



## **Grade Crossing Predictor 4000 Field Manual**

**Document Number: SIG-00-08-10**

**Version: D.3**

**December 2015 Revised February 2018 and April 2022**

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**WARNING**

**RAILROADS OR AGENCIES ARE RESPONSIBLE FOR ENSURING ONLY PROPERLY TRAINED AND/OR AUTHORIZED PERSONNEL HAVE ACCESS TO THE GCP 4000.**

**TRACKS MUST BE VERIFIED TO BE FREE OF ANY AND ALL TRACK RELATED ISSUES PRIOR TO BEING PLACED IN SERVICE. ANY TRACK RELATED ISSUES THAT ARE IDENTIFIED MUST BE CORRECTED AND VERIFIED TO BE CORRECT PRIOR TO PLACING THE GCP 4000 INTO SERVICE.**

**PROGRAM CHANGES MUST BE PERFORMED IN ACCORDANCE WITH RAILROAD PROCEDURES.**

**VERIFY THAT THE GCP 4000 HAS ALL PROPER COMPONENTS AND IS PROGRAMMED AS SPECIFIED BY THE RAILROAD'S OR AGENCY'S APPROVED WIRING OR INSTALLATION DIAGRAM.**

**FAILURE TO DO SO MAY LEAD TO INCORRECT OR UNSAFE OPERATION OF THE TRACK CIRCUIT.**

**FAILURE TO FOLLOW THE RAILROAD'S OR AGENCY'S APPROVED WIRING OR INSTALLATION GUIDELINES REGARDING THE GCP 4000 MAY LEAD TO POSSIBLE UNSAFE OPERATION OF THE TRACK CIRCUIT.**

**AFTER INSTALLATION OF A UNIT, OR WHENEVER A CHANGE IS MADE TO THE SOFTWARE OR THE CONFIGURATION, THE INSTALLATION SHOULD BE FULLY OPERATIONALLY TESTED TO ENSURE SAFETY.**

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

## HOW TO USE THIS MANUAL

This handbook is intended to provide guidance to maintenance personnel. Information is provided in the indicated locations for the listed purpose:

System Cutover	Page 7
Calibration	Page 19
Operational Checks	Page 47
Troubleshooting	Page 56

### **WARNING**

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

### SYSTEM CUTOVER

#### **GCP 4000 CUTOVER TEST PROCEDURE AND CHECK-OFF SHEET**

The cutover test procedure should be used when initially installing, modifying, or after disarrangement of a GCP 4000 system and includes the SEAR2I and SEAR2I appliances (i.e., Mini Track Side Sensors, MTSS, Intelligent Light Out Detectors, iLODS, VHF Communicators, Ground Fault Tester, GFT, etc.)

#### **NOTE**

This procedure does not supersede procedures of the maintaining railroad. This procedure is designed to supplement railroad procedures. In case of conflicts between procedures, the most restrictive procedure should govern.

Results of the tests may be documented on the GCP 4000 Test Procedure Form, which is found in the Microprocessor Based Grade Crossing Predictor Model 4000 Family Application Guidelines, SIG-00-08-06.

Unless otherwise noted, the term 'activate crossing' means activating the flashing light signals and gates by de-energizing an AND 1 XR Enable input. Do not use an Emergency Activation input unless instructed to do so.

#### **Equipment Needed:**

Hardwire test shunt

0.06 ohm test shunt

Stop watch

GCP 4000 Display Module, or PC with Diagnostic Terminal, DT, software.

PC with HyperTerminal software may be needed for SEAR2I and communication setup

Volt meter – Either a Agilent U1252A or equivalent with a True RMS AC + DC scale or a conventional volt-meter, which requires use of the conversion chart found in Table 18.

**NOTE**

It is not necessary to remove power from the GCP case before installing or removing modules. If possible, disconnect lamp load before removing or inserting SSCC3I modules.

**CIRCUIT AND PROGRAMMING VERIFICATION**

Verify the GCP 4000 modules shown on the circuit plans are properly inserted and secured into their appropriate slots (main/standby).

**WARNING**

**THE SSCC3I MODULES SHALL BE SECURED WITH THE BUILT IN SCREW FASTENERS.**

**REMOVAL OF A SSCC3I WILL CAUSE THE GATES TO DESCEND IMMEDIATELY (WITHOUT GATE DELAY) AND THE LIGHTS WILL NOT ACTIVATE.**

**STEP 1**

Remove all connectors (green screw type and orange cage-clamp) to the GCP 4000.

Close battery buss to 4000 system case.

Verify the voltage and polarity of the B and N wiring to the GREEN plug connectors for the GCP and SSCC.

Insert only the GREEN power plug connector above the CPU module and verify programming after system boots.

If used, set the GCP 4000 Transfer Timer Module 80406 or Transfer Timer Assembly 80486 timer transfer switch to MAIN.

Review the program in the GCP 4000 by selecting the PROG button on the GCP 4000 DT menu bar.

Verify the programming per the text document in the circuit plans. Field measured parameters (approach, DAX offset and island distances) are added at this time.

If used, verify that the ATCS (SIN) number is per the circuit plan.

If used verify the office configuration check number is per the circuit plan.

**NOTE**

The main and standby modules do not require independent programming. Both sets of modules operate from the same stored application program.

**STEP 2**

If used, verify the Echelon LAN wiring and termination is in place.

Before connecting power to other GCP connectors, verify wiring to GCP 4000 system, case wiring, wiring to surge panels, track, warning devices, and cable circuits to other locations.

Connect track cable at house termination points.

Connect other cable circuits at house termination points.



**WARNING**

**DURING THE SSCC3I BOOT-UP PROCESS AND AFTER ALL WIRING IS CONNECTED:**

**THE CROSSING GATES WILL BE DOWN WITH CROSSING LAMPS FLASHING AND BELLS RINGING.**

**A80405 MODULE(S) WILL NOT BE RESPONSIVE TO CROSSING CONTROL INPUT FROM THE 4000 GCP.**

**TAKE ADEQUATE PRECAUTIONS TO WARN ANY PEDESTRIANS, PERSONNEL, TRAINS, AND VEHICLES IN THE AREA UNTIL PROPER SYSTEM OPERATION IS VERIFIED.**

**CAUTION**

THE SSCC3I MODULE HAS ACTIVE INTERNAL SHORT CIRCUIT PROTECTION FOR LAMP, BELL AND GATE CONTROL OUTPUTS THAT IS EFFECTIVE ONLY AFTER THE SSCC3I HAS BOOTED UP. THEREFORE, AT THE INITIAL CUTOVER IT IS IMPORTANT TO BOOT UP THE SYSTEM PRIOR TO CONNECTING EXTERNAL LOADS. SEE CONNECTION SEQUENCE BELOW IN STEP 3. DO NOT INSERT THE GCP 4000 SSCC3I GREEN CONNECTORS FOR: B, N, L1, L2, GC'S, BELLS, AND INPUTS

**NOTE**

Once the SSCC3I module has booted up (Health LED flashing at 1 Hz), the SSCC3I module has internal short circuit protection for lamp, bell and gate control outputs. Therefore, at the initial cutover it is important to boot up the system prior to connecting external loads.

**STEP 3**

The SSCC3I connectors and wiring to loads must be applied in the following sequence to avoid damage:

Open the lamp, gate GC control, GP inputs, GD inputs and bell circuits at the surge panel(s).

Verify battery polarity on GREEN power plugs and ORANGE input plug connector(s).

Connect the screw-lock power connector for each SSCC3I module and lock by tightening screws.

Wait approximately 40 seconds for SSCC3I module(s) to boot up.

Connect the GC/bell and GP/GD ORANGE Input cage-clamp plug connectors to the appropriate SSCC3I.

Close the lamp, gate control, GP/GD inputs and bell circuits on the surge panel(s).

Connect warning device wiring and cables at house termination points.

Connect all other connectors to GCP 4000 system.

Connect all other electronic equipment to the battery busses.

## SEAR2I SETUP

Selecting the SEAR button at the top of the 4000 GCP Status Screen (Figure 1) brings up the SEAR Interface screen, Figure 2.

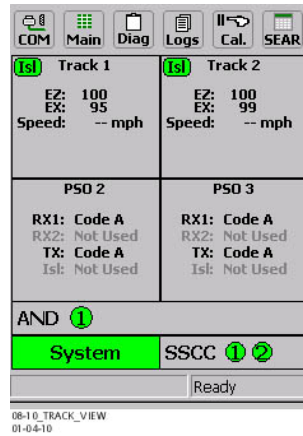


Figure 1: SEAR Button At Top Of Screen

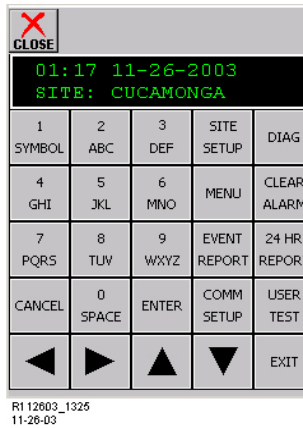


Figure 2: SEAR2I Interface

The interface may also be accessed by selecting the **Site Setup** item from the **SEAR** or the **TEMPLATE: SEAR** windows.

### NOTE

The SEAR interface may be accessed only from the A80407 Display Module Diagnostic Terminal, DT, and not on the PC based DT.

Refer to SEAR2I Configuration Summary document for details of application CDL program, LEDs, and Alarms. ATCS address must be entered prior to SEAR2I communicating with GCP

Prior to beginning SEAR2I setup procedure have circuit plans showing SEAR2I setup page available for reference.

Site Setup must be run in its entirety directly from the SEAR Interface on the GCP 4000 Display. Filling in certain fields via laptop and other interfaces does not accomplish setup and cannot be substituted for Site Setup.

**STEP 1:**

Select **SITE SETUP** button on SEAR interface screen.

Step through the 3 stages of site setup by answering each question as indicated by the SEAR2I setup page in the crossing's circuit plans.

Stage 1 will cover Date/Time, Site Identification Information, addressing, and serial port configuration. Refer to circuit plans for the specific answers such as ATCS address assignments. If plans do not have proper ATCS addresses, some portions of configuration cannot be completed."

Press **ENTER** to accept each step, or after revising each step.

Each stage will automatically compile when the end of the stage is reached.

After stage 3 has compiled, the user will be prompted to install peripheral equipment on the echelon® network. (This step assigns the ATCS subnode address of each device). This may include VHF communicators, iLODs, Analog/Digital I/O units, etc. If a Wayside Access Gateway, WAG, is used for communication protocol conversion, the WAG will be setup separately.

When prompted, push the echelon® button on the side of each device and watch for "installed" to be shown on the display.

The button only needs to be depressed for approximately a second. The yellow LED next to the button will turn on during that time.

**Step 2:**

The next step in the site setup process is battery calibrations.

At this point, the user will be prompted to turn off AC power and select **ENTER**.

The batteries will settle for 3 minutes.

The voltage of each battery channel is shown and the user will press **ENTER** for each if the voltages are correct.

Then, a prompt will instruct to turn AC power back on.

**STEP 3:**

The last step is lamp calibration.

The first calibration requires AC to be on.

Activate the warning devices by opening the AND 1XR ENABLE input or by disconnecting the GC/Bell WAGO connector for a SSC3I module.

This step requires that the SEAR Interface screen be displayed

Once the gates are horizontal (gate tip sensors on), press "enter".

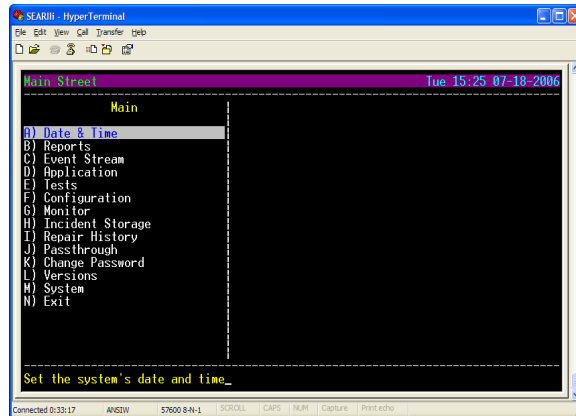
After 15 seconds the user is asked how many bulbs are on each sensor, if the correct amount is not shown, enter that value, when the correct number is shown press **ENTER**.

Next, the SEAR2I will prompt for the same calibration steps but with AC power off.

## WAG NODE INSTALLATION

If a Wayside Access Gateway, WAG, is used as a protocol converter to Internet protocol, it will need to be installed as a module to the SEAR2I.

From the SEAR II keypad, select **MENU**.



**Figure 3: Sear Main Menu Window using HyperTerminal**

Press **down arrow** until you come to **CONFIGURATION**.

Press **ENTER** on the keypad to select it.

Press **down arrow** until you come to **MODULES**.

Press **ENTER** on the keypad to select it.

**ADD MODULE** will be the first menu item displayed.

Press **ENTER** to select it.

The screen will read **MODULE TYPE**.

Press the Down Arrow key **WAG**.

Press **ENTER** to Select it.

Use the number/letter keys on the keypad to spell the Module Name. (Similar to the way you add a name on a cell phone.)

Press **ENTER** to enter the name you typed.

Refer to site plans and enter proper **NODE** assignment.

Set **NODE** to 1, if assignment is not on plans.

You will be returned to **MODULE MENU** at the **ADD MODULE** prompt.

Press **EXIT** to return to the **CONFIGURATION** at the **MODULES** prompt.

Press **EXIT** again.

You will be prompted with **SAVE CONFIGURATION CHANGES? YES**. (You can press the UP or DOWN arrow to scroll between YES and NO.)

Press **ENTER** to select **YES**.

The unit will recompile and save the changes.

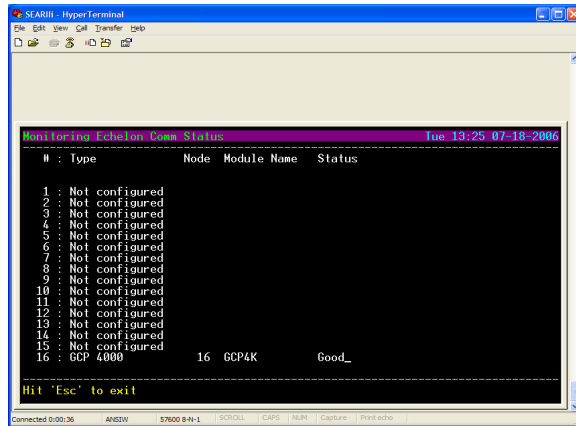
Ensure the AUX Serial Port is set to the baud rate shown on circuit plans.

## SEAR2I OPERATION

Now that site setup is complete, peripheral devices, as well as items onboard the SEAR2I will be checked for proper operation. This ensures that the SEAR2I is receiving all the information it needs for proper alarming and execution of the SEAR Application Program. Unless specified, all items below will be described assuming a laptop is present with a HyperTerminal connection to the SEAR2I's USER port. All items in this section can be done through similar menus from the GCP 4000 display module.

Once HyperTerminal is running, enter **CTRL+L** on the computer to initiate the communication session with the

SEAR21. The following screen will be displayed. To select a menu item, press the letter corresponding to the menu item. All peripheral equipment on the Echelon® network will need to be checked for good communication with the SEAR21. All of those modules can be checked in one screen by choosing, **Main>Monitor>Module Comm. status**. The type of module will be shown on the left and the communication status will be on the right. The status of each module should be “GOOD”.



**Figure 4: SEAR Echelon Communication Status**

Verify iLOD operation by the following:

Once good communication is verified, further checks of the iLOD can verify that it is seeing normal amperage/flash rates.

To view these values in real time, select **Main>Monitor>Module I/O>** and then choose the iLOD unit to view.

In that screen both sensors are shown, the first iLOD unit will show EB1, EN1. When the lamps are flashed, both sensors should display that lamps are on, the amperage reading, and the flash rate in flashes per minute.

These values are shown in real time; they should be steady and not fluctuate. If the value fluctuates, the lighting circuit will need to be checked for intermittent operation.

Verify operation of Ground Fault Testers (GFT's):

All LED's on the GFT units should be on steady. If the BAT 1 Fault or BAT 2 Fault LED's are slow flashing then they have detected a ground condition.

The GFT can be monitored at **Menu>Monitor>Onboard I/O>** and then use the right arrow keys until the GFT input is displayed. If the input shows STUCK LOW, that indicates the data wire between the GFT and SEAR21 is open and will need to be repaired.

If the data connection is good, the following would be displayed for GFT1:

GFT1: HL=G MD=N B1=0 B2=0

HL=G indicates that the GFT health is good.

MD=N indicates that test mode=no

B1 & B2 = 0 shows that there are no ground faults on BAT 1 or BAT 2.

A ground can be simulated on those inputs by running a wire from the ground input of the GFT to each BAT input, one at a time. The state of each BAT input will change to '1' if a ground is present.

Verify MTSS/gate tip/bell sensor:

The MTSS can be monitored in the same screen as the GFT: **Menu>Monitor>Onboard I/O>**. As with the GFT, if the input shows STUCK LOW, then the data wire between the MTSS and SEAR2I is open and will need to be repaired.

If the data connection is good, the following would be displayed for TSS1:

TSS1: U=1 D=0 T=0 A=0 P=0

U=Gate Up

D=Gate Down

T=Gate Tip Sensor

A=Bell Audio

P=Bell Power

#### **NOTE**

These items can be either 1 or 0. In the example, U=1 so the gate up contact is energized. The other items are all de-energized. Dropping the gates to horizontal will activate the tip sensors and deenergize the gate up contact, changing the MTSS data to U=0 and T=1. Activating the bell will check the bell sensor, A & P should both equal 1 when the bell is on.

The SEAR2I relays must function properly in order to run automated inspection tests. These outputs are most easily tested using the SEAR menu on the GCP 4000 display module.

Verify SEAR2I relays:

Go to MENU>DIAG/MONITOR>RELAYS>GndFitTest and press ENTER.

Then press '1' to energize the relay output. Both BAT FAULT LED's on the Ground Fault Testers should be flashing.

Now press '0' to deenergize the relay. The LED's should go on steady.

Press EXIT and then ENTER to get back into the RELAYS menu.

Select AC Control. Press '1' to energize the relay output. AC power to the chargers should go off, or Press '0' to deenergize the relay and be sure that AC power to the chargers is restored.

Press "exit" until the date/time main screen is visible.

#### **SEAR2I Communication**

Testing communications to the office can be accomplished using a menu function to generate a test alarm and by creating events that generate alarms. Before testing the SEAR Ili by sending alarms to the office, the unit must be configured for communications in the Site Setup. Once a SEAR2I is configured thru Site Setup and communication established, the location will register itself with the WAMS office.

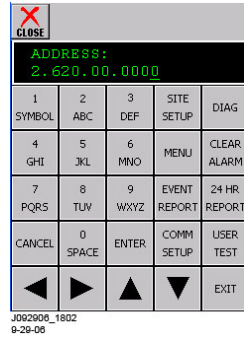
Test Communications with SEAR option on the display menu.

In the SEAR Interface menu, select MENU (Figure 1)

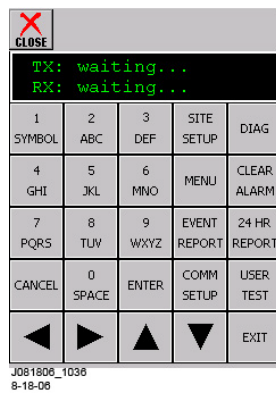
Press the down arrow to DIAG/Monitor press ENTER

Press the down arrow to FIELD COMM, press ENTER.

TX: waiting... RX: waiting will be displayed (Figure 6) if site is to hop data to, or receive data from, another crossing. To send a test packet to the other crossing Press 4 (Figure 5).  
 Enter ATCS address of the other crossing.  
 To send a test packet to the WAMS office:  
 Press 5 (Figure 6)  
 Enter railroad specific office address.  
 Refer to circuit plans for office address.  
 Typically, the office ATCS address is 2.RRR.00.0000, where RRR is the ATCS number assigned to the railroad.



**Figure 5: WAMS Office Address**



**Figure 6: Waiting Message**

### Alarms

Alarm Generation is the final step in checking out the SEAR21/WAMS interface. The following procedure tests the wiring of the various components in the SEAR/ WAMS sub-system.

#### Ground Fault Alarm

A ground fault can be simulated on those inputs by running a wire from the ground input of the GFT to each BAT input, one at a time.

Each Battery's LED will flash when ground fault is detected and a "Ground Fault Detected on xxx" alarm will be generated where xxx represents the Battery name.

#### Ground Fault Clear

Removing the wire that simulates the ground will generate a Ground Fault Cleared message.

#### Analyzer Failure Alarm

Remove the connector that powers the GFT or that MTSS unit inside the gate mechanism. Doing so on either unit will cause an "Analyzer Failure" alarm.

#### Analyzer Normal

Restoring the connector will generate an Analyzer Normal message.

**WARNING**

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

## GCP Transferred Alarm

Force the GCP to switch to Standby by the transfer switch on the Transfer Module.

This will create a GCP Transferred Alarm.

Forcing it to switch back will cause another GCP Transferred message.

**WARNING**

**TAKE ALTERNATE MEANS TO WARN VEHICULAR TRAFFIC, PEDESTRIANS AND EMPLOYEES. REMOVAL OF A SSCC3I WILL CAUSE THE GATES TO DESCEND IMMEDIATELY (WITHOUT GATE DELAY); HOWEVER, THE LIGHTS WILL NOT ACTIVATE.**

## Crossing Controller Failure Alarm

Temporarily remove a SSCC3I to generate Crossing Controller Failure alarm

Restore SSCC3I for a Crossing Controller Normal message. False Detection Alarm

Activate the crossing using test switch (or other method shown on plans) allowing the gates to drop and then cancel activation.

After 30 minutes a False Detection alarm will be generated.

If a normal train move occurs prior to the 30 minutes, a Pre-Ring alarm will be generated.

## AC Power Off For 20 Minutes Alarm

Turn off AC power for at least 20 minutes and this alarm will be generated.

## AC Power Back On

Restore power and wait at least 1 minute.

This completes the SEAR2li setup. Proceed to Maintenance Call (MC) light.

**MAINTENANCE CALL (MC) LIGHT**

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

Verify that the MC light is lit

Verify that the MC extinguishes when:

If used, Deenergizing the MAINT CALL RPT Input (observe input on I/O view).

Restore MAINT CALL RPT input and MC lights.

If power-off relay used to control MC light

deenergize POK relay

Restore POK relay and MC lights.

**VERIFY OFFICE CONFIGURATION CHECK NUMBER**

If used validate the office configuration check number is per the circuit plan.



This completes the 4000 system check out procedure.

## **WIRE PREPARATION & INSERTION INSTRUCTIONS FOR KEYED INTERFACE CONNECTORS**

### **External Wiring Connectors and Wire Size**

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

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

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

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

### **Wire Preparation**

Strip insulation from the end of the wire as indicated in Figure 7 below.

**Table 1:  
Wire Strip Lengths by Connector**

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

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

### **Wire Insertion**

For screw-down type connectors:

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

Verify that no portion of the wire insulation is in contact with the wire receptor.

Tighten screw to a torque of 4.5 inch pounds (0.5 – 0.6 Nm). (About the same tightness as required when tightening a signal terminal nut.)

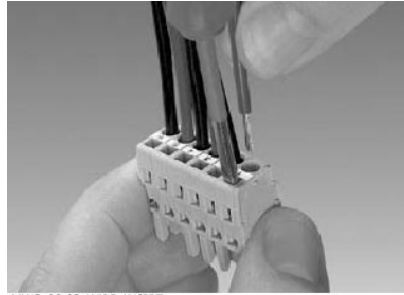
Pull on wire to determine that it does not move within the connector. (Pull with about the same amount of force as when tightening boot laces.)

If a wire is suspected of moving when pulled, remove the wire and run the wire receptor through its full range of motion. Repeat steps 1 through 4 for this wire.

Repeat steps 1 through 4 for each wire being attached to the connector.

If any wire receptor fails to hold the wire securely, replace the screw-type connector with an appropriate cage-clamp style connector.

