SIEMENS

GCP 5000 SEAR IIi Internal Event Recorder Field Manual

Document Number: SIG-00-19-03
Version: A.1
May 2021

PROPRIETARY INFORMATION

TRANSLATIONS

The manuals and product information of **Siemens Mobility, Inc.** are intended to be produced and read in English. Any translation of the manuals and product information are unofficial and can be imprecise and inaccurate in whole or in part. Siemens Mobility, Inc. does not warrant the accuracy, reliability, or timeliness of any information contained in any translation of manual or product information from its original official released version in English and shall not be liable for any losses caused by such reliance on the accuracy, reliability, or timeliness of such information. Any person or entity who relies on translated information does so at his or her own risk.

WARRANTY INFORMATION

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See Back Cover for contact information

TABLE OF CONTENTS

LIST OF FIGURES

LIST OF TABLES

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:

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.

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.

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

If there are any questions, contact Siemens Technical Support.

ELECTROSTATIC DISCHARGE (ESD) PRECAUTIONS

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

- Ground yourself before touching card cages, assemblies, modules, or components.
- Remove circuit boards (modules) from card cages by the ejector lever only. If an ejector lever is not provided, grasp the edge of the circuit board but avoid touching circuit traces or components.
- Handle circuit boards by the edges only.
- Never physically touch circuit board or connector contact fingers or allow these fingers to come in contact with an insulator (e.g., plastic, rubber, etc.).
- When not in use, place circuit boards in approved static-shielding bags, contact fingers first. Remove circuit boards from static-shielding bags by grasping the ejector lever or the edge of the board only. Each bag should include a caution label on the outside indicating static-sensitive contents.
- Cover workbench surfaces used for repair of electronic equipment with static dissipative workbench matting.
- Use integrated circuit extractor/inserter tools designed to remove and install electrostatic-sensitive integrated circuit devices such as PROM's (OK Industries, Inc., Model EX-2 Extractor and Model MOS-40 Inserter (or equivalent) are highly recommended).
- Utilize only anti-static cushioning material in equipment shipping and storage containers.

For information concerning ESD material applications, please contact the Siemens Mobility, Inc.

SECTION 1 – INTRODUCTION

The Siemens Internal Event Recorder (SEAR IIi) is a non-vital module of the 4000/5000 GCP. This manual will discuss the use of the SEAR IIi with the GCP 5000, i.e. a module running executive software 9VC25. For GCP 4000 SEAR IIi functionality, see SIG-00-08-13.

The SEAR IIi module:

- provides continuous real-time status and event recording of the 5000 GCP and the grade crossings monitored by the GCP
- receives and transmits data via Echelon Lontalk® Protocol
- has a standard memory capacity of 180,000 stored events
- memory may be expanded to 390,000 stored events
- provides the heel and front dry contacts of two internal non-vital relays for external applications
- provides 6 RTU outputs
- monitors and records:
  - two user-defined digital inputs on the front panel
  - 61 channels on the backplane
  - temperature
  - battery voltage

⚠ WARNING

The SEAR IIi is a non-vital module. Do not use for vital applications.

⚠ CAUTION

The model 5000 GCP and all devices connected to the LAN should be contained entirely within the same signal case or bungalow.

NOTE

Additional LAN protocols may be accommodated. For information contact Siemens Systems Applications Engineering.

The SEAR IIi defaults to subnode 99 and device 01. The 5000 GCP ATCS address must always be the same 7RRRLLLGGG as the SEAR IIi. Unless specified otherwise, the GCP subnode number is 16. The GCP device number is not user selected. The default address in the SEAR IIi and the GCP are the same.

If the location is not equipped with external communications, a unique ATCS address is not required. Then the SEAR IIi default address 7.620.100.100.99.01 and GCP 5000 default address 7.620.100.100.16 may then be used.

1.1 APPLICABLE DOCUMENTS

The following documentation is associated with this product and may be used for reference purposes.

Table 1-1: Reference Documents

Component	Manual Title	Document Number
GCP 5000 SEAR IIi Internal Event Recorder, A80410	Field Manual	SIG 00-19-03
Event Recorders: • A80273 SEAR II • A80311 Argus • A80410 SEAR IIi	NS Backhaul Service Manual	SIG-00-20-06
GCP 4000 SEAR IIi Internal Event Recorder	Field Manual	SIG-00-08-13

1.2 RECORDED DATA ACCESS

Recorded information and monitored states can be accessed:

- internally from the 5000 GCP Display Module
- externally via the front panel serial connectors

1.3 EXTERNAL COMMUNICATION

SEAR IIi may communicate with external equipment via:

- the GCP **LONTALK® PROTOCOL** LAN connector
  - establishes own LAN node identification
  - employs ATCS Specification 200 nested within Lontalk® Protocol
- front panel serial ports
  - ATCS MCP radio with RS232 port
  - telephone dial-up modem
  - serial printer
  - computer

1.4 SITE CONFIGURATION

The SEAR IIi is fully configurable for each installation site. Configuration is accomplished using:

- the SEAR IIi menu items available on the GCP A80485 Display Module
- the Web User Interface of the A80485 Display module available via a standard internet browser
- a computer running any standard terminal emulation program such as HyperTerminal

NOTE

Standard SEAR IIi configuration is primarily handled by a custom configuration file (.PAC) created by the Office Configuration Editor.

SEAR configuration includes selection of:

- site information
  - ATCS identification number
  - local time
  - location (with DOT Crossing Number, milepost number, site name, and site type)
- office ATCS address
- communication data
- input activation and selection

1.4.1 ATCS Address

In the GCP 5000 site configuration, the common ATCS address of the GCP and SEAR IIi is set to the RRR.LLL.GG level. The subnode of the GCP and SEAR IIi can be changed, but they default to 16 and 99 respectively.

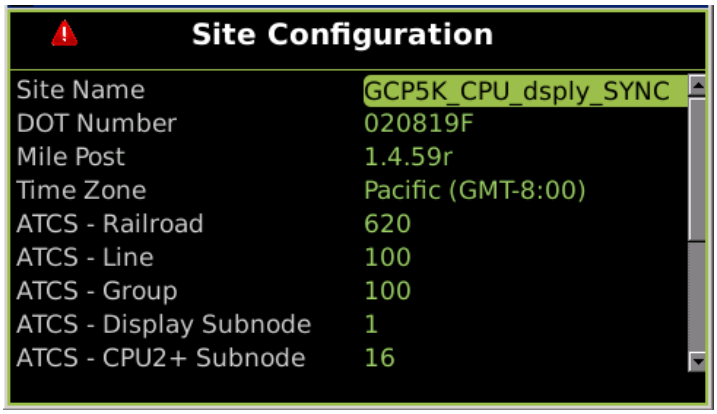


Figure 1-1: Site Configuration ATCS Config

The ATCS address follows a railroad industry method of identifying specific locations and equipment at that location. In the address 7.RRR.LLL.GGG.99.01:

- RRR is the railroad number
- LLL is the line number
- GGG is the group number, which generally is the location
- 99 is a sub-node at the location, and
- The 01 is the device number

1.5 STATUS LEDS

The 19 front-panel LEDs display LAN, SEAR IIi and event status are depicted in Figure 1-2:

- **ECH SVC** LED flashes yellow until SEAR IIi is initialized, then turns off
- **POWER** LED lights green while power is applied
- **HEALTH** LED
  - Flashes green if backup battery output is within acceptable voltage range.
  - Flashes red if backup battery is below minimum acceptable voltage.
  - Off while SEAR IIi is inoperative.
  - Flashes yellow while compiling.
- 16 application dependent event LEDs (**T01 – T16**):
  - Light when programmed event occurs
  - Light red, green, or yellow
  - Event color predetermined by program
  - Event label area provided above each LED

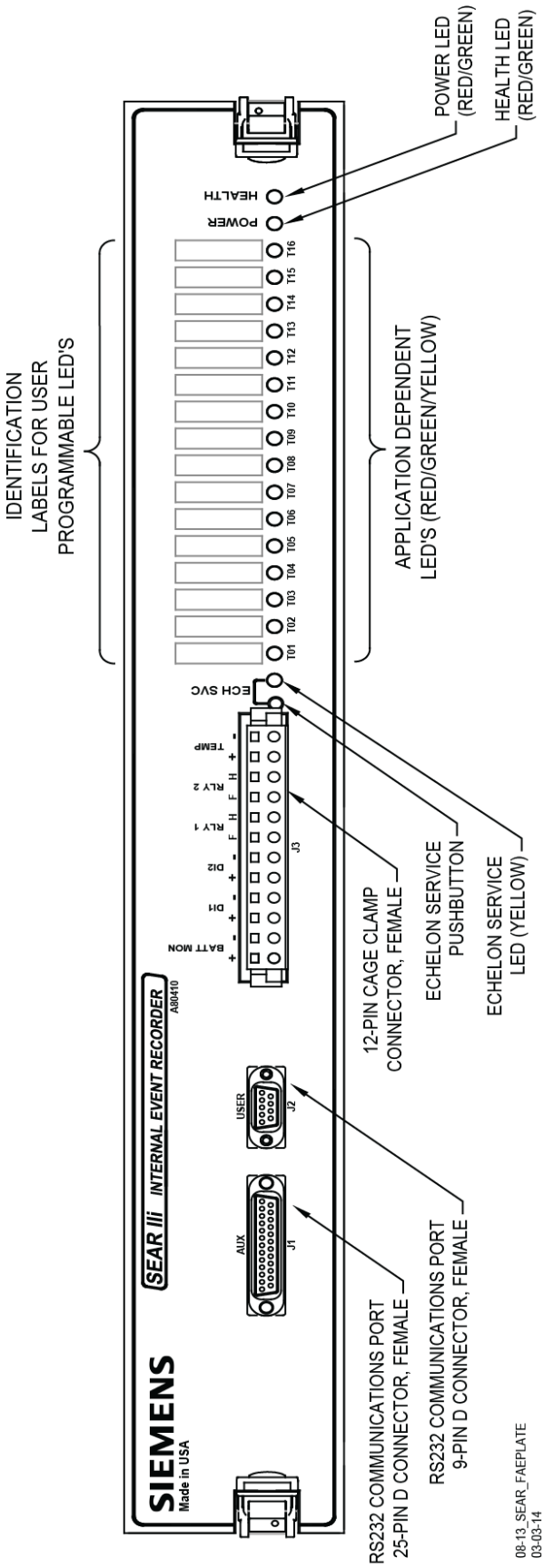


Figure 1-2: Internal Event Recorder Front Panel

SECTION 2 – OPERATION

2.1 CONTROLS

Operational control of the SEAR IIi is maintained by an internal microprocessor.

- The executive software and programming instructions are stored in flash memory.

2.1.1 Event Memory

Events are stored in battery-backed SRAM (Static Random Access Memory).

- The event memory capacity in the standard SEAR IIi configuration is 180,000 events.
- With the memory expansion option, the memory capacity is 390,000 events.

2.1.2 Real Time Clock

An internal real-time clock maintains SEAR IIi time and date.

- SEAR IIi Time and date are normally set using the SEAR IIi keypad available on the GCP Display Module
  - may also be set by means of a computer connected to the USER port
  - clock automatically adjusts for leap years
  - automatic daylight savings adjustments are under user control
- The time and date is used to timestamp events in the Event Log.
- internal back-up battery accurately maintains time and date in event of power failure

NOTE

The internal memory and the real-time clock contain random data when the unit is powered up for the first time in the field. Time/Date adjustments should be performed immediately following the initial power-up sequence.

2.1.3 Internal Battery

An internal lithium battery maintains power to the SRAM and real-time clock when power is removed from the unit.

The SEAR IIi stores event log data and some programmable parameters in battery-backed RAM. The backup battery maintains the memory contents when power is removed from the system. When the backup battery is low, the SEAR IIi provides a low battery indication by displaying a message on the display, periodically beeping, and optionally sending an alarm message to a back-office alarm management system.

The SEAR IIi low battery indication alone is not a reliable means to determine when to replace the backup battery. There are situations where the battery may fail to maintain the memory contents once power is removed but the low battery indication is not asserted. The battery must be replaced on a schedule, regardless of the low battery indication.

- Under normal circumstances, the memory contents will be kept for a minimum of 2 months without power applied to the recorder.

⚠ CAUTION

To prevent loss of power to the memory and real-time clock during battery replacement, a new battery should be inserted into the empty holder before removing the old battery.

NOTE

The SEAR IIi uses a standard 3.6 V AA-size lithium battery. SEAR IIi module is shipped from the factory with the lithium battery electronically disconnected from the circuit. Although the SEAR IIi comes with two battery holders only one holder contains a battery. The battery is automatically connected when the Model 5000 GCP is first powered up in the field.

