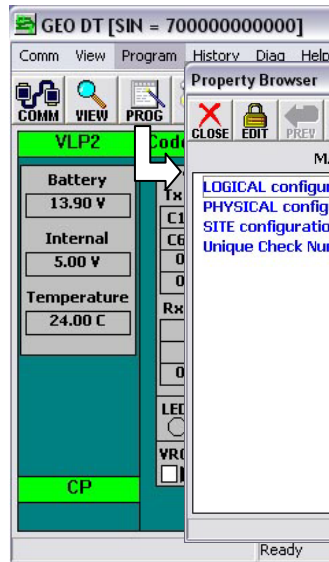
NOTE: Use the scroll bar at the right side of the display to scroll down screen and view software information for each of the modules in the GEO unit.

Viewing Current Operating and Configuration Parameters While Connected to GEO:

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VIEWING PROGRAMMING



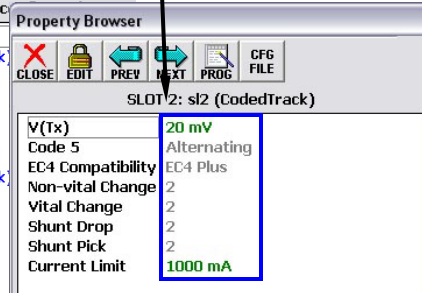
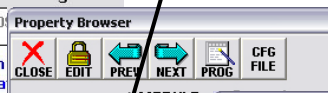
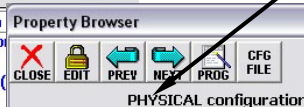
1. Click **PROG** button or **Program** menu

2. Select configuration category to view from the Property Browser **MAIN PROGRAM** menu.

3. Select configuration information to view from configuration category menu.

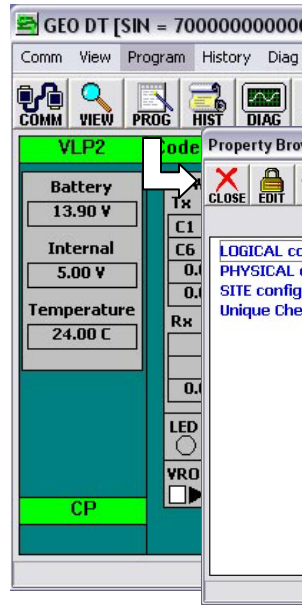
4. Select item to view.

5. Operating parameter values are green, configuration parameter values are gray.



NOTE: See pages 46, 54, 63, 66 & 73 to change operating and configuration parameters.

Saving Configuration Files (in binary format) to the PC:

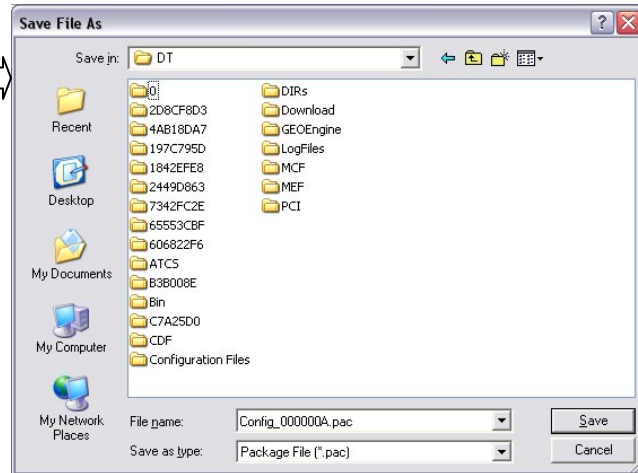


1. Click **PROG** button or **Program** menu
2. Click **CFG FILE** button on **Property**

Browser screen

3. Select **Save to File**
4. On **Save File As** screen:

- a) select a file location
- b) name the file
- c) Click the **Save** button



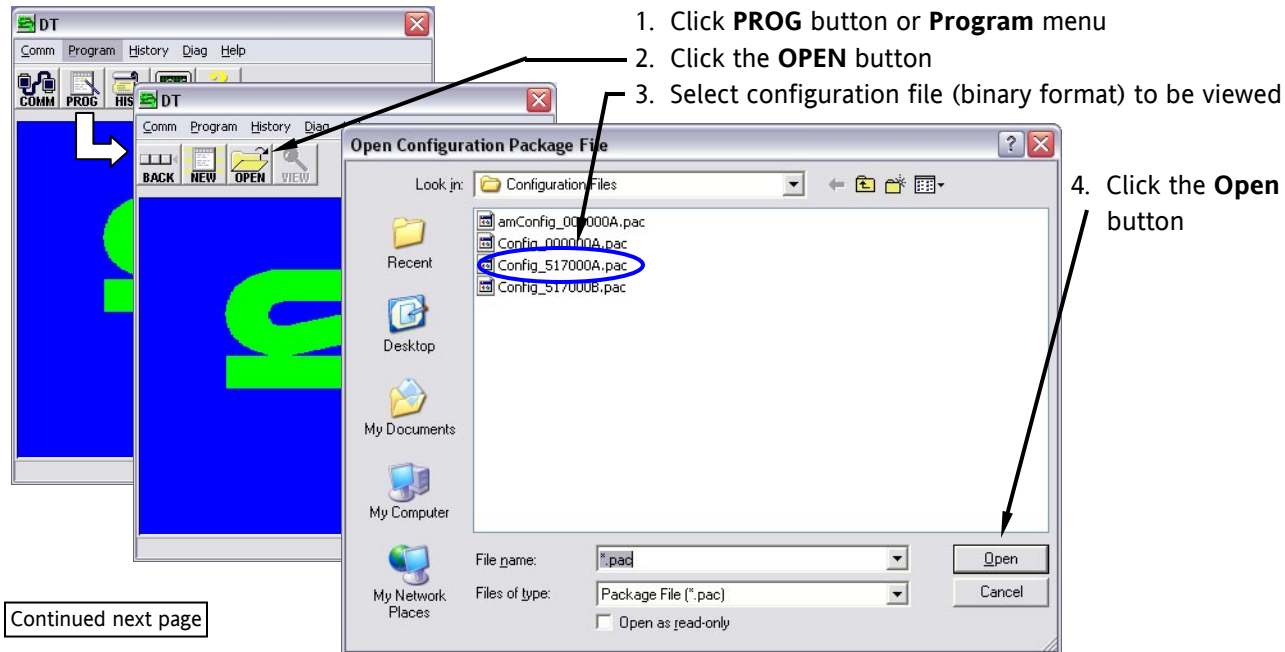
NOTE: Binary files can only be viewed using the DT.

Viewing & Printing Reports on the PC (disconnected from GEO):

Document No.: SIG-00-04-17

Version C.1

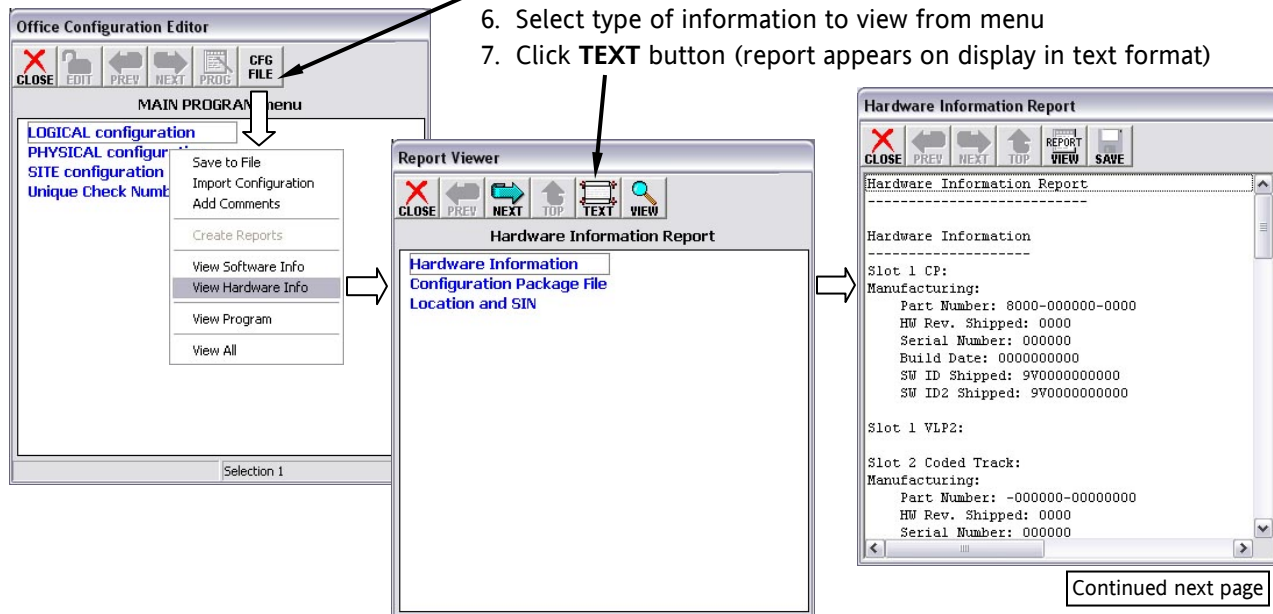
VIEWING & PRINTING REPORTS



Continued next page

Viewing & Printing Reports on the PC (disconnected from GEO): (continued from previous page)

5. Click **CFG FILE** button
6. Select type of information to view from menu
7. Click **TEXT** button (report appears on display in text format)



Viewing & Printing Reports on the PC (disconnected from GEO): (concluded)

Document No.: SIG-00-04-17

Version C.1

VIEWING & PRINTING REPORTS

8. Click **SAVE** button

9. Select location to save file

10. Name the file

11. Select **Save** button (file saved in text format)

NOTE:
The text file can now be opened and printed using a text editor program such as Microsoft® Notepad.