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



MWS\_08-06\_WIRE\_INSERT  
04-15-08

**Figure 7: Inserting Wire in  
Cage Clamp Type Connector**

**CAUTION**

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

**NOTE**

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

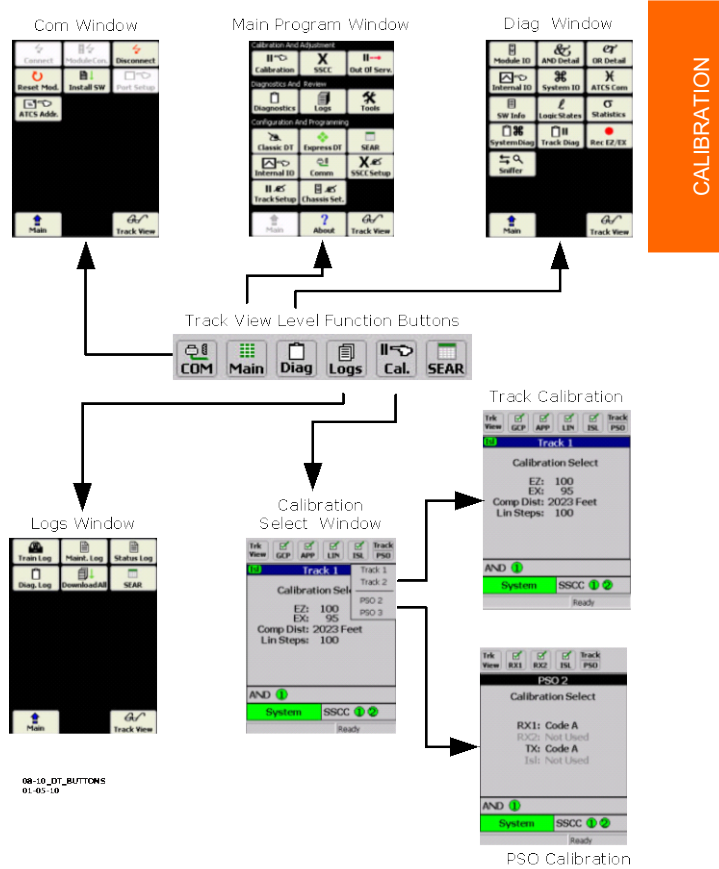
Lever the wire cage clamp open by pressing straight down  
on the screwdriver.

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

Hold the wire in place and remove the screwdriver blade  
from the slot. The wire clamp closes down on the stripped  
end of the wire.

## CALIBRATION

The GCP 4000 is programmed through the use of the Display Terminal (DT). The DT may either be operated through the Display Module, A80407\_0X, or via laptop connection to the Diag Port on the top half of the case. GCP 4000 System Calibration consists of GCP calibration, SSCC lamp adjustment, and system checkout.



**Figure 8: Display Terminal (DT) Buttons and Associated Menus**

### WARNING

**IF ISLAND STATUS IS CHANGED FROM NO TO INTERNAL, ISLAND RECALIBRATION MAY BE REQUIRED.**

### NOTE

If the CPU module MCF is changed, requisite programming and recalibration will be required.

### **RECALIBRATION & REPROGRAMMING REQUIREMENTS DUE TO MODULE REPLACEMENT**

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

**NOTE**

When using MCF gcp-t6x-02-2.mcf or newer, Tables 2, 3, and 4 have been updated to include reprogramming instructions for the new PSO module.

**Table 2:  
Recalibration & Reprogramming Requirements  
Due to Module/Chassis Replacements**

Module /Assembly Replacement	Calibration Required					Reprogramming Required	
	GCP CAL	GCP APP	GCP LIN	ISL CAL	PSO		
A80403	CPU	No	No	No	No	No	No
A40418	Track	Yes <sup>1</sup>	Yes/ No <sup>2</sup>	Yes/ No <sup>2</sup>	Yes	No	No
A80428-03	PSO	No	No	No	No	No	No
A40413	RIO (I/O)	No	No	No	No	No	No
A80406	Transfer	No	No	No	No	No	No
A80405	SSCC <sup>5</sup>	No	No	No	No	No	No
A80407	Display (DT)	No	No	No	No	No	No
A80410	SEAR	No	No	No	No	No	N/A <sup>3</sup>
A80438-2	ECD <sup>4</sup>	No	No	No	No	No	No
n/a	Chassis	Yes	Yes	Yes	Yes	No	Yes
Notes:		1. For track with changed A80418. 2. May be bypassed using <b>BYPASS</b> button instead of the <b>START</b> button in calibration procedure. 3. Site Setup required. 4. Plug-in located on chassis behind CPU Module. Requires same MCF as previously in use. 5. SSCC lamp voltages must be readjusted					

**RECALIBRATION REQUIREMENTS DUE TO PROGRAM CHANGES**

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

**Table 3: Recalibration Requirements  
Due to Program Changes**

Program Changes	Calibration Required					Reprogramming Required
	GCP CAL	GCP APP	GCP LIN	ISL CAL	PSO CAL	
Increased Number of Tracks	Yes <sup>1</sup>	Yes <sup>1</sup>	Yes <sup>1</sup>	Yes <sup>2</sup>	No	Yes <sup>1</sup>
GCP Frequency Change	Yes <sup>3</sup>	Yes <sup>3</sup>	Yes <sup>3</sup>	No	No	No
Island Frequency Change	No	No	No	Yes <sup>4</sup>	No	No
PSO Frequency Changed	No	No	No	No	Yes	No
Application changed: Unidirectional to Bidirectional, Bidirectional to Unidirectional or Unidirectional to Simulated Bidirectional	Yes <sup>5</sup>	Yes <sup>5</sup>	Yes <sup>5</sup>	No	No	No
Transmit Level Changed						
Approach Distance Changed						
Ballast Compensation Value Changed						
Island Operation Changed from No to Internal or from Internal to No	Yes <sup>6</sup>	No <sup>7</sup>	No <sup>7</sup>	Yes <sup>8</sup>	No	No
Template Changed	Yes <sup>9</sup>	Yes <sup>9</sup>	Yes <sup>9</sup>	Yes <sup>9</sup>	Yes	Yes <sup>10</sup>
Template Set To Default selected						
New Software Installed:						
• Track MEF changed	No <sup>11,12</sup>	No <sup>7</sup>	No <sup>7</sup>	No <sup>11,12</sup>	No	No
• Other MEFs changed	No	No	No	No	No	No
• System MCF changed	Yes <sup>9</sup>	Yes <sup>9</sup>	Yes <sup>9</sup>	Yes <sup>9</sup>	Yes <sup>9</sup>	Yes <sup>10</sup>
• PSO MEF changed	No	No	No	No	Yes <sup>5</sup>	No

CALIBRATION

**Table 3: Recalibration Requirements  
Due to Program Changes**

CALIBRATION	Notes:
	1. For added tracks only.
	2. If island is used.
	3. For tracks with new GCP frequencies.
	4. For tracks with new island frequencies.
	5. For changed tracks only.
	6. If EZ varies more than 2.
	7. Can be bypassed.
	8. If changed to internal.
	9. For all tracks.
	10. Complete reprogramming is required. This does not apply if the changed software is any of the MEF (executive software) files but will apply if the MCF (application logic) was changed.
	11. In general GCP and ISL calibration is not required when software is updated. However, in some cases due to the nature of the change, it may be necessary to force a recalibration, in this case the module will show that calibration is required after the new software has been loaded. Approach and Linearization can be bypassed after GCP calibration has been performed.
12. Calibration may be needed, check Product Release Bulletin (PRB) associated with release for specific conditions, for example an update to GCP04_80.mef, requires recalibration, see PRB0539. Approach and Linearization can be bypassed after GCP calibration has been performed.	
<b>NOTE:</b> Uploading a new PAC may require recalibration	

**RECALIBRATION REQUIREMENTS DUE TO TRACK  
EQUIPMENT CHANGES**

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

**Table 4: Recalibration Requirements  
Due to Track Equipment Changes**

Track Equipment Changes	Calibration Required				
	GCP CAL	GCP APP	GCP LIN	ISL CAL	PSO CAL
Termination Shunts Changed	Yes <sup>1</sup>	No <sup>3</sup>	No <sup>3</sup>	No	Yes
Termination Shunts Moved to New Location	Yes <sup>1</sup>	Yes <sup>1</sup>	Yes <sup>1</sup>	No	Yes
Change of shunt or frequency in overlapping territory	Yes <sup>1</sup>	Yes <sup>1</sup>	Yes <sup>1</sup>	No	Yes
Termination Shunts of Other Frequencies Added, Removed From, or Moved Within the 4000 GCP Approaches)	Yes <sup>1</sup>	Yes <sup>1</sup>	Yes <sup>1</sup>	No	Yes
Wide band Insulated Joint Couplers (8A076 or 8A077) Replaced in 4000 GCP Approaches)	Yes <sup>1</sup>	No <sup>2,3</sup>	No <sup>2,3</sup>	No	Yes <sup>1</sup>
Tuned Insulated Joint Couplers (62785-f) Replaced in 4000 GCP Approaches)	Yes <sup>1</sup>	Yes <sup>1</sup>	Yes <sup>1</sup>	No	Yes

4000 GCP Track Wire(s) Replaced, Disarranged, and/or Modified	Yes <sup>1</sup>	No <sup>2,3</sup>	Yes	Yes	Yes
Change of Insulate Joint Bypass Coupler (Tuned) 7A422-f	Yes	Yes	Yes	No	Yes
Notes: 1. For changed tracks only. 2. Requires bypass. 3. If, after completing maintenance and reconnecting Track Wires, the EZ/EX returns to the previous value, approach or linearization recalibrations are not required. But if the values are different, recalibrate the approach or linearization.					

**NOTE**

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

**CALIBRATION PROCEDURES**

**WARNING**

**GCP TRACKS MUST BE VERIFIED TO BE FREE OF ANY AND ALL TRACK RELATED ISSUES PRIOR TO BEING PLACED IN SERVICE. ANY TRACK RELATED ISSUES THAT ARE IDENTIFIED MUST BE CORRECTED AND VERIFIED TO BE CORRECT PRIOR TO FINAL CALIBRATION AND LINEARIZATION.**

**NOTE**

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

GCP calibration is divided into the following procedures:  
 Tuning the Tuned Joint Coupler (TJC)  
 GCP Calibration (GCP CAL)  
 Approach Distance (APP CAL) and Linearization (LIN CAL)  
 Calibration  
 Island Calibration (ISL CAL)  
 Standby Module Calibration

**WARNING**

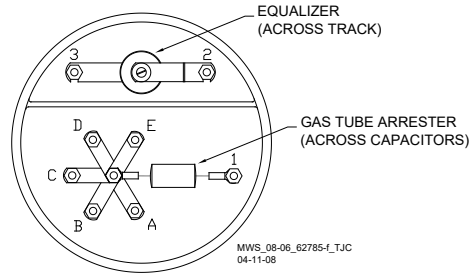
**THE APPROACH AND LINEARIZATION PROCEDURES REQUIRE THE RECORDING OF THE COMPUTED APPROACH DISTANCES IN FEET (NOT THE EZ VALUE).**

**WHEN EDITING THE COMPUTED APPROACH DISTANCES, ENTER THE VALUE IN FEET (NOT THE EZ VALUE).**

**FAILURE TO ENTER DISTANCES IN FEET MAY RESULT IN SHORTER WARNING TIMES THAN INTENDED.**

**PERFORM THE FOLLOWING TUNING PROCEDURES ON THE TUNED JOINT COUPLER PRIOR TO BEGINNING THE LINEARIZATION PROCESS.**

## Tuning the 62785-f Tuned Joint Coupler



**Figure 9: Tuned Joint Coupler, 62785-f**

CALIBRATION

The Tunable Insulated Joint Bypass Coupler, 62785-f is the only tuned bypass coupler to be used with the GCP 4000 for bypassing insulated joints in DC coded track.

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

The 62785-f Coupler is available in standard Safetran frequencies of 114 Hz through 970 Hz.

### **WARNING**

**INSULATED JOINT BYPASS COUPLERS, 62531-F AND 62631-F, MUST NOT BE USED WITH THE 4000 GCP.**

**THE MINIMUM DISTANCES TO THE INSULATED JOINTS SPECIFIED IN TABLE 5 APPLY TO THE 3000/4000 GCP ONLY; NOT TO ANY EARLIER SAFETLAN GCP'S (MODELS 660, 600, 400, AND 300).**

**WHEN THE 4000 GCP IS PROGRAMMED AS A PREDICTOR, THE 62785-F COUPLER CANNOT BE USED TO BYPASS INSULATED JOINTS WITHIN THE INNER TWO-THIRDS OF AN APPROACH, EXCEPT AS SPECIFIED IN TABLE 5.**

**THE TUNED JOINT COUPLER MUST BE TUNED PRIOR TO PERFORMING SETUP FOR APPROACH LENGTH AND LINEARIZATION PROCEDURES DURING THE TRACK CALIBRATION PROCESS.**

**62785-F TUNED BYPASS COUPLERS MUST ONLY BE USED TO BYPASS INSULATED JOINTS IN CODED OR NON-CODED DC TRACK CIRCUITS.**

The application guidelines for Tunable Insulated Joint Bypass Coupler, 62785-f when used only with the 4000 GCP have been expanded as follows:

In DC coded track circuits, the insulated joints within an approach may be bypassed using the Safetran 62785-f Tunable Insulated Joint Bypass Coupler, provided the minimum distances specified in Table 5 are observed.



The 62785-f Coupler must be field tuned to pass the 4000 GCP operating frequency (f) around insulated joints in DC or coded DC track circuits.

Field tuning of the Coupler enables precise frequency adjustment for track and joint parameters.

The Coupler must be located within 10 ft. (3.04 m) of the insulated joints that it is coupling.

The minimum distance to the insulated joints is generally a function of the 4000 GCP operating frequency; i.e., the lower the operating frequency, the longer the minimum distance.

Two sets of insulated joints may be coupled in any single approach, provided the minimum operating distances specified in Table 5 are observed.

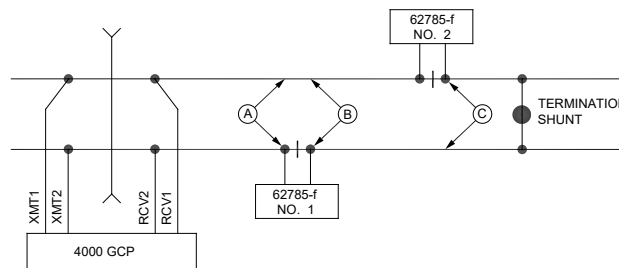
Table 5 indicates the minimum operating distances (in feet/meters) to the first and second set of insulated joints that are coupled with 62785-f couplers for 4000 GCP operation.

**Table 5:  
Tuned Joint Coupler, 62785-f Minimum Distances**

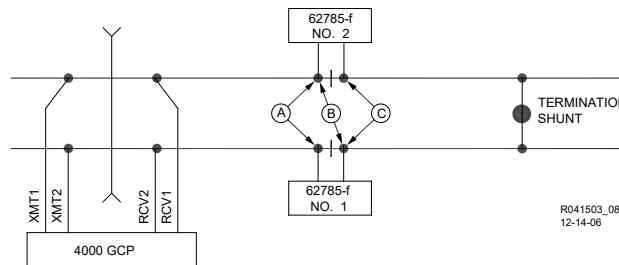
Frequency (Hz)	Minimum Distance to 1 <sup>st</sup> Set of Insulated Joints (Feet/Meters)*	Minimum Distance to 2 <sup>nd</sup> Set of Insulated Joints (Feet/Meters)*
151 to 211	1500 (457.2)	2200 (670.6)
212 to 348	1000 (304.8)	1400 (426.7)
349 to 560	700 (213.4)	1000 (304.8)
561 to 790	500 (152.4)	800 (243.8)
791 to 979	400 (121.9)	700 (213.4)

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

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



**Staggered Insulated Joints**



**Non-Staggered Insulated Joints**

**Figure 10: Shunt Placement For 62785f Bypass Coupler**

**WARNING**

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

**NOTE**

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

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

- AREMA binding posts are labeled A through E (see Figure 9)
- AREMA binding posts are equipped with special gold AREMA adjustment nuts

**Table 6:  
Method 1 for Tuning the 62785-f Tuned Joint Coupler**

See Figure 10 above for locations referred to in this table.	
<b>Step 1</b>	Tighten the gold nut securely on terminal E of each coupler.
<b>Step 2</b>	Calibrate the 4000 GCP, setting the EZ value to 100.
<b>Step 3</b>	Place a hardwire test shunt across the track at location A.
<b>Step 4</b>	Note the EZ value appearing on the 4000 GCP display.
<b>Step 5</b>	Move the test shunt to location B.
<b>Step 6</b>	<p>Tune the Tunable Insulated Joint Bypass Coupler #1 to the same EZ value noted in Step 4.</p> <p>Tighten the gold nut on the Coupler #1 terminals labeled D, C, B, and A, in sequence beginning with terminal D.</p> <p>If tightening a nut results in an EZ value that is lower than the value recorded in step 4, loosen the nut and tighten the next nut in sequence.</p> <p>If, after tightening a nut, the EZ value remains higher than the value recorded in step 4, leave the nut tightened and tighten the next nut in sequence.</p> <p>Continue to tighten nuts D through A as necessary to obtain an EZ value that is approximately the same as that recorded in step 4.</p>
<b>Step 7</b>	Move the test shunt to location C.

**Table 6:  
Method 1 for Tuning the 62785-f Tuned Joint Coupler**

<b>Step 8</b>	<p>Tune the No. 2 Tunable Insulated Joint Bypass Coupler to the EZ value noted in step 4.</p> <p>Tighten the gold nut on the Coupler #2 terminals labeled D, C, B, and A, in sequence beginning with terminal D.</p> <p>If tightening a nut results in an EZ value that is lower than the value recorded in step 4, loosen the nut and tighten the next nut in sequence.</p> <p>If, after tightening a nut, the EZ value remains higher than the value recorded in step 4, leave the nut tightened and tighten the next nut in sequence.</p> <p>Continue to tighten nuts D through A as necessary to obtain an EZ value that is approximately the same as that recorded in step 4.</p>
<b>Step 9</b>	Remove the test shunt.
<b>Step 10</b>	Tighten a standard AREMA nut against each gold nut of both couplers to ensure all nuts are securely locked in position.
<b>Step 11</b>	Secure the end caps over the terminal end of both couplers.
<b>Step 12</b>	Completely recalibrate the 4000 GCP and perform all operational checks.
<b>Step 13</b>	Verify that a smooth change in the EZ value occurs across the couplers during a train move.

CALIBRATION

**Table 7:  
Method 2 for Tuning the 62785-f Tuned Joint Coupler**

See Figure 10 above for locations referred to in this table.	
<b>Step 1</b>	Tighten the gold nut securely on terminal E of each coupler.
<b>Step 2</b>	Calibrate the 4000 GCP, setting the EZ value to 100.
<b>Step 3</b>	Place a hardwire test shunt across the track at location A.
<b>Step 4</b>	Note the EZ and EX values appearing on the 4000 GCP display.
<b>Step 5</b>	Move the test shunt to location B.
<b>Step 6</b>	Tune the Tunable Insulated Joint Bypass Coupler #1 <b>EX</b> value to above 75. The <b>EZ</b> value may be as much as 8 points above the value noted in Step 4.
<b>Step 7</b>	Move the test shunt to location C.
<b>Step 8</b>	Tune the Tunable Insulated Joint Bypass Coupler #2 <b>EX</b> value to above 75. The <b>EZ</b> value may be as much as 16 points above the value noted in Step 4.
<b>Step 9</b>	Remove the test shunt.
<b>Step 10</b>	Tighten a standard AREMA nut against each gold nut of both couplers to ensure all nuts are securely locked in position.
<b>Step 11</b>	Secure the end caps over the terminal end of both couplers.

**Table 7:  
Method 2 for Tuning the 62785-f Tuned Joint Coupler**

<b>Step 12</b>	Completely recalibrate the 4000 GCP and perform all operational checks.
<b>Step 13</b>	Verify that a smooth change in the EZ value occurs across the couplers during a train move.

CALIBRATION

**WARNING**

**AT THE COMPLETION OF FIELD TUNING THE 62785-F BYPASS COUPLERS ENSURE THAT A STANDARD AREMA NUT IS TIGHTENED SECURELY AGAINST EACH GOLD NUT ON TERMINALS A THROUGH E. TERMINALS THAT ARE NOT USED FOR TUNING THE COUPLER MUST HAVE THEIR GOLD NUTS REMOVED.**

**Calibrating a Track Module**

**WARNING**

**DO NOT RECALIBRATE IF AN IN-SERVICE TRACK SUDDENLY HAS A LARGE JUMP IN EZ OR HIGH SIGNAL ERROR. THE CAUSE MAY BE A TRACK, BOND, COUPLER OR SHUNT RELATED PROBLEM WHICH MUST BE INVESTIGATED AND CORRECTED BEFORE CONSIDERING RECALIBRATION. BEFORE STARTING CALIBRATION, ENSURE THAT TRACK BONDING IS GOOD, THAT ALL TERMINATION SHUNTS, INSULATED JOINT COUPLERS, AND TRACK ISOLATION DEVICES ARE INSTALLED AND THAT NO TRAINS ARE IN THE GCP APPROACHES.**

**NOTE**

During approach calibration of the GCP 4000, when the island is deenergized, the EX value is locked to 100. During a new installation, an upgrade, or a Track Card replacement, with the EX locked at 100 the EZ may appear abnormally low. Once the island is energized, the EX unlocks and the EX and EZ display actual approach values based upon field conditions. The island for a given track module does not necessarily have to be on that particular module (or any module if an external island), depending upon circuit arrangement.

Track Module calibration is required if:

The DT Status Screen shows one of the following:

- GCP Cal Req
- GCP Approach Req
- Linearization Req
- Island Cal Req

The Track Module 4-character display shows one of the following:

- GCAL
- GAPP
- GLIN
- ICAL

CALIBRATION

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



Figure 11: Calibration Process

Table 8:  
GCP Calibration

<b>Step 1</b>	If system has a transfer module, set the transfer switch to <b>MAIN</b> .
<b>Step 2</b>	If a 60 or 100 Hz Cab Signal is in use, turn it off at this time. Go to the Main Menu and select the <b>SETUP</b> button at the top of the display.
<b>Step 3</b>	From the menu that appears, select the track to calibrate. Menu shows only enabled tracks.
<b>Step 4</b>	Select the <b>GCP CAL</b> button. The <b>GCP Calibration</b> Window appears. The current <b>EZ</b> and <b>EX</b> values appear. If <b>Calibration Req.</b> appears below the <b>EZ</b> and <b>EX</b> values. calibration is required.
<b>Step 5</b>	Select the <b>START</b> button. The <b>START</b> button deactivates (grays out). The display shows an <b>Initiating</b> then an <b>In Progress</b> message during the calibration. The track module requires about 15 seconds to calibrate. If calibration is successful: The <b>Calibration Select</b> window appears. <b>EZ</b> should be 98 to 102 and the <b>GCP CAL</b> button has a green check in the box. If calibration is not successful, the display shows a <b>Failed</b> message.

**Table 8:  
GCP Calibration**

CALIBRATION

<b>Step 6</b>	To record the reason for the recalibration in the Maintenance log, select the <b>GCP CAL</b> button. The GCP Calibration Window appears.
<b>Step 7</b>	Select the <b>ADD LOG ENTRY</b> button. The Log Entry Window opens.
<b>Step 8</b>	Type any notes concerning the reason and select <b>OK</b> to save the entry. Log Entry Window closes and the display returns to the GCP Calibration Window
<b>Step 9</b>	If the cab signal was turned off in Step 2, turn it on.
<b>Step 10</b>	Select the <b>CAL SELECT</b> button. The display changes to Calibration Select Window.

The linearization procedure compensates for lumped loads in the GCP 4000 approach that can affect the linearity of EZ over the length of the approach as a train approaches the crossing. The linearization is essential to improving warning time accuracy. Linearization may be affected by: narrow band shunts in other frequencies, which may occur when other GCP approaches overlap the GCP approach circuit; other track equipment in the GCP approach such as audio frequency overly track circuits, coded track circuits, etc.; and missing or incorrect track battery chokes.

**WARNING**

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

**NOTE**

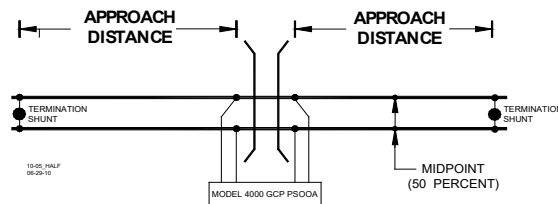
If an in-service 4000 GCP requires only that the **GCP CAL** procedure be performed, the BYPASS procedure must be completed for both **GCP APP** and **GCP LIN**. See next page.