The battery should be replaced:

- After every 2 years of operation
- After the unit has been powered off for longer than 2 months

2.1.3.1 Battery Replacement

Refer to the battery replacement procedure (Table 2-1) to replace the Lithium battery in the SEAR IIi.

Table 2-1: Lithium Battery Replacement

Step 1	Use the ejector clips at each end of the SEAR IIi front panel to release the PC board from the 5000 GCP case assembly connectors.
Step 2	Pull the SEAR IIi assembly far enough out of the 5000 GCP case to expose the battery (see figure 9-2 below).
Step 3	Install a new battery in the empty battery clip (observe proper polarity).
Step 4	Remove the old battery from the other battery clip.
Step 5	Reinstall the SEAR IIi assembly in the 5000 GCP case. Make sure connectors are properly seated.
Step 6	Return the ejector clips to the locked position.

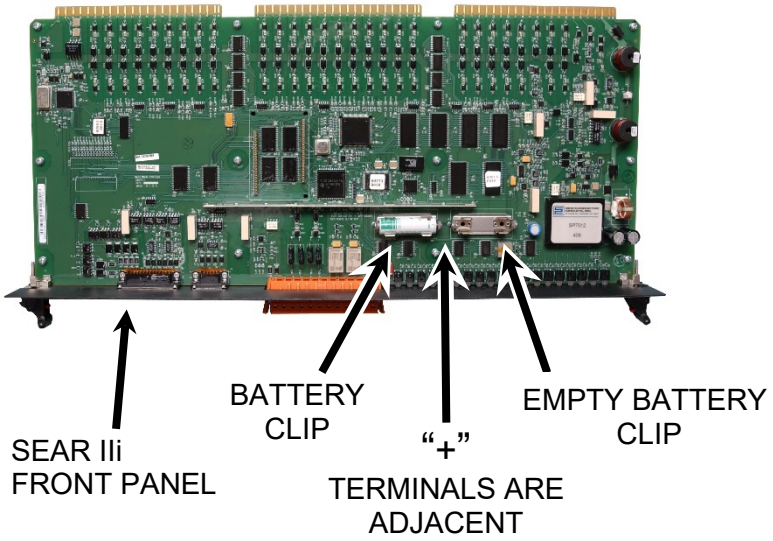


Figure 2-1: Battery Location on SEAR IIi

2.1.4 Digital Inputs

The two digital inputs may be used to monitor signals up to 120V DC/AC.

Each input:

- is independently opto-isolated
- energizes (turns on) when the input voltage exceeds 6V DC

2.1.5 Relay Outputs

The two sets of relay terminals provide independently isolated front (**F**) and heel (**H**) dry contacts.

- Contacts are rated for 5A at 30VDC or 120VAC.

2.1.6 Data Ports

SEAR IIi data may be accessed via the front panel serial port connectors:

- A telephone dial-up modem or a radio connected to the **AUX J1** port may be used to remotely access:
  - Inputs
  - outputs
  - diagnostics
  - event logs
  - configuration menu
- Serial printers and computers connected to **USER J2** port may be used to:
  - access data for printout and/or display
  - upload executive and application programs

The SEAR Iii data may also be accessed via the GCP 5000 Display, either via the local user interface (Display and keypad), or the Web User Interface (WebUI) either via a network connection or direct ethernet connection. The Display and WebUI can be used to access

- Inputs
- outputs
- diagnostics
- event logs
- configuration menu
- access data for printout and/or display
- upload executive and application programs

For further information on using the Display for software uploads, reference Section 3.1.2. For further information on the Display and WebUI menus, reference Section 4.1.1.

SECTION 3 – STARTUP

3.1 SEAR IIi STARTUP

SEAR IIi startup occurs when power is applied to the 5000 GCP. Startup sequentially enables:

- SEAR IIi boot monitor operation
  - verifies data bus
  - verifies address bus
  - validates executive CRC
- download of new executive software
- access to SEAR IIi debugger function
- start of SEAR IIi executive software

3.1.1 Boot Monitor Screen

The boot monitor screen, Figure 3-1:

- displays the boot operational sequence
- may be accessed as described in procedure 2

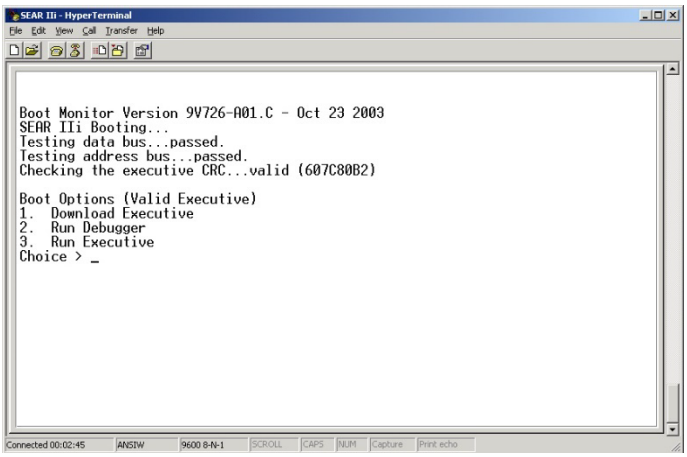


Figure 3-1: SEAR IIi Boot Monitor Screen

NOTE

The SEAR IIi **USER J2** serial port and the computer COMM port settings must match in order to communicate.

- Default settings: **9600, 8, N, 1**

Table 3-1: Boot Monitor Screen Access

Step 1	Connect a standard nine-pin, RS-232 serial cable between the SEAR IIi **USER J2** serial port (DB9 male) and the computer serial COMM port (DB9 female).
Step 2	Configure the terminal emulation software to communicate with the SEAR IIi.
Step 3	Cycle power to the 5000 GCP. The boot monitor screen, figure 9-3, displays. After 5 seconds the following message is added to the display: Boot Monitor complete. Running SEAR IIi Executive.

NOTE

HyperTerminal or any other available terminal emulation software may be used, however, for transferring software to and from the SEAR IIi using ZModem, HyperTerminal is recommended as other terminal emulator may not be compatible. The SEAR IIi uses ANSI terminal emulation with line wrap turned off.

3.1.2 Upgrading the Executive Software

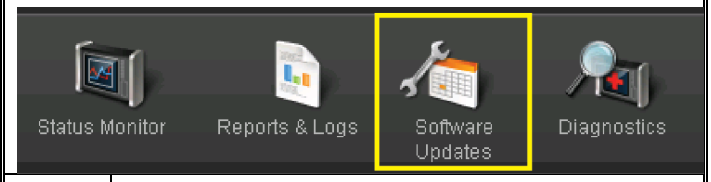
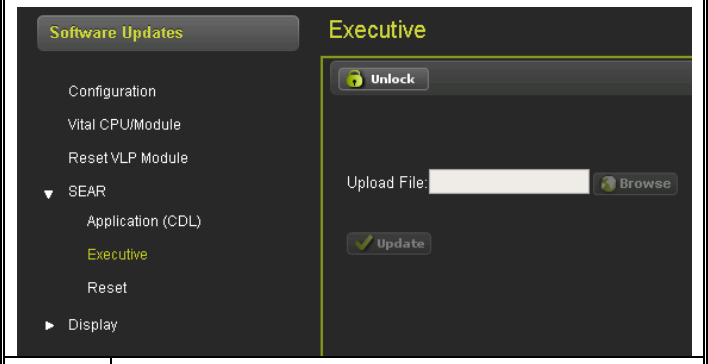
Upgrading the Executive software can be performed from the WebUI, or the USB interface of the GCP 5000 Display module, or the Boot Monitor Screen using the terminal interface (see SECTION 6).

- To upload new Executive software via the WebUI (GCP 5000), follow the procedure in Table 3-2.

To upload new Executive software via the Display interface (GCP 5000) follow the procedure in

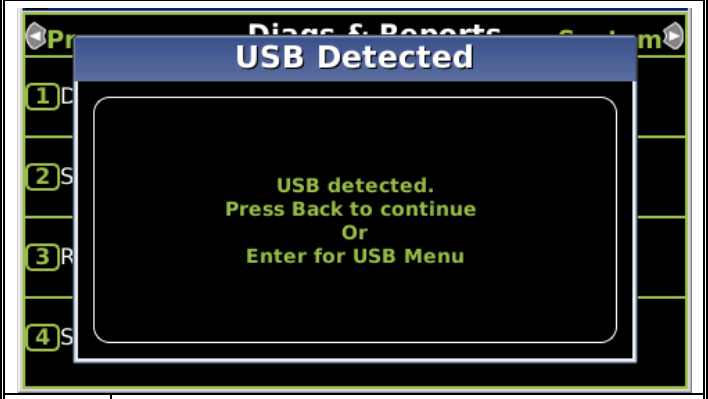
- Table 3-3.
- To upload new Executive software via the Boot Monitor Screen, follow the procedure in Table 6-2.

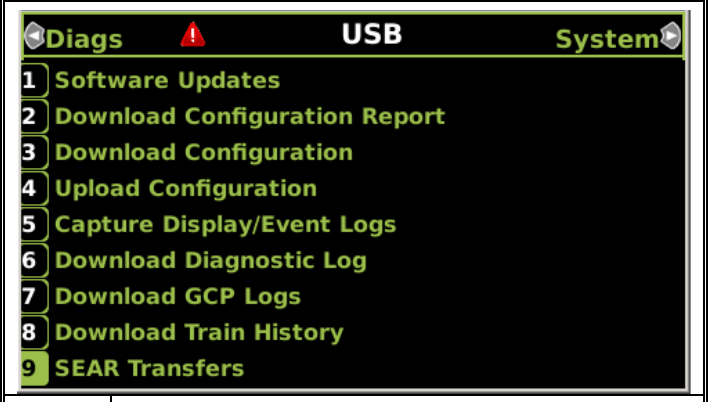
Table 3-2: Upgrading the Executive Software using the Display Module WebUI

Step 1	Access the WebUI via an internet browser using https:// <IP address of GCP> then logging in with maintainer password.
Step 2	Select the **Software Updates** Icon from the top of the page.
	
Step 3	From the **Software Updates** menu on the side of the screen, select SEAR > Executive. This will bring up the screen that allows the user to browse and select the Executive software file.
	
Step 4	To unlock this screen, local user presence will need to be confirmed on the GCP Display. Once the unlock button is clicked on the WebUI, a prompt will appear on the GCP Display asking the user to press the enter button to unlock.

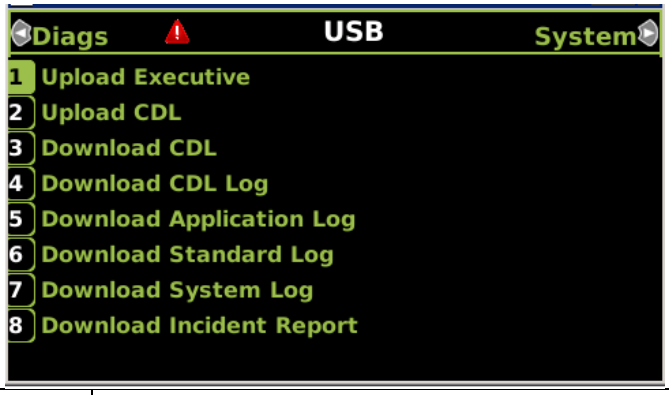
Step 5	Once the **Browse** button is unlocked, the user can go to the Executive software file location and select the proper file for upload.
Step 6	Click **Update** to initiate the software upload. Once complete, the screen will indicate that the software upload was successful.

Table 3-3:
Upgrading the Executive Software using the Display Module USB

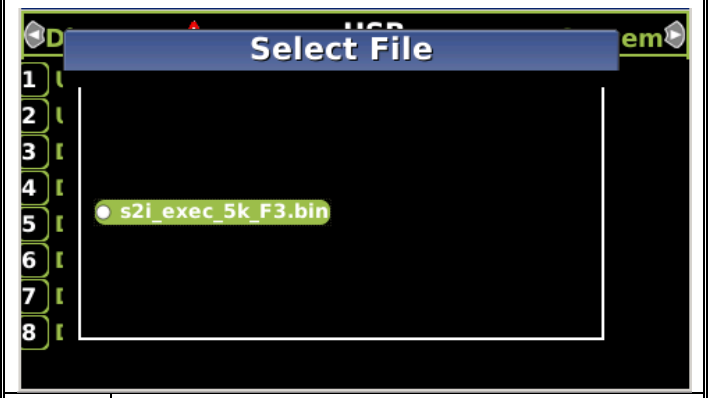
NOTE	Uploading or downloading files between the GCP and the USB Device requires that a specific file structure be created on the USB Device. The system looks for specific file folders to find or place Application, Executive, Configuration or Report files. The file structure is as follows for uploads: SAFETRAN > GCP4000 > APPLICATIONS: .CDL SAFETRAN > GCP4000 > EXECUTIVES: .BIN CDL files to be uploaded should be placed under the GCP4000\Applications. Executive software to be uploaded should be placed under the GCP4000\Executives. Downloaded files are placed under the Safetran\DOT-SITENAME\GCP4000 folder.
Step 1	Insert a USB drive (with Executive software under the proper file structure as indicated above) into the USB slot on the front of the GCP Display.
	