Hardware Information Report

Hardware Information

Slot 1 CP:

Manufacturing:

Part Number: 8000-000000-0000

HW Rev. Shipped: 0000

Serial Number: 000000

Build Date: 0000000000

SW ID Shipped: 9V0000000000

SW ID2 Shipped: 9V0000000000

Slot 1 VLP2:

Slot 2 Coded Track:

Manufacturing:

Part Number: -000000-00000000

HW Rev. Shipped: 0000

Serial Number: 000000

Save File As

Save: Configuration Files

Recent

Desktop

My Documents

My Computer

My Network Places

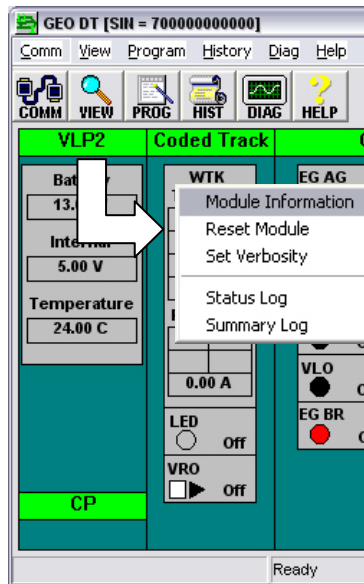
File name: HWInfo.txt

Save as type: Text (*.txt)

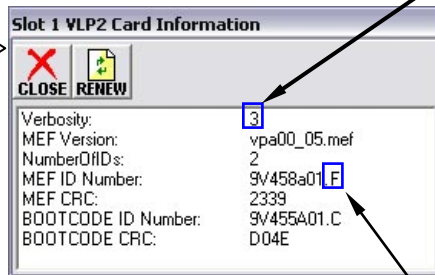
Save

Cancel

Viewing Module Information:



1. On the Main Display, right-click on the module label.
2. Select **Module Information**

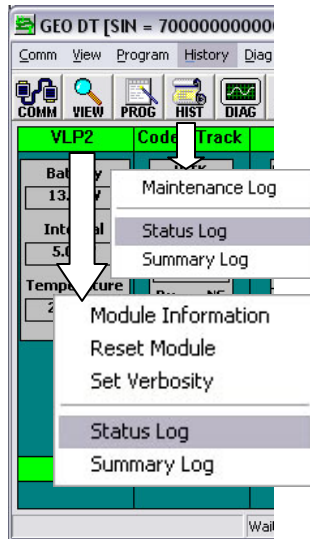


Verbosity setting affects Status Log event listing (see page 36).

MEF version level

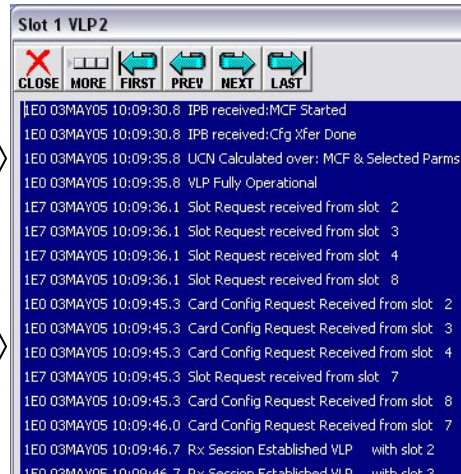
Viewing a Module Status Log:

1. Click **HIST** button or **History** menu
2. Select **Status Log**



OR

1. Right-click module label
2. Select **Status Log**



OR

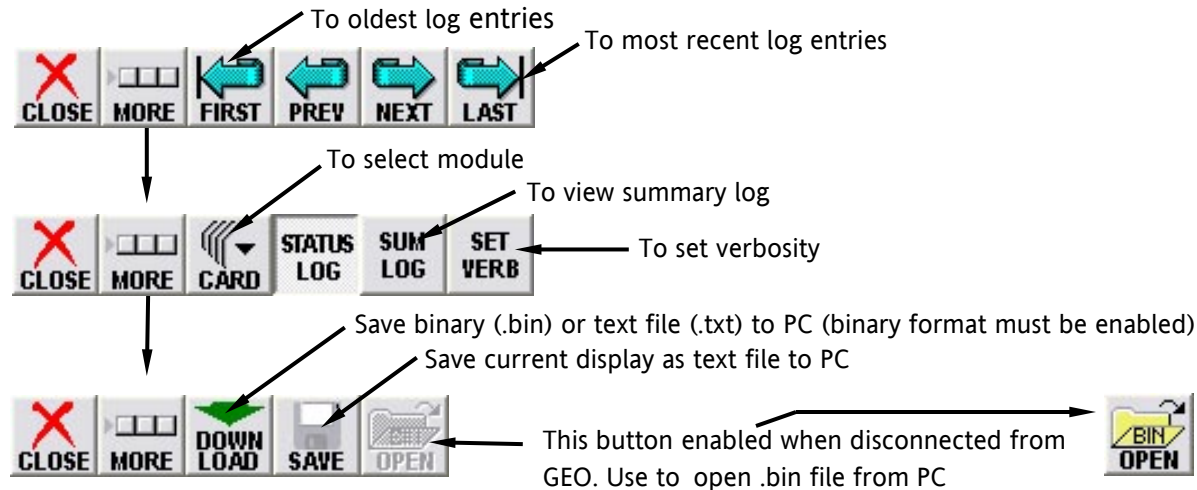
The Status Log can contain the following event history:

- System status events
- Parameter changes
- Internal command activity
- Session status
- Rx and Tx session activity

The Status Log for the VLP includes messages from other modules.

The level of detail goes up with the verbosity level from 1 to 5. CPU II+ CP processor is limited to verbosity levels 1 and 2. To change the verbosity level, right click on the module label and select **Set Verbosity**.

Navigating the Status Log Text Box:



To update the Status Log listing, click on the **CARD** button and select the same module.

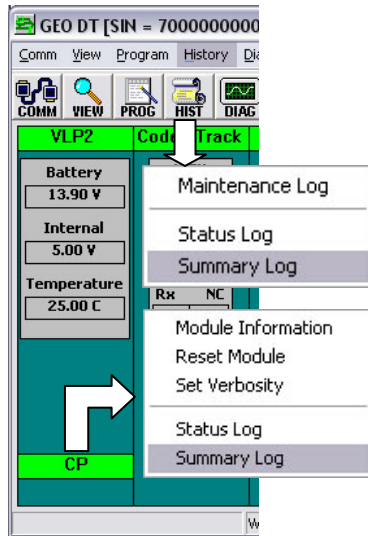
Status log data is lost when a module is powered down except for the CPU II+ (CP).

Viewing a Module Summary Log:

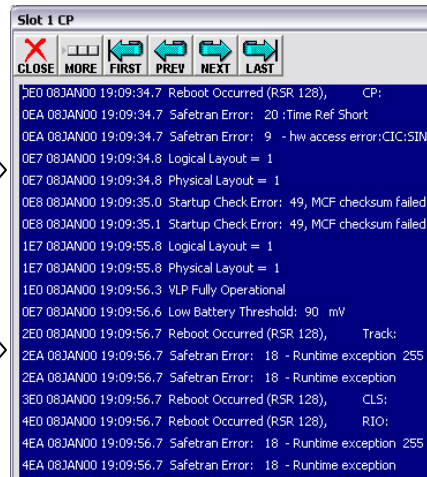
1. Click **HIST** button or **History** menu
2. Select **Summary Log**

OR

1. Right-click module label
2. Select **Summary Log**



OR

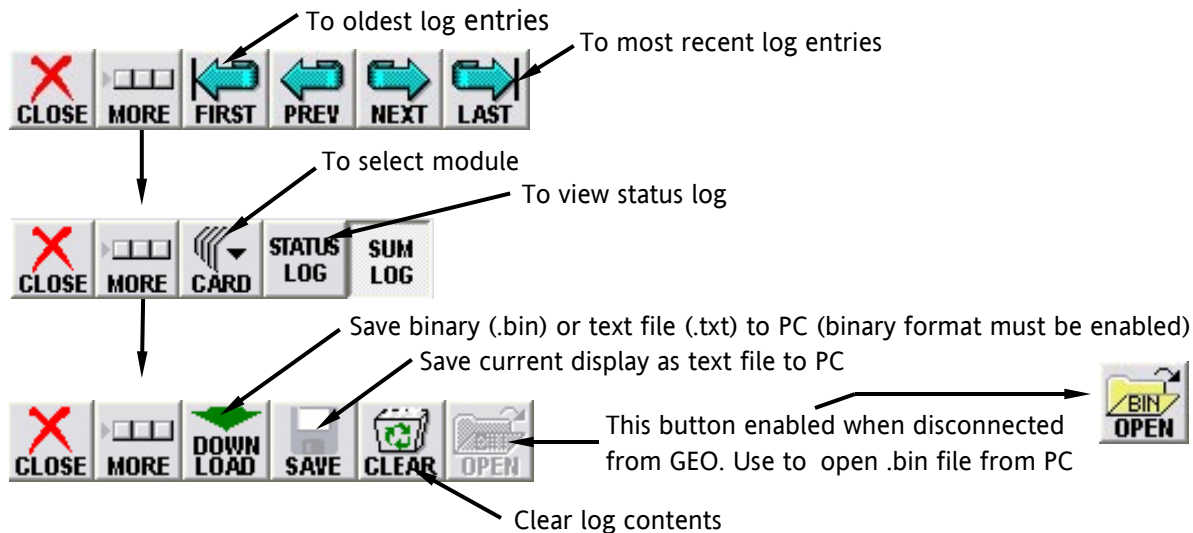


The Summary Log can contain the following event history:

- Reboots
- Critical errors
- Parameter changes

The Summary Log for the VLP includes UCN, MEF CRCs and fully operational start events.