**Table 9:  
GCP APP & GCP LIN Calibration Bypass Procedure**

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

**WARNING**

**THE APPROACH AND LINEARIZATION PROCEDURES REQUIRE THE RECORDING OF THE COMPUTED APPROACH DISTANCES IN FEET (NOT THE EZ VALUE). FAILURE TO ENTER DISTANCES IN FEET MAY RESULT IN SHORTER WARNING TIMES THAN INTENDED.**



**Figure 12: Midpoint Location (See Step 6 below)**

**Table 10:  
Approach Distance and Linearization Calibration**

<b>Step 1</b>	Record the EZ and EX values for the track (before installing hardwire shunt) in the <b>Step 1</b> Step 2 column ( <b>Calibrated Values</b> ) on the Calibration Values History form at the end of this procedure. Then, temporarily place a hardwire shunt across the termination shunt. For bidirectional installations, use the termination shunt furthest from the crossing.
<b>Step 2</b>	Record the EZ and EX values for the track in the <b>First Approach, Step 2</b> column on the Calibration Values History form.
<b>Step 3</b>	Select the <b>GCP APP</b> button. The GCP Approach Window appears.
<b>Step 4</b>	Select the <b>START</b> button. The <b>START</b> button deactivates (grays out). The display shows an <b>Initiating</b> then an <b>In Progress</b> message during the calibration. If calibration is successful: The <b>Calibration Select</b> window appears and the computed approach distance ( <b>Comp Dist</b> ) appears. The <b>GCP APP</b> button has a green check in the box. If calibration is not successful, the display shows a <b>Failed</b> message (see Troubleshooting).
<b>Step 5</b>	Record the computed approach distance in feet for the track in the <b>First Approach, Step 5</b> column ( <b>Comp Dist</b> ) on the Calibration Values History form at the end of this procedure.
<b>Step 6</b>	Accurately (within 1%) locate the midpoint of the longest approach and move the hardwire shunt to that point on the rails.
<b>Step 7</b>	Select the <b>GCP LIN</b> button. The <b>GCP Linearization</b> Window appears.
<b>Step 8</b>	Select the <b>START</b> button. The <b>START</b> button deactivates (grays out). The display shows an <b>Initiating</b> then an <b>In Progress</b> message during the calibration. If calibration is successful: The <b>Calibration Select</b> window appears. The <b>GCP LIN</b> button has a green check in the box. If calibration is not successful, the display shows a <b>Failed</b> message (see Troubleshooting).
<b>Step 9</b>	Record the linearization step value for the track in the <b>First Approach, Step 9</b> column ( <b>Lin Steps</b> ) on the Calibration Values History form at the end of this procedure. value between 68 and 132.

CALIBRATION

**Table 10:  
Approach Distance and Linearization Calibration**

CALIBRATION

<b>Step 10</b>	<b>Verify</b> that the computed approach distance in feet ( <b>Comp Dist, Step 5</b> ) and the linearization steps ( <b>Lin Steps, Step 9</b> ) values recorded on the Calibration Values History form are the same as the values displayed on the <b>Calibration Select</b> window.
<b>Step 11</b>	Remove the hardwire shunt from the track.
<b>Step 12</b>	If the approach is unidirectional or simulated bidirectional, go to step 31. If the track is bidirectional and the measured distance to the other termination shunt is within 10 % of the first approach distance, go to step 13. Otherwise, if the distance is clearly shorter, go to step 31.
<b>Step 13</b>	Temporarily place a hardwire shunt across the termination shunt of the other approach.
<b>Step 14</b>	Record the EZ and EX values for the track in the <b>Second Approach, Step 14</b> column on the Calibration Values History form at the end of this procedure.
<b>Step 15</b>	Select the <b>GCP APP</b> button. The GCP Approach Window appears.
<b>Step 16</b>	Select the <b>START</b> button. The <b>START</b> button deactivates (grays out). The display shows an <b>Initiating</b> then an <b>In Progress</b> message during the calibration. If calibration is successful: The <b>Calibration Select</b> window appears. The computed approach distance ( <b>Comp Dist</b> ) appears. The <b>GCP APP</b> button has a green check in the box. If calibration is not successful, the display shows a <b>Failed</b> message (see Troubleshooting).
<b>Step 17</b>	Record the computed approach distance in feet in the <b>Second Approach, Step 17</b> column on the Calibration Values History form at the end of this procedure.
<b>Step 18</b>	Accurately (within 1%) locate the midpoint of this approach and move the hardwire shunt to that point on the rails.
<b>Step 19</b>	Select the <b>GCP LIN</b> button. The <b>GCP Linearization</b> Window appears.



**Table 10:  
Approach Distance and Linearization Calibration**

<b>Step 20</b>	Select the <b>START</b> button. The <b>START</b> button deactivates (grays out). The display shows an <b>Initiating</b> then an <b>In Progress</b> message during the calibration. If calibration is successful: The <b>Calibration Select</b> Window appears. <b>GCP LIN</b> button has a green check in box. If calibration is not successful, the display shows a Failed message (see Troubleshooting).
<b>Step 21</b>	Record the linearization ( <b>Lin Steps</b> ) value (between 68 and 132) for the track in the <b>Second Approach, Step 21</b> column ( <b>Lin Steps</b> ) on the Calibration Values History form at the end of this procedure. Verify that the computed approach distance in feet ( <b>Comp Dist</b> , step 17) and the linearization steps ( <b>Lin Steps</b> , step 21) values recorded are the same as the values displayed on the <b>Calibration Select</b> window.
<b>Step 22</b>	Remove the hardwire shunt from the track.
<b>Step 23</b>	If the Lin Steps value for the second approach (step 21) is greater than or the same as the Lin Steps value recorded for the first approach (step 9), go to step 31. If the Lin Steps value for the second approach (step 21) is less than the value recorded for the first approach (step 9), go to step 24.
<b>Step 24</b>	Select the <b>GCP LIN</b> button. The <b>GCP Linearization</b> Window appears.
<b>Step 25</b>	Select the <b>EDIT</b> button. The Linearization Steps dialog box appears.
<b>Step 26</b>	Enter the <b>Lin Steps</b> value recorded on the Calibration Values History form for the first approach (step 9) into the <b>New Value field</b> using the keypad numbers and select <b>UPDATE</b> . The Calibration Select Window appears.
<b>Step 27</b>	Select the <b>GCP APP</b> button. The GCP Approach Window appears.
<b>Step 28</b>	Select the <b>EDIT</b> button. The Computed Approach Distance dialog box appears.
<b>Step 29</b>	Enter the computed approach distance ( <b>Comp Dist</b> ) value (in feet) recorded for the first approach (step 5) into the <b>New Value field</b> using the keypad numbers and select <b>UPDATE</b> . The Calibration Select Window appears.
<b>Step 30</b>	<b>Verify</b> that the computed approach distance ( <b>Comp Dist</b> , step 5) and the linearization steps ( <b>Lin Steps</b> , step 9) values recorded on the Calibration Values History form for the first approach are the same as those displayed on the <b>Calibration Select</b> window.

CALIBRATION

**Table 10:  
Approach Distance and Linearization Calibration**

<b>Step 31</b>	To record the reason for the Calibration and store it in the Maintenance log, select the <b>GCP LIN</b> button and then the <b>ADD LOG ENTRY</b> button. Type any notes about the calibration and select OK to save the entry.
----------------	---

**Table 11:  
Calibration Value History Form, 1st Approach**

	Calibrated Values (Step 1)		1 <sup>st</sup> Approach E/W( ) ( N/S			
			Hardwire Across Term. Shunt (Step 2)		Computed Approach Distance (Comp Dist) (Step 5)	Linearization Step Value (Lin Steps) (Step 9)
			EZ	EX	EZ	EX
Track 1						
Track 2						
Track 3						
Track 4						
Track 5						
Track 6						

**Table 12:  
Calibration Value History Form 2nd Approach**

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

**NOTE**

This completes **Approach and Linearization Calibration**. If the system includes an internal island, proceed to **Island Calibration (ISL CAL)**. If not, proceed to Table 15.

The island can be calibrated to respond to a shunting sensitivity of 0.12, 0.3, 0.4, or 0.5 ohms. A hardwire shunt is used for calibration.

**NOTE**

Island track circuit calibration is generally performed using 0.12 ohm shunting sensitivity. In an area where poor shunting is experienced or anticipated, a minimum of 0.3 ohm shunting sensitivity is recommended.

In areas of passenger operation, a minimum of 0.3 ohm shunting sensitivity is recommended.

**Table 13:  
Island Calibration**

<b>Step 1</b>	If an Island circuit is used, select the <b>ISL CAL</b> button. The <b>ISLAND CALIBRATION</b> Window appears.
<b>Step 2</b>	Temporarily install a hardwire shunt beyond the island receiver rail connections at the appropriate distance specified below the Calibration Required message.  Shunt distances for island frequencies are provided in the table following the Island Calibration procedure.  Ensure EZ value is less than or equal to 5. See Figure 13
<b>Step 3</b>	Select the START button. The START button deactivates (grays out). The display shows an Initiating then an In Progress message during the calibration. If calibration is successful: The Calibration Select Window appears. The ISL CAL button has a green check in the box.  Return to TRACK DETAIL VIEW (see Figure 13). Ensure the Island Z value is less than 40. If the value is greater than 40, repeat calibration steps 2 and 3. If the Z value is still greater than 40, REMOVE THE TRACK MODULE FROM SERVICE. If calibration is not successful the display shows a Failed message (see Troubleshooting).
<b>Step 4</b>	Verify that the island LED on the Main Status menu is off and remove the hardwire shunt. The island LED is now on. Temporarily install the hardware shunt across the island transmitter connections. Use the TRACK DETAIL VIEW (see Figure XX) and ensure the EZ value is less than or equal to 5. and the Island Z value is less than 40. If the Z value is greater than 40 repeat steps 2, 3 and 4. If the Z value remains above 40, REMOVE THE TRACK MODULE FROM SERVICE.

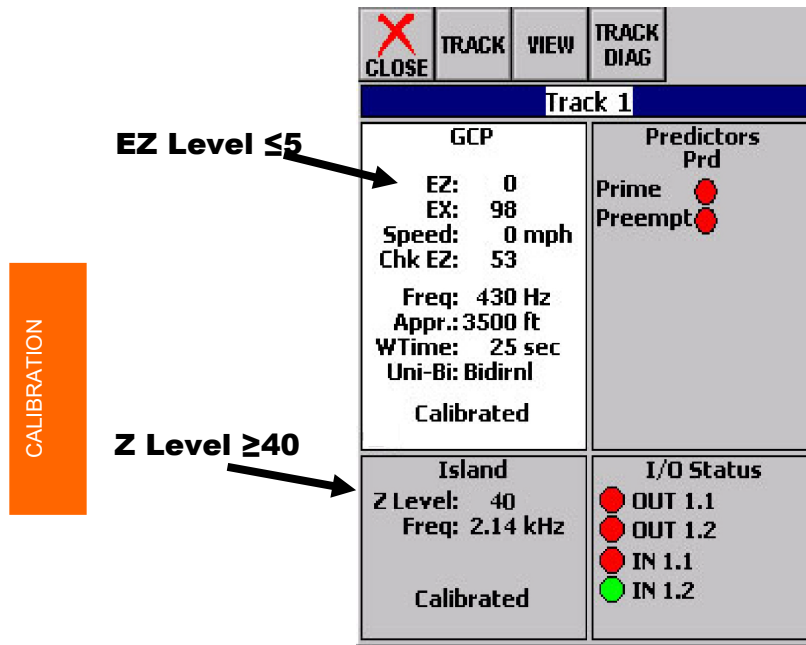


Figure 13 Track View EZ Level and Island Z Level

Table 14:  
Island Shunt Distance

Island Frequency (kHz)	Shunt Distance (Feet/Meters)			
	0.12 ohm Sensitivity	0.3 ohm Sensitivity	0.4 ohm Sensitivity	0.5 ohm Sensitivity
2.14	20/6.10	50/15.24	67/20.42	84/25.60
2.63	17/5.18	43/13.11	58/17.68	72/21.95
3.24	13/3.96	33/10.06	44/13.41	55/16.76
4.0	10.5/3.20	27/8.23	36/10.97	45/13.72
4.9	9.0/2.74	23/7.01	31/9.45	39/11.89
5.9	7.5/2.29	19/5.79	26/7.92	32/9.75
7.1	6.5/1.98	17/5.18	23/7.01	29/8.84
8.3	6.0/1.82	15/4.57	20/6.10	25/7.62
10.0	5.0/1.50	13/3.96	18/5.49	22/6.71
11.5	4.5/1.37	12/3.66	16/4.88	20/6.10
13.2	4.0/1.22	10/3.20	14/4.27	17/5.18
15.2	3.5/1.07	9/2.74	12/3.66	15/4.57
17.5	3.0/0.91	8/2.44	11/3.35	14/4.27
20.2	3.0/0.91	8/2.44	11/3.35	14/4.27

**CAUTION**

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

**NOTE**

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

Repeat all GCP approach, linearization, and island calibration steps for each MAIN side track module installed.

**NOTE**

When using MCF gcp-t6x-02-2.mcf or newer, the Track and PSO Standby Modules do not require calibration when switching from MAIN to STBY.

**Table 15:  
Standby Modules Calibration**

<b>Step 1</b>	On Transfer module A80406 (A80468), set the transfer switch to <b>STBY</b> .
<b>Step 2</b>	Go to the main Status menu and select the <b>SETUP</b> button at the top of the display.
<b>Step 3</b>	From the menu that appears, select the track to calibrate. Only enabled tracks appear on the menu.
<b>Step 4</b>	Select the <b>GCP CAL</b> button. The <b>GCP Calibration</b> Window appears. The current <b>EZ</b> and <b>EX</b> values appear. If calibration is required, <b>Calibration Req.</b> appears below the <b>EZ</b> and <b>EX</b> values.
<b>Step 5</b>	Select the <b>START</b> button. The <b>START</b> button deactivates (grays out). The display shows an <b>Initiating</b> then an <b>In Progress</b> message during the calibration. The track module requires about 15 seconds to calibrate. If calibration is successful: The <b>Calibration Select</b> window appears. <b>EZ</b> should be 98 to 102 and the <b>GCP CAL</b> button has a green check in the box. If calibration is not successful, the display shows a Failed message (see Troubleshooting).
<b>Step 6</b>	Select the <b>GCP APP</b> button. The <b>GCP Approach</b> Window appears. The computed approach distance ( <b>Comp Dist</b> ) appears. This is the value calculated on the MAIN side. <b>Calibration Req.</b> appears at the bottom of the window.
<b>Step 7</b>	Select the <b>BYPASS</b> button. The computed approach distance is accepted as correct and the <b>GCP APP</b> button shows a green check in the box.

**Table 15:  
Standby Modules Calibration**

CALIBRATION

<b>Step 8</b>	Select the <b>GCP LIN</b> button. The <b>GCP Linearization</b> Window displays. The current value for Linearization Steps displays. This is the value calculated on the MAIN side.
<b>Step 9</b>	Select the <b>BYPASS</b> button. The <b>Linearization steps</b> value is accepted as correct and the <b>GCP LIN</b> button shows a green check in the box.
<b>Step 10</b>	If an internal Island circuit is used, select the <b>ISL CAL</b> button. If not used, go to step 14. The ISLAND CALIBRATION Window appears.
<b>Step 11</b>	Temporarily install a hardwire shunt beyond the island receiver rail connections at the appropriate distance specified below the <b>Calibration Required</b> message. (See also preceding Island Shunt Distance table.)
<b>Step 12</b>	Select the <b>START</b> button. The <b>START</b> button deactivates (grays out). The display shows an <b>Initiating</b> then an <b>In Progress</b> message during the calibration. If calibration is successful: The <b>Calibration Select</b> window appears. The <b>ISL CAL</b> button has a green check in the box. If calibration is not successful, the display shows a Failed message (see Troubleshooting).
<b>Step 13</b>	Verify the island LED is off and remove the hardwire shunt. Island LED is now on.
<b>Step 14</b>	Repeat steps 1 through 13 for each standby-side Track Module installed.

**Calibrating a PSO Module**

**WARNING**

VERIFY THAT THE PSO MODULE'S SOFTWARE, FREQUENCY, AND ADDRESS FORMATS ARE AS SPECIFIED BY THE RAILROAD'S OR AGENCY'S APPROVED WIRING OR INSTALLATION DIAGRAM. FAILURE TO DO SO MAY LEAD TO INCORRECT OR UNSAFE OPERATION OF THE TRACK CIRCUIT.

IF ANY RECEIVER IS CALIBRATED IN POOR BALLAST CONDITIONS, IT MUST BE RE-CALIBRATED WHEN BALLAST CONDITIONS IMPROVE.

FAILURE TO FOLLOW THE RAILROAD'S OR AGENCY'S APPROVED WIRING OR INSTALLATION GUIDELINES REGARDING RECEIVER SETTINGS AND CALIBRATION MAY LEAD TO POSSIBLE UNSAFE OPERATION OF THE TRACK CIRCUIT.

**AFTER CALIBRATION, VERIFY THAT THE TRACK CIRCUIT DE-ENERGIZES WHEN THE TRACK CIRCUIT IS SHUNTED WITH THE APPROPRIATE CALIBRATION RESISTANCE (0.06, 0.2, 0.3, 0.4, OR 0.5 OHMS). FAILURE TO DO SO MAY LEAD TO INCORRECT OR UNSAFE OPERATION OF THE TRACK CIRCUIT.**

**FOLLOWING INSTALLATION OR AFTER ANY RECEIVER MENU CHANGES HAVE BEEN MADE, RECALIBRATE THE RECEIVER AND TEST FOR PROPER OPERATION PER THE REQUIREMENTS SPECIFIED IN TABLE 2 AND TABLE 4.**



With the PSO Module properly installed and programmed per the railroad's or agency's written instructions, calibrate the receiver (RX1 or RX2) as follows:

**Table 16: PSO Module Calibration**

<b>Step 1</b>	When the track ballast is good, connect a track test shunt (hardwire, 0.06-ohm, 0.2-ohm, or as required) across the track at the receiver track connections of the approach. When the ballast is poor, connect the shunt across the track at a point 30 ft. (9.14 m) beyond the receiver track connections of the approach. Ensure that the shunt has solid connections to each rail.
<b>Step 2</b>	Select the CAL button located on the top row of the DT window.
<b>Step 3</b>	Select the Track/PSO button located on the top row of the Track window. When the pull-down menu opens, select the appropriate PSO from the list.
<b>Step 4</b>	Either: Select the RX1 box If the application is an Internal PSO, or Select the RX2 box If the application is a Center Fed PSO
<b>Step 5</b>	Shunt the receiver path
<b>Step 6</b>	Select Start. Calibration begins.

**Table 16: PSO Module Calibration**

CALIBRATION

<p><b><u>WARNING</u></b></p> <p>IF “FAIL” APPEARS ON THE DISPLAY, THE CALIBRATION REQUIRED LED (LEFT COLUMN) REMAINS LIT, OR THE CALIBRATED LED (RIGHT COLUMN) DOES NOT LIGHT, THE CALIBRATION PROCESS DID NOT COMPLETE. SHOULD THIS HAPPEN, CYCLE THE UNIT POWER AND THEN REPEAT STEP 2 ABOVE. IF “FAIL” APPEARS AGAIN, FURTHER TROUBLESHOOTING IS REQUIRED.</p>	
<p><b>Step 7</b></p>	<p>Remove the track test shunt. The Occupancy LED should light. If the Occupancy LED fails to light, the calibration process has failed (refer to the WARNING above). Inspect all equipment and connections and repeat steps 1 &amp; 2. If the calibration fails again, further troubleshooting is required.</p>

**PSO Module Checkout Procedures**

**Table 17: PSO Module Calibration**

<p><b>Step 1</b></p>	<p>Select Logs&gt;Status Log&gt;MORE&gt;CARD. When the pull-down opens, select the appropriate PSO card.</p>
<p><b>Step 2</b></p>	<p>Take note of the Signal Level. This is the normal receive signal value.</p>
<p><b>Step 3</b></p>	<p>In the shelter containing the transmitter, remove the transmitter’s signal to the track by disconnecting a transmitter lead from the shelter’s track surge equipment.</p>
<p><b>Step 4</b></p>	<p>On the receiver, take note of the Signal Level. If the Signal Level is greater than 20, an unassociated signal of like frequency may be present.</p>
<p><b><u>WARNING</u></b></p> <p>THE CONDITION DETERMINED IN STEP 4 MUST BE RESOLVED. DO NOT PROCEED TO STEP 6 AND BEYOND UNTIL THE UNASSOCIATED SIGNAL OF LIKE FREQUENCY IS NO LONGER PRESENT.</p>	
<p><b>Step 5</b></p>	<p>Verify that the RX LED found in the Occupancy portion of the face of the unit is de-energized.</p>
<p><b>Step 6</b></p>	<p>Restore the Transmitter signal to the track by reconnecting the lead in the transmitter’s shelter track surge equipment.</p>



**Table 17: PSO Module Calibration**

<b>Step 7</b>	Verify that the RX LED found in the Occupancy portion of the face of the unit energizes. If the LEDs fail to light, troubleshoot the unit, re-calibrate, and perform Steps 1 – 6 again.
<b>Step 8</b>	Verify proper operation of the track circuit equipment before placing in service in accordance with railroad or agency procedures and applicable FRA rules.
<b>Step 9</b>	Verify proper PSO module operation by observing train moves, per railroad or agency policy.

CALIBRATION

## ADJUSTING LAMP VOLTAGES FOR SSCC3, SSCC3A, SSCC3+, AND SSCC4

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

### General

#### **WARNING**

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

CALIBRATION

To accurately read the crossing lamp voltages, a “true rms AC + DC” multimeter (e.g., Agilent U1252A digital multimeter or equivalent) must be used. However, a conventional multimeter may be used, but the voltage reading will be lower than “true rms AC + DC” values. The variance is not a set percentage and is dependent on battery voltage. A conversion table for several conventional meters is provided in the table below.

**Table 18:  
Multimeter Reading Variance From Actual  
Incandescent Lamp Voltage**

Battery Voltage	Regulated Lamp Drive Voltage Range	Measurement Below Actual Drive Voltage	
		Using Digital Multimeter (Agilent U1252A7 or equivalent)	Using Analog Multimeter (TS111)
13.3	9.0 to 12.0	1.3 volts	0.6 volt
	>12.0	0.91 volt	0.42 volt
14.7	9.0 to 12.0	2.2 volts	1.1 volts
	>12.0	1.54 volts	0.77 volt
15.8	9.0 to 12.0	2.6 volts	2.0 volts
	>12.0	1.82 volts	1.4 volts

#### **NOTE**

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

#### **Meter Reading Conversion Examples**

Following are two examples of how to measure the lamp voltages using a conventional meter. In both examples:

Battery bank voltage is 14.7 volts

Multimeters are set to read DC

Lamp Voltage Measurement Example 1

When setting crossing lamp voltages to 9.5 volts, the conventional meter reading is determined by subtracting the meter variance given in Table 18 from the desired lamp voltage.

When using a **digital multimeter** (e.g. Agilent U1252A):

$$\begin{array}{r} \text{Desired lamp voltage} = \quad \quad \quad 9.5 \\ \text{Meter variance for 14.7 volt battery} = \quad \quad \quad \underline{-2.2} \\ \text{Meter reading} = \quad \quad \quad \mathbf{7.3} \end{array}$$

When using an **analog multimeter** (e.g. TS111):

$$\begin{array}{r} \text{Desired lamp voltage} = \quad \quad \quad 9.5 \\ \text{Meter variance for 14.7 volt battery} = \quad \quad \quad \underline{-1.1} \\ \text{Meter reading} = \quad \quad \quad 8.4 \end{array}$$

Lamp Voltage Measurement Example 2

In this example, it is desired to check that lamp voltage is greater than 8.5 volts and the battery voltage is 13.3 volts.

When verifying that the lamp voltages are greater than 8.5 VDC, the conventional meter reading is determined by subtracting the meter variance given in Table 18 from the minimum lamp voltage threshold.