Step 2	The Display will prompt to user to press Enter and continue to the USB Menu, as indicated in the graphic above.
Step 3	From the USB Menu, select 9) **SEAR Transfers**.



Step 4	From the **SEAR Transfer** menu, select 1) **Upload Executive**.



Step 5	The Display should detect the correct file on the USB and display it for selection. Press **Enter** to select.



Step 6	Once the file has been selected the Display will start the upload process.

Step 7	Upon successful completion of the Executive software upload the Display will note “Upload Successful.”

SECTION 4 – PROGRAMMING

4.1 DISPLAY MODULE INTERFACE

Various SEAR options are located throughout the Display interface on the 5000 GCP. The navigation and programming options will be discussed briefly in this section.

4.1.1 Program View

From the **Program View** menu, the **SEAR Programming** (3) option can be selected.

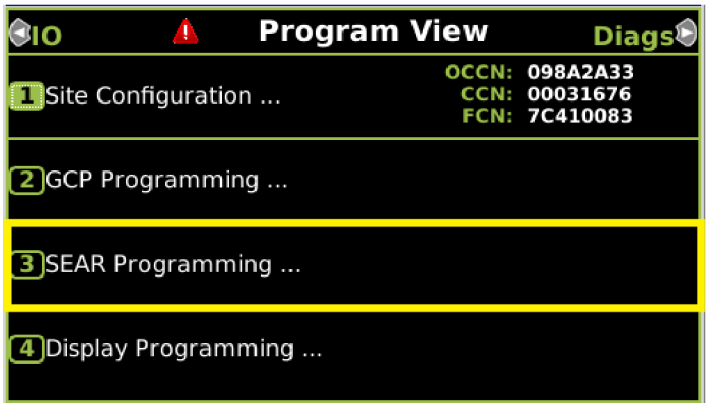


Figure 4-1: Display Program View

The **SEAR Program Menu** contains nine submenus which allow the user to adjust the SEAR configuration parameters. On a standard install, these parameters will be set via the Office Configuration Editor-generated .PAC file, however, any additional adjustments can be made here.

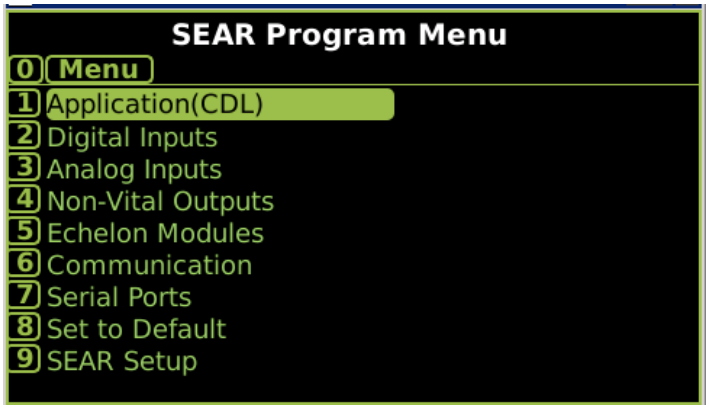


Figure 4-2: SEAR Program Menu

4.1.2 Diags & Reports

From the Diags & Reports menu the **2) SEAR** option can be selected.

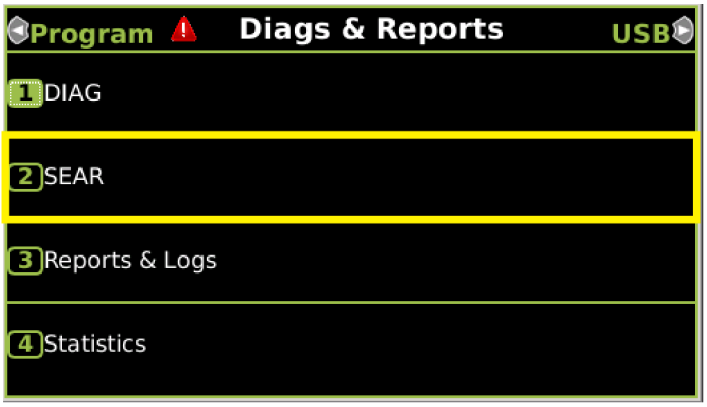


Figure 4-3: Diags and Reports

The below menu gives the user access to placing the unit in Maintainer On Site mode, diagnostic messages, WAMS Test Messages, clear the alarms and reset the SEAR module.

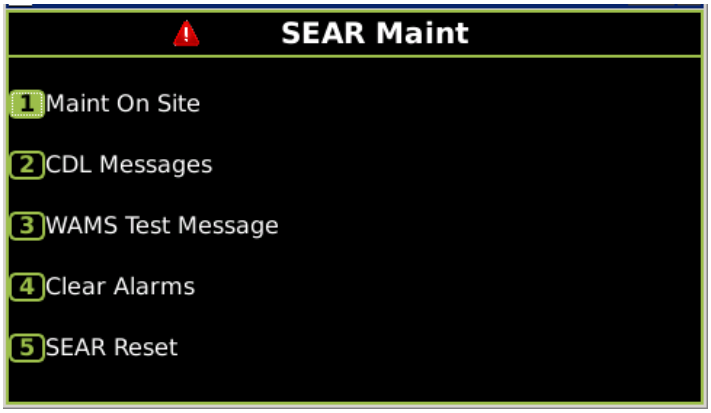


Figure 4-4: SEAR Maintainer Menu

From the Diags & Reports menu the 3) **Reports & Logs** option can be selected, prompting the user to select either Reports or Logs. There are SEAR related items under both menus.

Figure 4-5: Reports & Logs

The **Reports** menu allows the user to access the SEAR Incident Reports (option 6).

Figure 4-6: Reports

The **Logs** menu allows the user to access the SEAR Event Log (option 7), the SEAR Application Log (option 8), and the SEAR CDL Log (option 9). The logs and reports may be viewed with the up and down arrows on the display allowing for scrolling through the report.

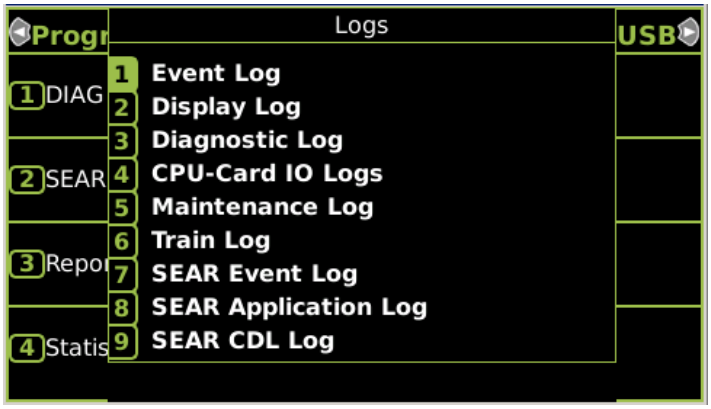


Figure 4-7: Logs

4.1.3 USB Menu

When a USB drive is plugged into the front of the Display, the Display prompts the user to either **Enter** the menu or continue on the current menu.

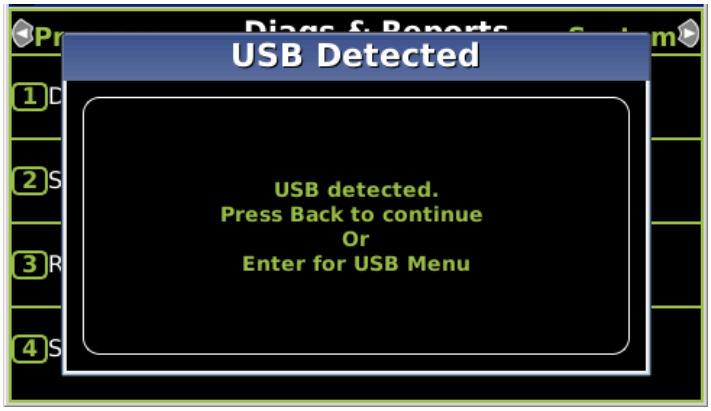


Figure 4-8: USB Menu Pop-up

The USB menu (Option 9) is where the user can upload software and download logs and reports. For further details on uploading software see Table 3-3.

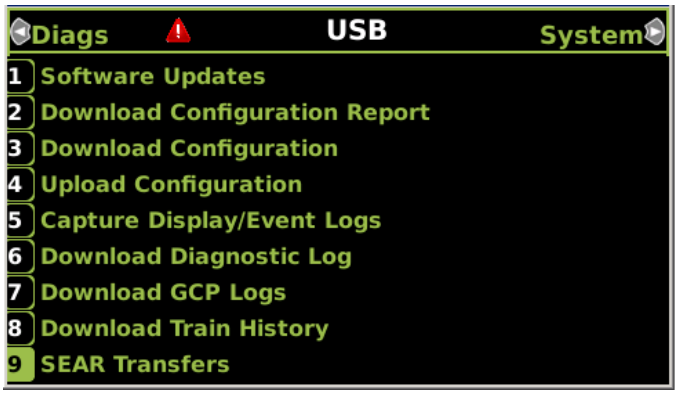


Figure 4-9: USB Menu

The total options provided in the **SEAR Transfers** USB menu are indicated in the graphic below.

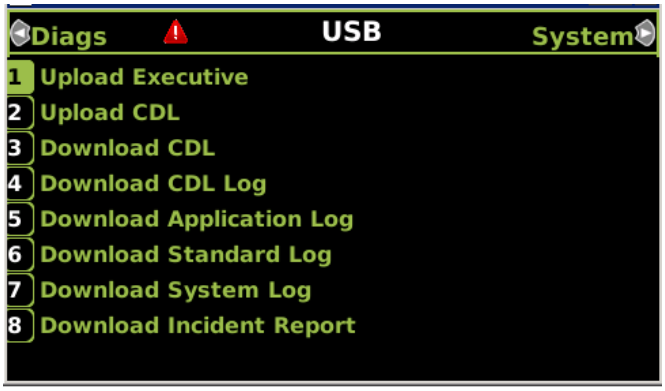


Figure 4-10: SEAR Transfers USB Menu

4.2 GCP DISPLAY MODULE WEB USER INTERFACE (WEBUI)

The WebUI for the GCP 5000 has seven different sub-menus: System View, Configuration, Calibration & Adjustment, Status Monitor, Reports & Logs, Software Updates, and Diagnostics.

Figure 4-11: WebUI Menu Icons

The System View offers an I/O display of all of the SEAR related inputs and outputs. The Diagnostic items (CDL Messages) and Calibration activities located under the SEAR System View menu are also available under their respective icons.

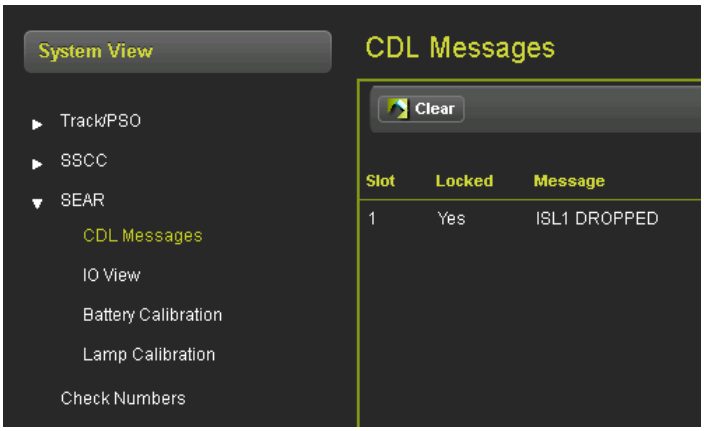


Figure 4-12: WebUI System View Menus

The **Configuration** menu is where all the SEAR Programming options are, as listed in the graphic below. The specific application questions shown below depend on which CDL program is loaded.