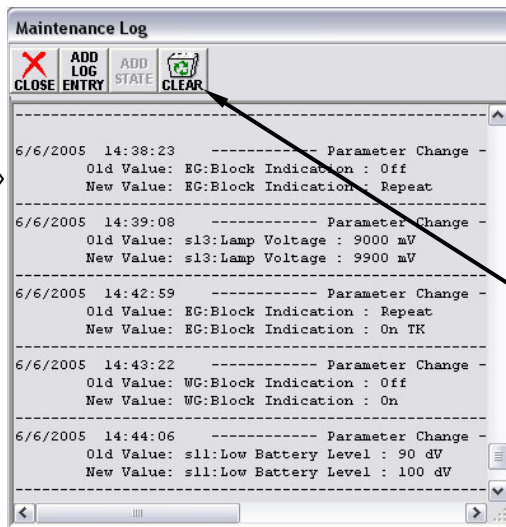
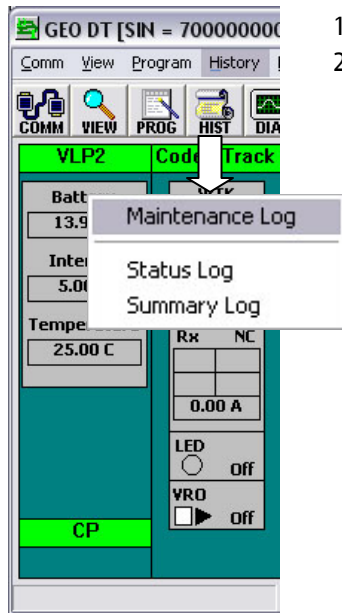
Navigating the Summary Log Text Box:



To update the Summary Log listing, click on the **CARD** button and select the same module. Status log data is lost when a module is powered down except for the CPU II+ (CP).

Viewing Maintenance Log of Parameter Changes:

1. Click **HIST** button or **History** menu
2. Select **Maintenance Log**



The Maintenance Log is a date and time-stamped record of all parameter changes made to the GEO system.

NOTE:
Clicking the **CLEAR** button deletes the contents of the Maintenance Log.

Adding Comments to Maintenance Log:

1. To add a comment, click **ADD LOG ENTRY**.

2. Using PC keyboard, type comment in **Log Entry** text box.

3. Date and time-stamped 'User Entry' is added to the end of the Maintenance Log.

Maintenance Log

CLOSE ADD LOG ENTRY ADD STATE CLEAR

6/6/2005 14:38:23
Old Value: EG:B
New Value: EG:B

6/6/2005 14:39:08
Old Value: s13:
New Value: s13:

6/6/2005 14:42:59
Old Value: EG:B
New Value: EG:B

6/6/2005 14:43:22
Old Value: WG:B
New Value: WG:B

6/6/2005 14:44:06
Old Value: s1l:
New Value: s1l:

Log Entry

Adjusted low battery level to prevent frequent alarms. (DLW)

OK Cancel

Maintenance Log

CLOSE ADD LOG ENTRY ADD STATE CLEAR

Old Value: EG:Block Indication : Off
New Value: EG:Block Indication : Repeat

6/6/2005 14:39:08 ----- Parameter Change -----
Old Value: s13:Lamp Voltage : 9000 mV
New Value: s13:Lamp Voltage : 9900 mV

6/6/2005 14:42:59 ----- Parameter Change -----
Old Value: EG:Block Indication : Repeat
New Value: EG:Block Indication : On TK

6/6/2005 14:43:22 ----- Parameter Change -----
Old Value: WG:Block Indication : Off
New Value: WG:Block Indication : On

6/6/2005 14:44:06 ----- Parameter Change -----
Old Value: s1l:Low Battery Level : 90 dV
New Value: s1l:Low Battery Level : 100 dV

6/6/2005 14:46:13 ----- User Entry -----
Adjusted low battery level to prevent frequen

WARNING: DURING SOFTWARE UPGRADE, THE GEO UNIT DOES NOT HAVE CONTROL OF THE SIGNAL SYSTEM. TAKE ADEQUATE PRECAUTIONS PER RAILROAD SAFETY AND OPERATING RULES PERTAINING TO THE SIGNAL SYSTEM.

Load MEFs only to the directly accessible unit; remote destination addressing will not work for this operation.

When downloading the GEO MEF into the CPU II+ module, use the left **VLP** port to update the Vital Logic Processor MEF or the right **DIAG (CP)** port to update the Communications Processor MEF. When downloading the MEF for a particular GEO module, connect the serial cable directly to the **DIAG** port on that module.

1. Connect to the module to be upgraded. (See pages 5 & 6.)
2. Click the **COMM** button or menu, then select **Install Software**.
3. A text box appears displaying boot messages until the Setup Program menu is displayed.
4. Press the F4 function key on the PC keyboard or click the **F4** button on the display to start the MEF change process.
5. Select the correct MEF file for the module.
6. Once the loading of the new MEF starts, the bar at the base of the text box shows progress.

7. When the new MEF is completely loaded the text box will return to the Setup Program menu.

NOTE: If the module fails to reboot, or reboots and re-enters the Setup Program, check the boot messages to see if the correct MEF is listed. If not, repeat the MEF download process by clicking the **MEF** button or pressing F4.

NOTE: If the unit is without an MEF, Click the **COMM** button and select **Reset Module** from the menu. If “No Valid MEF” is displayed in the Text Terminal screen, then respond to “Change module setup (Y/N)?” by typing a “Y” from the keyboard, and then repeat steps 4 through 6 above.

8. Select **EXIT** to reboot the module and exit the Setup Program.
9. After observing that the module is rebooting, select **EXIT** again to close the text box.
10. Wait until the GEO reboot is complete. Move the DB9 serial cable to the CPU module DIAG port if needed and reconnect DT.
11. Use the **Module Information** function (see page 35) to check that the new MEF installation was successful.

WARNING: DURING SOFTWARE UPGRADE, THE GEO UNIT DOES NOT HAVE CONTROL OF THE SIGNAL SYSTEM. TAKE ADEQUATE PRECAUTIONS PER RAILROAD SAFETY AND OPERATING RULES PERTAINING TO THE SIGNAL SYSTEM.

Load MCFs only to directly accessible units; remote destination addressing will not work.

When downloading the GEO MCF, use the **DIAG (CP)** port (the one on the right) on the CPU II+ module.

1. Click the **COMM** button or menu, then select **Install Software**.
2. After the text box displays the boot messages and the Setup Program menu is displayed, press the F3 function key on the PC keyboard or click the **MCF – F3** button on the display.
3. Select the MCF to download from the PC, then click **Open**.
4. When the MCF download is complete, press the F2 function key on the PC keyboard or click the **MCF – F2** button on the display.
5. When the CRC query box comes up, refer to the documentation supplied with the upgrade instructions for the 8-digit CRC number to enter.

6. Enter the CRC number, simultaneously press the **SEL** (select) and **NAV** (navigate) buttons on the CPU module front panel, and then click the **OK** button.
7. Click **Exit** to reboot the GEO.

NOTE: If the module fails to reboot, or reboots and re-enters the Setup Program, check the boot messages or check the character display on the CPU module for MCF or MCF CRC problems. In the event of problems, repeat steps 2 through 7 above.

NOTE: The correct UCN must be entered within 30 minutes of setting up a pending MCF change. See “Setting Unique Check Numbers(UCNs)” on page 80.

8. Once the GEO reboots, click the DT **COMM** button and then select **Connect** to bring up the module assignment display.
9. Click the **PROG** button and select **Unique Check Number (UCN)** to bring up the UCN dialog box. Enter the 8-digit UCN supplied with the MCF. See “Setting Unique Check Numbers(UCNs)” on page 80.
10. Boot GEO and finish any necessary changes in operating parameters or timers.

Module Operating Parameters:

All GEO modules have one or more programmable features that are independent of the MCF and MEF. These **operating parameters** are stored in the CIC and include user options, timers and operational thresholds.

CAUTION: SETTING OPERATING PARAMETERS INCORRECTLY COULD RESULT IN A SYSTEM THAT IS NOT FULLY OPERATIONAL. THE RAILROAD ASSUMES RESPONSIBILITY FOR ITS FIELD-CONFIGURED OPERATING PARAMETERS.

CPU II+

Parameter	Range	Description
Daylight Savings	On or Off	Enable / disable daylight savings function
Units	Standard or Metric	Not currently supported
Low Battery Enabled	On or Off	Enable / disable low battery detection
Low Battery Level	90 – 150 dV (1 decivolt increments)	Set low battery detection level
Radio Subnode	1 - 99	Set radio subnode
Password Access	On or Off	Enable / disable password function
Password	1111 to 9999	Set 4-digit password

Coded Track

Parameter	Range	Description
V(Tx)	0 – 4000 mV (20 millivolt increments)	Set coded track transmit voltage
Current Limit	1000 to 10000 (50 milliamperere increments)	Set track output Current Limit

Coded Line

Parameter	Range	Description
V(Tx)	0 – 4000 mV (20 millivolt increments)	Set coded line transmit voltage
Current Limit	1000 to 10000 (50 milliamperere increments)	Set line output Current Limit

Color Light (CLS)

Parameter	Range	Description
Lamp Voltage	9000 – 13000 mV (20 millivolt increments)	Set lamp voltage
Filament Threshold	150 – 2500 mA (10 milliampere increments)	Sets lamp filament threshold for light out detection.
VPI Debounce	20 –200 ms (2 millisecond increments)	Set VPI debounce time
Lamp Voltage Regulation	Variable or Constant	Set to Constant to maintain constant lamp output voltage even under low battery conditions.

Search Light (SLS)

Parameter	Range	Description
Lamp Voltage	9000 – 13000 mV (20 millivolt increments)	Set lamp voltage
VPI Debounce	20 – 200 ms (2 millisecond increments)	Set VPI debounce time
Mech1 Response	300 – 3000 ms (10 millisecond increments)	Set time allowed to detect correspondence between commanded position of searchlight mechanism 1 and the current position before declaring the mechanism as failed.
Mech2 Response	300 – 3000 ms (10 millisecond increments)	Set correspondence detect time for searchlight mechanism 2 (see above).
Lamp Voltage Regulation	Variable or Constant	Set to Constant to maintain constant lamp output voltage even under low battery conditions.