When using a **digital multimeter** (e.g. Agilent U1252A):

$$\begin{array}{r} \text{Minimum lamp voltage threshold} = \quad \quad \quad 8.5 \\ \text{Meter variance for 13.3 volt battery} = \quad \quad \quad \underline{-1.3} \\ \text{Minimum meter reading} = \quad \quad \quad \mathbf{7.2} \end{array}$$

When using an **analog multimeter** (e.g. TS111):

$$\begin{array}{r} \text{Minimum lamp voltage threshold} = \quad \quad \quad 8.5 \\ \text{Meter variance for 13.3 volt battery} = \quad \quad \quad \underline{-0.6} \\ \text{Minimum meter reading} = \quad \quad \quad \mathbf{7.9} \end{array}$$

## SSCC3I LAMP VOLTAGE ADJUSTMENT

### **WARNING**

**TO BE ACCURATE, LAMP VOLTAGES MUST BE MEASURED AT THE LAMP. THE VOLTAGE ON THE DISPLAY IS THE VOLTAGE AT THE SSCC CONNECTOR. INACCURATE MEASUREMENTS MAY RESULT IN DIM LAMPS OR EARLY LAMP FAILURE.**

### **NOTES**

Before performing Lamp Voltage Adjustment procedure, the crossing controllers must be inactive; i.e., gates up, lights off and bell off.

If a train approaches during lamp adjustment, the crossing controllers will activate and the lamps will flash. Restart Lamp Voltage Adjustment Procedure following completion of train move.

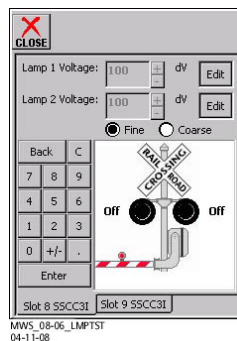
The regulated output is a pulse-width modulated output that produces a square wave. A meter with a "True RMS AC + DC" scale is required to accurately measure the voltage. See Table 18 for measuring voltages with a conventional meter.

IF SSCC3I modules are included in the system, proceed to **SSCC3I LAMP VOLTAGE ADJUSTMENT** and **SSCC LAMP TESTS**. Otherwise, proceed to **OPERATIONAL CHECKS**. Regardless of the actual location of the SSCC3I board on the physical case of the GCP, the tabs on the Lamp Setup Window depicts the two choices as Slot 8 SSCC3I and Slot 9 SSCC3I.

When "far gate" lamps and "near gate" lamps are driven from the same output, first adjust the lamp voltage on the far gate. Then adjust the lamp voltage on the near gate using adjustment resistors.

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

CALIBRATION



**Figure 14: Adjust Lamp Voltage Window**

**Table 19:  
Crossing Controller Lamp Voltage Adjustments**

<b>Step 1</b>	Select the <b>Setup</b> button at the top of the Main Status screen. The Track Setup Menu appears
<b>Step 2</b>	Select the <b>SSCC Lamps</b> entry of the Track Setup Menu The Lamp Setup window appears
<b>Step 3</b>	Select the <b>Slot 8 SSCC3I</b> tab at the bottom of the window.
<b>Step 4</b>	Select the <b>Edit</b> button to the right of the <b>Lamp 1 Voltage</b> field. (It may take a few seconds for Edit button to become active – turns black.) The <b>Lamp 1 Voltage</b> field highlights. The corresponding lamp output is turned on steady.
<b>Step 5</b>	Set the <b>Lamp 1 Voltage</b> field to the output voltage required to set the correct voltage at the lamps. Select either the Fine or Coarse adjustment button. <b>Fine</b> changes the voltage in 1 dV (0.1 V) steps <b>Coarse</b> changes the voltage in 5 dV (0.5 V steps) Increment the voltage display using the <b>+</b> or <b>-</b> buttons to the right of the Lamp Voltage 1 field. Measure voltage at the actual lamps.
<b>Step 6</b>	When the meter displays the correct voltage, select the <b>Enter</b> button at the bottom of the keypad. The Lamp 1 Voltage field deactivates. The new voltage value is saved. Corresponding lamp output is turned off.
<b>Step 7</b>	Select the <b>Edit</b> button to right of the <b>Lamp 2 Voltage</b> field. The <b>Lamp 2 Voltage</b> field highlights. Corresponding lamp output is turned on.
<b>Step 8</b>	Set the <b>Lamp 2 Voltage</b> field to the output voltage required to set the correct voltage at the lamps. Select either the Fine or Coarse adjustment button. Increment the voltage display using the <b>+</b> or <b>-</b> buttons to the right of the Lamp Voltage 2 field. Measure the voltage at the actual lamps.
<b>Step 9</b>	When your meter reads the correct voltage, select the <b>Enter</b> button at the bottom of the keypad. The <b>Lamp 2 Voltage</b> field deactivates. The new voltage value is saved. Corresponding lamp output is turned off.
<b>Step 10</b>	Select the <b>Slot 9 SSCC3I</b> tab at the bottom of the window.
<b>Step 11</b>	Repeat steps 4 through 9 for the second SSCCIIIi module.

CALIBRATION

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**SSCC3I TEST MODE**

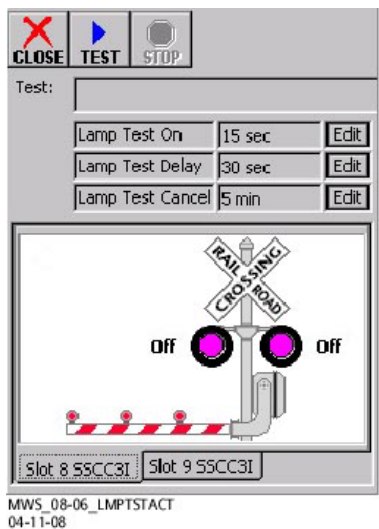
**WARNING**

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

**NOTE**

While in Test Mode, if a train approaches (XR input logic de-energizes), the test is cancelled and the crossing activates normally. When the train departs, the system remains in normal operation.

OPERATIONAL CHECKS



**Figure 15: Lamp Test Activated**

**Table 20:  
Crossing Controller Lamp Test Selection**

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

The operation of each Solid State Crossing Controller (SSCC3I) can be tested from this window.

Select the Crossing controller using tabs at the bottom of window:

Slot 8 SSCC3I

Slot 9 SSCC3I

Three function buttons at the top of the window control the SSCC tests.

The **CLOSE** button closes the window and returns the display to the Status Screen.

The **TEST** button opens the Test Initiation menu  
Selection of item from menu:

- Starts selected item test
- Closes menu
- Identifies selected test in **Test:** field

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

**TEST ITEMS**

The following SSCC tests may be performed:

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



**Figure 16: Lamp Test Options**

After these tests have been started, they remain active until:  
 the **Stop** button is selected,  
 the Lamp Test cancel time expires  
 the window is closed

**Types of Timed Tests**

**Timed Tests:** When the Timed Test is started, the GCP performs the following sequence:  
 pauses for the programmed **Lamp Test Delay** time  
 flashes the lamps for the programmed **Lamp Test On** time  
 turns the lamps off  
 stops the test.

**Repeat Tests:** When the Repeat Test is started, the GCP performs the following sequence:  
 pauses for the programmed Lamp Test Delay time  
 flashes the lamps for the programmed Lamp Test On time  
 turns the lamps off for twice the programmed Lamp Test Delay time  
 flashes the lamps for the programmed Lamp Test On time  
 turns the lamps off  
 stops the test.

**Parameters for Timed Tests**

Parameters for each SSCC timed test are set in the fields below the **Test:** field.  
 The **Lamp Test On** field designates the duration of the Lamp On test.  
 Select the **Edit** button to the right of the field to open the **Set Parameter** dialog box. This **Set Parameter** dialog box allows the test duration timer to be modified.  
 Default value: **15 sec**  
 Valid entry range: **15 to 60** seconds  
 The **Lamp Test Delay** field designates the time between test selection and test start. Select the **Edit** button to the right of the field to open the **Set Parameter** dialog box. This



**Set Parameter** dialog box allows the **Lamp Test Delay** timer to be modified.

Default value: **30 sec**

Valid entry range: **30** to **120** seconds

The **Lamp Test Cancel** field designates the automatic test termination time following test initiation. Select the **Edit** button to the right of the field to open the **Set Parameter** dialog box. This **Set Parameter** dialog box allows the **Lamp Test Cancel** timer to be modified.

Default value: **5 min**

Valid entry range: **1** to **15** minutes

### **Test Status Indications**

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

Four status notations appear during operational tests:

**Off** indicates that the SSCCIII module lamp drive outputs are off.

**Ringing** indicates that the SSCCIII module bell output is energized.

**Flashing** indicates that the SSCCIII module lamp outputs are alternately energizing (flashing).

**Failed** indicates that a bell, lamp, or crossing gate output failure has been detected.

## GCP OPERATIONAL TEST MODE

Prior to placing a system in service, tests must be performed to verify proper system operation and I/O wiring. Proceed to next step if a feature is not used.

### **WARNING**

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

### **WARNING**

**IF A RAPID CHANGE OCCURS IN THE VALUE OF EZ AT ANY TIME THE TRAIN IS MOVING WITHIN THE TERMINATION SHUNTS, TRACK DISCONTINUITY CAUSED BY A HIGH RESISTANCE BOND OR A DEFECTIVE COUPLER IS INDICATED. LOCATE AND CORRECT THE PROBLEM IMMEDIATELY.**

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

OPERATIONAL  
CHECKS

**Table 21:  
GCP Operational Tests**

Step 1	Check tracks for: <ul style="list-style-type: none"><li>• Open transmit wire<ul style="list-style-type: none"><li>○ Crossing activates</li><li>○ EZ = 0</li></ul></li><li>• Open receive wire<ul style="list-style-type: none"><li>○ Crossing activates</li><li>○ EZ = 0</li></ul></li></ul>
Step 2	UAX, DAX Enables & AND Enable input(s), if these features are used: <ul style="list-style-type: none"><li>• Crossing activates when each remote DAX line circuit that controls a UAX, DAX Enable or AND Enable input (controlling the crossing) is de-energized or opened from the far end of the circuit.</li><li>• Pickup Delay time is correct when input closes.</li></ul>
Step 3	DAX outputs and "Radio DAX" operation using Spread Spectrum Radio, if these features are used: <ul style="list-style-type: none"><li>• Downstream crossing activates when the appropriate DAX output or Radio DAX message is deenergized</li><li>• DAX Pickup Delay time is correct</li></ul>

**Table 21:  
GCP Operational Tests**

Step 4	<p>WRAP logic, if this feature is used:</p> <ul style="list-style-type: none"> <li>• WRAP logic W is displayed on Main status screen for each corresponding wrapped track (when WRAP inputs are energized as seen on system I/O view).</li> </ul> <p><b>W</b> is removed from corresponding track on Main status screen when:</p> <ul style="list-style-type: none"> <li>• Corresponding track with wrap is shunted or</li> <li>• Corresponding wrap input is deenergized</li> </ul> <p>Measure WRAP LOS pickup delay from the time the wrap input is energized until the <b>W</b> is displayed on corresponding track status screen. Verify the LOS pickup delay time (minimum of 5 seconds).</p>
Step 5	<p>OVERRIDE logic, if this feature is used. There may be one or up to three OVERRIDE inputs used depending on OVERRIDE programming. The OVERRIDE options are: ALL PREDICTORS Override or DAX A, DAX B and DAX C Override.</p> <p>When corresponding OVERRIDE input is energized, OVERRIDE Input Status is GREEN on System I/O view.</p> <ul style="list-style-type: none"> <li>• Observe that corresponding Override input changes to RED when:</li> <li>• Corresponding switch in GCP approach is reversed or</li> <li>• Corresponding signal field apparatus is changed from energized to deenergized or deenergized to energized depending on field signal logic for OVERRIDE.</li> </ul>
Step 6	<p>Traffic Signal Preemption, if this feature is used: The preempt output deenergizes:</p> <ul style="list-style-type: none"> <li>• When the prime deenergizes for simultaneous preemption</li> <li>• At the programmed preemption warning time for advance preemption</li> <li>• The warning devices activate when the prime predictor predicts, or after the Advance Preempt Delay timer times out, whichever is sooner. Time should be equal to Adv Preemption timer value or shorter.</li> </ul> <p>When used, Advance Preempt IP input open causes Preempt Output to de-energize and activates warning devices after the Advance Preempt Delay Timer times out. (Observe input on I/O view).</p> <p>When used, Preemption Health IP input open activates warning devices immediately (without advance preempt Delay time interval). (Observe input on I/O view).</p> <p>When used, Traffic Signal Health open initiates simultaneous preemption, rather than advance preemption, upon train detection</p>

OPERATIONAL  
CHECKS

**Table 21:  
GCP Operational Tests**

OPERATIONAL CHECKS	Step 7	<p>Island detection</p> <p>When used, observe the ISLAND symbol on tracks on the Main Status display. Place a 0.06 ohm shunt on island track wires ISLAND symbol is GRAY Observe island LED on track module as shunt is removed and while ISLAND Pickup Delay is timing.</p> <p>ISLAND LED is flashing After the island pickup delay time expires on module and island LED is steady RED ISLAND symbol on Main display is GREEN, and warning devices are deactivated.</p>
	Step 8	<p>Out of Service, OOS, if this feature is used: If the Display method is used:</p> <ul style="list-style-type: none"> <li>• Take each track out of service using the display.</li> <li>• Observe</li> <li>• Display indicates track is OOS</li> <li>• Return track to service</li> <li>• Display indicates track is back in service</li> </ul> <p>If Display + OOS IP input is used, then for each track:</p> <ul style="list-style-type: none"> <li>• Turn on OOS input for the track (observe input on I/O view).</li> <li>• Take track OOS using the display</li> <li>• Display indicates track is OOS</li> <li>• Turn off OOS input</li> <li>• Display indicates track is back in service</li> </ul> <p>If OOS IP Input is used:</p> <ul style="list-style-type: none"> <li>• Turn on OOS input for the track (observe input on I/O view).</li> <li>• Main Display indicates track is OOS</li> <li>• Turn off OOS input</li> <li>• Display indicates track is back in service</li> </ul> <p>If 4000 Case OOS IP Input used:</p> <ul style="list-style-type: none"> <li>• Turn on 4000 Case OOS input. (observe input on I/O view).</li> <li>• Main Display indicates all track are OOS</li> <li>• Turn off 4000 Case OOS input</li> <li>• Main Display indicates all tracks are back in service</li> <li>•</li> </ul>

**Table 21:  
GCP Operational Tests**

<b>Step 9</b>	<p>Maintenance Call (MC) Light, if this feature is used:</p> <ul style="list-style-type: none"> <li>• Verify that the light is lit</li> <li>• Verify that the MC extinguishes when one of the following occurs:</li> <li>• Taking a track out of service, or by energizing an out-of-service input.</li> <li>• If “Low Battery Enable” is ON, temporarily raise the “Low Battery Level” to above the battery voltage.</li> <li>• Removing CPU module from the chassis, which will activate the crossing also.</li> </ul> <p>Restore the track, low battery level, or CPU module to operation and the MC light should turn on.</p>
<b>Step 10</b>	<p>If Positive Start, Advanced Approach Prediction, and/or Sudden Shunt Detection are used:</p> <ul style="list-style-type: none"> <li>• Shunt at the appropriate point</li> <li>• Take the required measurements</li> <li>• Reprogram EZ threshold levels as required</li> </ul>

OPERATIONAL CHECKS

Finishing Step 9 completes the GCP operational checks / tests. Proceed to SSCC3I Operational Tests for SSCC calibration and operational checks / tests.

### SSCC3I OPERATIONAL TESTS

After the system has been programmed, GCP calibrated and the lamp voltages have been adjusted, tests must be performed to verify the operation of the SSCC prior to placing the system in service. In addition to the operational tests required by the maintaining railroad, the SSCC operation should be further tested and verified as described in the SSCC Operational Tests procedure provided below.

#### **WARNING**

**AFTER INITIAL PROGRAMMING OR PROGRAMMING, MODULE, OR WIRING CHANGES, TESTS MUST BE PERFORMED TO VERIFY PROPER OPERATION OF THE SSCC PRIOR TO PLACING THE SYSTEM IN SERVICE.**

#### **NOTE**

While in Test Mode, if a train approaches (XR input logic de-energizes, the test is cancelled and the crossing activates normally. When the train departs, the system remains in normal operation.

If advance preemption is used, the preemption output and warning devices will operate as follows for the indicated method of activation:

For a train move:

Pre-emption Output de-energizes at the pre-empt warning time.

Activation of the warning devices will be delayed until the Advance Pre-empt Timer times out, or the Prime Warning time is reached.

Advance Pre-empt Input de-energized:

Pre-emption Output de-energizes

Activation of the warning devices will be delayed until the Advance Pre-empt Timer times out.

AND 1 Enable Input de-energized:

Pre-emption Output de-energizes

Activation of the warning devices occurs simultaneously (no advance pre-empt time).

"Test the Crossing" Test Mode;

Pre-emption Output de-energizes

Activation of the warning devices occurs simultaneously (no advance pre-empt time).

**Table 22:  
SSCC Operational Tests**

<b>Step 1</b>	Verify that the light/gate battery is charged.
<b>Step 2</b>	Verify that all connectors on the SSCC have been properly positioned, seated and secured.
<b>Step 3</b>	Verify that all the electrical connections in the Bell, Lamp, and Gate circuits are properly assembled, tightened and secured.
<b>Step 4</b>	Verify that all flashing lamps light and none are burned out.
<b>Step 5</b>	Verify that all lights have been aligned.
<b>Step 6</b>	Verify that the gates are operational.
<b>Step 7</b>	Verify that the bells are operational.
<b>Step 8</b>	Verify that all SSCC programming is correct (program and configure menus).
<b>Step 9</b>	Verify that all lamp voltages have been set.
<b>Step 10</b>	Momentarily turn on the flashers from the TEST menu and verify that the battery charger is operational and providing current to the lamps and battery.
<b>Step 11</b>	Verify that the gate delay time is correct.
<b>Step 12</b>	Verify that the lights continue to flash while the gates are rising.

OPERATIONAL CHECKS

After performing SSCC Lamp Mode Tests, GCP Operational Tests, and SSCC Operational Tests, verify proper Train Detection, Warning Times and Crossing Operation

**Table 23:  
Train Detection, Warning Times  
and Crossing Operation**

<b>Step 1</b>	EZ continuity check on train moves: <ul style="list-style-type: none"> <li>• Crossing devices activate and EZ value decreases smoothly (without rapid change) for an approaching train.</li> <li>• Crossing devices turn off when island recovers after train move and the EZ rises smoothly (without rapid change) as the train recedes.</li> </ul>
<b>Step 2</b>	For MAIN and STANDBY, check warning times for inbound train moves on each approach including DAX operation.
<b>Step 3</b>	Check for proper gate / flasher / bell operation on all train moves.

## TROUBLESHOOTING

The GCP Display Module is the main diagnostic tool available to maintenance personnel. The display is a touch screen activated device equipped with a timeout feature. To activate the display, touch it with the stylus. The track function status view is shown in Figure 17.

The EZ and EX are shown for each track. A track status area (two in the example in Figure 17) is displayed for each track module in the system (up to six). The approximate speed of a train approaching the crossing is shown as a positive (+) number. The approximate speed of a train moving away from the crossing is shown as negative (-) number.

### **NOTE**

If the Display Module is replaced, the logs remain on the removed Display Module, and any logs stored on the new Display Module will be shown when called.

### **NOTE**

Whenever any files are being saved using the Display Terminal (DT) they may be saved either to a laptop or to a USB Device.

TROUBLESHOOTING

## SYSTEM STATUS INDICATORS AND LOGS

### Track Status Window Color Scheme

The status window background color indicates track status:

Red: The Track Module is not installed, or the Track Module is unhealthy

Gray: The Track Module is healthy, and no train is in the approach

White: The Track Module is healthy, and a Train is in the approach

Flashing blue: The GCP or the island on the Track Module is out of service.

### Track Function Status

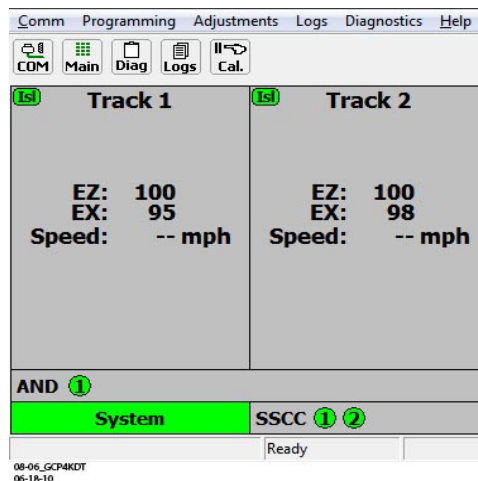


Figure 17: GCP 4000 DT Window



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

#### Wrap Circuit Status

“W” indicates Wrap input energized.

“W” is displayed only when Wrap input is energized and when “Track # Wrap Used” is set to YES.

#### Enhanced Detection

“ed” indicates enhanced detection has been activated for the current train movement.

“ed” is only displayed when “Enhanced Detection Used” is set to YES and inbound poor shunting is detected.

#### Motion Sensor Restart

“m” indicates that the predictor switched to a motion sensor due to motion sensor control input being low or MS restart timer is running.

### ISL and SSCC and System Status Indications

#### ISL:

Gray symbol = island occupied

Green symbol = island unoccupied or, if used, Wrap input energized regardless of occupancy state.

No symbol = not used

#### AND:

Status Bar indicates which AND functions are programmed as shown by a circled number.

Gray circle = the AND function is de-energized and not Wrapped (if used).

Green circle = the AND function is energized and not Wrapped (if used).

Yellow circle = the AND function is Wrapped regardless of state of AND function logic.

Flashing blue background = the AND functions are out of service.

#### SSCC:

Status bar Indicates which SSCC3I are used as shown by circled number.

Green circle = not activated (lamps not flashing)

Grey circle = signals are activated (lamps flashing)

#### System:

Green status bar = all tracks are calibrated track conditions are within normal operating parameters system is fully functional

Red status bar = unhealthy system or track condition exists. displays system status status window for affected track also displays red

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

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

## **NOTE**

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

The train speeds are relative and may be affected by track parameters that include:

- Insulated joint proximity
- Insulated joint couplers
- Overlapping termination shunts
- Lumped ballast loads

The speed values are only intended to assist maintenance personnel in:

- Identifying slow versus fast train movements
- Distinguishing between accelerating, decelerating, and relatively constant speed train movements

The primary function of the recording is to document warning time.

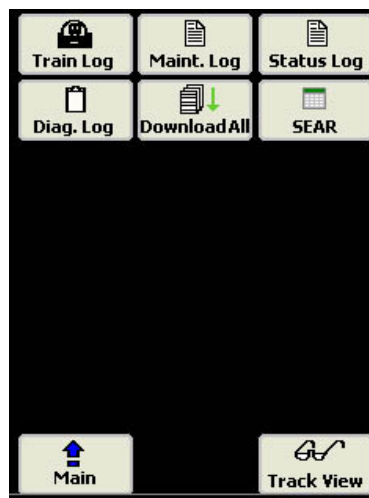
Speed values are secondary and may not be consistent with recordings made by devices specifically designed to record train speed.

## **History Logs**

## **NOTE**

If the Display Module is replaced, the logs remain on the removed Display Module, and any logs stored on the new Display Module will be shown when called.

TROUBLESHOOTING



**Figure 18: The Logs Screen**

Four history logs may be accessed as shown below:

## **Train Log**

Separate log for Main and Standby:

Train Log stored on CPU Module

Main log on main CPU

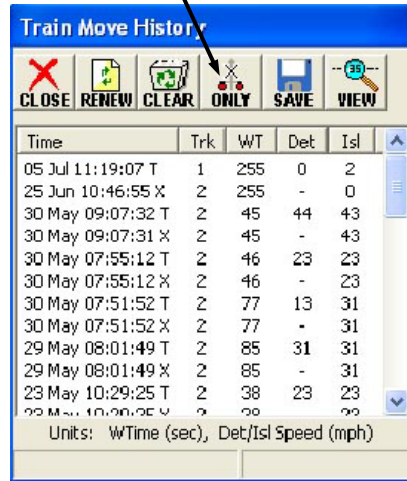
Standby log on standby CPU

Contains:

- Date and time of move
- Crossing warning time (**WT**)
- Detection (**Det**) speed
- Island (**Isl**) speed

Each move listing is designated by either an **X** (crossing) or **T** (track) to the right of the time entry.