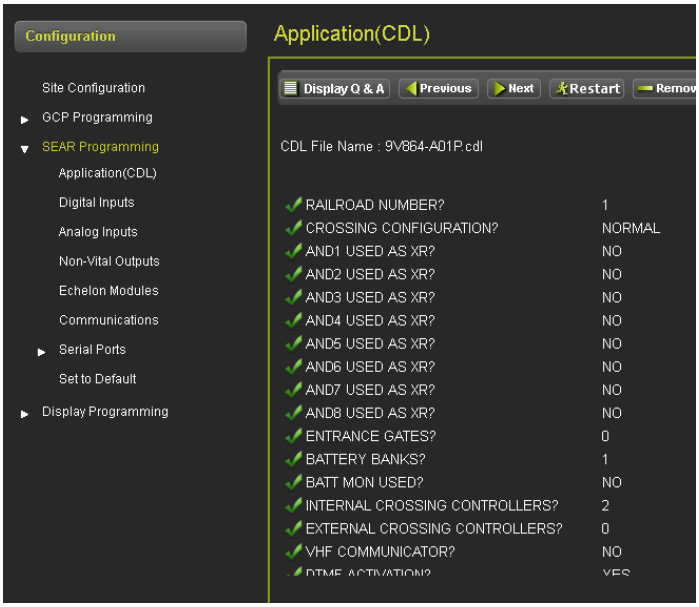


Figure 4-13: WebUI SEAR Programming Menu

The Software Updates menu allows the user to upload Executive and Application software.

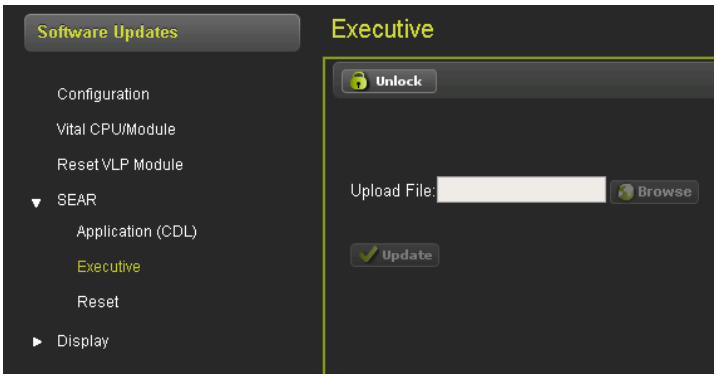


Figure 4-14: WebUI Software Updates

The Reports & Logs menu allows the user to sort and download a variety of logs and incident reports.

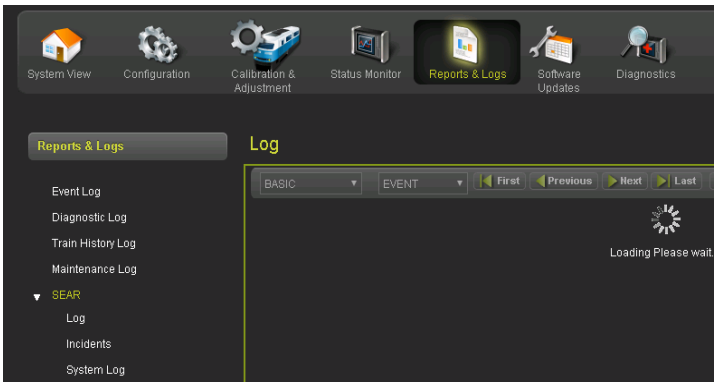


Figure 4-15: WebUI Reports & Logs

4.3 PROGRAMMING

NOTE

The SEAR application will not run unless CDL Setup is completed.

4.3.1 CDL Setup

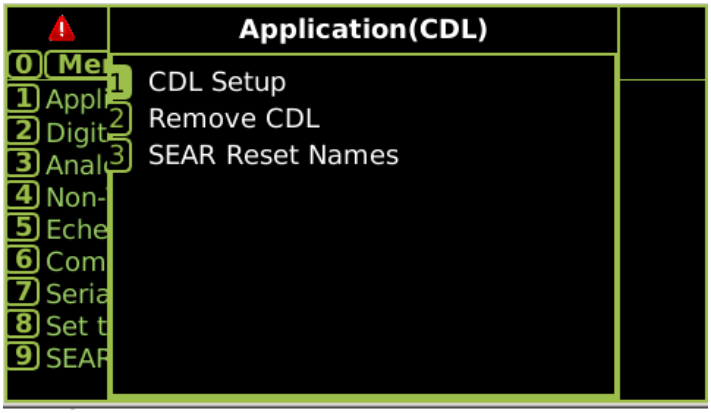


Figure 4-16: CDL Setup

The SEAR Program Menu is accessed from the Program View by pressing 3) **SEAR** Programming. When the SEAR Program window is displayed, press 9) SEAR Setup. There are three stages of all application programs that must be completed to setup the SEAR IIi. The 1st and 3rd stage apply to all application programs. The 2nd stage may be either a “generic” configuration or one that is “specific” to the railroad’s application program.

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

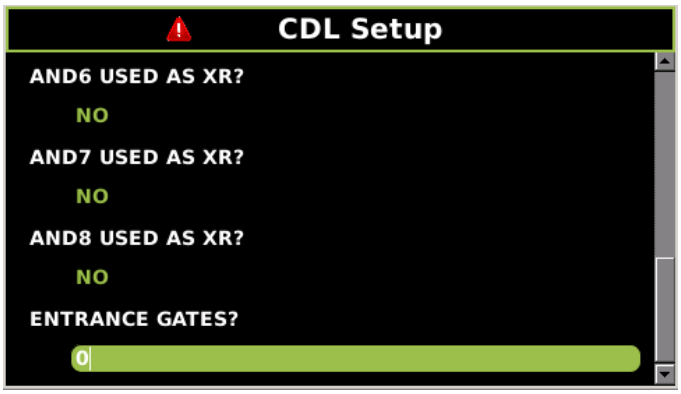


Figure 4-17: CDL Setup Example

As CDLs are specific to the applications, they generally have a configuration summary created that details the specific programming and program questions associated with that file. The tables below list general CDL questions that will appear on all configurations.

Table 4-1: Stage 1 (for all application programs)

QUESTION	OPTIONS/RANGE	TYPICAL CONFIGURATION
DATE / TIME	Current date & time	Current date & time
AUTOMATIC DST ADJUST-MENT?	YES, NO	YES
TIME ZONE?	Eastern, Central, Mountain, Pacific, Alaska, Hawaii, Atlantic, Saskatchewan, Newfoundland	Eastern
SITE NAME?	Site Name, e.g. Siemens Systems Corp.	Enter Site Name
MILE-POST?	e.g., 1234.56	Enter Milepost
DOT #?	e.g., 123456A	Enter DOT crossing number

QUESTION	OPTIONS/RANGE	TYPICAL CONFIGURATION
TESTER TYPE?	Crossing, Wayside	Crossing
DATE FORMAT?	mm-dd-yyyy, dd-mm-yyyy	mm-dd-yyyy
TEMP. FORMAT?	Fahrenheit, Celsius	Fahrenheit
INDICATE HOLD (SEC)?	0 - 99	0
INDICATE REFRESH (SEC)?	0 - 999	60
SITE ATCS ADDRESS?	7.RRR.LLL.GGG .99.01	All locations must be programmed with a unique address assigned by the RR if ATCS communications are used. However, default address of 7.620.100.100.99.01 may be used at stand alone locations (No Communication)
SITE TYPE?	No Communication Bullhorn/ModBus , Dial-up, Node, Collector, CDS-902X	No Communication
INIT STRING?	Optional Hayes Modem Initialization String	SITE TYPE = Dial-up or OFFICE COMM. DEVICE = Dial modem (RS232)
OFFICE ATCS ADDRESS?	2.RRR.NN.DDD D	Typically 2.RRR.00.0000. SITE TYPE = Node or Collector
PRIMARY HOP ADDRESS?	7.RRR.LLL.GGG .00.01	Primary hop address 7.620.100.100.00.01 SITE TYPE = Node
BACKUP HOP 1?	7.RRR.LLL.GGG .00.01	Secondary Hop address. 7.620.100.100.00.01 SITE TYPE = Node
BACKUP HOP 2?	7.RRR.LLL.GGG .99.01	Third hop address. SITE TYPE = Node
FIELD COMM. DEVICE?	VHF Comm (Echelon), Spread-Spec (RS232), WAG (Echelon), VHF Comm (RS232), None	SITE TYPE = Node or Collector
MODE?	Gen/ATCS, Genisys	SITE TYPE = Collector

QUESTION	OPTIONS/RANGE	TYPICAL CONFIGURATION
WAMS XID?	Enabled, Disabled	SITE TYPE = Collector
OFFICE COMM. DEVICE?	Direct (RS232), MCM (RS232), WAG (Echelon), MCM (Echelon), Dial modem (RS232), S200 Radio (RS422)	SITE TYPE = Collector
RADIO ATCS ADDR?	7.000.000.000.000.00 to 7.999.999.999.999.99	OFFICE COMM. DEVICE = MCM (RS232), MCM (Echelon) or WAG (Echelon)
PHONE #	Phone number of WAMS	OFFICE COMM. DEVICE = Dial Modem (RS232)
USER PORT	Baud, Data bits, Parity, Stop Bits, Flow Control	Typically 57600, 8,N,1,N
USER PORT DATA BITS?	0-9	8
USER PORT PARITY?	None, Odd, Even	None
USER PORT STOP BITS?	0-9	8
USER PORT FLOW CONTROL	None, Hardware, Radio	None
AUX PORTR BAUD?	300, 600, 1200, 2400, 4800, 9600, 19200, 38400, 57600	57600
AUX PORT DATA BITS?	0-9	8
AUX PORT PARITY?	None, Odd, Even	None
AUX PORT STOP BITS?	0-9	8
AUX PORT FLOW CONTROL	None, Hardware, Radio	None

Table 4-2: Stage 3 (for all application programs)

QUESTION	OPTIONS/RANGE	TYPICAL CONFIGURATION
EDIT DIGITAL INPUTS	No, Yes	NO
EDIT BATTERIES	No, Yes	NO
EDIT RELAYS	No, Yes	NO
EDIT TEST LEDS	No, Yes	NO
EDIT MODULES	No, Yes	NO
GCP4K NODE?	1-16	

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

SECTION 5 – DOWNLOADS

5.1 SEAR IIi DOWNLOADS

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

- On the GCP Display
- On WebUI
- Download SEAR IIi information to a PC

The following paragraphs explain all three methods.

5.1.1 Viewing SEAR IIi Information on Display

From the **Diag & Reports** Screen, SEAR content can be accessed under both the 2) **SEAR** menu and the 3) **Reports & Logs** menu.

Figure 5-1: Diags & Reports

The options on the 2) **SEAR** menu:

- Maint On Site
- CDL Messages
- WAMS Test Message
- Clear Alarms
- SEAR Reset

The options on the 3) **Reports & Logs > Reports** menu:

- SEAR Incident Reports

Most frequently, Reports will be useful for maintenance.

Event reports are displayed for a range of time, one line at a time.

The options on the 3) **Reports & Logs > Logs** menu:

- SEAR Event Log
- SEAR Application Log
- SEAR CDL Log

The SEAR Event Log displays events as they occur in real time. A more efficient method of viewing SEAR IIi information is on a PC.

5.1.2 Downloading SEAR IIi Information to a PC via the Display

After plugging a USB drive into the GCP 5000 Display, the prompt to “Press Back to continue Or Enter for USB Menu” will appear. Press **Enter** then select **9) SEAR Transfers**.

The menu shown in Figure 5-2 will appear, allowing the user to select, either via scrolling with the arrow keys, or by number, which Log/Report to download.

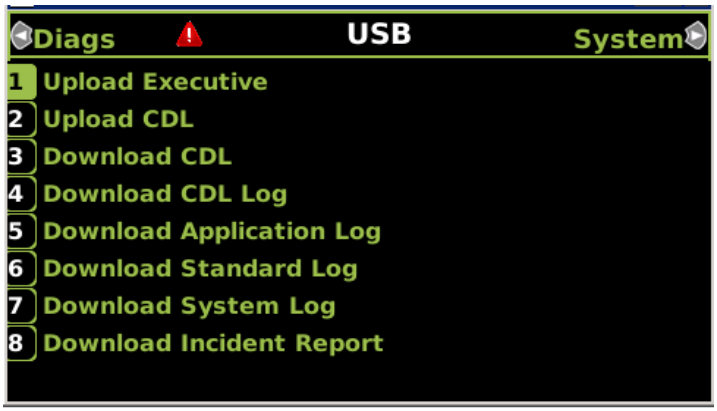


Figure 5-2: SEAR Transfers

Once the report shows complete, the USB drive can be removed and plugged into a PC. The files will appear as detailed in the note at the beginning of Table 3-3.

5.1.3 Downloading SEAR IIi Information to a PC via the WebUI

From the Reports and Logs menu, the user can select the desired type of SEAR Log from the left-hand menu, then click the **Download** button.