VPI

Parameter	Range	Description
VPI Debounce	20 – 200 ms (2 millisecond increments)	Set VPI debounce time

RIO

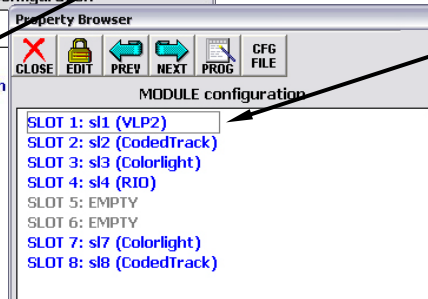
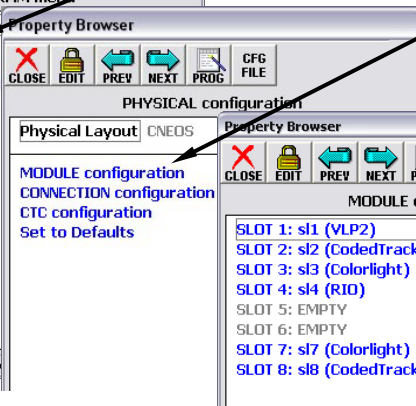
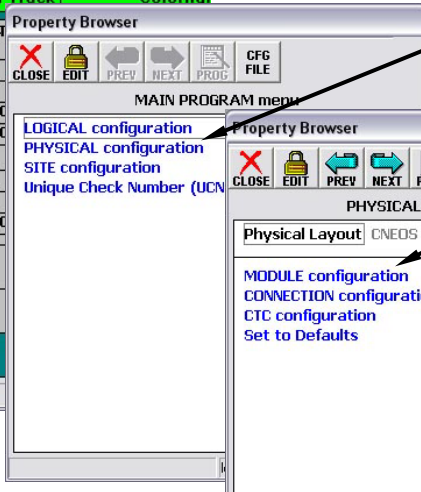
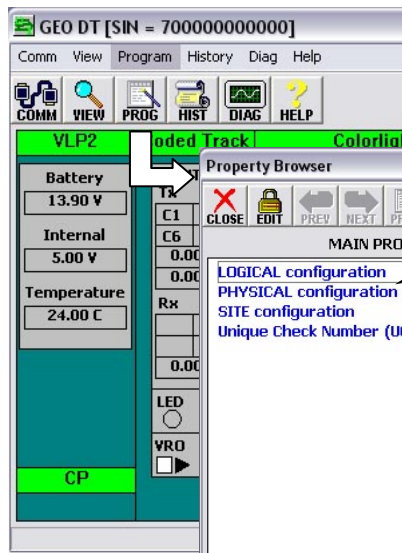
Parameter	Range	Description
VPI Debounce	20 – 200 ms (2 millisecond increments)	Set VPI debounce time

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Changing Module Operating Parameters:

NOTE: Operating parameters are typically not safety related and can be easily changed within the parameter limits as shown here. These parameter changes take effect immediately.

1. Click **PROG** button or **Program** menu
2. Select **PHYSICAL configuration** from the Property Browser **MAIN PROGRAM** menu.
3. Select **MODULE configuration** from the configuration category menu.
4. Select item to change.



Changing Module Operating Parameters: (concluded)

5. Select operating parameter value to change (operating parameters shown in green text).

6a. Type new numeric value in Set Parameter screen text window using PC keyboard or display

6b. Change alpha options or listed numeric options by selecting the new value from the list provided.

7. Click **Update** to save change.

NOTE: Click **Cancel** to leave parameter value unchanged.

Module Configuration Parameters:

Certain GEO modules have programmable **configuration parameters** that affect safety related functions. These configuration parameters appear in gray text.

WARNING: CHANGING CONFIGURATION PARAMETERS COULD ADVERSELY AFFECT SYSTEM OPERATION. THE IMPLEMENTATION OF CONFIGURATION PARAMETER CHANGES AND THEIR EFFECTS ON RAILROAD SAFETY ARE THE RESPONSIBILITY OF THE RAILROAD.

WARNING: CHANGING CONFIGURATION PARAMETERS WILL REQUIRE A NEW UCN. UNTIL THE CORRECT UCN IS ENTERED, THE SYSTEM WILL OPERATE IN THE MOST RESTRICTIVE STATE.

WARNING: A SYSTEM REBOOT COULD OCCUR AT ANY TIME DURING THE CONFIGURATION PARAMETER CHANGE PROCESS. CAREFULLY MONITOR USER INTERFACE INDICATORS TO DETECT A REBOOT. IF A REBOOT OCCURS BEFORE THE CHANGE PROCESS IS COMPLETE, THE ORIGINAL CONFIGURATION PARAMETERS WILL REMAIN IN EFFECT UNLESS A CORRECT UCN WAS APPLIED AND CHANGES WERE UPLOADED TO NON-VOLITALE MEMORY.

NOTE: If configuration parameters have been changed but the new UCN is not available or the change process must be aborted for some other reason, right click on VLP module label and select **Reset Module** from the menu. The system will return to the previous configuration parameter values and return to normal operation.

Coded Track

Parameter	Range	Description
Code 5	Standard, Long or Alternating	Select code 5 format
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.
Vital Change	1 – 3 cycles	Number of code cycles before changing from: one vital code to another vital code, a non-vital code to a vital code, 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.

Coded Line

Parameter	Range	Description
Code 5	Standard, Long or Alternating	Select code 5 format
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.
Vital Change	1 – 3 cycles	Number of code cycles before changing from: one vital code to another vital code, a non-vital code to a vital code, 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.

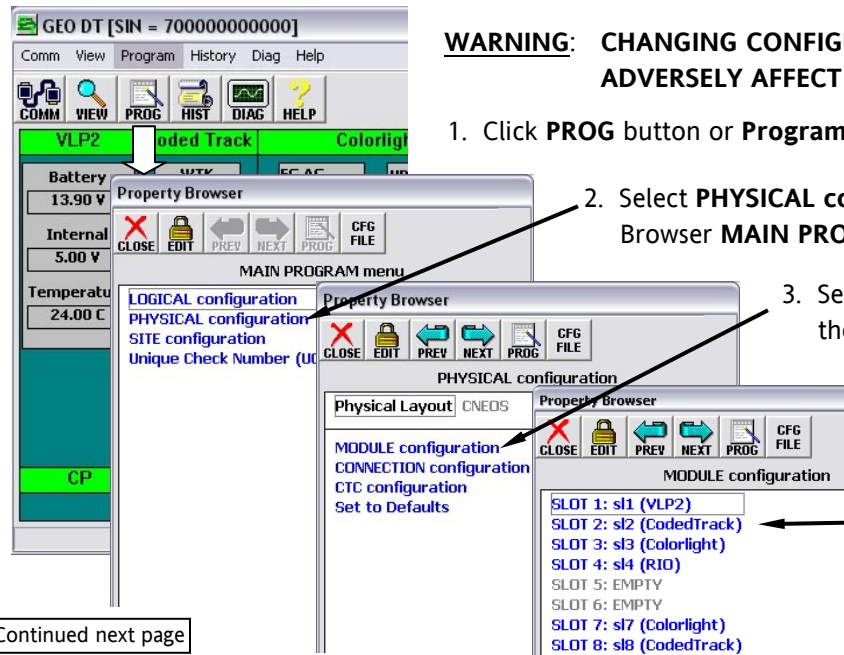
Color Light (CLS)

Parameter	Range	Description
Cold Filament Test	Yes or No	Enable / disable cold filament test
VLO Flash Rate	40, 45, 50, 55, 60, 65, 70 CPM	Sets vital lamp output flash rate in cycles per minute (CPM) with 50% duty cycle.
Red Retaining Relay Enabled	Yes or No	Enable / disable red retaining relay. Yes = enabled, red retaining relay controlled by CPU module. No = disabled, red retaining relay controlled by color light module,
Red Retaining Relay Group 1	No Relay, Slot 1 – Slot 8	Specifies a group of color light modules (by slot number) for red retaining relay management.
Red Retaining Relay Group 2	No Relay, Slot 1 – Slot 8	See Red Retaining Relay Group 1 above.
Red Retaining Relay Group 3	No Relay, Slot 1 – Slot 8	See Red Retaining Relay Group 1 above.

Changing Module Configuration Parameters:

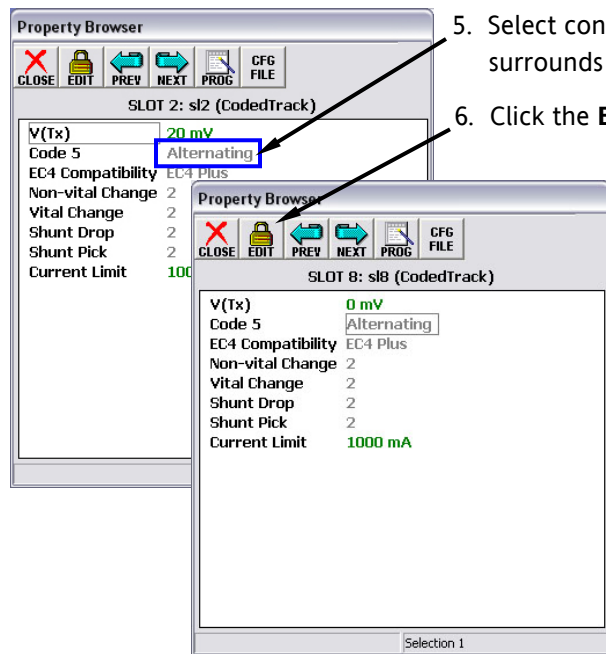
WARNING: CHANGING CONFIGURATION PARAMETERS COULD ADVERSELY AFFECT SYSTEM OPERATION.

1. Click **PROG** button or **Program** menu
2. Select **PHYSICAL configuration** from the Property Browser **MAIN PROGRAM** menu.
3. Select **MODULE configuration** from the configuration category menu.
4. Select item to change.