Selecting the **ONLY** button selects only the crossing moves for display.



MWS\_08-06\_TRN\_MOVE\_HIST  
04-11-08

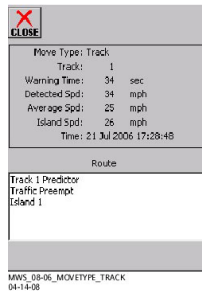
**Figure 19: Train Move History Window**

**NOTE**

The above screen shows a CLEAR button. It may be necessary to select a MORE button for the CLEAR button to appear. The CLEAR selection allows the maintainer to clear the log after it is reviewed so that only events that occur between this visit and the next visit will appear next time.

TROUBLESHOOTING

Select a train move entry and then the **VIEW** button to display the Train Move History Detail screen which includes:  
Average speed of the train move  
Route of the train move which is useful when multiple track circuits are used.



MWS\_08-06\_MOVE\_TYPE\_TRACK  
04-11-08

**Figure 20: Train Movement History Detail Screen**

**NOTE**

If the Display Module is replaced, the logs remain on the removed Display Module, and any logs stored on the new Display Module will be shown when called.

**Maintenance Log**

Combines entries for both Main and Standby Maintenance Log stored on Display Module. Information from Main and Standby CPUs stored in same log. Captures events only while the Display Module is connected to the GCP.

Contains programming changes  
 Contains Calibration information  
 Contains user entered maintenance notes (ADD LOG ENTRY). For instance Maintainer can add notes about weather, periodic tests, or reason for calibration.  
 Can be cleared by maintainer after review.

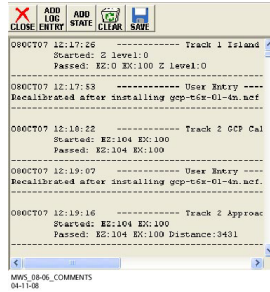


Figure 21: Maintenance Log with Comments

**NOTE**

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

If the Display Module is replaced, the logs remain on the removed Display Module, and any logs stored on the new Display Module will be shown when called.

TROUBLESHOOTING

**Status Log**

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

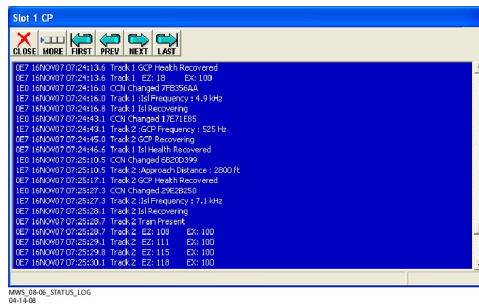


Figure 22: Status Log

**Summary Log**

- Provides a summary of the significant events from the status log.
- Separate log for Main and Standby (log stored on each CPU)
- Contains error events.

Can be cleared by maintainer after review

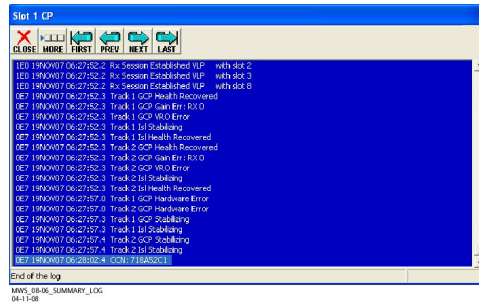


Figure 23: Summary Log

TROUBLESHOOTING

## SYSTEM TROUBLESHOOTING

This subsection describes the method of troubleshooting a problem in a system that has previously been in service. When entering the signal house, the GCP display will be dark because the touch screen display has a timeout feature. To activate the display touch it with the stylus. The first step in troubleshooting a problem is to determine whether the components of a 4000 GCP system have detected a problem. When the 4000 GCP system is healthy, it shows the following:

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

System Status bar on DT Status Screen is green.

Health LEDs on all modules (CPU, Track, RIO, and SSCIII) are flashing slowly (1HZ).

Transfer Module display is not counting down.

SEAR Alarm LED's indicate that no alarms are present.

CPU LED 1 is on, indicating that the Maintenance Call output is on.

CPU LED 2 is on, indicating that the transfer signal is being generated.

Power LEDs on all modules are on and steady.

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

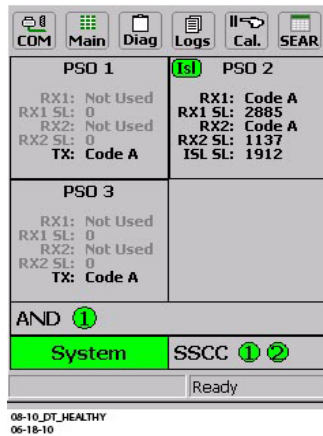


Figure 24: GCP 4000 DT Window

## Diagnostics

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

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

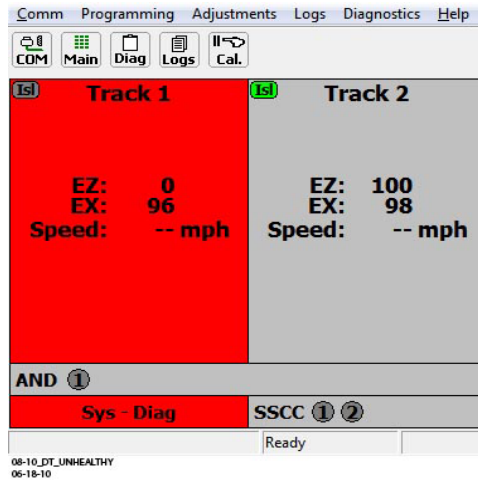


Figure 25: Unhealthy GCP 4000 DT Window

### System Diagnostics

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

Selecting one of the displayed error descriptions displays the diagnostic detail screen shown on the following page.

TROUBLESHOOTING

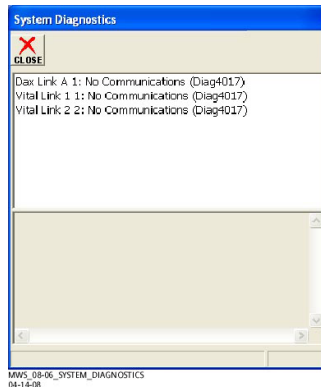


Figure 26: System Diagnostics Window

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

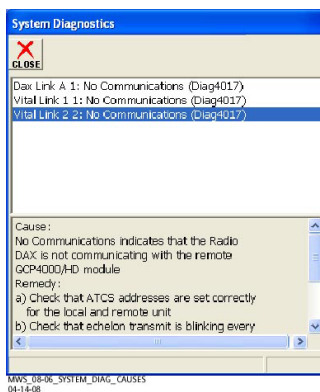


Figure 27: System Diagnostics Window with Analysis Shown

## Troubleshooting the Modules

Use the following tables to troubleshoot the individual modules.

**Table 24:  
Diagnosing CPU Module Problems**

Diag Display / Description	Cause	Remedy
<b>CRC MCF CRC incorrect (Diag3004)</b> / The MCF CRC is incorrect for the current MCF	MCF CRC entered is incorrect	Reload MCF CRC
	MCF is corrupt	Reload MCF
<b>ADR ATCS Session address invalid (Diag3015)</b> / The radio DAXing neighbor ATCS address of is invalid.	Usually occurs when ATCS Site Address (SIN) is not entered correctly	Reenter ATCS Site Address (SIN)
<b>UCFG VLP Unconfigured (Diag3018)</b> / VLP is unconfigured and not communicating with I/O modules	Usually due to: Incorrect MCF CRC MCF not loaded MCF not stored in ECD (ECD replaced) No ATCS Site ID (SIN) entered for radio DAX application	Check other diagnostic message for exact cause.

TROUBLESHOOTING

**Table 25:  
Track Module Indications (Module States)**

Indication	Meaning	Module State
<b>CKEX</b>	The check wire phase is incorrect	All predictors are de-energized
<b>CHK1</b>	The receive wire EZ reading is very low in comparison with the check wire EZ	All predictors are de-energized
<b>CHK2</b>	The check wire EZ reading is very low in comparison with the receive wire EZ	All predictors are de-energized
<b>CHK4</b>	The check wire and receive wire readings are more than 50 points different	All predictors are de-energized
<b>GAPP</b>	GCP Approach Calibration is required	All predictors are de-energized



**Table 25:  
Track Module Indications (Module States)**

<b>Indication</b>	<b>Meaning</b>	<b>Module State</b>
<b>GCAL</b>	GCP Calibration is required	All predictors are de-energized
<b>GEXP</b>	GCP detected decreasing phase which could be a bad bond	All predictors are de-energized
<b>GFRQ</b>	GCP frequency not set	All predictors are de-energized
<b>GHWR</b>	GCP hardware error	All predictors are de-energized
<b>GIPS</b>	Enhanced detection is turned on and the GCP detects poor shunting	Prime and Preempt de-energized (any zero offset predictors)
<b>GLIN</b>	GCP Linearization Calibration is required	All predictors are de-energized
<b>GLCK</b>	EZ or check EZ is below 3 after GCP has booted up Refer to the Trouble-shooting section	All predictors are de-energized
<b>GMAX</b>	GCP module does not support MAX transmit level Set transmit level to Medium or High Change Module to A80418 newer than rev D	All predictors are de-energized
<b>GOFS</b>	MS/GCP Operation is Out of Service	All used predictors are energized All unused predictors are de-energized
<b>GPRM</b>	The Track Module is configured to expect an island and the prime has a non-zero offset value Set the prime to zero offset, if applicable If island is used at remote location, use a DAX not the prime Set the Island Connection to No Islands if no island is intended	All predictors are de-energized
<b>GRCV</b>	GCP receiver error	All predictors are de-energized
<b>GSLV</b>	GCP slaving error	No effect on predictors
<b>GSTB</b>	GCP is stabilizing after transmitter was turned on	All predictors are de-energized

**Table 25:  
Track Module Indications (Module States)**

<b>Indication</b>	<b>Meaning</b>	<b>Module State</b>
<b>GXMT</b>	GCP transmitter error	All predictors are de-energized
<b>HIEZ</b>	High EZ (>115) detected on main or check wires	All predictors are de-energized
<b>ICAL</b>	Island Calibration is required	Island is de-energized
<b>ICON</b>	Island Connect Error. The GCP Island Connection indicates an island is connected, but no island is turned on.	All predictors are de-energized
<b>IFRQ</b>	Island frequency not set	Island is de-energized
<b>IOFS</b>	Island Operation is Out of Service	Island energized
<b>ISTB</b>	Island is stabilizing after transmitter has been turned on	Island deenergizes
<b>ITST</b>	Island has detected a possible interfering signal	No effect on Island occupancy
<b>IXMT</b>	Island transmitter error	Island deenergizes
<b>LWEX</b>	Low EX detected Low EX Adjustment is usually 39	All predictors are de-energized
<b>LWEZ</b>	Low EZ detection is turned on and EZ has remained below the low detection level for longer than the low EZ detection time.	All predictors are de-energized
<b>RECV (RE-COVERY)</b>	The GCP is running a 30 second Recovery Time-out after an error has cleared.	All predictors are de-energized
<b>RECV (RE-COVERY)</b>	The Island is running a 30 second Recovery Time-out after an error has cleared.	Island is occupied
<b>RXEX</b>	The receive wire phase is incorrect	All predictors are de-energized
<b>UCFG</b>	Track module is unconfigured	All predictors are de-energized; Island is deenergized; Outputs are deenergized; Inputs are de-energized
<b>VOER</b>	Output hardware failure detected. Output is commanded on but is detected as off	Failed output(s) de-energized

TROUBLESHOOTING

**Table 26:  
Track Module Indications (Remedies)**

<b>Panel Indication – Diagnosis</b>	<b>Description</b>	<b>Cause</b>	<b>Remedy</b>
<b>CHCK1</b> Gain Check – Receive Wire Error (Diag1008)	Receive signal level is low while check signal level is normal. Check EZ is normal and track EZ is very low value	High resistance or open connection in a receive wire.	Locate and repair open connection in the receive wires
<b>CHCK2</b> Gain Check – Check Wire Error (Diag1007)	Check signal level is low while transmit and receive levels are normal. Check EZ is very low while track EZ is normal value	High resistance or open connection in a check wire.	Locate and repair high resistance or open connection in check wires.
<b>CHCK4</b> Gain Check Error (Diag1010)	Receiver and check signal levels differ by a significant amount	If a train is present: High resistance in transmitter track wires	Locate and repair: High resistance connections in transmitter track wires
<b>CHCK4</b> Gain Check Error (Diag1010)	Receiver and check signal levels differ by a significant amount	If no train is present: High resistance in receiver or check receiver track wires open track connection	Locate and repair: High resistance connections in receive or check track wires open connections in receive or check track wires

TROUBLESHOOTING

**Table 26:  
Track Module Indications (Remedies)**

<b>Panel Indication – Diagnosis</b>	<b>Description</b>	<b>Cause</b>	<b>Remedy</b>
<b>CKEX</b> Check Wire EX Error (Diag1006)	Check wires and transmit wires are out of phase Generally occurs at cutover with 6-wire installations	The check wires and transmit wires are misphased.	Change the check wires connections so that: T1 & C1 are tied together T2 and C2 are tied together
<b>GAPP</b> GCP Approach Calibration Required (Diag1021)	GCP Approach Calibration Required	Approach is uncalibrated An approach reverts to its uncalibrated state when the: GCP is recalibrated Track Module is replaced Template is set to default or a new template is selected Programmed approach distance is changed MCF is changed	Access the appropriate GCP Calibration Window If the computed approach distance is correct, select the <b>BYPASS</b> button If the computed approach distance is known for this track from a previous calibration, enter the correct value by selecting the <b>EDIT</b> button. If the computed approach distance is incorrect and is unknown, perform the approach calibration as described in Section 6.

TROUBLESHOOTING

**Table 26:  
Track Module Indications (Remedies)**

<b>Panel Indication – Diagnosis</b>	<b>Description</b>	<b>Cause</b>	<b>Remedy</b>
<b>GCAL</b> GCP Calibration Required (Diag1020)	GCP Calibration Required	<p>The Track Module is uncalibrated.</p> <p>A Track Module reverts to its uncalibrated state when the:</p> <ul style="list-style-type: none"> <li>Track Module is replaced</li> <li>MCF software is changed</li> <li>Template is set to default or a new template is selected</li> <li>Track Frequency is changed</li> <li>Approach distance is changed</li> <li>Compensation value is changed</li> <li>Transmit level is changed</li> <li>Directional (bi/uni) mode is changed</li> </ul>	Access the appropriate Calibration Select Window and calibrate the GCP as described in Section 6.
<b>GEXP</b> EX Process Error (Diag1016)	Phase (EX) decreases as train approaches crossing	Possibly caused by: poor shunting high resistance bond generally located near the GCP track wires	Locate and repair high resistance bonds
<b>GFRQ</b> No GCP frequency Selected (Diag1012)	No track frequency set	MS/GCP Operation has been programmed as ON, but no GCP frequency has been selected	Select a GCP frequency from the <b>GCP: track n</b> program menu

**Table 26:  
Track Module Indications (Remedies)**

<b>Panel Indication – Diagnosis</b>	<b>Description</b>	<b>Cause</b>	<b>Remedy</b>
<b>GHWR</b> Track Hardware Error (Diag1019)	Track Hardware Error	This occurs when the Track Module detects that its hardware is not operating correctly	Replace the module
<b>GIPS</b> IPS Mode (Diag1013)	Inbound poor shunting (IPS) detected	<b>IPS Mode</b> is shown when the Track Module is configured with the Enhanced Detection option On and the module detects inbound poor shunting	None
<b>GLCK</b> Power Up Lockout Error (Diag1018)	EZ or Check EZ low after reboot	The EZ or Check EZ values are less than three after a power up. This could be caused by a train shunting the tracks near the feed point open receive or check wires	If a train is present, clear the lockout by selecting the Release Track icon on diagnostic terminal Status Screen If no trains are present repair the check and/or receive wires as required.

TROUBLESHOOTING

**Table 26:  
Track Module Indications (Remedies)**

<b>Panel Indication – Diagnosis</b>	<b>Description</b>	<b>Cause</b>	<b>Remedy</b>
<b>GLIN</b> GCP Linearization Required (Diag1022)	GCP Linearization Calibration Required	Linearization is uncalibrated Linearization reverts to its uncalibrated state when the: GCP is recalibrated Track Module is replaced Template is set to default or a new template is selected Programmed approach distance is changed MCF is changed	Go to the Setup Track Linearization Screen. If the linearization value is correct, select the BYPASS button. If the linearization value is known for this track from a previous calibration, enter the correct value by selecting the <b>EDIT</b> button. If the linearization value is incorrect or not known perform a linearization calibration as described in Section 6.
<b>GMAX</b> Transmitter Error (Diag1011)	GCP module does not support MAX transmit level	GCP module does not support MAX transmit level	Set transmit level to MED or HIGH. Change Transmit Module to A80418 newer than rev D.
<b>GOFS</b> Out of Service Error	MS/GCP Operation is Out of Service		

TROUBLESHOOTING

**Table 26:  
Track Module Indications (Remedies)**

<b>Panel Indication – Diagnosis</b>	<b>Description</b>	<b>Cause</b>	<b>Remedy</b>
<b>GPRM</b> Program-Error	The Track Module is configured to expect an island and the prime has a non-zero offset value	Prime is set not set to zero.	Set the prime to zero offset, if applicable.  If island is used at remote location, use a DAX not the prime.  Set the Island Connection to NO Islands if no island is intended.
<b>GRCV</b> Receiver Error (Diag1014) or (Diag1015)	Track Module internal receiver channels differ	Unacceptable difference between the redundant receivers on the Track Module is detected	Replace Track Module
<b>GSLV</b> GCP Slave Signal Error (Diag1023)	Slaving Error	The Track Module is not receiving clock sync from the Primary Track Module.  The primary Track Module is normally the module in the Track 1 Slot.	If only one Track Module is reporting the error, replace that module.  If all Track Modules are reporting the error, replace the primary Track Module (generally T1).
<b>GSTB</b> GCP Stabilizing (Diag1001)	20 sec. stabilization period prior to start of normal operation.	System startup	Wait

TROUBLESHOOTING



**Table 26:  
Track Module Indications (Remedies)**

<b>Panel Indication – Diagnosis</b>	<b>Description</b>	<b>Cause</b>	<b>Remedy</b>
<b>GXMT</b> Transmitter Error (Diag1011)	Transmitter cannot maintain a constant current	All installation: High resistance or open transmit track wire High resistance or open track wire rail connection	Locate and repair open transmit wires or high resistance transmit wires connections.
<b>GXMT</b> Transmitter Error (Diag1011)	Transmitter cannot maintain a constant current	Unidirectional installations only: open termination open coupler open bond	Locate and repair: open termination open coupler open bond
<b>HIEZ</b> High EZ (Diag1002)	High EZ or high EZ check value detected	Ballast has increased significantly since calibration	Recalibrate only after verifying that no other cause exists.
<b>HIEZ</b> High EZ (Diag1002)	High EZ or high EZ check value detected	Broken rail	Repair broken rail
<b>HIEZ</b> High EZ (Diag1002)	High EZ or high EZ check value detected	Defective insulated joint coupler	Replace defective insulated joint coupler
<b>HIEZ</b> High EZ (Diag1002)	High EZ or high EZ check value detected	Defective termination shunt	Repair defective termination shunt
<b>HIEZ</b> High EZ (Diag1002)	High EZ or high EZ check value detected	High resistance termination shunt connection	Repair high resistance connection to termination shunt
<b>HIEZ</b> High EZ (Diag1002)	High EZ or high EZ check value detected	High-resistance track bond wire connection	Repair high resistance bond

TROUBLESHOOTING

**Table 26:  
Track Module Indications (Remedies)**

<b>Panel Indication – Diagnosis</b>	<b>Description</b>	<b>Cause</b>	<b>Remedy</b>
<b>HIEZ</b> High EZ (Diag1002)	High EZ or high EZ check value detected	Poor calibration	Recalibrate only after verifying that no other cause exists.
<b>ICAL</b> Island Calibration Required (Diag1305)	Island requires calibration	Calibration is required when the:  Track Module is replaced  MCF is changed  Template is set to default or a new template is selected  Island frequency is changed	Access the appropriate Calibration Select Window and calibrate the island as described in Section 6.
<b>ICON</b> Island Connect Error	The GCP Island Connection indicates that an island is connected, but no island is turned on.	Faulty programming. Bad Connection	Verify programming against plan. Check Island wiring
<b>IFRQ</b> No Island Frequency Selected (Diag1300)	No island frequency has been programmed	An Island Operation is requested but no island frequency is selected	Select an island frequency from the Program menu
<b>ISTB</b> Island Stabilizing (Diag1301)	Island stabilizing after a power up	On startup the Track module initiates a 20 second timeout to allow the island output to stabilize	Wait
<b>ITST</b> Island Self Test Error (Diag1302)	Variations in the island receive frequency	An interfering signal is causing large variations in the Island receive signal	Change island frequency

TROUBLESHOOTING

**Table 26:  
Track Module Indications (Remedies)**

<b>Panel Indication – Diagnosis</b>	<b>Description</b>	<b>Cause</b>	<b>Remedy</b>
<b>ITST</b> Island Self Test Error (Diag1302)	Variations in the island receive frequency	Defective Track Module	Replace the Track Module
<b>IXMT</b> Island Transmitter Error (Diag1304)	Island cannot supply a constant current	All installations Track Module detects:  High resistance transmit track wire  Open transmit track wire  High resistance or open track wire rail connection	Locate and repair defective wiring or connections
<b>IXMT</b> Island Transmitter Error (Diag1304)	Island cannot supply a constant current	Unidirectional installations Track Module also detects:  open termination open joint coupler open bond	Locate and repair open termination, joint coupler, or bond
<b>LWEX</b> Low EX (Diag1003)	Low track ballast resistance detected.	Broken rail	Repair broken rail
<b>LWEX</b> Low EX (Diag1003)	Low track ballast resistance detected.	Low ballast	Determine cause of low ballast and compensate
<b>LWEX</b> Low EX (Diag1003)	Low track ballast resistance detected.	Low ballast and defective insulated joint coupler	Replace defective insulated joint coupler
<b>LWEX</b> Low EX (Diag1003)	Low track ballast resistance detected.	Low ballast and high resistance bond	Repair high resistance bond
<b>LWEX</b> Low EX (Diag1003)	Low track ballast resistance detected.	Mud or other contaminants within ballast	Verify EX Adjust as described in <b>Table 35</b>

**Table 26:  
Track Module Indications (Remedies)**

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<b>Panel Indication – Diagnosis</b>	<b>Description</b>	<b>Cause</b>	<b>Remedy</b>
<b>LWEX</b> Low EX (Diag1003)	Low track ballast resistance detected.	Poor drainage at crossing	Temporarily shorten the approach (see WARNING)
<b>LWEX</b> Low EX (Diag1003)	Low track ballast resistance detected.	Salted crossing	Use a lower GCP frequency
<b>LWEZ</b> Low EX (Diag1004)	Low EZ Detection is programmed ON and its timer interval is exceeded.	A false shunt on the track	Remove false shunts from the track
<b>LWEZ</b> Low EX (Diag1004)	Low EZ Detection is programmed ON and its timer interval is exceeded .	A false shunt on the track	Check that EZ returns to normal after false shunt removal.
<b>LWEZ</b> Low EX (Diag1004)	Low EZ Detection is programmed ON and its timer interval is exceeded.	A train is on the approach for a time longer than the timer setting.	Temporarily turn off low EZ detection until train has left.
<b>LWEZ</b> Low EX (Diag1004)	Low EZ Detection is programmed ON and its timer interval is exceeded.	Open receive track wire	If false shunt is not found, refer to the diagnostics messages for open receive wire.
<b>LWEZ</b> Low EX (Diag1004)	Low EZ Detection is programmed ON and its timer interval is exceeded.	Open receive track wire	Repair
<b>RECV</b> GCP Recovering (Diag1000)	30 sec. recovery time-out	Clearing of system error	Wait

**Table 26:  
Track Module Indications (Remedies)**

<b>Panel Indication – Diagnosis</b>	<b>Description</b>	<b>Cause</b>	<b>Remedy</b>
<b>RECV</b> Island Recovering (Diag1303)	Island recovering after self test	The Track module initiates a 30-second recovery timeout after an island error has cleared.	Wait
<b>RXEX</b> Receive Wire EX Error (Diag1005)	Transmit and receive wires are out of phase Generally observed at cutover	The receive and transmit wires are connected to the wrong rail (misphased)	Change the track wire connections so that:  T1 & R1 are connected to rail 1  T2 & R2 are connected to rail 2
<b>UCFG</b> No Communications (Diag1017)	No communication to a Track Module.	Track Module is not communicating with the CPU.	Verify that a module is in appropriate slot
<b>UCFG</b> No Communications (Diag1017)	No communication to a Track Module.	Track Module is not communicating with the CPU.	Replace the module if the Track Module is continuously rebooting.  BOOT displays on 4-character display at one minute (approximate) intervals.