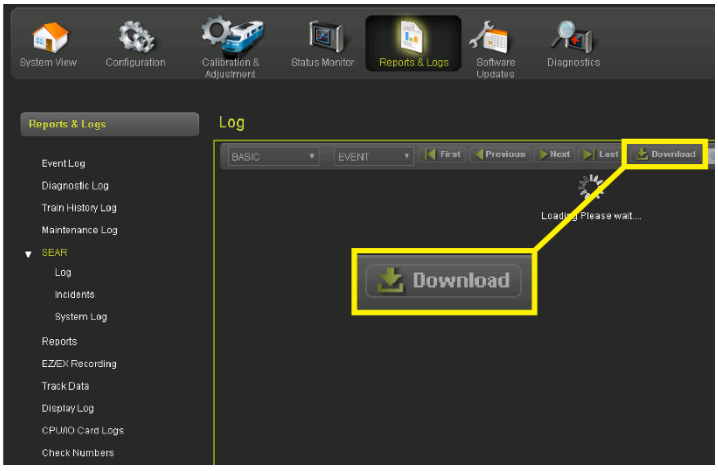


Figure 5-3: Downloading Logs

SECTION 6 USING HYPERTERMINAL

6.1 LEGACY OPERATION

This section details the use of HyperTerminal. The SEAR IIi programming, monitoring, and report generation when used with a GCP 5000 should be done either via the Display Module (A80485) menus, or via the Web User Interface. This is because the SEAR configuration settings are stored in the USB ECD accessed by the Display Module, thus the SEAR IIi can be removed and replaced without needing reprogramming. A copy of the settings is also stored in the SEAR IIi in case of Display removal/failure.

If the SEAR IIi is programmed via the Terminal Interface with no Display Module present and then a Display Module is placed in the unit, the SEAR settings in the Display Module will overwrite those that were previously programmed into the SEAR.

When the Display Module is present, the Time zone should not be changed via the Terminal Interface as it will prevent proper synchronization between the SEAR IIi and the Display Module and if the system is rebooted, the value held by the Display Module will overwrite the previously set value.

6.2 TERMINAL INTERFACE

The Terminal Interface provides computer access to the SEAR IIi configuration function menu.

6.2.1 Terminal Interface Main Menu

The Terminal Interface Main Menu, Figure 6-1:

- provides a menu item for each SEAR IIi configuration option
- displays when **Ctrl+L** is pressed from the after the SEAR IIi has completed booting, Figure 6-1

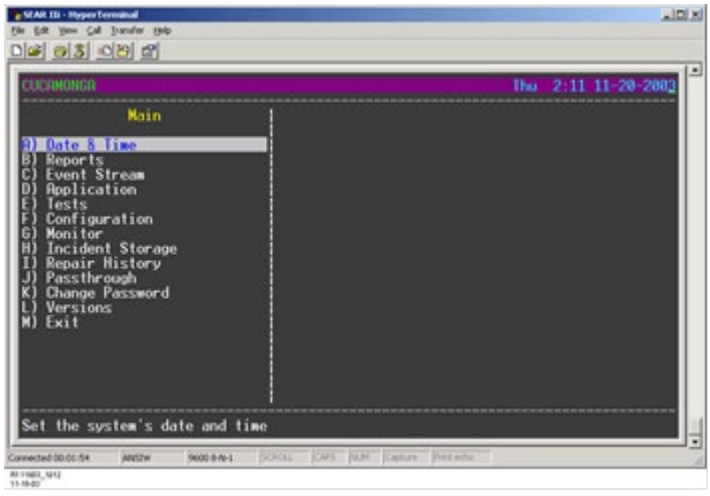


Figure 6-1: SEAR IIi Terminal Interface Main Menu

6.2.1.1 Menu Navigation

Menu navigation is implemented as follows:

- Menu items allow navigation to other menus and/or data edit fields.
- Menu items may be selected by:
  - highlighting an entry using the up or down arrows and pressing Enter
  - entering the letter designation to the left of the entry
- Submenu titles bracketed by arrows (<- title ->) indicate that corresponding data edit fields may be sequentially accessed using the right or left arrows.
- Pressing the **Esc** key exits the current screen and returns the display to the previous screen.
- Pressing **Ctrl + X** exits the terminal session.
- Pressing **Ctrl + R** refreshes the terminal screen.
- From a blank screen, pressing **Ctrl + L** will start or restart the terminal session.
- Position arrows (←, →, ↑, and ↓) may be used to:
  - highlight items within a menu
  - move the cursor through a data field
  - deletes each selected text entry position
  - change the entry field to another preset value

NOTE

If no action is performed on the terminal interface for more than 10 minutes, the session is automatically terminated.

If data is changed and no further action is performed for 10 minutes, a prompt is displayed requesting that the changes be saved.

If no response is initiated for an additional 10 minutes, all changes are discarded and the prior configuration remains in effect

6.2.1.2 Entering Terminal Data

The Terminal Interface Menu data field types:

- data field
  - Selected data field is identified by brackets **[ ]**
  - Data field(s) are changed by:
  - pressing left arrow (←) key to clear each successive data field
  - entering new data from keyboard
  - Data field accepted by pressing **Enter**
- list field
  - Selected list field is identified by brackets **[ ]** followed by **^v** symbols
  - Arrows (←, →, ↑, and ↓) are used to make selection
  - List field accepted by pressing **Enter**

6.2.2 Menu Structure

The Main menu provides access to additional menus as shown in Figure 6-19 through Figure 6-21.

These menus are described in Table 6-1.

NOTE

- CDL = Control Descriptor Language
- LLW = Ladder Logic Instruction
- LLB = Ladder Logic Labels

Table 6-1: SEAR IIi Menu Items

SCREENS			FUNCTION / DESCRIPTION
LEVEL 1	LEVEL 2	LEVEL 3	
A) Date & Time			Sets SEAR date and time
B) Reports	A) Standard Report		Displays standard format event report
	B) Field Report		Displays condensed format event report.
	C) Config-uration Report		Displays SEAR configuration data
	D) Incident Report		Displays report of all saved GCP incidents
	E) Repair History Report		Displays a report of GCP repair history
	F) Application Report		Displays a report of application messages
	G) Inspection Report		Displays automated inspection results
	H) Version Report		Displays SEAR Executive and Application versions
	I) GCP 3000 Parameters		Displays GCP3000 parameter settings
	J) Bitmap Labels		Displays ladder logic bitmap labels
	K) Exit		Returns display to **Main** menu
C) Event Stream			Displays events as they occur in real time
D) Applica-tion	A) Down-load File to SEAR		Downloads new CDL program (overwrites existing file)
	B) Upload File from SEAR		Uploads CDL , LLW, and LLB file using ZModem protocol
	C) Print/ Capture CDL		Dump CDL file to printer or file

SCREENS			FUNCTION / DESCRIPTION
LEVEL 1	LEVEL 2	LEVEL 3	
	D) Erase Application File		Erases Application Files
	E) Compiler Log		Lists compiler messages
	F) Site Setup		Terminal Site Setup
	G) Exit		Returns display to **Main** menu
E) Tests	A) View Results		Displays results for user, automated, and manual tests
	B) Manual entry		Allows manual test results to be manually entered
	C) Force test		Forces a user test or automated inspection to run
	D) Save Tests		Saves user defined tests
	E) Import test dates		Transfer test dates file to SEAR
	F) Exit		Returns display to **Main** menu
F) Configuration	A) Site Information		Allows SEAR site specific information to be edited
	B) Communication		Allows communica-tion settings between SEAR and office to be edited
	C) Serial Port	A) Edit	Allows editing of displayed SEAR communication port settings
		B) Exit	Returns display to level 1 sub menu
	D) Digital Inputs	A) Edit	Allows editing of SEAR digital input settings
		B) Exit	Returns display to level 1 sub menu
	E) Battery Inputs	A) Edit	Allows displayed SEAR battery monitor input settings to be edited
		B) Exit	Returns display to level 1 sub menu
	F) Relay Outputs	A) Edit	Allows selected relay output settings to be edited
		B) Exit	Returns display to level 1 sub menu

SCREENS			FUNCTION / DESCRIPTION
LEVEL 1	LEVEL 2	LEVEL 3	
	G) Test LEDs	A) Edit	Allows displayed test LED settings to be edited
		B) Exit	Returns display to **Test LEDs** menu entry
	H) LED Mode		Allows LED display mode to be changed
	I) Modules	A) Add Module	Add a module to the network
		B) Change Module	Change the network settings of a module
		C) Replace Module	Replace a network module
		D) Re-install Module	Re-install a network module
		D) Remove Module	Remove a module from network
		E) Identify Module	Identify a module on network
		F) Exit	Returns display to the **Configuration** menu
	J) Restore Defaults		Returns all settings to factory default
	K) Save Changes		Saves changed configuration data
	L) Exit (no save)		Returns the display to the **Main** menu without saving changes
G) Monitor	A) Onboard I/O		View SEAR I/O status in real time
	B) Onboard LED's		View/control SEAR onboard LED status in real time
	C) Module Comm. Status		View SEAR comm status of network modules
	D) Ladder Logic Bitmap		View/control SEAR bitmap status in real time
	E) Module I/O		View SEAR network module I/O in real time
	F) Exit		Returns display to **Main** menu
	A) View		View a previously saved incident report

SCREENS			FUNCTION / DESCRIPTION
LEVEL 1	**LEVEL 2**	**LEVEL 3**	
H) Incident Storage	B) Save		Save an incident report
	C) Delete		Delete an incident report
	D) Exit		Returns display to the **Main** menu
I) Repair History	A) View		View the repair history
	B) Add		Add a manual repair entry
	C) Exit		Returns display to the **Main** menu
J) Pass through			Pass through to another port
K) Change Password			Change one of the passwords
L) Version			View a software version number
M) System	A) Reset System		Reset the SEAR unit
	B) System Log Display	A) SysLog Dump	Dump current SEAR system log to terminal
		B) SysLog Stream	Show SEAR system log entries as they occur
		C) Dump ->Stream	Dumps the SEAR system log stream
		D) SysLog viewer	Views the SEAR System Log
		E) Exit	Returns display to the **Level 2** Menu
	C) Reset Log		Resets the System Log to either On Screen, Z-Modem transfer, or Print/Capture
	D) Stack Usage		Displays the Task Stack Status
	E) Exit		Returns display to the **Main** menu
M) Exit			Exit the **Main** menu

Table 6-2: Upgrading the Executive Software

Step 1	Connect a standard nine-pin, RS-232 serial cable between the SEAR IIi **USER J2** serial port (DB9 male) and the computer serial COMM port (DB9 female).
Step 2	Configure the terminal emulation software to communicate with the SEAR IIi.
Step 3	Cycle power to the 5000 GCP or remove and re-insert the SEAR IIi. The Boot Monitor Screen, figure 9-3, displays.
Step 4	At the **Choice >** prompt select **1** (within 5 seconds). The terminal screen displays: Waiting for executive download…
Step 5	Using the terminal emulator Transfer command, initiate download of the new Executive binary file. A typical transfer window using the ZModem protocol is shown in Figure 6-2. After the Executive software is downloaded and stored in the SEAR flash memory, the boot options are again displayed. A typical HyperTerminal screen display is shown in Figure 6-3.

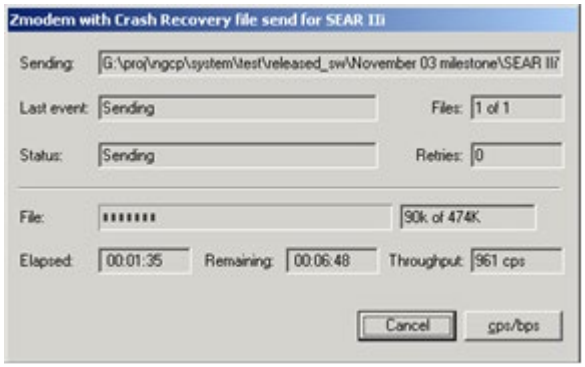


Figure 6-2: Zmodem Transfer Window

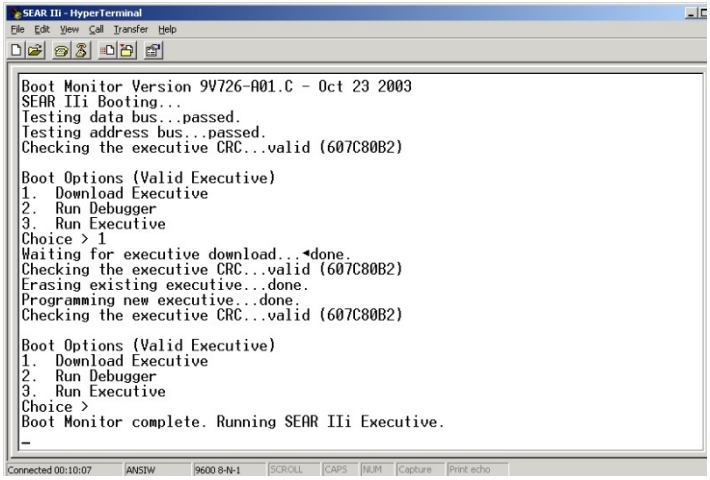


Figure 6-3: SEAR IIi Executive Software Download Screen (HyperTerminal)

NOTE

Downloading a new Executive must be started within 5 seconds after the **Choice >** prompt is displayed by the initial Boot Monitor Screen.