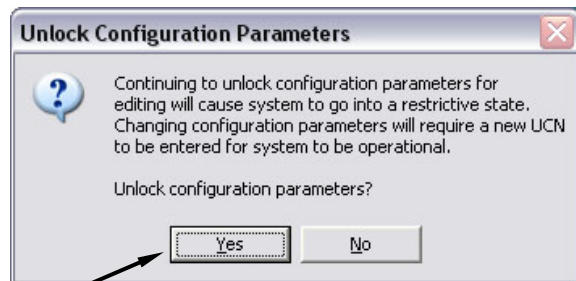
Continued next page

Changing Module Configuration Parameters: (continued from previous page)



5. Select configuration parameter value to change (a gray rectangle surrounds parameter value when selected).

6. Click the **EDIT** button. AN Unlock prompt appears (see below).



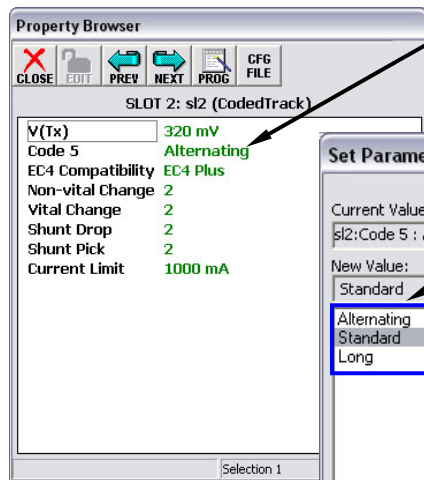
7. To proceed with the parameter edit, click the **Yes** button on the Unlock prompt. Click **No** to cancel the edit.

NOTE: Clicking **Yes** places the system in the most restrictive state.

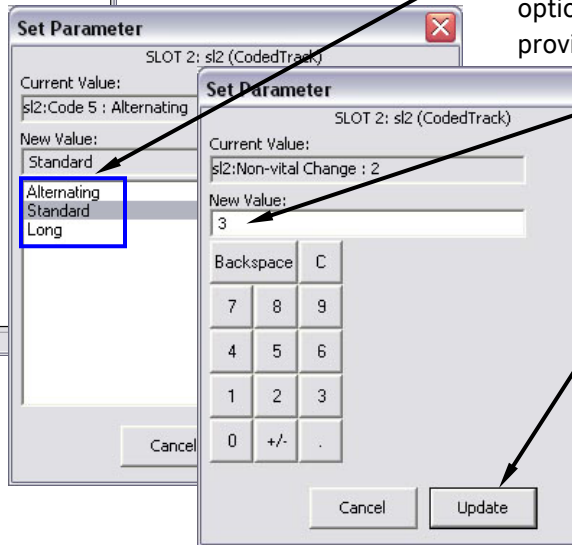
Continued next page

Changing Module Configuration Parameters: (continued from previous page)

8. All parameter values are now displayed green. Select the configuration parameter value to change.



9a. Change alpha options or listed numeric options by selecting new value from list provided.



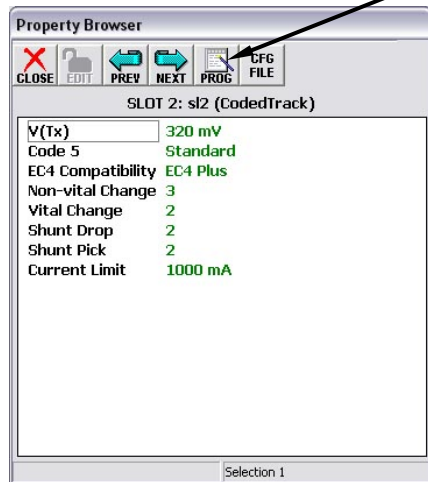
9b. Type new numeric values in Set Parameter screen text window using PC keyboard or display keypad.

10. Click **Update** to save change.

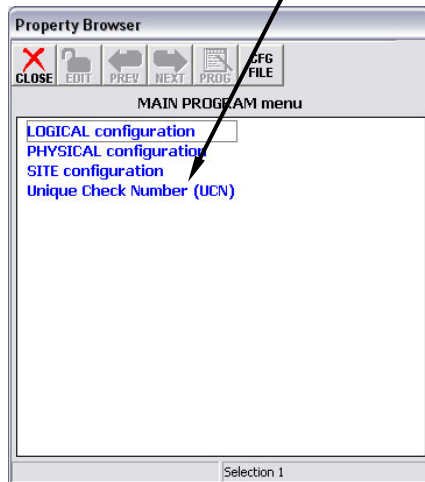
NOTE: Click **Cancel** to leave parameter value unchanged.

Continued next page

Changing Module Configuration Parameters: (concluded)



11. After all configuration parameter values are updated to the new values, click the **PROG** button to return to the MAIN PROGRAM menu.



12. Select **Unique Check Number (UCN)**.

13. After all system modifications have been entered, enter the new UCN provided by the office. See **Setting Unique Check Number (UCN)** on page 80.

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Changing Geographic Object Operating Parameters:

Each Geographic Object used in the track layout has one or more programmable features that are independent of the MCF and MEF. These **operating parameters** are stored in the CIC.

The operating parameters appear in green text.

CAUTION: SETTING OPERATING PARAMETERS INCORRECTLY COULD RESULT IN A SYSTEM THAT IS NOT FULLY OPERATIONAL. THE RAILROAD ASSUMES RESPONSIBILITY FOR ITS FIELD-CONFIGURED OPERATING PARAMETERS.

NOTE: The Geographic Object operating parameters are object specific. Due to the large number of objects available in the Geographic Object Library, the objects and their associated parameters are too numerous to list here.

Continued next page

Changing Geographic Object Operating Parameters: (continued from previous page)

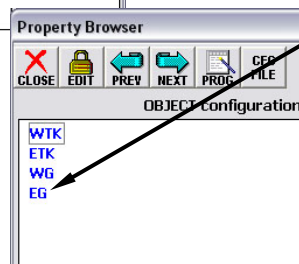
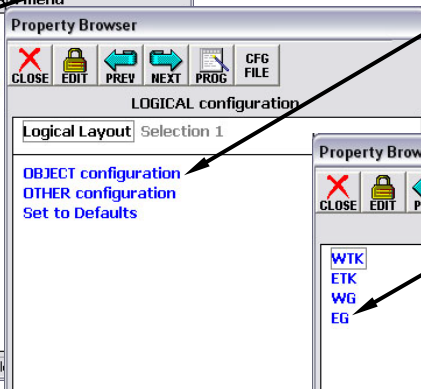
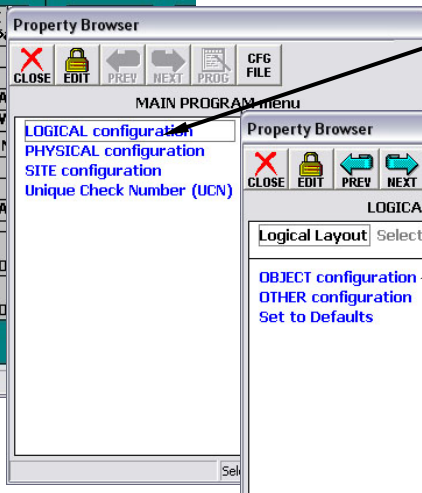
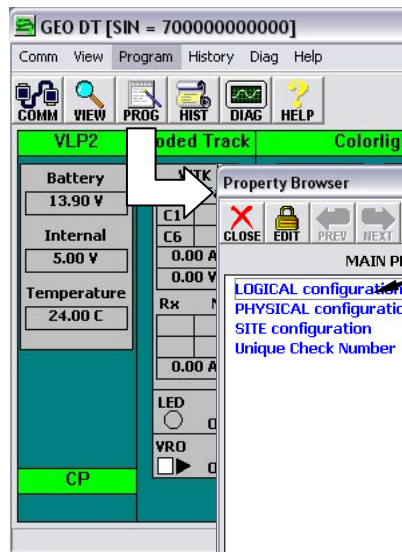
NOTE: Object operating parameters are typically not safety related and can be easily changed within the parameter limits as shown here. These parameter changes take effect immediately.

1. Click **PROG** button or **Program** menu

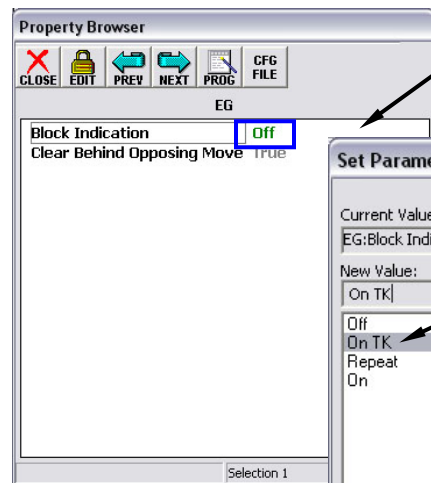
2. Select **LOGICAL configuration** from the Property Browser **MAIN PROGRAM menu**.

3. Select **OBJECT configuration** from the configuration category menu.

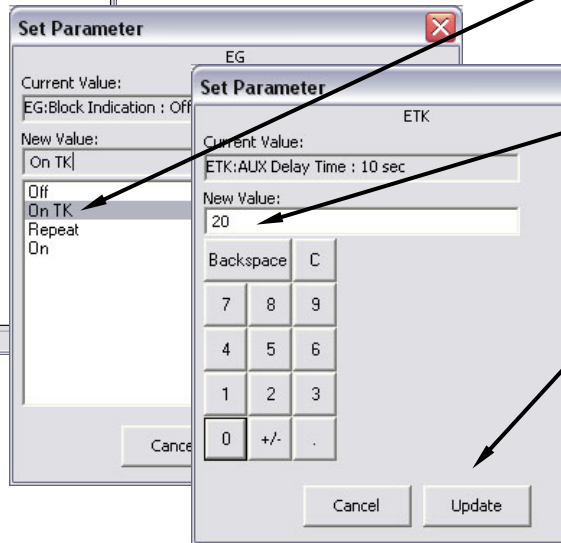
4. Select object to change.



Changing Geographic Object Operating Parameters: (concluded)



5. Select operating parameter value to change (operating parameters shown in green text).



6a. Change alpha options or listed numeric options by selecting new value from list.

6b. Type new numeric values in Set Parameter screen text window using PC keyboard or display keypad.

7. Click **Update** to save change.

NOTE: Click **Cancel** to leave parameter value unchanged.