TROUBLESHOOTING

**Table 26:  
Track Module Indications (Remedies)**

<b>Panel Indication – Diagnosis</b>	<b>Description</b>	<b>Cause</b>	<b>Remedy</b>
<b>UCFG</b> No Communication to a Track Module (Diag1017)	No communication to a Track Module.	Track Module is not communicating with the CPU.	If the Track Module is not continuously rebooting determine if <b>UCFG</b> is shown on the module's display. If only this module displays <b>UCFG</b> , replace it if all Track Modules display <b>UCFG</b> replace the CPU Module
<b>VOER OUT</b> Correspondence Check Error (Diag1200)	No Vital output voltage	A vital output is commanded to be on, but is producing no voltage. May be caused by: Open or shorted output Defective Track Module.	Check for an open or shorted output and repair as required. If the output is not open or shorted, replace the Track Module

TROUBLESHOOTING

**TABLE 27:  
DIAGNOSING PSO MODULE PROBLEMS**

<b>DIAG DISPLAY / DESCRIPTION</b>	<b>CAUSES</b>	<b>REMEDY</b>
<b>PSO Transmitter Frequency Error (PFXR) / No Transmitter frequency is set</b>	The PSO Transmitter does not have a valid frequency selected.	Select a valid frequency from the Program menu
<b>PSO Transmitter Error (PXMT) / PSO Transmitter detects a fault</b>	The PSO Transmitter is detecting a fault in the connections.	Check that the transmit wires are connected properly. Check for open terminations, open couplers, or open bonds
<b>PSO Receiver Frequency Error (1FRQ or 2FRQ) / No Receiver frequency is programmed</b>	The PSO Receiver does not have a valid frequency selected.	Select a frequency from the Program menu.
<b>PSO Receiver Calibration Error (1CAL or 2CAL) / Calibration is required</b>	The PSO Receiver requires calibration	Verify that Receiver is programmed correctly.

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**Table 28:  
Diagnosing SSCC Module Problems**

<b>Diag Display / Description</b>	<b>Cause</b>	<b>Remedy</b>
<b>Crossing Bank Failure (Diag2001) / SSCC3l module lamp drive output failure</b>	Lamp driver bank A has failed.	Replace the SSCCIIIi module
<b>Lamp Neutral Wire Open (Diag2002) / The SSCCIIIi has detected open lamp neutral wire</b>	Lamp neutral wire is open	Repair open neutral wire to lamps

**Table 28:  
Diagnosing SSCC Module Problems**

<b>Diag Display / Description</b>	<b>Cause</b>	<b>Remedy</b>
<b>Low Battery Warning (Diag2003) / SSCCIIIi detected low battery voltage</b>	Battery voltage is below the programmed Low Battery Detection level. This may be caused by:	
	Incorrect Low Battery Detection Level setting	Correct Low Battery Detection Level setting:
	Defective battery charger operation	Perform battery charger maintenance
	Defective Battery operation	Perform battery maintenance
<b>Lamp Voltage Limited (Diag2005)</b>	Lamp voltages are set above the battery terminal voltage.	Reduce the lamp voltages to be less than the battery voltage
<b>No Communications (Diag2017)</b>	SSCCIIIi Module in wrong slot	Move Module to appropriate slot.
	SSCCIIIi Module defective. Indicated by:  <b>POWER</b> light is off  <b>HEALTH</b> LED is off for 10 seconds and then on for 10 seconds (module continuously reboots).  <b>HEALTH</b> LED flash at fast rate (other modules function properly)	Replace SSCCIIIi Module
	CPU Module defective. Track Module displays read <b>UNFG</b> <b>HEALTH</b> LED's of all modules flash at fast rate	Replace CPU Module

TROUBLESHOOTING



## **NOTE**

The SSCC3I module performs a self-diagnostic test at approximately noon each day. The test momentarily energizes each lamp output to verify operation. Four very brief flashes may be noticed on the L1 and then the L2 LEDs of each SSCC3I module during a normal test.

Where only LEDs lamps are used, a false lamp-neutral-wire-open condition may be detected when **Lamp Neutral Test** is set to **On**.

To avoid a false error indication set the **Lamp Neutral Test** status entry for each active crossing controller to **Off**.

Effective with Revision D of the SSCCIII, **FLASH SYNC** is an isolated two-wire output.

If two Revision D or later SSCC3I units in the same chassis are operated by separate batteries, the FLASH SYNC returns are connected internally and no additional connection is required.

Revision D SSCC3I Modules can be identified by:

- “D” located at end of Part Number / Bar Code tag.
- Large metal bracket located on component side of module.

When using Revision C SSCC3I or earlier, or when external SSCC units are connected to a master SSCC3I and operated from a different battery, the following wiring must be provided for FLASH SYNC Return:

If two Revision C SSCCIII units in the same chassis are operated by separate batteries, the **N** pins of the SSCCIII power and lamp connectors must be wired together.

If an external SSCC IIIA, SSCC III PLUS, or SSCC IV is connected to a master SSCC3I:

- If the SSCC3I is Revision C or earlier, the negative terminals of the master SSCC3I and external SSCC must be wired together.
- If the SSCC3I is Revision D or later, the SSCC3I **FLASH SYNC** return (-) must be connected to **N** on the external SSCC.

The terminology for flash sync control differs between a GCP 4000 and an external SSCC device. The GCP 4000 terms Master and Slave SSCC, are called “Flash Sync Out” and “Flash Sync In” respectively in an external SSCC (Slave = Flash Sync In).

## Release Track

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

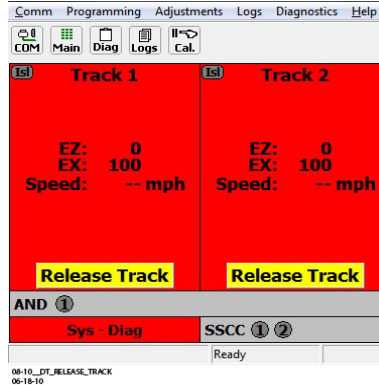


Figure 28: Release Track Window

TROUBLESHOOTING

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

Select a displayed error description and the lower portion of the screen opens a window to show a list of possible causes for that error.

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

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

## Diagnostics Log

The diagnostic log provides a time and date stamp of all previous errors. Select **DIAG**, then **DIAGNOSTIC LOG**. Can be used to provide important information for intermittent track or equipment problems.

Log is stored in the Display Module.

Captures events only while the Display Module is connected to the GCP.

Can be cleared by maintainer after being reviewed.

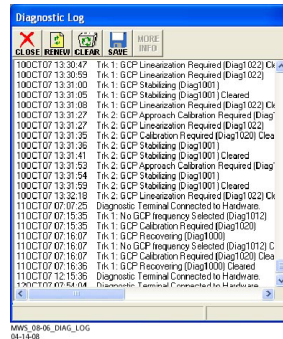


Figure 29: Diagnostic Log

Refer to the Troubleshooting Flow Chart, on Figure 30 Page 85 and Figure 31 on Page 86, to assist in system and track problem diagnosis.

## Maintenance Call Lamp Output

### **NOTE**

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

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

The maintenance call output de-energizes when:

The SEAR2I application program detects low voltage, power off indication or other custom conditions in the railroad specific application program.

The CPU detects a battery voltage less than the programmed and enabled low battery threshold.

An enabled SSCCIII module is unhealthy.

An enabled SSCCIII module with low voltage detection “On” detects a battery voltage less than the programmed low battery threshold.

The maintenance call repeater input is enabled and the maintenance call input is low.

The maintenance call output is low when using SSCC IV and it detects low battery or vehicle detect health input is used and it is low

Out of Service inputs are used and they are energized  
SEAR is used but not in session with GCP CPU

## Transfer Output

When the 4000 GCP system is healthy, the transfer output is energized (on) as shown by LED2 lit on the active CPU module.

This output level stops the Transfer Module from counting down and transferring to the opposite side when the Transfer Module is in the auto mode.

The transfer output is de-energized (off) when:

a module is programmed as used but is not communicating with the CPU.

MS/GCP or Island operation on a Track Module is unhealthy.

PSO is unhealthy

a vital output on a Track or RIO Module is commanded on, but the module cannot provide the 12-volt output.

Troubleshooting information regarding each module may be found at:  
CPU Module Table 24  
Track Module: Table 25, and Table 26  
PSO Module, Table 27  
Table 28

TROUBLESHOOTING

# Troubleshooting Flowchart

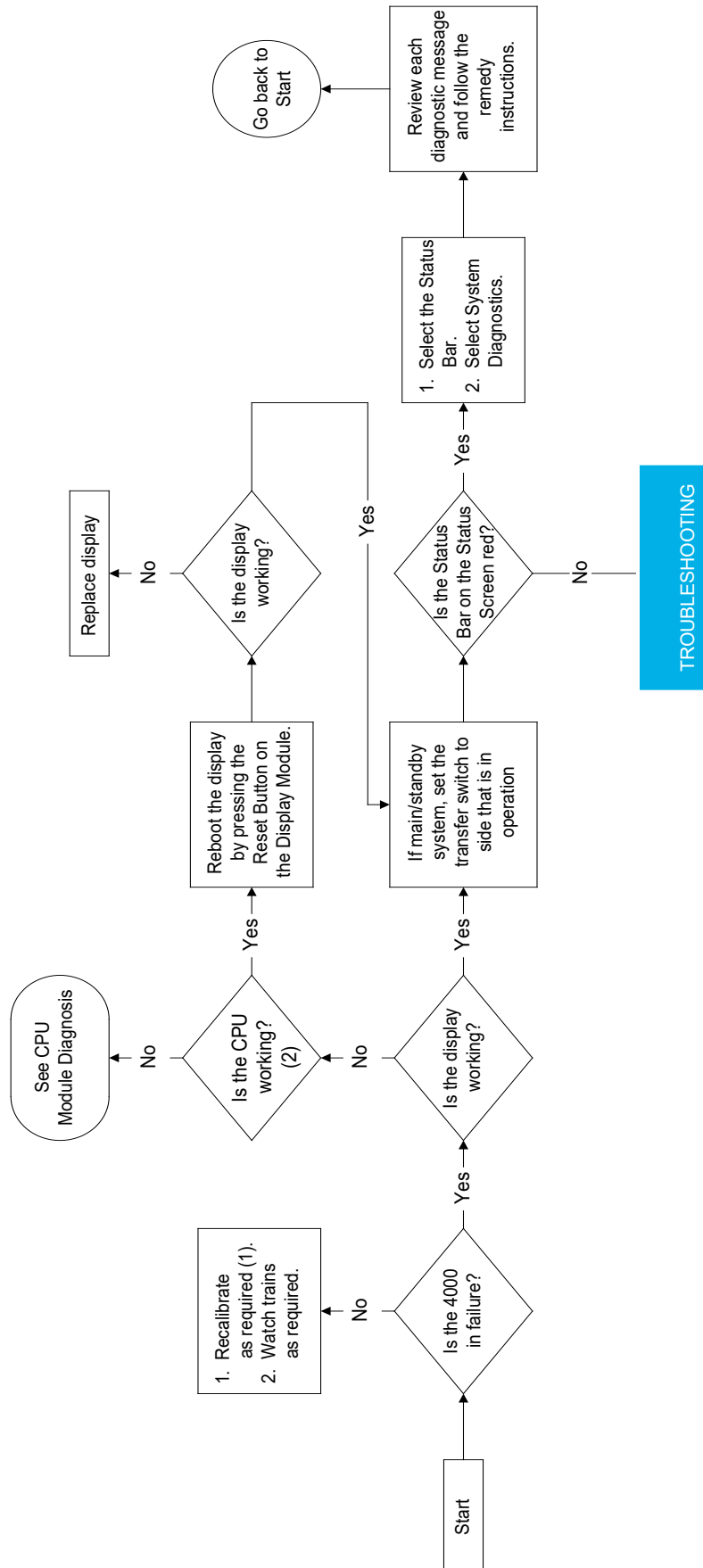
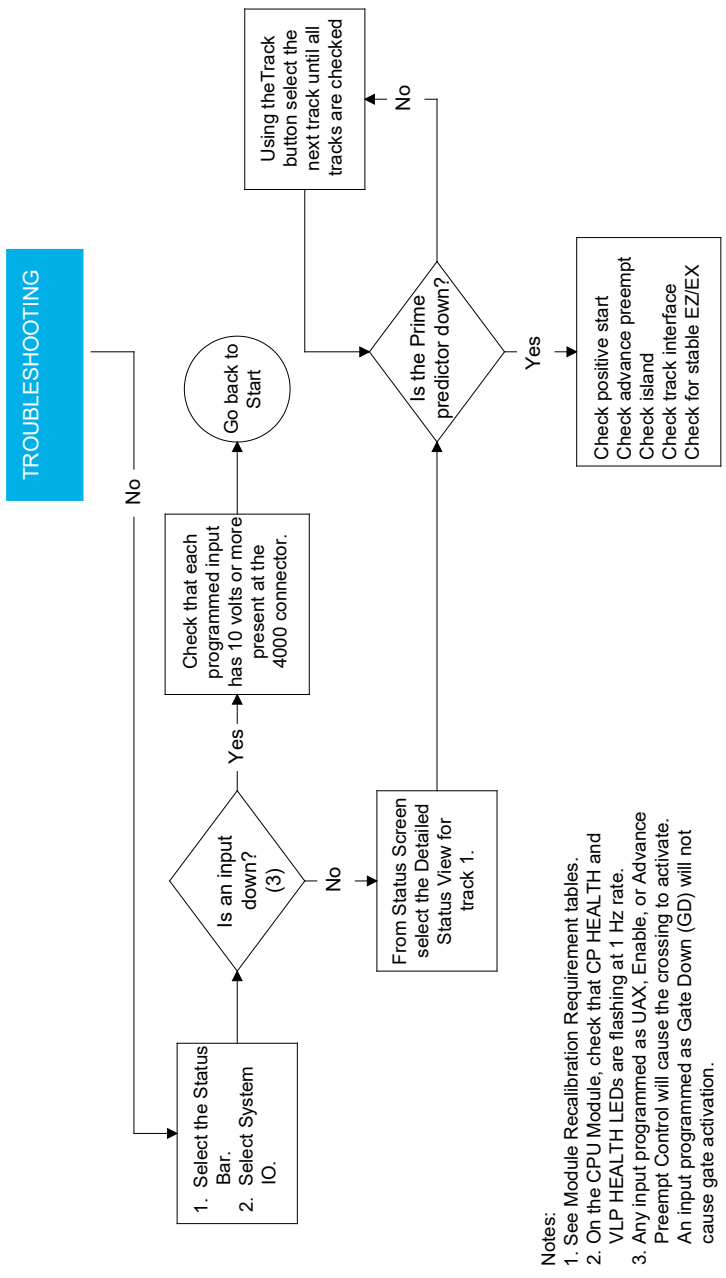


Figure 30: Troubleshooting Flowchart (Part 1)



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**Figure 31: Troubleshooting Flowchart (Part 2)**

## TESTING TRACKSIDE EQUIPMENT

### Testing Insulated Joint Couplers

**Table 29:  
Insulated Joint Coupler Test**

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

TROUBLESHOOTING

**Table 30:  
PSO Insulated Joint Coupler (Tuned) 7A422-f Test**

<b>Step 1</b>	Connect a hardwire shunt on the crossing side of the joint coupler.
<b>Step 1</b>	Note the PSO RX value: _____
<b>Step 2</b>	Move the hardwire shunt to the termination side of the joint coupler.
<b>Step 3</b>	Note the PSO RX value: _____
<b>Step 4</b>	Remove the hardwire shunt.
<b>Step 5</b>	Note the difference in PSO RX values in steps 2 and 4. If difference is greater than ten percent (10%) one or both couplers may be defective

## Testing Rail Bonds

**Table 31:  
Rail Bond Test**

Step 1	Note the EX value with no shunt _____
<b>Step 2</b>	Place a hardwire shunt at the 50% point of the approach.
<b>Step 3</b>	Note the EX value: _____
<b>Step 4</b>	Note the difference in EX values in steps 1 and 3. An EX value <b>always</b> increases as a shunt is placed closer to the crossing. If the EX value recorded in step 3 is greater than the EX value in step 1, the bad bond is between the hardwire shunt and the termination. If the EX value recorded in step 3 is lower than the EX value in step 1, the bad bond is between the hardwire shunt and the crossing.
<b>Step 5</b>	Continue placing the hardwire shunt closer or further away from the starting point, based on the value in step 3. When the EX value increases, the last bond passed is the bad bond.

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

TROUBLESHOOTING

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

**Table 32:  
Termination Shunt Test**

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



## Troubleshooting A De-energized Predictor

This subsection describes the method of troubleshooting a problem in a system that has previously been in service. The first step in troubleshooting a problem is to determine whether the GCP track circuit continuity and components of a 4000 GCP system are healthy.

When the 4000 GCP system is healthy it shows the following:

Track windows:

- are gray (or white if a train is present) on DT Display
- have no calibration required messages on DT Display
- System Status bar on DT Status Screen is green
- Health LEDs on all module (CPU, Track, RIO, SSCCIII) are flashing slowly (1HZ)

Transfer Module display time is not counting down

SEAR Alarm LED's indicate that no alarms are present

CPU LED **1** is on, indicating that the Maintenance Call output is on

CPU LED **2** is on, indicating that the transfer signal is not allowing transfer

Power LEDs on all modules are on and steady

If the system is unhealthy use the System Diagnostics or the Track Diagnostics to locate the problem.

Refer to the Troubleshooting Flow Chart, Figure 30 and Figure 31, to assist in system and track problem. If the track module is healthy, predictors can be de-energized for the following reasons:

**Table 33:**  
**Troubleshooting a De-energized Predictor**

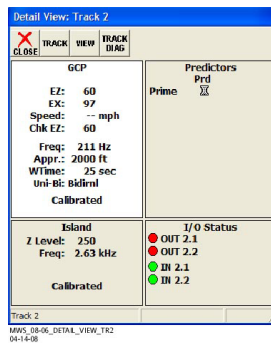
Reason	How
The track module senses that EZ is decreasing at a rate that is fast enough to trigger the prediction.	An approaching train.
The predictor (usually Prime and Preempt) has a zero offset distance and the island used by the MS/GCP is de-energized	If the Island LED on the Track Module is off the island is de-energized.
The predictor is running its pickup delay	If the Track Module LED for this predictor is flashing or the Track Detail View shows an hour glass symbol for the predictor, the predictor is running its pickup delay. If the predictor does not recover after its programmed pickup delay time, it should be treated as de-energized.

**Table 33:  
Troubleshooting a De-energized Predictor**

Reason	How
Positive Start is enabled and the EZ level is below the programmed Positive Start EZ Level	Positive start is de-energizing the predictor. Enabled in the GCP: track n pos start program menu. Predictor remains de-energized while the EZ is less than the positive state level plus 5. The current Track Module EZ is shown on the module's 4-character display and the Track Window of the DT Status Screen.
An UAX input is deenergized	A UAX input is programmed for the Track Module and the input is not energized or is running UAX Pickup delay.
A DAX Enable input is deenergized	A DAX Enable input is programmed for the Track Module and the input is not energized or is running DAX Enable Pickup delay.
A Preempt Health input is deenergized	A Preempt Health input is programmed for the Track Module and the input is not energized.
Interference is causing large EZ fluctuations which appear to be an approaching train	The rapid fluctuation of the displayed track EZ level by 5 to 10 points (or more) indicates the presence of interference.

TROUBLESHOOTING

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



**Figure 32: Track Detail Status View – Predictor Running**

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

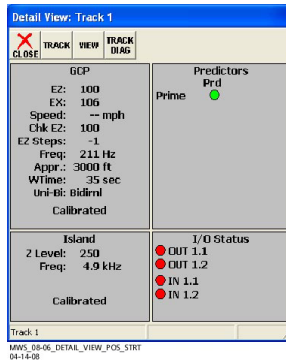


Figure 33: Track Detail Status View – Positive Start

### High EZ and Low EX History & Calibrated Approach

When in the track detail screen, selecting VIEW allows selection of the high EZ and low EX history (HEZ LEX) and the Computed Approach distance for that track. The HEZ and LEX values are useful in determining when the EZ was high and when the EX was low. The maintainer may reset this information after review.

TROUBLESHOOTING

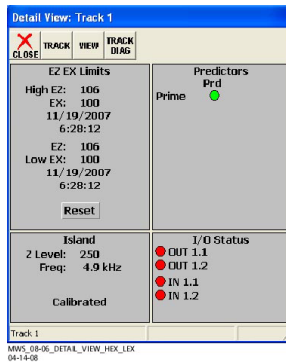


Figure 34: Track Detail Status View – HEX and LEX

### NOTE

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

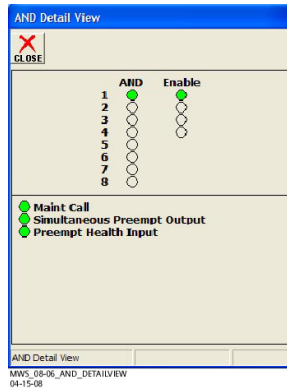
### Troubleshooting A Physical 4000 GCP Input

To determine the status of the physical inputs and outputs, select **SYSTEM IO** in the **VIEW** menu. View either Input Only, Output Only, or Input/Output by pressing the MODE button.



Figure 35: System IO Window

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



**Figure 36: AND Detail View Window**

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

TROUBLESHOOTING

<b>Table 34: Troubleshooting Inputs</b>	
<b>Step 1</b>	Determine the connections to the physical inputs by referring to the circuit plans for the location. These inputs may include: a DAX circuit from a remote site a preempt health input from a traffic preempt relay other external inputs
<b>Step 2</b>	If the input is connected to other equipment that is not in this bungalow, go to step 5.
<b>Step 3</b>	Verify that the output of the other equipment is energized using either the indications from that equipment or a meter.
<b>Step 4</b>	If the output of the other equipment is energized but the GCP input is not, check the wiring between the equipment and the GCP.
<b>Step 5</b>	Using a meter, check the remote connection input at the point it enters the bungalow. If the input is energized, go to the remote site and check the output. If the input is de-energized, check the wiring from this point through to the GCP terminals.

## **WARNING**

**IF APPROACH LENGTH IS REDUCED,  
MAXIMUM TRAIN SPEED MUST ALSO  
BE CORRESPONDINGLY REDUCED**

## **NOTE**

A power up lockout is indicated by a **Release Track** message that appears at the bottom of the corresponding Track Status Window. The lockout caused by the train shunt (EZ < 3) may be cleared by:

- accessing the Diagnostic Terminal Status Screen
- selecting the displayed message block within the affected Track Status Window

### **Troubleshooting Maintenance Call (MC) Light Problems**

Several operations in the 4000 GCP system will turn-off the MAINT CALL (MC) light. This procedure assumes:  
The warning devices are not activated and modules are healthy, including SSCC IV and SEAR2I if used. (If system status bar is red, proceed with Troubleshooting Flowchart, Figure 30 and Figure 31)  
No track is out-of-service  
MC operation is being placed in service for the first time and wiring must be checked.

The following procedure checks the most common items first. If the MAINT CALL light does not turn on after a step, proceed to the next step.

Observe LED 1 on CPU module (MCF Defined LED's, Figure 171), or **Maint Call** on **AND Detail** screen  
If LED 1 is on, or Maint Call is Green, go to step 3.  
If LED 1 is off, or Maint Call is Red, go to step 2.  
Refer to the circuit plans for the location and if a Maintenance Call Repeater Input is used, verify that the MC Repeater input is on. Check input LED on corresponding module, or check View System IO on System Status Bar. (On the **7 ADVANCED programming** screen, select **Site Options**. If the **Ext Maint Call Input** is set to **Yes**, an input must be programmed on an input assignment screen to **Maint Call Rpt IP** and the input must be on.)