Prior to initiation of Procedure 9-3, make sure that the new Executive is ready for download.

- Only 1 minute is allowed to initiate the download after **Download Executive** selection.
- When using the HyperTerminal, file download is initiated from the **Send File** item of the **Transfer** drop-down menu.

6.2.3 Downloading SEAR IIi Information to a PC Via HyperTerminal

The SEAR IIi computer interface may be accessed with terminal emulation software such as HyperTerminal.

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

- 9600 baud
- 8 data bits
- No parity bits
- 1 stop bit

It recommenced that the baud rate be increased to 57600. The COMM port settings are changed in the HyperTerminal program by selecting FILE then PROPERTIES. In the properties window select CONFIGURE. The next window is PORT SETTINGS. Set the port settings as desired and select OK until it returns to the HyperTerminal screen.

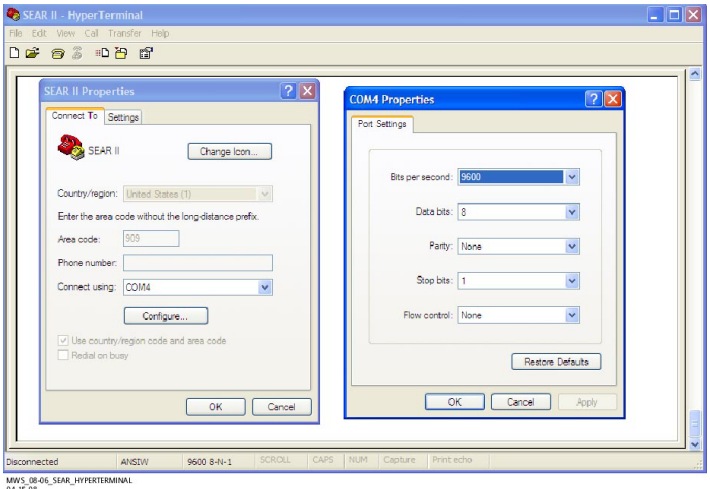


Figure 6-4: Comm Port Settings

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

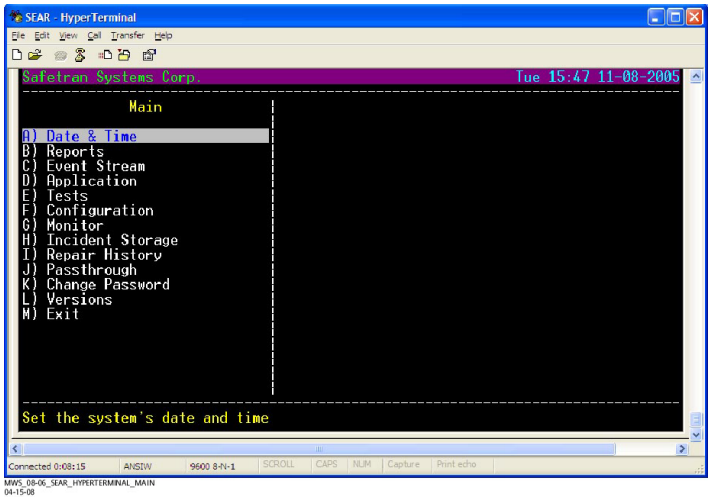


Figure 6-5: SEAR IIi Main Menu on HyperTerminal

The options are selected by entering the option's letter, or using the keyboard ARROW keys and ENTER. Enter B for Reports, etc. The Reports screen appears as shown in Figure 6-6.

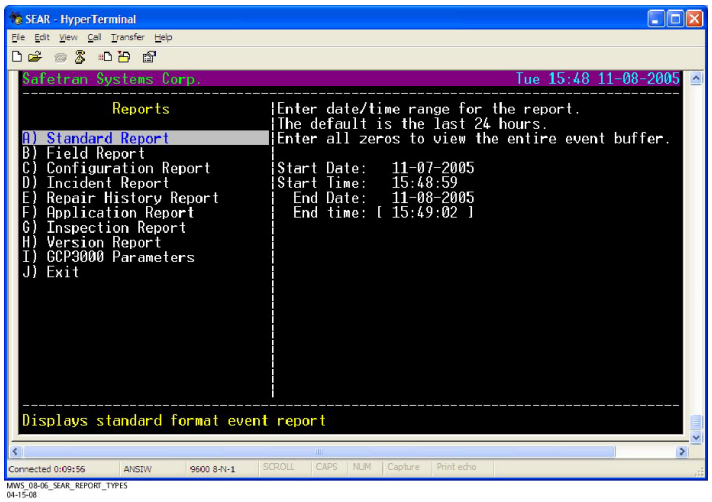


Figure 6-6: SEAR IIi Reports Screen

The default time range is the previous 24 hours. The date and time range may be changed as each item is selected. The Start Date appears first. The date may be changed by moving the cursor over the entry that is to be changed and typing over. Hit ENTER to move to the Start Time, and so on. After the End Time is entered, a Format option to view On Screen or Print/Capture is displayed. The options can be switched by the UP or DOWN ARROW keys, then pressing ENTER.

The report is a complete list of all GCP 5000 activity during that period. (See Figure 6-7).

Figure 6-7: Example Report Screen

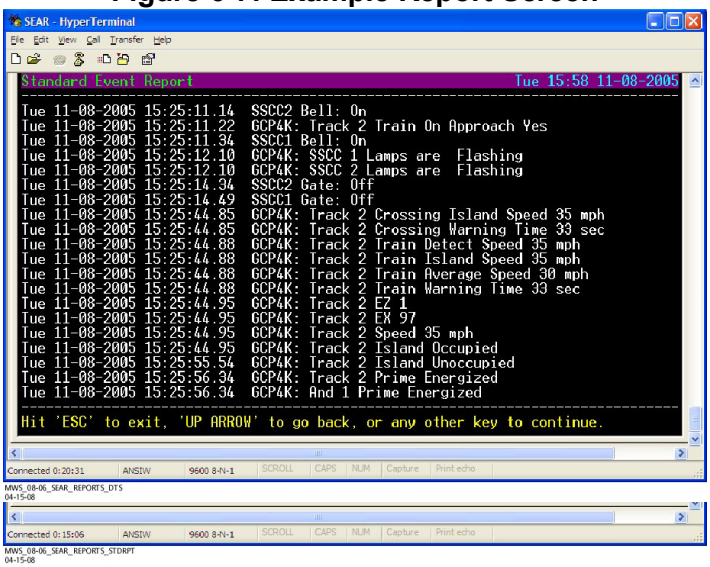


Figure 6-8: Report Selection

Capturing reports on the computer allows retrieval at a later date. Figure 6-9 is an example of the PRINT/CAPTURE option.

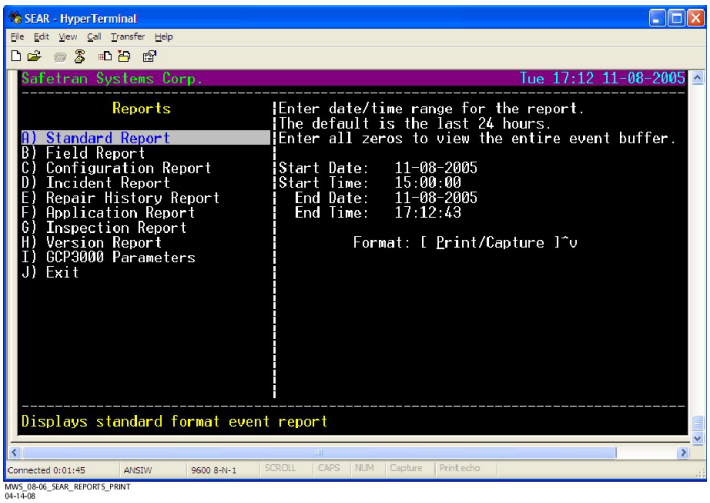


Figure 6-9: Print/Capture Option

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

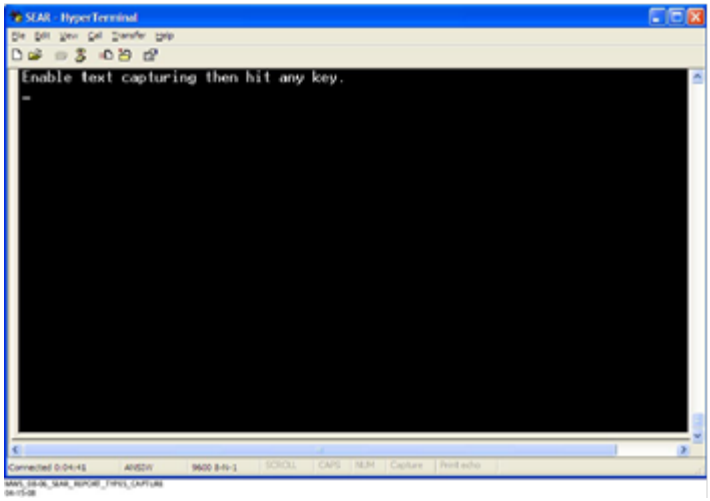
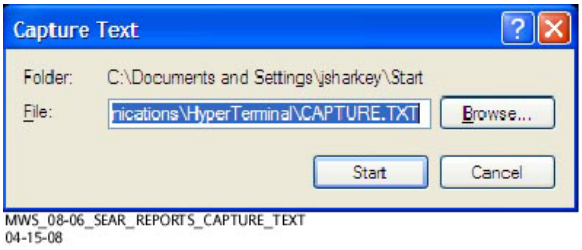


Figure 6-10: Text Capture Message

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

A standard dialog box appears that allows the user to choose the location the file will be saved to. (Figure 6-11)



MWS_08-06_SEAR_REPORTS_CAPTURE_TEXT
04-15-08

Figure 6-11: Capture Text Dialog Box

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

6.2.4 Configuration Report

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

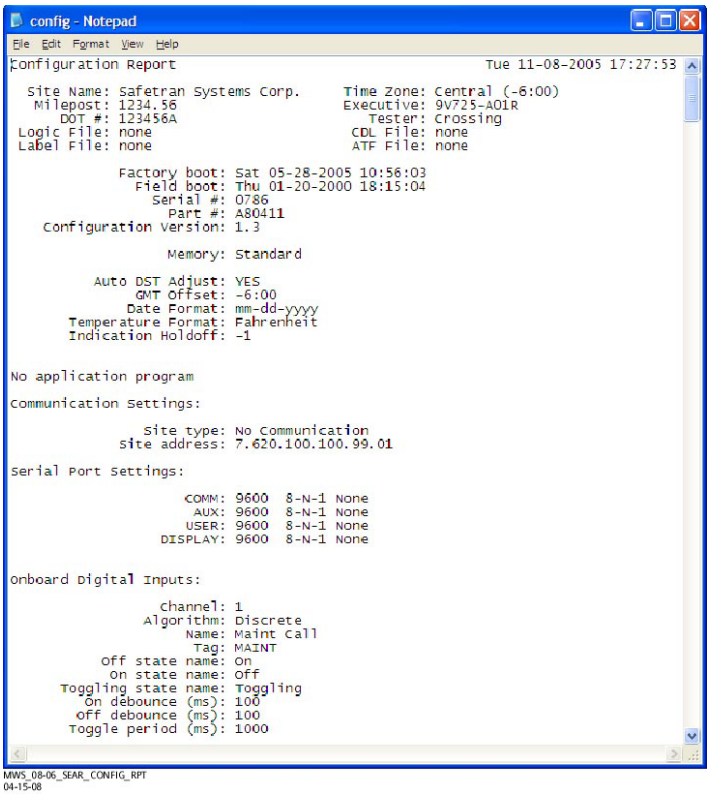


Figure 6-12: Configuration Report Sample Text File

6.2.5 Incident Storage

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

Select INCIDENT STORAGE on the main menu.