Changing Geographic Object Configuration Parameters:

Geographic Objects may have programmable **configuration parameters** that affect safety related functions. These configuration parameters appear in gray text. Due to the large number of objects available in the Geographic Object Library, the objects and their associated parameters are too numerous to list here.

NOTE: If configuration parameters have been changed but the new UCN is not available or the change process must be aborted for some other reason, right click on VLP module label and select **Reset Module** from the menu. The system will return to the previous configuration parameter values and return to normal operation.

WARNING: CHANGING CONFIGURATION PARAMETERS COULD ADVERSELY AFFECT SYSTEM OPERATION. THE IMPLEMENTATION OF CONFIGURATION PARAMETER CHANGES AND THEIR EFFECTS ON RAILROAD SAFETY ARE THE RESPONSIBILITY OF THE RAILROAD.

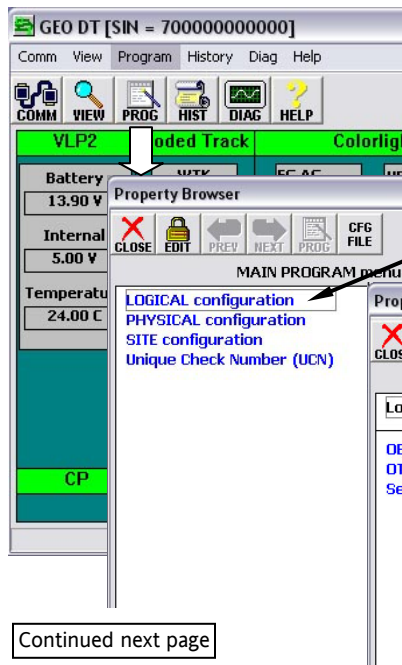
WARNING: CHANGING CONFIGURATION PARAMETERS WILL REQUIRE A NEW UCN. UNTIL THE CORRECT UCN IS ENTERED, THE SYSTEM WILL OPERATE IN THE MOST RESTRICTIVE STATE.

WARNING: A SYSTEM REBOOT COULD OCCUR AT ANY TIME DURING THE CONFIGURATION PARAMETER CHANGE PROCESS. CAREFULLY MONITOR USER INTERFACE INDICATORS TO DETECT A REBOOT. IF A REBOOT OCCURS BEFORE THE CHANGE PROCESS IS COMPLETE, THE ORIGINAL CONFIGURATION PARAMETERS WILL REMAIN IN EFFECT UNLESS A CORRECT UCN WAS APPLIED AND CHANGES WERE UPLOADED TO NON-VOLITALE MEMORY.

Changing Geographic Object Configuration Parameters:

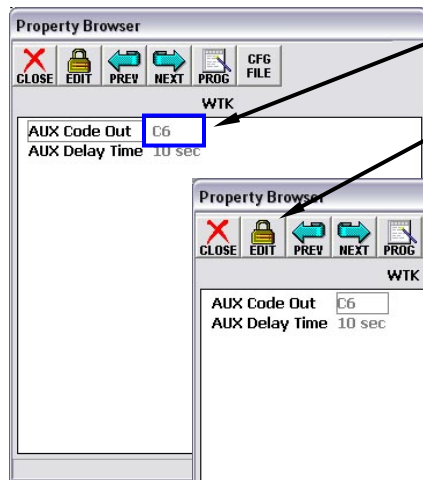
WARNING: CHANGING CONFIGURATION PARAMETERS COULD ADVERSELY AFFECT SYSTEM OPERATION.

1. Click **PROG** button or **Program** menu
2. Select **LOGICAL configuration** from the Property Browser **MAIN PROGRAM** menu.
3. Select **OBJECT configuration** from the configuration category menu.
4. Select object to change.



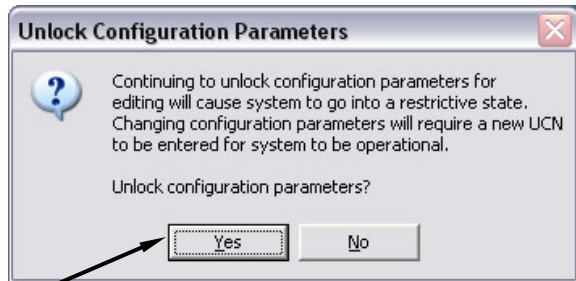
Continued next page

Changing Geographic Object Configuration Parameters: (continued from previous page)



5. Select configuration parameter value to change (a gray rectangle surrounds parameter value when selected).

6. Click the **EDIT** button. AN Unlock prompt appears (see below).



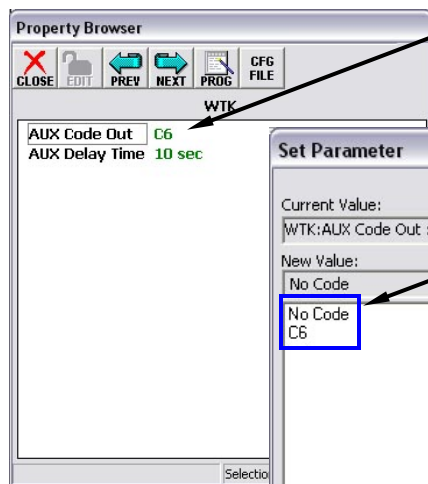
7. To proceed with the parameter edit, click the **Yes** button on the Unlock prompt. Click **No** to cancel the edit.

NOTE: Clicking **Yes** places the system in the most restrictive state.

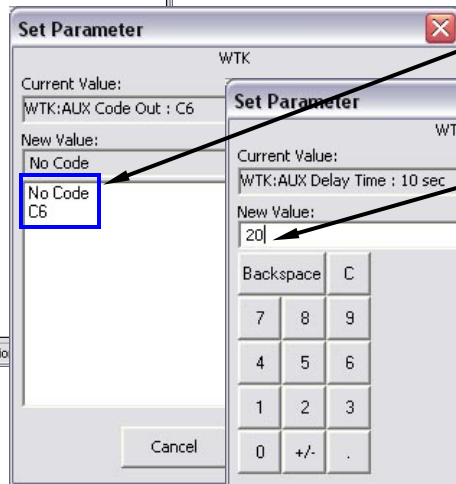
Continued next page

Changing Geographic Object Configuration Parameters: (continued from previous page)

Continued next page



8. All parameter values are now displayed green. Select the configuration parameter value to change.



9a. Change alpha options or listed numeric options by selecting new value from list provided.

9b. Type new numeric values in Set Parameter screen text window using PC keyboard or display keypad.



10. Click **Update** to save change.

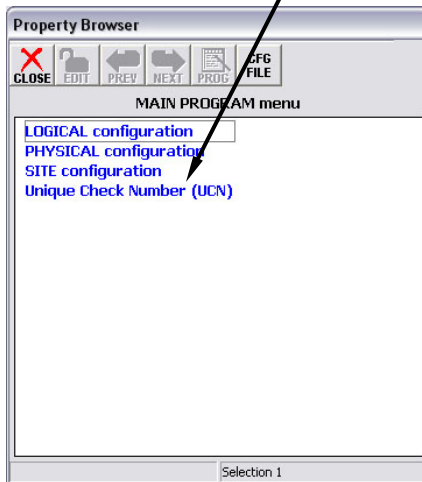
NOTE: Click **Cancel** to leave parameter value unchanged.

Changing Geographic Object Configuration Parameters: (concluded)

11. After all configuration parameter values are updated to the new values, click the **PROG** button.



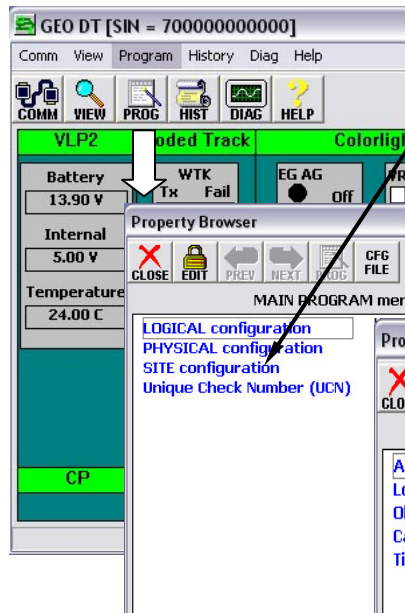
12. Select **Unique Check Number (UCN)**.



13. After all system modifications have been entered, enter the new UCN provided by the office. See **Setting Unique Check Number (UCN)** on page 80.

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Changing Site Configuration Parameters:



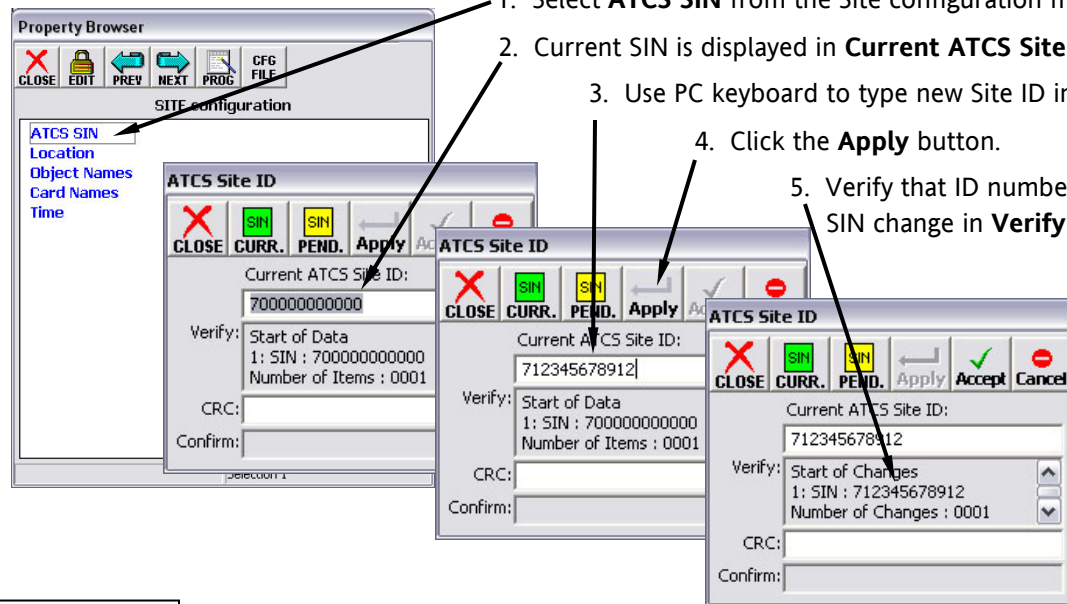
1. Click **PROG** button or **Program** menu
2. Select **SITE configuration** from the Property Browser **MAIN PROGRAM** menu.
3. The **SITE configuration** menu provides access to change the following site parameters:

- ATCS Site Identification Number
- Location – DOT number, Milepost, Site name
- Object names – names of Geographic objects used in the track layout
- Card names – module labels that appear on the main display
- System time

Refer to the following pages for directions on how to change these parameters.