Determine that the MC light functions by testing the lamp circuit as follows:

Measure DC voltage between **B** (+ meter lead) and **MAINT CALL** (MC) out (- meter lead) on the green connector above the CPU.

If voltage is within 0.5 volts of B, then the lamp or lamp circuit is open and must be repaired.

If voltage is less than 1.0 volts, go to next step.

Measure between **N** (- meter lead) and **MC** (+ meter lead) on the green connector.

If voltage is within 0.5 volts of B, then the lamp circuit is okay, but the MC output is off.

If LED 1 is on, replace CPU module

If LED 1 is off, go to the next step

Battery voltage may be low:

- If **Low Battery Enabled** is set to **ON** (on **11 SITE programming** screen), verify that the voltage on the CPU battery connector is more than the **Low Battery Level** shown.
- If **Low Battery Detection** is set to **Yes** (on **8 SSCC programming, SSCC: 1** screen), verify that the voltage on the SSCC 1 battery connector is more than the **Low Battery Level** shown.
- If **Low Battery Detection** is set to **Yes** (on **8 SSCC programming, SSCC: 2** screen), verify that the voltage on the SSCC 2 battery connector is more than the **Low Battery Level** shown.
- If a SEAR2I is used it may monitor power off inputs (POK), external Battery Monitor or other SEAR2I Application Program specific logic.  
Temporarily turning the SEAR off may isolate the MC problem:
- On the display, press **PROG**  
Select 2 BASIC Configuration  
On the **SEAR Used** line, press the **Yes**  
When 'New Value' updates to **No**, press **Update**  
If the MC light turns on, turn the SEAR2I back on:  
Select 2 BASIC Configuration  
On the SEAR Used line, press the **No**  
When New Value updates to **Yes**, press **Update**.  
Refer to the circuit plans for the location and:  
Verify that the SEAR Site Setup is accurate.  
Verify all POK inputs are on.
- If used, verify that SEAR2I Application Program MC related parameters are correct. (Refer to SEAR2I Application Configuration Manual, SIG-0008-XX)
- On the display, press the **SEAR** button (on PC with HyperTerminal follow similar steps), then:  
Select **MENU**  
Press Down Arrow until **DIAG/MONITOR** is displayed, then press **ENTER**.  
Press Down Arrow until **Network I/O** is displayed, then press **ENTER**.  
Press Left or Right Arrow until **MODULE TO MONITOR?** displays **GCP4K**, then press **ENTER**.  
If **GCP4K COMM STATUS** is **Bad**, refer to the circuit plans for the location and verify the ATCS address of the GCP 4000 and the SEAR2I.  
If ATCS addresses are correct, replace CPU module.  
If **GCP4K COMM STATUS** is **Good**, replace the CPU module.  
If the MC light stays off, turn SEAR2I back on:  
Select 2 BASIC Configuration  
On the SEAR Used line, press the **No**  
When New Value updates to **Yes**, press **Update**  
If the MC light remains off, replace SEAR2I.  
If unit is redundant, transfer to opposite set of modules.

## **WARNING**

**AT CROSSINGS USING MEFS XNG02\_00.MEF AND EARLIER, GATES WILL BEGIN TO LOWER IMMEDIATELY (WITHOUT GATE DELAY TIME) WHEN THE TRANSFER SWITCH IS USED TO SWAP BETWEEN HEALTHY UNITS. USE CAUTION WHEN TRANSFERRING CONTROL TO AVOID GATES HITTING VEHICLES OR PEDESTRIANS.**

If the MC lamp turns on, replace the initial CPU module.  
If the MC lamp stays off, call Inv0ensys Rail Technical Support.

## **TESTING FOR TRACK CIRCUIT ISSUES**

### **Track Circuit Problems**

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

If EZ and Check EZ move higher or lower than normal, but remain relatively equal to each other, the track circuit problem lies on the transmitter side of the crossing.

If EZ and Check EZ move higher or lower than normal, but their values differ by more than 5, the track circuit problem most likely lies on the receiver side of the crossing.

### **Low EX**

A Low EX condition exists when EX is below 39.

If a low EX condition is occurring at a cutover of a new installation, check the following:

Defective Bonds

Defective insulated joint couplers

Missing battery choke in approaches

Defective gauge rods or switch rods

Open termination shunt

Improper application of other frequency NBS in the approaches.

When low EX occurs at an in-service crossing, follow the steps shown in **Table 35** to determine whether the Low EX Adjustment can safely be lowered below 39.

Low EX condition commonly occurs at an in-service crossing when track conditions are extremely wet and possibly salted.

## **WARNING**

**DO NOT LOWER THE LOW EX ADJUSTMENT BELOW 39 IF THERE IS NOT A 5 POINT DROP IN EZ.**

**Table 35:  
Low EZ Qualification Test**

<b>Step 1</b>	With EX below 39, connect a hardwire shunt at the termination shunt of the longest approach.
<b>Step 2</b>	Record the EZ value: _____
<b>Step 3</b>	Move the hardwire shunt in to the 90% point of the approach.
<b>Step 4</b>	Record the EZ value: _____ If the EZ value at the 90% point is at least 5 less than the EZ value at the termination shunt (step 2), the Low EX Adjustment can safely be lowered below 39, proceed to step 5. If the EZ values do not drop 5 points, the Low EX Adjustment cannot be safely lowered below 39. Do not continue.
<b>Step 5</b>	Scroll to <b>Program View &gt; 8) GCP Miscellaneous</b> . The <b>TRK "N": GCP Miscellaneous</b> screen opens
<b>Step 6</b>	Press <b>Enter</b> to select the Low EX Adjustment value. The <b>Low EX Adjustment</b> screen opens.
<b>Step 7</b>	Enter a new EX value between 34 and 39, press <b>Enter</b> . The new value appears as the <b>Low EX Adjustment</b> entry value
<b>Step 8</b>	Press the <b>BACK</b> button until <b>Program View</b> appears again.

TROUBLESHOOTING

**Nuisance Activation – Rail Phase Check**

In situations where EZ shifting between 5 to 20 points concurrently with EX is shifting from 2 to 5 points, checking the rail to ground voltage is required. From within the enclosure, measure the AC voltage from RCV1 to ground, and then measure the AC voltage from RCV2 to ground. The ideal measurement is identical. If  $V_{RCV1}$  differs from  $V_{RCV2}$  by approximately 0.75V or higher, nuisance activations may occur. Typically, the cause of this problem is a failing insulating joint or arrester in the signal block

**WARNING**

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

**CAUTION**

FOLLOWING INSTALLATION OF DUAL COUPLERS OR DUAL SHUNTS AROUND INSULATED JOINTS, VERIFY PROPER OPERATION OF THE TRACK CIRCUIT PRIOR TO PLACING IT INTO OPERATION.



## OUT OF SERVICE FEATURE

### **WARNING**

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

This section describes:

How to take a track out of service.

What logic functions are bypassed and the affect of that bypass on other modules and I/O

How to place the track circuit(s) back in operation

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

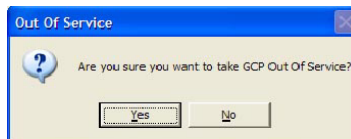


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04-14-08

TROUBLESHOOTING

**Figure 37: Out of Service Window – GCP In Service**

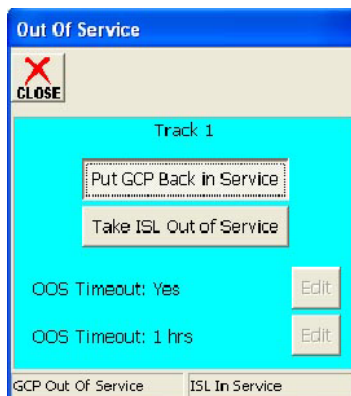
When the TAKE GCP OUT OF SERVICE is clicked, the following message will appear.



MWS\_08-06\_OOS\_CONFIRM  
04-14-08

**Figure 38: GCP Out of Service Confirmation Window**

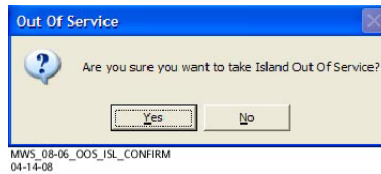
Once the GCP approach is taken out of service the option to TAKE ISL OUT OF SERVICE is presented.



MWS\_08-06\_OOS\_TR1\_RT5  
04-14-08

**Figure 39: Out of Service Window – GCP Out of Service**

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

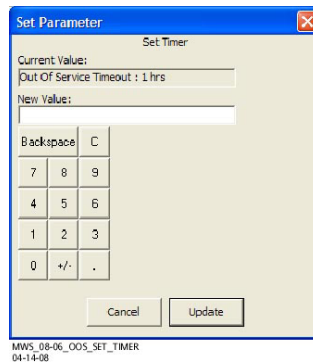


**Figure 40: Island Out of Service Confirmation Window**

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

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

TROUBLESHOOTING



**Figure 41: Set Out of Service Timeout Window**

### **NOTE**

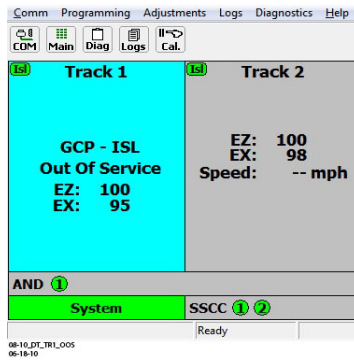
If one or more tracks are taken out of service, the Out of Service Timeout covers all tracks taken out of service with one time interval.

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

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

The following will be displayed to indicate the final selections.

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



**Figure 42: GCP 4000 DT Window – Track 1 OOS**

To return the track(s) and island(s) to service, touch the desired TRACK STATUS screen and select the OUT OF SERVICE menu. Select **Put ISL Back in Service**.



TROUBLESHOOTING

**Figure 43: Return Track to Service Window**

The GCP is returned to service in the same manner: Click on **Put GCP Back in Service**. The default OOS window appears.



**Figure 44: Out of Service Window – Track 1 in Service**

When the tracks are unselected, they are back in service.

**WARNING**

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

## Out of Service Inputs

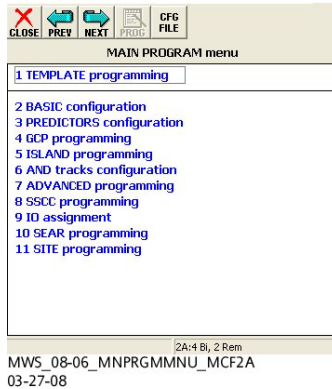
Sometimes it is desired to have an additional step be required to take a track out of service. When Out of Service Inputs are programmed, an input must be energized as well as the track out of service box checked for the track to be taken out of service.

### **WARNING**

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

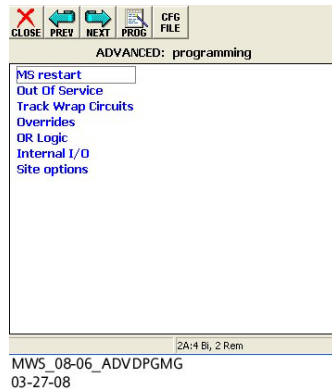
The Out of Service Input programming is found in the following screen by selecting ADVANCE PROGRAMMING.

TROUBLESHOOTING



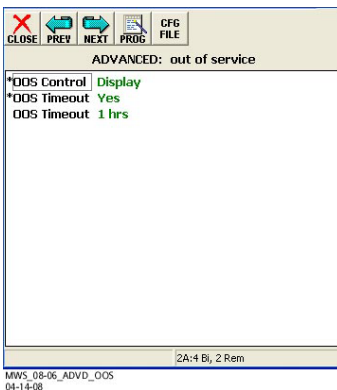
**Figure 45: MAIN PROGRAM menu Window**

Then select Out of Service.



**Figure 46: ADVANCED: programming Window**

The following screen will appear.



**Figure 47: ADVANCED: out of service Window**

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

### Return Track to Service

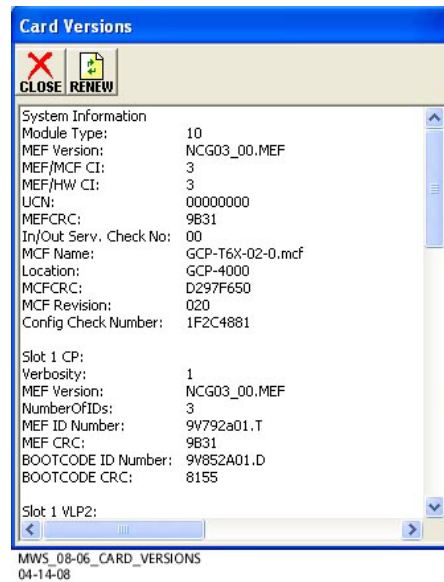
De-energizing the Out of Service Input or un-checking the track Out of Service box will return the track to service.

#### NOTE

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

### SOFTWARE VERSIONS

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



TROUBLESHOOTING

**Figure 48: Card Versions Window**

The SEAR2I software versions are determined by selecting the SEAR button on the display. Select MENU on the SEAR Keypad Display screen. Use the UP Arrow until the display says MAIN MENU VERSIONS. Press ENTER and display will alternate between the Executive and Application software version names.

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

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## PROGRAMMING

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

### **WARNING**

**PROGRAM CHANGES MUST BE PERFORMED IN ACCORDANCE WITH RAILROAD PROCEDURES.**

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

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

Each template:

Provides the simplified programming menus and programming defaults for a typical track arrangement and application

Predefines default parameters for train detection

Has rules that specify which:

Track circuits are unidirectional and bidirectional

Track circuits have islands (indicated by an \*)

Islands are connected to multiple track circuits

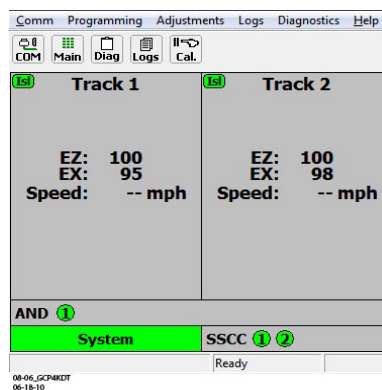
Track circuits are remote and DAX towards the crossing

Track circuits are remote and DAX away from the crossing

### **PROGRAMMING THE GCP 4000**

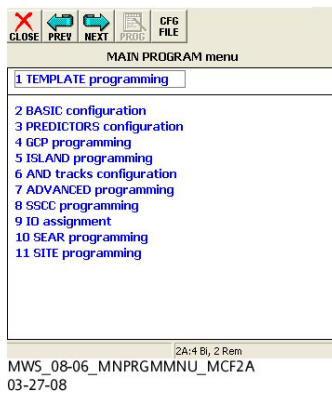
#### **NOTE**

Please refer to the Railroad Installation Drawing or the Installation Plans for the exact parameters to be entered when programming the GCP 4000.



**Figure 49: GCP 4000 DT Window**

To program the GCP 4000, select **PROG** from the GCP 4000 DT Window. The **MAIN PROGRAM** menu Window opens.



**Figure 50: MAIN PROGRAM menu Window**

The GCP can then be programmed using either the **1 TEMPLATE programming** feature, which passes through each upper level template used in the MCF, or by going through each individual submenu, i.e., **2 BASIC configuration, 5 ISLAND programming, 9 IO assignment**, etc.

**WARNING**

**THE GCP 4000 DISPLAY TERMINAL (DT) IS NOT CURRENTLY CONFIGURED TO ACCEPT DISTANCES MEASURED IN METERS. THEREFORE, NO METRIC DISTANCE UNITS ARE USED TO PROGRAM PARAMETER VALUES ON THE GCP 4000.**

PROGRAMMING



## FIELD AND SUPERVISOR PASSWORDS

### **NOTE**

Field and Supervisor Passwords are used only on GCP 4000s running MCF gcp-t6x-02-0.MCF or newer that have Display II Modules, P/N A80407-03 that are use software version 4.8.0 or higher. Older versions of the MCF or older versions of the Display Panel and DT software have the Password Access feature found on the **SITE: programming** Window.

Asterisks (\*) that appear in the menus depict parameters that may reveal additional parameters when chosen

The GCP 4000 Crossing System using cp-t6x-02-0.MCF or higher with a Display II Module using DT version 4.8.0 or higher have a two tier password system. The two types of passwords are Field Passwords and Supervisor Passwords. Supervisor Passwords are assigned to senior personnel who design the programming of the GCP. Field passwords are assigned to Field Maintainers. The Field Passwords are discussed in this manual.

There are now four methods of access to the 4000 GCP's editable parameters:

No Passwords Used:

When both passwords are set to NO, anyone who gains access to the 4000 GCP can edit any parameter.

Field Password only used

When the Field Password only is set to Yes, no parameters may be edited without the password, and all parameters may be edited when the Field Password is entered.

Supervisor Password only used

When the Supervisor Password only is set to Yes, field parameters may be edited without the password, but once the password is entered, all parameters may be edited.

Field Password and Supervisor Password both set to Yes.

When Field Password and Supervisor Password are both set to Yes, no parameters may be edited without either password being entered: if the Field Password is entered, only those parameters editable by field personnel may be edited; if the Supervisor Password is entered, all parameters may be edited.

Information regarding Supervisor Passwords and further discussion of all GCP parameters are found in Siemens's Application Guidelines for the Microprocessor Based Grade Crossing Predictor Model 4000 Family, Document Number SIG-00-08-06.

### **LOGIN USING THE FIELD PASSWORD**

Begin the login process by selecting the **PROG** from the **GCP 4000 DT** Window. The **Enter Password** Window opens.

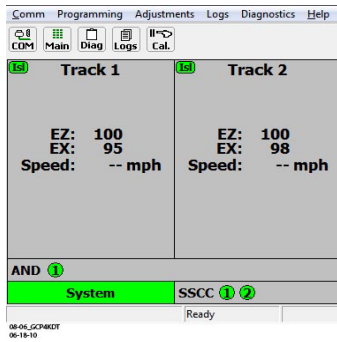


Figure 51: GCP 4000 DT Window

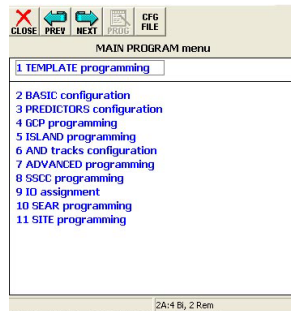


MWS\_08-06\_ENTRPSWD  
03-27-08

Figure 52: Enter Password Window

Enter the password and select **OK**. The Main Program Window Opens.

PROGRAMMING



MWS\_08-06\_MNPRGMNU\_MCF2A  
03-27-08

Figure 53: MAIN PROGRAM Window

### PARAMETERS EDITABLE USING FIELD PASSWORD

The following field editable parameters are found within the programming windows. Those items that appear in grey are not field editable when using the field password. These displays are used to set the field editable parameters governing GCP operation.



Figure 54: GCP: track "n" Window

**GCP Freq Category:** Range of values are Standard, Offset, or Other. The default setting is Standard.

**GCP Frequency:** Range of values are in a pull-down list. The default setting is Not Set.

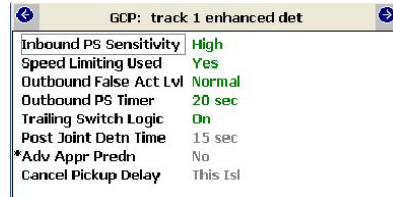
**Approach Distance:** Range of values are 0 – 9999 ft. The default setting is 9999 ft.

**GCP Transmit Level:** Range of values are Low, Medium and High. The default setting is Medium.

**Island Distance:** Range of values are 0 – 999 ft. The default setting is 199 ft. (60.7 m).

**WARNING**

**INCORRECT “INBOUND PS SENSITIVITY” SETTINGS CAN RESULT IN REDUCED WARNING TIME.**



**Figure 55: GCP: track “n” enhanced det Window**

**Inbound PS (IPS) Sensitivity:** (Formerly known as Poor Shunting (PS) level.) Range of values are Off, Max, High, Medium, Low. The default setting is High.

**Speed Limiting Used:** Range of values are Yes or No. The default setting is Yes.

**WARNING**

**INCREASING “INBOUND PS SENSITIVITY” LEVEL TO MEDIUM OR HIGH MAY RESULT IN SLOWER REACTION OF SYSTEM TO TRAINS THAT STOP ON OUTBOUND AND START INBOUND BY UP TO 0.5 AND 1 SECOND RESPECTIVELY.**

**Outbound False Act Lvl:** (This was previously known as False Activate Level.) Range of values: Normal, Medium, High. The default setting is Normal.

**WARNING**

**INCREASING “OUTBOUND FALSE ACT LVL” LEVEL TO MEDIUM OR HIGH MAY RESULT IN SLOWER REACTION OF SYSTEM TO TRAINS THAT STOP ON OUTBOUND AND START INBOUND BY UP TO 1 SECOND RESPECTIVELY.**

**Outbound PS Timer:** Range of values are 10 – 120 seconds. The default setting is 20s.

**Trailing Switch Logic:** Range of values are Off and On. The default setting is On.



**Figure 56: GCP: track “n” BIDAX RX/TX**

PROGRAMMING

**Stick EZ Value:** Range of values are 20 – 100. Default setting is 20.

**Appr Clear EZ Value:** Range of values are 0 – 80. Default setting is 80.

**RX1/RX2 Freq Category:** Range of values are Standard, Offset, or Other. The default setting is Standard.

**RX1/RX2 Frequency:** Range of values are in a pull-down list. The default setting is Not Set.

**TX Freq Category:** Range of values are Standard, Offset, or Other. The default setting is Standard.

**TX Frequency:** Range of values are in a pull-down list. The default setting is Not Set.

GCP: track 1 prime	
Prime Warning Time	35 sec
*Prime Offset Distance	0 ft
Switch MS EZ Level	10
*Prime MS/GCP Mode	Pred
Prime Pickup Delay	15 sec
*Prime UAX	IP
Prime UAX Pickup	5 sec

**Figure 57: GCP: track “n” prime Window**

**Prime Offset Distance:** Range of values 0 – 9999 ft. The Default setting is 0 ft.

PROGRAMMING

GCP: track 1 Dax A	
Dax A Warning Time	35 sec
*Dax A Offset Distance	99 ft
Switch MS EZ Level	1
Pickup Delay Mode	Fixed
*Dax A MS/GCP Mode	Pred
Dax A Pickup Delay	15 sec
*Dax A Enable	Not Used

**Figure 58: GCP: track “n” Dax “n” Window**

**\*Dax Offset Distance:** Range of values are 0 – 9999 ft. The default setting is 99 ft.

GCP: track 1 preempt	
Prmpt Warning Time	45 sec
*Prmpt Offset Distance	0 ft
Switch MS EZ Level	10
*Prmpt MS/GCP Mode	Pred
Prmpt Pickup Delay	15 sec
*Prmpt Enable	Not Used

**Figure 59: GCP: track “n” preempt Window**

**\*Prmpt Offset Distance:** Range of values are 0 – 9999 ft. The default setting is 0 ft.

GCP: track 1 pos start	
*Positive Start	On
Positive Start Level	10
Positive Start Offset	0 ft
*Sudden Shnt Det Used	Yes
Sudden Shnt Det Level	70
Sudden Shnt Det Offset	0 ft
*Low EZ Detection Used	Yes
Low EZ Detection Level	70
Low EZ Detection Time	10 min
Low EZ Det Effect	Activate
Low EZ Det Override IP	No

**Figure 60: GCP: track “n” pos start Window**

**Positive Start Level:** Range of values are 1 – 80. The default setting is 10.

**Positive Start Offset:** Range of values are 0 – 9999 ft. The default setting is 0 ft.

**Sudden Shnt Det Level:** Range of values is 5 – 75. The default setting is 70.

**Sudden Shnt Det Offset:** Range of values are 0 – 9999 ft. The default setting is 0 ft.

**Low EZ Detection Level:** Range of values is 50 – 80. The default setting is 70.

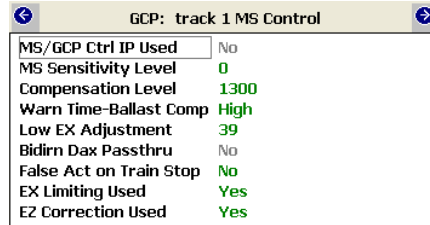


Figure 61: GCP: track “n” MS Control Window

**MS Sensitivity Level:** Provides control of motion sensitivity. Range of values are 0 – 100. The default setting is 0.

**Compensation Level:** Range of values is 1000 – 2000. The default setting is 1300.

**Warn Time-Ballast Comp:** Range of values are None, Low, Medium and High. The default setting for approaches with an island is High, the default setting for approaches with no island is Low.