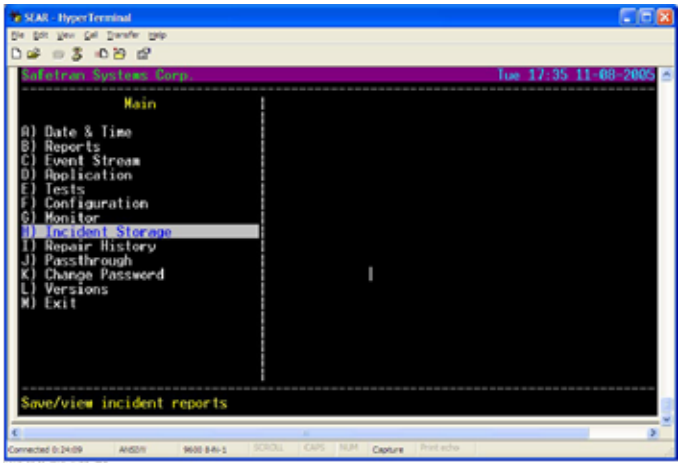


Figure 6-13: Incident Storage Menu Selection

To save an incident, select SAVE and ENTER.

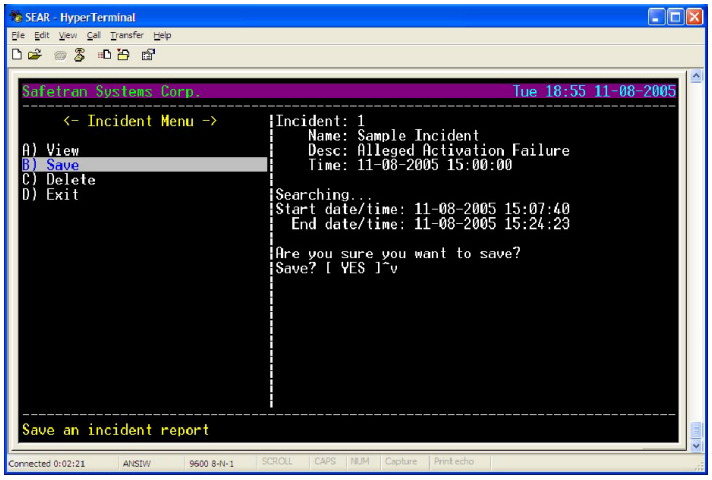


Figure 6-14: Incident Save Selection

Fill in the requested information.

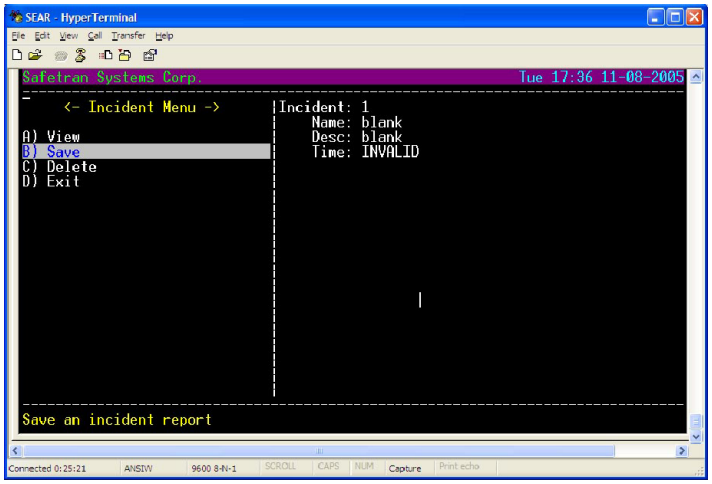


Figure 6-15: Incident File Information Screen

The Incident will be saved in the SEAR IIi and can be captured and saved on a computer. The report can be displayed by selecting the VIEW option. (Figure 6-16)

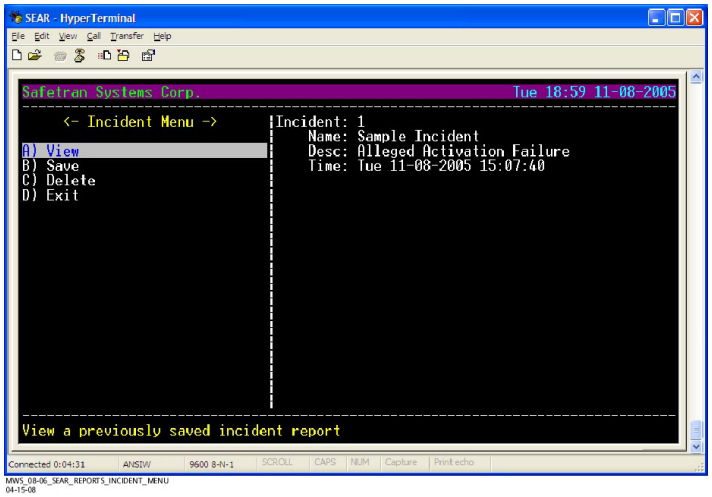


Figure 6-16: Viewing the Saved Incident Report

An example of the report is shown in Figure 6-17.

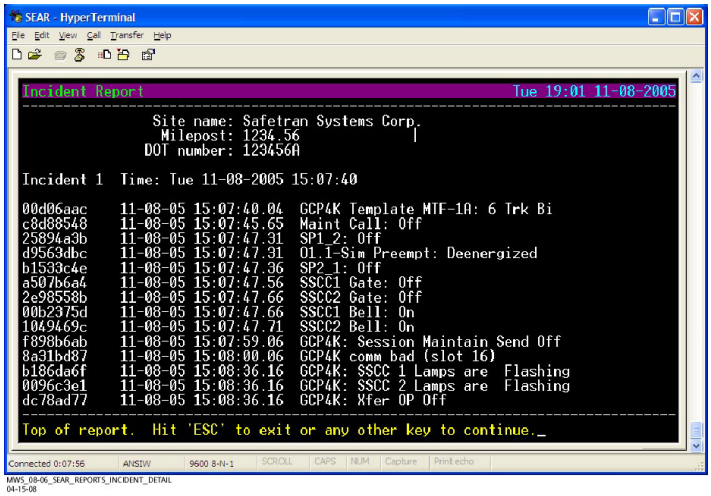


Figure 6-17: Example of Viewing a Saved Incident Report

NOTE

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

The remainder of the selections on the main menu can be selected, viewed, or captured in the same manner. Similarly, the selections can be selected and displayed on the display module. To end the HyperTerminal session select EXIT.

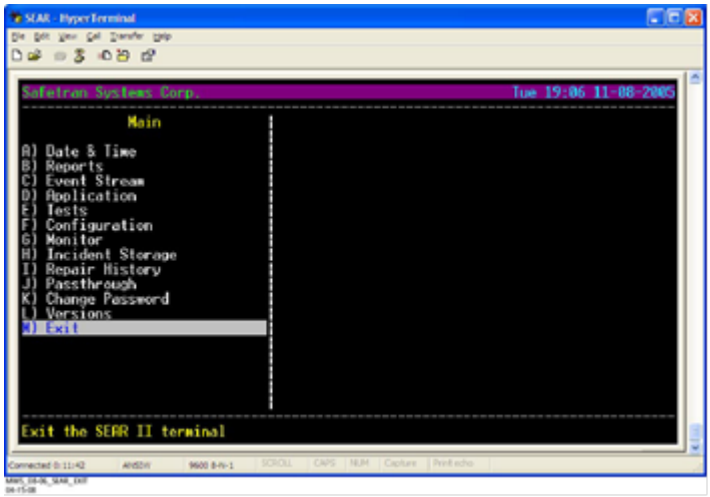


Figure 6-18: Ending the HyperTerminal Session

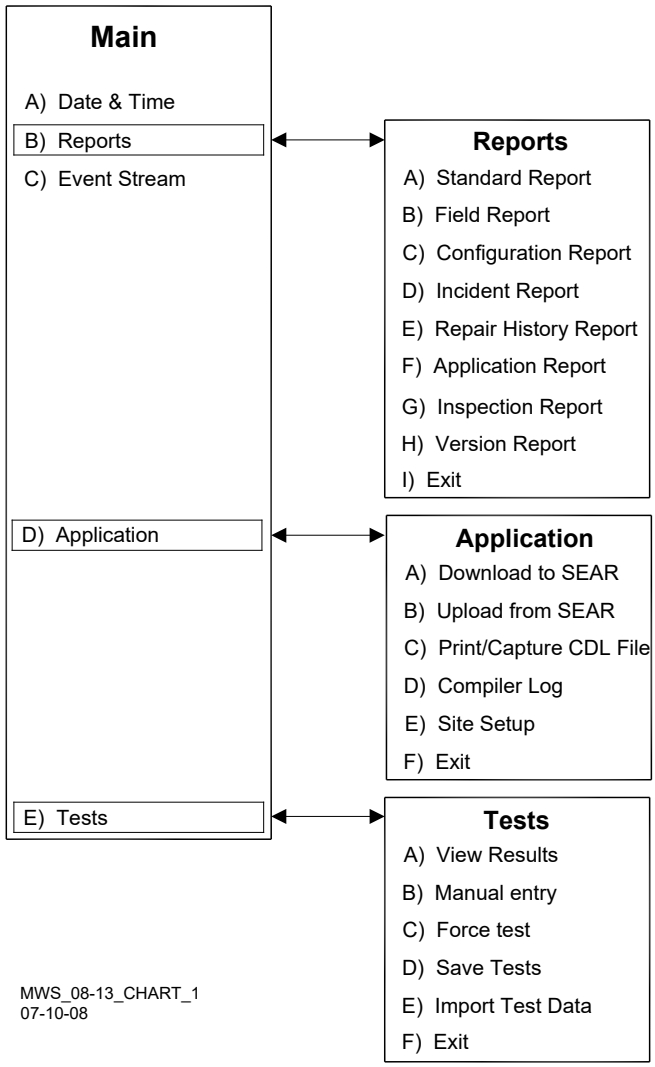


Figure 6-19:
Main Menu (Reports, Application, & Tests)

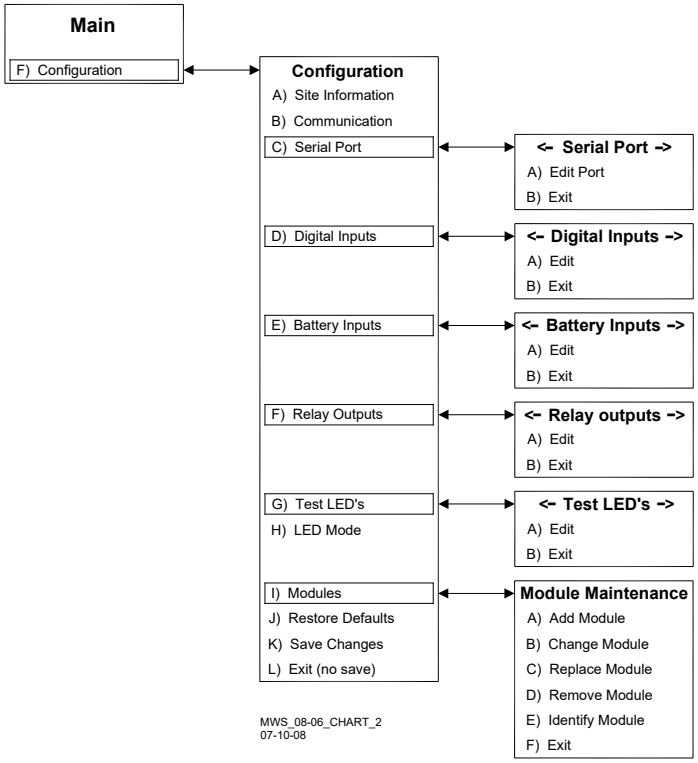


Figure 6-20: Main Menu (Configuration)

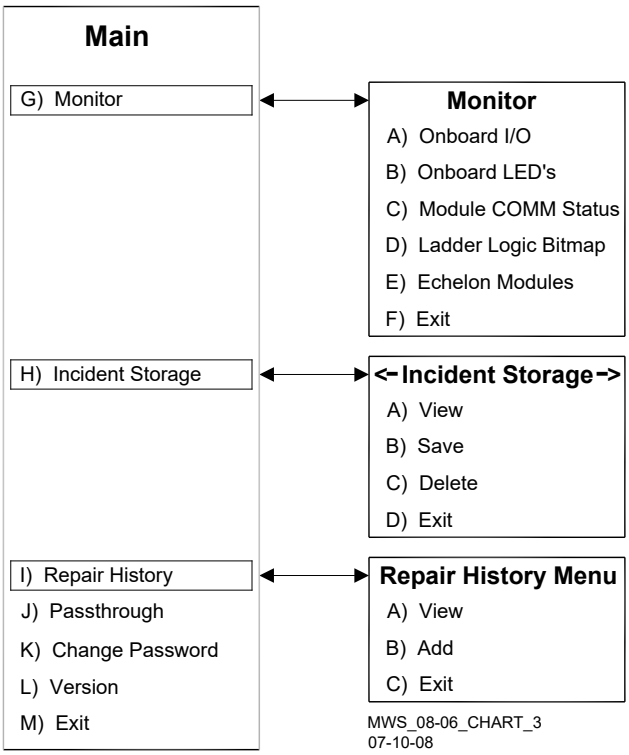


Figure 6-21: Main Menu (Monitor, Incident Storage, & Repair History)