Changing ATCS Site Identification Number (SIN): (continued from page 73)

1. Select **ATCS SIN** from the Site configuration menu.
2. Current SIN is displayed in **Current ATCS Site ID** text box.
3. Use PC keyboard to type new Site ID in the text box.
4. Click the **Apply** button.
5. Verify that ID number entered matches SIN change in **Verify** box.



Changing ATCS Site Identification Number (SIN): (concluded)

6. Scroll down in **Verify** box to reveal **Confirmation CRC**.

ATCS Site ID

☒ CLOSE ☒ CURR. ☐ PEND.

Current ATCS Site ID:
712345678912

Verify:
1: SIN : 712345678912
Number of Changes : 0001
Confirmation CRC : F844

CRC: F844|

Confirm:

7. Use PC keyboard to type **Confirmation CRC** in **CRC** text box (not case sensitive).

8. Click the **Accept** button.

ATCS Site ID

☒ CLOSE ☒ CURR. ☐ PEND.

Current ATCS Site ID:
712345678912

Verify:
1: SIN : 712345678912
Number of Changes : 0001
Confirmation CRC : F844

CRC: F844

Confirm: Changes succeeded.

9. When new SIN is accepted successfully, 'Changes succeeded' appears in the **Confirm** box at the bottom of the ATCS Site ID display.

10. After all system modifications have been entered, the correct UCN must be entered and the system rebooted before the new SIN is put to use. See **Setting Unique Check Number (UCN)** on page 80.

Changing Location Identification Data: (continued from page 73)

1. Select **Location** from the Site configuration menu.

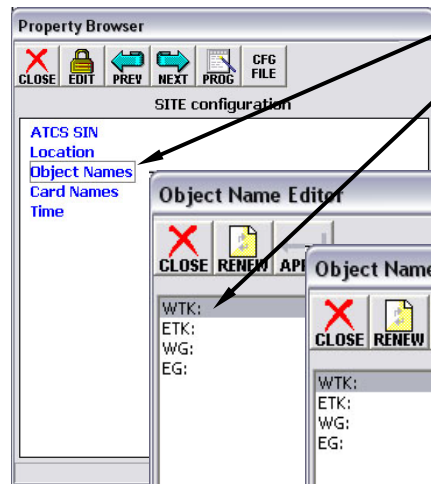
2. Current DOT Crossing Number, Milepost and Site Name are displayed (defaults shown).

3. Using PC keyboard, enter DOT Crossing Number, Milepost Number and Site Name as required.

4. Click **APPLY**, then **CLOSE**.

NOTE:
This field may be any alphanumeric character (A-Z, 1-9 and 0).

Changing Geographic Object Names: (continued from page 73)



1. Select **Object Names** from the Site configuration menu.

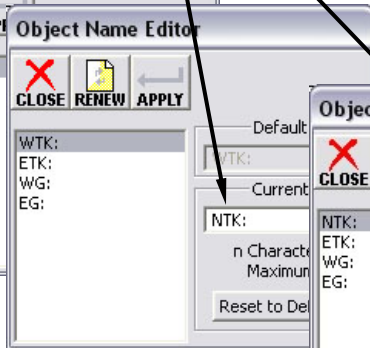
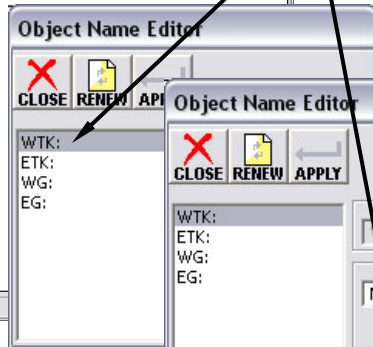
2. Select object name to change from the list (name appears in **Current** text box).

3. Using PC keyboard, type the new object name in **Current** text box.

4. Click **APPLY**.

5. The new name replaces the previous name in the list.

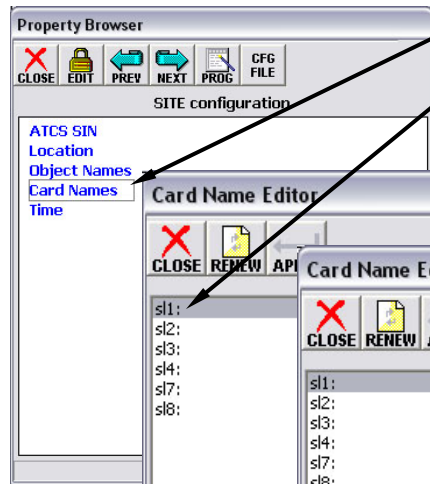
6. Repeat for each name to be changed, then click **CLOSE**.



NOTE:

To return to the object names originally assigned in the MCF, click **Reset to Default**.

Changing Card Names (module labels): (continued from page 73)



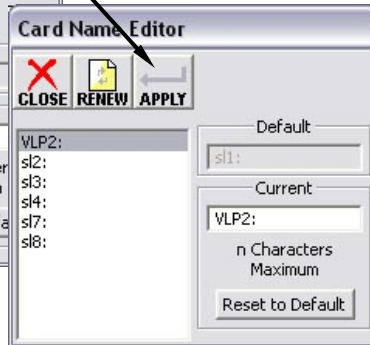
Card Name Editor



Card Name Editor



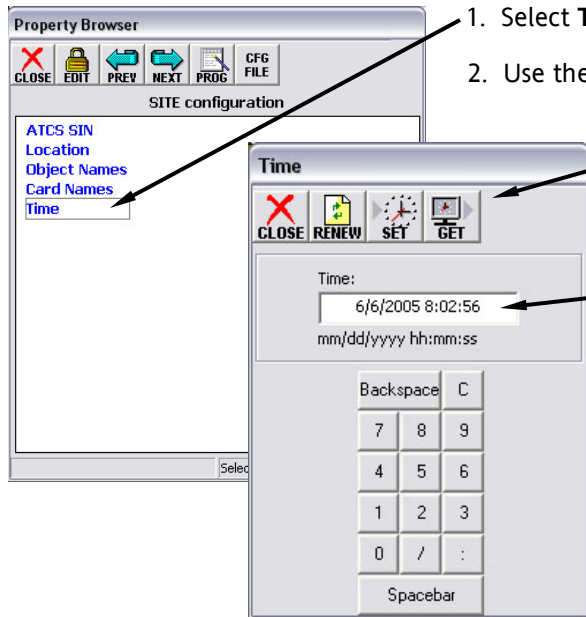
1. Select **Card Names** from the Site configuration menu.
2. Select a card name to change from the list (name appears in **Current** text box).
3. Using PC keyboard, type the new card name in the **Current** text box.
4. Click **APPLY**.
5. The new name replaces the previous name in the list.
6. Repeat for each card name to be changed, then click **CLOSE**.



NOTE:

To return to the default card names, click **Reset to Default**.

Changing System Time: (continued from page 73)



1. Select **Time** from the Site configuration menu.

2. Use the Time display one of two ways to set GEO system time:

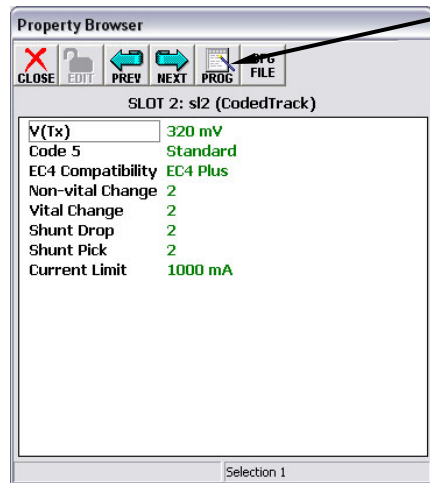
- Click the **GET** button followed very quickly by the **SET** button to synchronize GEO time with the time on the PC that the DT program is running on (use to synchronize multiple GEOs).
- Enter an advanced time setting in the Time box using either the PC keyboard or the Time display keypad. When the time entered in the **Time** box matches the time reference, click

3. Click the **RENEW** button to verify the current time setting and then click **CLOSE** when finished.

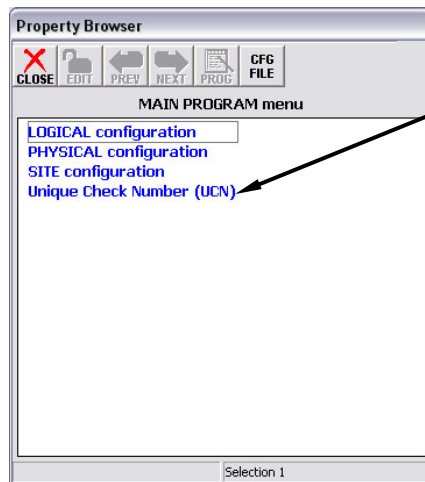
Setting Unique Check Number (UCN):

NOTE: The Unique Check Number process ensures that the maintainer is at the GEO location and is authorized to modify the GEO configuration. The new UCN is provided by the office.