SECTION 7 – GLOSSARY

GLOSSARY

Advance Preemption:	Notification of an approaching train is forwarded to the highway traffic signal controller by railroad equipment in advance of activating the railroad active warning devices.
Advance Preemption Time:	This period of time is the difference in the Maximum Preemption Time required for highway traffic signal operation and the Minimum Warning Time needed for railroad operation.
AF:	Audio Frequency
AFO:	Audio Frequency Overlay
AND:	AND circuits require all inputs to be energized for the output to be energized.
AND ENABLE:	An internal function that can be used to 'connect' an input to an AND circuit.
AND 1 XR:	The AND function that controls the local crossing. Is equivalent to the XR relay.
AND 2 thru 8:	Internal functions that are used to combine inputs.
AREMA:	American Railway Engineering and Maintenance-of-way Association
ATCS:	Advanced Train Control System – An industry standard used in the 4000/5000 GCP for communications.
CCN:	Configuration Check Number – The 32 bit CRC of the configuration data.
CDL:	Control Descriptor Language – The programming language used by application engineers to customize the operation, settings, and behavior of a SEAR II/IIi.
CHK:	CHECK receiver on a track module connected to transmit wires that perform track wire integrity checks.
CHK EZ:	Check EZ is a signal value compared to main receiver EZ that is useful in troubleshooting.
CIC:	Chassis Identification Chip - A non-volatile memory chip that is installed adjacent to the ECD on the GCP backplane. Stores site specific information for both Main and Standby operations.
Computed Approach Distance:	The track approach length calculated by the GCP. The calculated distance between the wire connections on the rail and the termination shunt connections.

CP:	Communications Processor – One of two microprocessors on the CPU II+ module, processes external communications for the GCP 5000.
CRC:	Cyclical Redundancy Check - Used to determine that data has not been corrupted.
CRTU:	Cellular Remote Telemetry Unit
DAX:	Acronym for Downstream Adjacent Crossing (Xing). DAX outputs are used to send prediction information from an upstream GCP to a downstream GCP when insulated joints are in the approach circuit.
dB:	Decibels
DIAG:	Diagnostic
DOT Number:	Department Of Transportation crossing inventory number assigned to every highway-railroad crossing that consists of six numbers with an alpha suffix.
DT:	Diagnostic Terminal – The Diagnostic Terminal (DT) is a Siemens developed Windows® based software that can run on the Display Module or on a PC, which allows the user to perform programming, calibration, and troubleshooting.
DTMF:	Dual Tone Multi-Frequency - The tones on a telephone or radio keypad.
ECD:	External Configuration Device – The non-volatile memory device on the GCP backplane used for storing the module configuration file.
Echelon:	A Local Area Network, LAN, used by the 5000 GCP.
EGOM:	Exit Gate Operating Mode – A dynamic mode in which the exit gate operation is based on the presence and detection of vehicles between the stop bar or entrance gate and the exit gate.
Enhanced Detection:	User selectable process that detects nonlinear fluctuations in track signal due to poor shunting and temporarily switches the track module from predictor to motion sensor.
Entrance Gate:	A gate used at the entrance to a highway-railroad grade crossing, which is designed to release and lower by gravity from the full vertical position to the horizontal position under a loss of power condition or when the control energy (GC) is removed.

EX:	The EX value is a numerical indication of track ballast conditions relative to the leakage resistance between the rails. A value of 100 represents nominal good ballast. A value of 39 represents very poor ballast.
Exit Gate:	A gate used at the exit from a highway-railroad grade crossing with Four Quadrant Gates to restrict wrong direction vehicular movements, which is designed to raise by gravity from the horizontal position to a vertical position great enough to allow vehicle clearing under a loss of power condition or when the control energy (GC) is removed.
EZ:	The track signal value that varies with approach track impedance that indicates the relative train position within an approach. 100 represents nominal value with no train in the approach, 0 represents nominal value for a train occupying the island.
FAR GATE:	On the same surge panel, the 'far gate' is the flashing light signal or gate with the largest voltage drop in the cable circuit. In general, if both signals have the same number and type of lamps and the same size cable conductors, the 'far gate' is the location with the longest cable run. The 'far gate' circuit on the surge panel does not have an adjustable resistor in series with L1 and L2 that provides voltage adjustment.
Field Password:	The password set that allows field maintenance personnel access to field editable parameters.
Flash Memory:	A type of non-volatile memory that can be reprogrammed in-circuit via software.
FLASH SYNC:	The two wire circuit that synchronizes the alternating flash of an external crossing controller with the internal crossing controller, SSCC IIIi or the external crossing controller, SSCCIV.
Gate Delay Period:	The programmable time period from when the lights begin to flash until the gates begin to descend.
GC:	Gate Control
GCP:	Grade Crossing Predictor – A train detection device used as part of a highway-railroad grade crossing warning system to provide a relatively uniform warning time.

GCP APP:	GCP Approach length calibration into a hardwire shunt located at the termination shunt.
GCP CAL:	GCP Calibration into a termination shunt.
GCP LIN:	Approach Linearization calibration into a hardwire shunt located at the 50% point on the approach.
GD:	Gate Down, input energized when gate arm is horizontal.
GFT:	Ground Fault Tester – An optional external device connected to the Echelon LAN that constantly monitors up to two batteries for ground faults and indicates battery status to the SEAR IIi.
GP:	Gate Position – Input energized when gate is vertical.
GU:	Gate Up – Used in a user defined SEAR IIi application program, (the same as GP).
Highway-Railroad Grade Crossing Advance Warning Sign:	A traffic control sign (round yellow sign with RR and a black X) placed by the highway agency in advance of many highway-railroad grade crossings
Healthy:	The GCP system, modules and track circuit are operating as intended. Health is generally indicated by a yellow LED flashing at 1 Hz (approximately the same flash rate as the FLASH SYNC on a controller or a flashing light signal). Unhealthy conditions are indicated by faster flash rates (2 Hz and 4 Hz) or a dark Health LED.
Hz:	Hertz – Common reference for cycles per second or flashes per second.
iLOD:	Intelligent Light Out Detector – used for measuring lamp current.
Interconnection:	The electrical connection between the railroad active warning system and the traffic signal controller for the purpose of preemption.
IO or I/O:	Input/Output
ISL:	Island
ISL CAL:	Island calibration
kHz:	kilohertz – 1000 Hz or 1000 cycles per second.
LAMP 1 VOLTAGE:	Voltage on 1L1 or 2L1 lamp output of the crossing controller module, SSCC IIIi.
LAMP 2 VOLTAGE:	Voltage on the lamp 1L2 or 2L2 lamp output of the crossing controller module, SSCC IIIi.

LAN:	Local Area Network – A limited network where the data transfer medium is generally wires or cable.
Linearization:	The linearization procedure compensates for lumped loads in the GCP approach that affects the linearity (slope) of EZ over the length of the approach.
Linearization Steps:	A calibration value that allows the GCP to compensate for non-linear EZ values within the approach circuit.
LOS:	Loss of Shunt – Commonly due to rust and / or rail contamination. LOS timers provide a pick up delay function.
Lumped Load:	A section of track that has a lower ballast resistance than the rest of the approach because of switches, crossings, contamination, etc.
MAIN:	The primary GCP Modules (CPU, Track, and RIO Modules) that are in a dual GCP chassis.
MBT:	Abbreviation for Master Boot file
MCF:	Module Configuration File – The GCP application logic file.
MEF:	Module Executable File – The GCP executive software program.
Module:	Physical package including PCBs and input/output terminals for connecting to external devices and equipment.
MS:	Motion Sensor – A train detection device used as part of a highway-railroad grade crossing warning system to provide a detection of a train approach.
MTSS:	Mini Trackside Sensor – A device located in the gate mechanism that combines input information from gate contacts, bell, and gate tip sensor and sends the information to the SEAR IIi.
NEAR GATE:	On the same surge panel, the 'near gate' is the flashing light signal or gate with the lowest voltage drop in the cable circuit. In general, if both signals have the same number and type of lamps and the same size cable conductors, the 'near gate' is the location with the shortest cable run. The 'near gate' circuit on the surge panel has an adjustable resistor in series with L1 and L2 that provides additional voltage adjustment.
NVRAM:	Non-Volatile Random Access Memory

OCCN:	Office Configuration Check Number – The 32 bit CRC of the configuration data, excluding items that are protected by the Field Password.
OCE:	Office Configuration Editor – The PC version of the DT that can be used to create configuration package files (Pac files) for the GCP 5000 system.
Offset Distance:	The distance between the track circuit connections of the remote GCP (sending DAX information) to the island track connections of the UAX GCP (receiving the information).
Out Of Service:	The process for taking one or more GCP approach circuits and / or approach and island circuits out of service.
Pac File:	A GCP 5000 configuration Package File that can either be created in the office using the OCE, or downloaded from a GCP 5000 system via the CP.
PCB:	Printed Circuit Board
Pick Up Delay:	An internal delay time between when an input receives the signal to pickup and when it actually responds.
POK:	Power Off Indication
Positive Start:	Activate crossing devices when EZ level is less than a programmed value.
Preemption:	The transfer of normal operation of traffic signals to a special control mode.
PRIME:	PRIME may be de-energized by a Track's prime predictor, UAX, advance preempt, and/or island, if zero offset is selected.
PSO-II, PSO-III, PSO4000:	Different models of Siemens' Phase Shift Overlay – a track circuit (transmitter at one location and receiver at another location) that supplies track occupancy information for crossing warning devices and other train or vehicle detection systems.
RADIO DAX:	DAX information transmitted via Spread Spectrum Radio or other communications devices.
RIO:	Relay Input Output Module
RS232:	Industry standard serial port.
RTU:	Remote Telemetry Unit
RX:	Receive

SEAR IIi Application Program:	Programming for SEAR IIi that controls alarms.
Simultaneous Preemption:	Notification of an approaching train is forwarded to the highway traffic signal controller unit or assembly and railroad active warning devices at the same time.
SIN:	Site (Subnode) Identification Number - A twelve-digit ATCS address representing the module as a subnode on the network.
Spread Spectrum:	A method of radio transmission in which the transmitted energy is evenly spread over the complete bandwidth of the radio, resulting in a low RF profile.
SSCC:	Solid State Crossing Controller
SSR:	Spread Spectrum Radio – A radio that utilizes spread spectrum transmission.
Standby:	The GCP Backup Modules (e.g., CPU, Track, and RIO modules) that are in a dual GCP chassis.
Supervisor Password:	The password set that allows application design personnel access to office editable parameters.
True RMS AC+DC:	A scale on a multimeter that measures the effective combined AC and DC portions of the total voltage. Used to measure the pulsed output of a crossing controller. Measured as VRMS.
TX:	Transmit
UAX:	Acronym for Upstream Adjacent Crossing (Xing). UAX inputs are used to receive prediction information from an upstream GCP as inputs to a downstream GCP when insulated joints are in the approach circuit.
USB Port:	Universal Serial Bus Port
USB Drive:	A memory device that plugs into a USB port which are commonly called flash drives or memory sticks.
VHF Communicator:	Communications device used for remote operations and calibration as well as data communications.
VLP:	Vital Logic Processor – One of two microprocessors on the CPUII+ module, processes GCP vital system logic.
VRMS:	Volt Root Mean Square – See True RMS AC + DC above.

WAG:	Wayside Access Gateway – The Siemens A53457 assembly converts Echelon® messages to Ethernet messages allowing Siemens equipment to use Ethernet Spread Spectrum radios A53325 for communications. WAG assembly A53457 also converts Echelon received messages to RS232 messages allowing the system to use modems for communication between Siemens equipment.
WAMS:	Wayside Alarm Management System – An office based application that communicates with and receives data from specially equipped crossings.
WCM:	Wayside Control Module – The Siemens A53105 assembly that centrally controls the functions of a Wayside Communications Package (WCP).
Wrap:	Common reference for a track circuit, or combination of track circuits that extend to or beyond the limits of a GCP approach, which provides train detection. Used to signify that a certain system function is being overridden based upon the state of a vital input.
Z Level:	An Island calibration value. A calibrated island will have a nominal Z Level of approximately 250. The Z Level approaches 0 when shunted.

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