SETTING UNIQUE CHECK NUMBER (UCN)

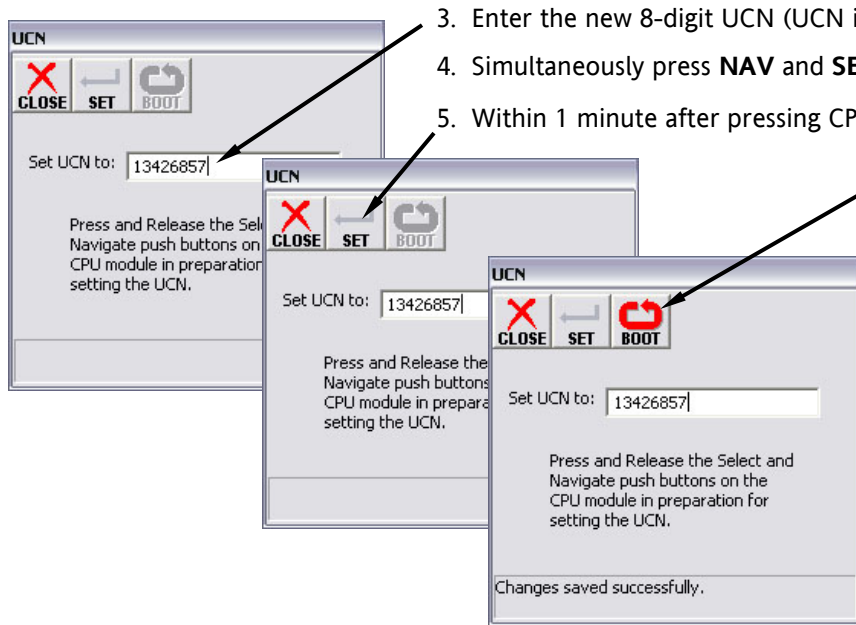


1. Click the **PROG** button (**PROG** button is available on the main display and on the Property Browser screen).



2. Select **Unique Check Number (UCN)**.

Setting Unique Check Number (UCN): (concluded)

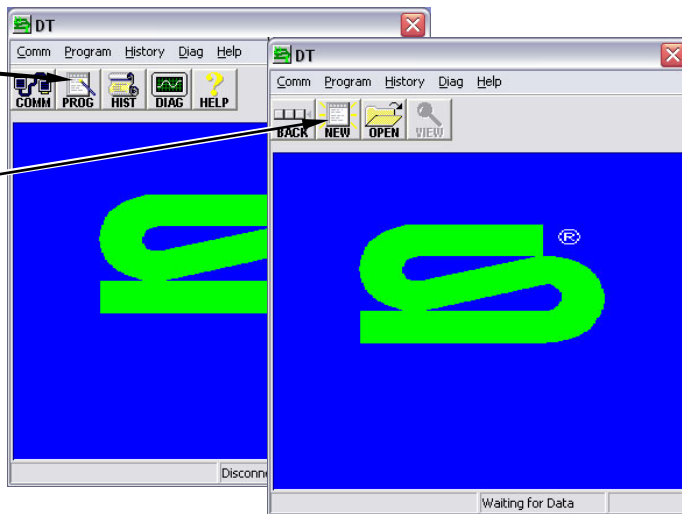
- 
3. Enter the new 8-digit UCN (UCN is not case sensitive).
 4. Simultaneously press **NAV** and **SEL** push buttons on CPU module.
 5. Within 1 minute after pressing CPU module buttons, click **SET**.
 6. When the UCN screen displays 'Changes saved successfully', click **BOOT** to restart GEO. If **BOOT** is not pressed, GEO will restart automatically in 5 minutes.

Unique Check Number (UCN) Calculator:

NOTE: Whenever changes are made to configuration parameters, a new 8-digit UCN must be entered for the GEO system to return to normal operation. The UCN is calculated at the office using a special edition of the DT software. The UCN and a list of parameter changes are then supplied to the field. The following pages describe the UCN calculation process.

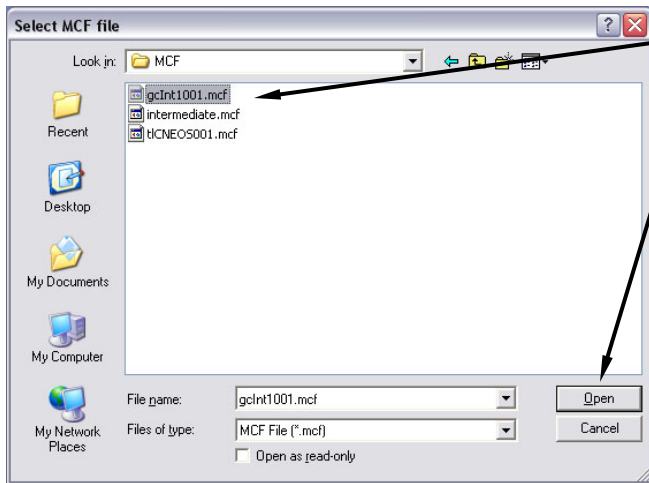
1. With the DT disconnected from GEO, click **PROG.**

2. Click **NEW.**

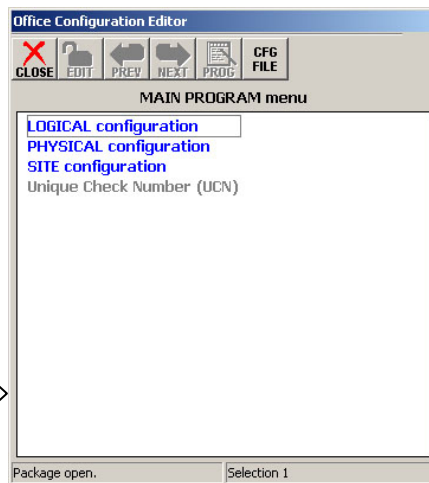


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Unique Check Number (UCN) Calculator: (continued from previous page)

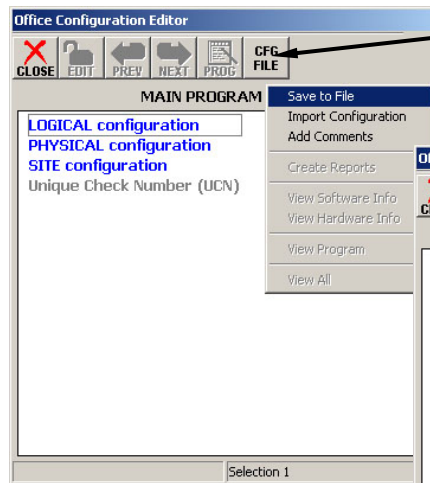


3. Select an Appliance Model MCF, then click **Open**.
4. Change configuration parameters as necessary (see pages 46 through 79)



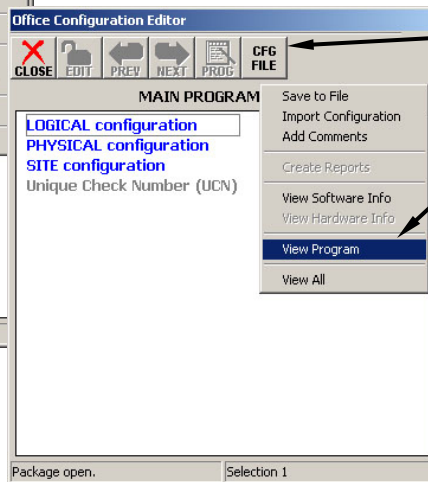
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Unique Check Number (UCN) Calculator: (continued from previous page)



5. Click **CFG FILE**

6. Select **Save to File** (creates package file and reports).

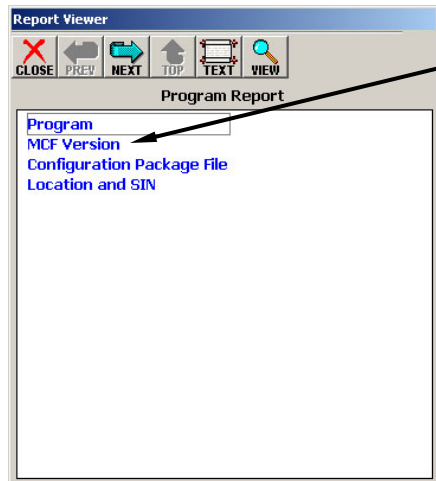


7. When package creation is complete, click **CFG FILE**

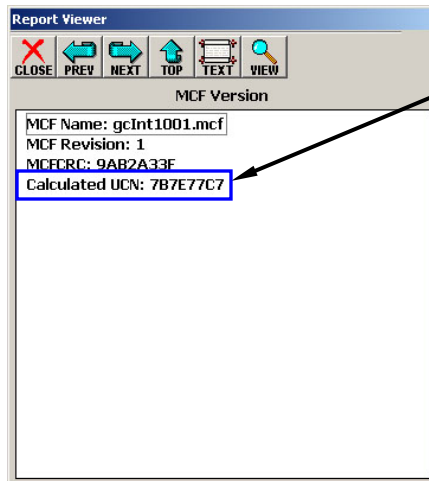
8. Select **View Program**

Continued next page

Unique Check Number (UCN) Calculator: (continued from previous page)



9. Select **MCF Version**



10. The new calculated UCN is displayed here.

Change Notice

The following changes have been made to the GEO Diagnostic Terminal (DT) Handbook, Document Number SIG-00-04-17:

September 2005 (create Rev B)

Revised entire document to cover new Appliance Model software.

July 2006 (create Rev B.1)

Title page, change document type from 'Field Handbook' to 'Handbook'

Page 4, update Serial Port Settings screen (serial port selection list replaced radio select buttons).

Added NOTE.

Page 16, update ATCS Communications screen (new scroll arrow format)

Page 18, added '(or double click)' to step 3.

Page 74, added note regarding alphanumeric characters in DOT Crossing Number suffix

July 2007 (create Rev C)

Page 48, Color Light (CLS) chart: added Lamp Voltage Regulation parameter,
Page 49, Search Light (SLS) chart: added Lamp Voltage Regulation parameter,
changed Mech1 Response range from 200 – 2000 ms to 300 – 3000 ms,
changed Mech2 Response range from 200 – 2000 ms to 300 – 3000 ms.

October 2014 (Rev C.1)

Rebrand for Siemens

FOR TECHNICAL SUPPORT

Siemens Rail Automation Technical Support

1-800-793-7233