**Low EX Adjustment:** Range of values are 39 to 34. The default setting is 39.

**False Act on Train Stop:** Range of values is Yes or No. The default setting is No.

**Ex Limiting Used:** Range of values is Yes or No. The default setting is Yes.

**EZ Correction Used** Range of values is Yes or No. The default setting is Yes.



Figure 62: ISLAND: track “n” Window

**Isl Frequency:** Range of values are selected from the pull down list. Default value is Not Set.



Figure 63: ADVANCED: restart track “n”

**MS/GCP Restart EZ Level:** This option appears when the **ADVANCED: MS Restart** Window’s **MS/GCP Restart** parameter is set to Yes. Range of values is 5 – 80. The default value is 80.

ADVANCED: site options	
Daylight Savings	Off
Units	Standard
Maint Call Rpt IP Used	No
Emergency Activate IP	No
*EZ/EX Logging	Periodic
EZ/EX Log Interval	4 sec
EZ/EX Point Change	3

Figure 64: ADVANCED: site options Window

**\*EZ/EX Logging:** Range of values is No logging, Change, and Periodic. The default setting is Change

**EZ/EX Logging Interval:** This parameter is visible when Periodic is selected in \*EZ/EX Logging. Range of values is 1 to 5 seconds. The default setting is 5 seconds

**EZ/EX Point Change:** This parameter is visible when Change is selected in \*EZ/EX Logging. Range of values is 1 to 5. The default setting is 3.

SSCC: 1	
SSCC-1 Number of GPs	1
SSCC-1 Number of GDs	2
Flash Rate	50
*Low Battery Detection	Yes
Low Battery Level	90 dV
Flash Sync	master
Lamp Neutral Test	On
*Aux-1 Xng Ctrl Used	Yes
Aux-1 Xng Ctrl Hlth IP	Yes

Figure 65: SSCC: 1 Window

**\*Low Battery Detection:** Range of values is Yes or No. The default setting is Yes.

**Low Battery Level:** Range of values is 90 – 150 dV. The default setting is 90 dV.

**Lamp Neutral Test:** Range of values is On or Off. The default setting is On.

PROGRAMMING

SEAR	
SEAR Subnode	99
DI 1	Not Used
DI 2	Not Used
Rly 1	Not Used
Rly 2	Not Used

[Site Setup](#)

Figure 66: SEAR Window

**SEAR Subnode:** Valid range of values is 1 – 99. The default setting is 99.

SITE: programming	
Radio Subnode	1
*Field Password	On
Field Password	9999
*Supervisor Password	On
*Low Battery Enabled	Off

ATCS Site Id  
[Time](#)  
[Location](#)

Figure 67: SITE: programming Window

**Radio Subnode:** Displays the current radio subnode value. Valid range of values is 1 – 98. The default setting is 1.

**\*Field Password:** Range of values is On or Off. The default setting is Off.

**Field Password:** Valid range of values is 0 – 9999. See your supervisor for the current Field Password.

**Low Battery Enabled:** Valid range of values is Off or On. The default setting is Off.

**Low Battery Level:** This parameter is visible when **Low Battery Enabled** is set to On. Range of values is 90 – 150 dV. The default setting is 90 dV.

**Time:** Allows setting of the Date and Time.

**Location:** Reflects the DOT Crossing Number, All other parameters may be edited when the supervisor password is used.

**ATCS INFORMATION**

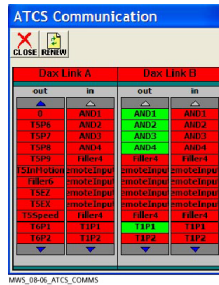
**ATCS Communication**

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

**Table 36:**  
**ATCS Communications Display Acronyms**

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

PROGRAMMING



**Figure 68: ATCS Communications Window**

**Connecting Echelon LONTALK Wiring**

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

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

**CAUTION**

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

## NOTE

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

The following rules apply when using the Echelon LAN:  
Wire size is from #22AWG to #16AWG, stranded twisted pair.

Each connection (node) must be wired in a daisy-chained bus configuration, no drops allowed (see Figure 70).

The maximum wiring length of LAN bus wiring is 425 ft (129.5 m) within a signal case or bungalow, but wiring should be kept as short as practical.

A maximum of 8 connections (nodes) is recommended within 53 ft. (15.2 m) of cable. If necessary additional cable may be added so that no more than 8 nodes are located within any 53 ft/15.2 m length. If additional connections are required, contact Siemens Technical Support for assistance.

In general, Echelon network requires a terminator for proper data transmission performance.

The Echelon network can be connected to ECH1 on the 4000 GCP and the Echelon terminator can be connected to ECH2 on the 4000 GCP

Order Network Echelon Termination Unit, part number 8000-80078-001

For further information, see Siemens's Echelon Configuration Handbook, COM-00-07-09.

PROGRAMMING

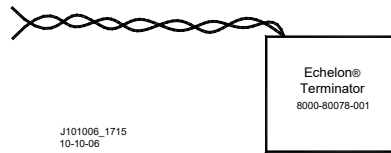


Figure 69: Siemens Echelon Terminator

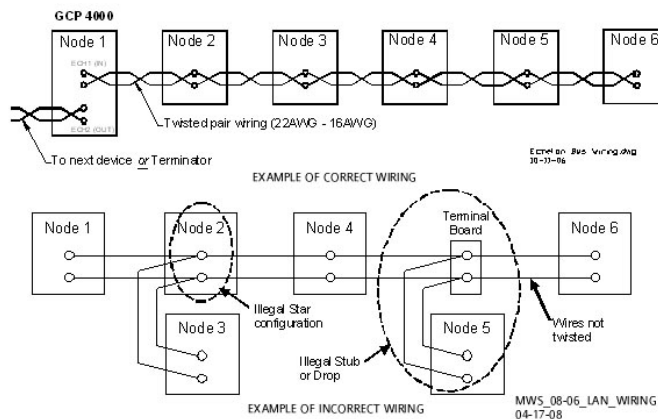


Figure 70: Echelon LAN Wiring Examples



## ATCS SITE ID ENTRY

Selecting the **ATCS Site Id** entry on the **TEMPLATE: Site Info** menu window brings up the dialog window shown in Figure 71A. This dialog window:

Displays the current Site Identification Number (SIN)

Allows the current SIN to be changed

A SIN may be changed as described in Table 37, and is controlled by six function buttons

Current SIN: 780220083116

Verify: Start of Changes  
1: SIN : 780220083116  
Number of Changes : 0001

CRC:

Backspace Clear

7	8	9	A	B
4	5	6	C	D
1	2	3	E	F
0	+/-	.		

RD 12404\_1445  
09-01-04

A

Current SIN: 780220083118

Verify: Start of Changes  
1: SIN : 780220083118  
Number of Changes : 0001

CRC:

Backspace Clear

7	8	9	A	B
4	5	6	C	D
1	2	3	E	F
0	+/-	.		

RD 12604\_0819  
01-26-04

B

Figure 71: Site Identification Number Dialog Window

### **WARNING**

**CHANGING THE SITE IDENTIFICATION NUMBER WILL RESULT IN ACTIVATION OF WARNING DEVICES.**

**BEFORE CHANGING THE SITE IDENTIFICATION NUMBER, ENSURE THAT ADEQUATE PRECAUTIONS ARE TAKEN TO WARN PEDESTRIANS, PERSONNEL, TRAINS AND VEHICLES IN THE AREA UNTIL PROPER SYSTEM OPERATION HAS BEEN VERIFIED.**



Selecting the:  
CLOSE button closes the SIN Window and returns the display to the Status Screen.



CURR. (current) button displays the current SIN in the Current SIN text box.



PEND. Button  
Changes the **Current SIN** text box to the **Pending SIN** text box.  
Displays the pending SIN in the **Pending SIN** text box.

A SIN is pending during the time interval between acceptance of a new SIN and the initiation of CPU reboot.

See Table 37, steps 5 through 7.



Apply button sends a SIN change to the Verify text box and initiates a Confirmation CRC number.



Accept button directs the DT to accept a SIN change and identify it as pending.



Cancel button clears all data from the window text boxes.

**Table 37:  
Changing Site ID Number**

<u>Step 1</u>	Select the <b>ATCS Site Id</b> entry from the <b>TEMPLATE: Site Info</b> menu window The SIN dialog window, Figure 71A, displays.
<u>Step 2</u>	Highlight the number displayed in the <b>Current SIN</b> text box. If the site identification number (SIN) is not displayed in the Current SIN text box, select the Curr. button to display the SIN.
<u>Step 3</u>	Clear the current SIN entry and enter the new SIN using the keypad at the bottom of the window. The keypad <b>Backspace</b> button clears the right-most SIN position each time it is selected. The keypad <b>Clear</b> button clears the entire SIN display.
<u>Step 4</u>	Select the <b>Apply</b> button at the top of the window. The new SIN appears in the <b>Verify</b> text box change as shown in Figure 71B. The <b>Apply</b> button deactivates (grays out) and the <b>Accept</b> button becomes active. A confirmation cyclic redundancy check (CRC) number is placed at the bottom of the <b>Verify</b> text box.

**Table 37:  
Changing Site ID Number**

<u>Step 5</u>	Use the scroll bar at the right of the <b>Verify</b> text box to display the bottom of text list. The Confirmation CRC number appears as shown in Figure 71A.
<u>Step 6</u>	Select the <b>CRC:</b> field and enter the displayed <b>Confirmation CRC</b> number using the keypad.
<u>Step 7</u>	<b><u>Press the SEL button on the front of the CPU module.</u></b> The new SIN is embedded in the Chassis Identification Chip (CIC).
<u>Step 8</u>	Select the <b>Accept</b> button at the top of the SIN Window. If the SIN window changes as shown in Figure 71B, proceed to step 10. The <b>Accept</b> button deactivates (grays out) <b>Changes succeeded</b> appears below the <b>CRC</b> text box. <b>End of Changes</b> appears at the bottom of the <b>Verify</b> text box. If Changes Failed appears below the CRC text box verify that the CRC number within the CRC text box and the Verify text box match. If the CRCs do not match repeat the procedure starting at step 7. If the CRCs match cycle power to the CPU module and repeat the procedure starting at step 1.
<u>Step 9</u>	Briefly cycle power to the power connector located above the CPU module. This can also be accomplished by cycling the Transfer Switch on redundant units. The CPU reboots. The CPU module identifies the new SIN as the current site address
Step 10	Select the <b>Close</b> button. The SIN dialog window closes and is replaced by the Status Screen.

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Close CURR. PEND. Apply Accept Cancel

Current SIN:  
780220083118

Verify: Confirmation CRC : SCDF  
End of Changes

CRC:

Backspace		Clear		
7	8	9	A	B
4	5	6	C	D
1	2	3	E	F
0	+/-	.		

R012804\_0822  
01-26-04

A

Close CURR. PEND. Apply Accept Cancel

Current SIN:  
780220083118

Verify: Confirmation CRC : SCDF  
End of Changes

CRC: SCDF

Changes succeeded.

Backspace		Clear		
7	8	9	A	B
4	5	6	C	D
1	2	3	E	F
0	+/-	.		

R012804\_0829  
01-26-04

B

Figure 72: Site Identification Number Window with CRC Display

## DIAGNOSTIC TERMINAL RUNNING ON A PC

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

### **NOTE**

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

### Installing DT on PC

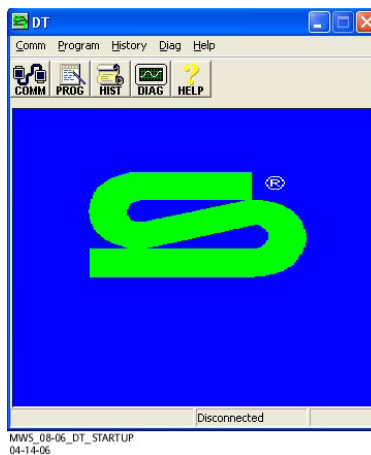
The DT is available on a CD for installation on laptop or desktop PCs.

### **NOTE**

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

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

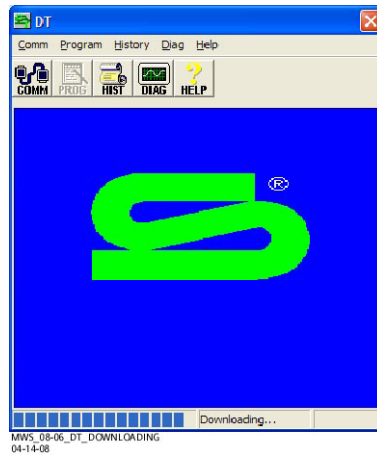
The following screen will appear.



**Figure 73: DT Startup Screen**

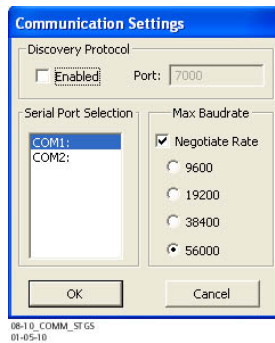
To begin a session using the DT press the **COMM** button then select **CONNECT**. While the DT is learning the GCP configuration, the following screen appears. Note the bar at the bottom of the window indicates activity.

**Figure 74: DT Startup Screen – Download in progress**



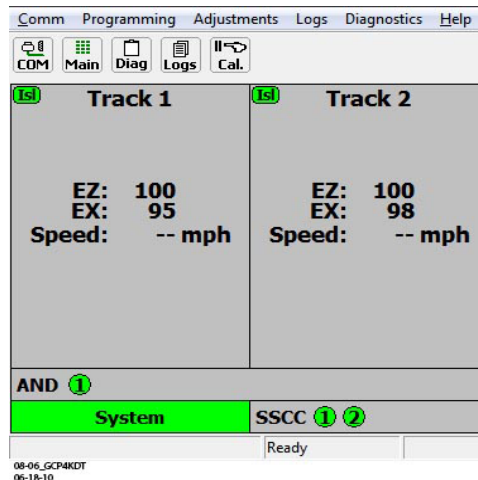
It may be necessary to set the communications port setup between the PC and the GCP. Press the COMM button, then select the **DT Port Setup** menu.

PROGRAMMING



**Figure 75: Serial Port Settings Window**

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



**Figure 76: PC Based GCP 4000 DT Window**

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

- Track Status
- Track Detailed Status View
- Track Diagnostics
- Calibrate Track
- Out of Service
- PSO Detailed Status View
- PSO Diagnostics
- Calibrate PSO
- View System Diagnostics
- View System IO

### Troubleshooting Problems on PC Based DT

PC settings may affect the appearance of the DT display and DT operation on some PCs. If the display does not appear correct or drop down menus do not function correctly, check the following items:

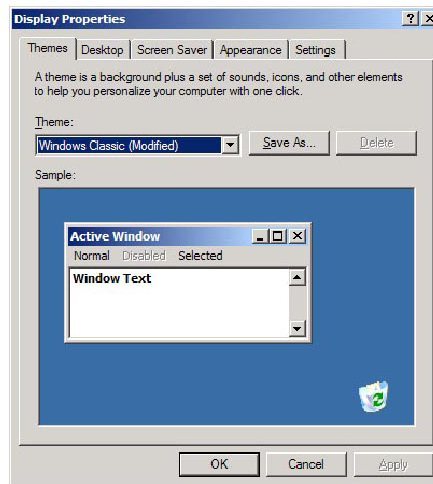
- Font is set to 'clear font'
- DPI is set to 'normal size (96 DPI)'
- Tahoma font properties are installed

#### To set display to 'clear font':

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

In the drop-down box select 'properties'.

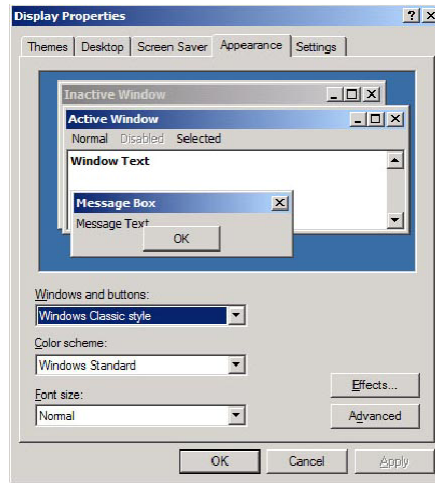
A **Display Properties** window similar to the following (depends on Windows® version used) should appear.



MWS\_08-06\_DT\_DISPLAY\_PROPS  
04-14-08

**Figure 77: Display Properties Window**

Select the 'Appearance' tab. A screen similar to the following should appear.

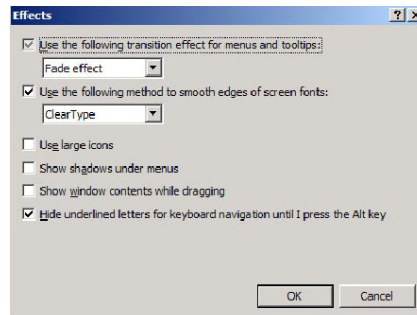


MWS\_08-06\_DT\_DISPLAY\_PROPS\_APP  
04-14-08

**Figure 78: Display Properties Window \_Appearance Tab**

Select the 'Effects' button. A screen similar to the following should appear.

PROGRAMMING



MWS\_08-06\_DT\_EFFECTS  
04-14-08

**Figure 79: Effects Window**

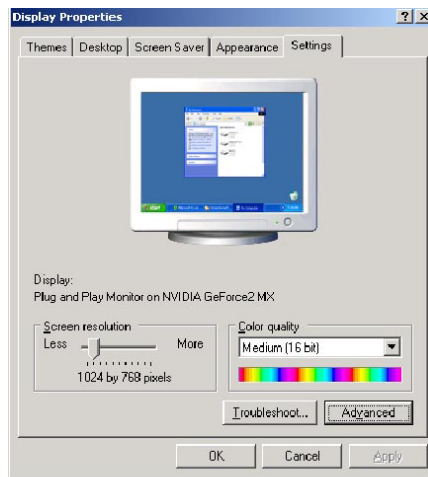
In the drop-down list below 'Use the following method to smooth edges of screen fonts', select 'Clear Type'. If the check box next to 'Use the following method to smooth edges of screen fonts' is not checked, click on this box to enable the drop-down list.

**To set the DPI setting:**

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

Select the 'Settings' tab. A screen similar to the following should appear.

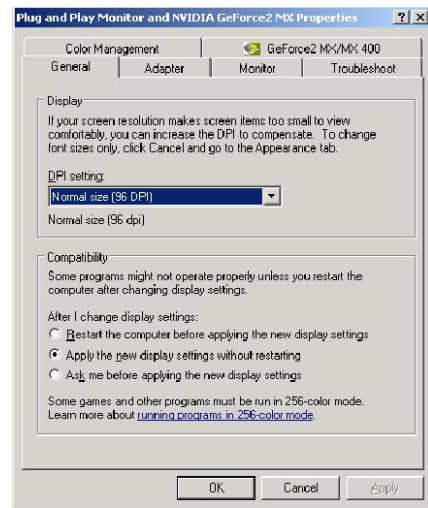




MWS\_08-06\_DT\_DISPLAY\_PROPS\_STGS  
04-14-08

**Figure 80: Display Properties Window - Settings Tab**

Select the 'Advanced' button. A screen similar to the following should appear.



MWS\_08-06\_DT\_DISPLAY\_PROPS\_MONITOR  
04-14-08

**Figure 81 Display Properties Window – Monitor Setup Window**

In the 'DPI setting' drop-down list, select 'Normal size (96 DPI)'.

**To install Tahoma font properties:**

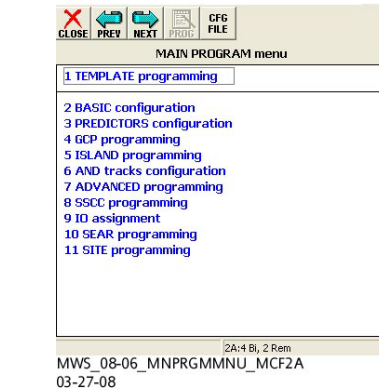
- Select the Windows® **Start** button (lower left corner of monitor display area).
- Select 'Control Panel' (earlier versions of Windows® require 'Settings' then 'Control Panel').
- Select 'Fonts'.
- On the Fonts tool bar, select 'View'.
- From the View drop-down list, select 'Refresh'.

PROGRAMMING

## Programmed Configuration Information

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

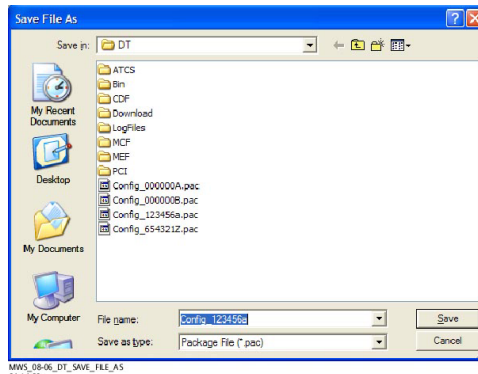
**Figure 82: MAIN PROGRAM menu Window**



PROGRAMMING

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

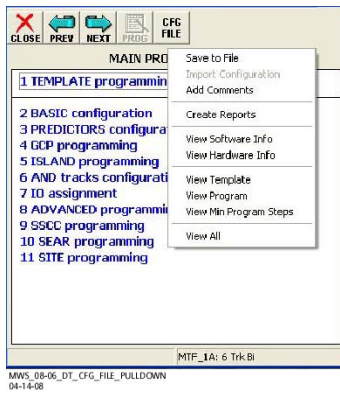
The file will be saved on the hard drive using the SAVE AS window.



**Figure 83: Save File As Window**

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

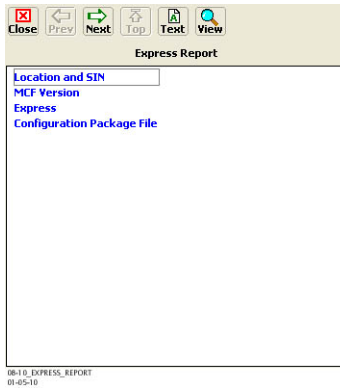
Several important options and reports are generated from the PAC file and are accessed again through the **CFG FILE** button, as seen on the following screen.



MWS\_08-06\_DT\_CFG\_FILE\_FULDOWN  
04-14-08

**Figure 84: Configuration File (CFG File) Button Options**

All View selections may be accessed from the GCP display but saving them to the PC allows easy retrieval and printing. The Express Report indicates the programming steps that were entered to transform the initial template into the site specific programming of the GCP. When a template is selected that most closely describes the track layout of the crossing, the Express Report will have information required to quickly program the unit. The above reports can be saved to the PC as text files by selecting the report, TEXT, SAVE.



**Figure 85: Express Report Window**

An example of the beginning of text file of the Express Report is shown below.



**Figure 86: Express Report**

## DIAGNOSTIC TERMINAL - INSTALLING SOFTWARE ON GCP 4000

The DT is also used to install new software issued by Siemens for the GCP 4000.

### **WARNING**

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

### **NOTE**

Follow railroad specific procedures for installing software in vital signal equipment. Companies may restrict who may install software and what additional documentation and operational checks are required.

Future software revisions will be issued with instructions that describe which module and data port (connector) the software is to be loaded into. These software instructions may supersede portions of this manual.

### **Installing Software on CPU Module**

### **NOTE**

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

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

#### CPU Module

VLP Port – File: VPH03\_20.MEF

DIAG (CP) Port – File: NCG03\_30.MEF

DIAG (CP) Port – File: gcp\_t6x\_02\_4.mcf,  
CRC=09FC363B

#### Track Module

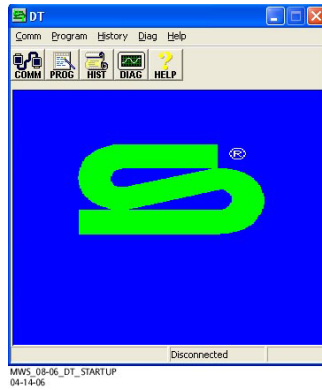
DIAG Port – File: GCP02\_30.MEF

#### PSO Module

DIAG Port – File: GPP00\_30.MEF

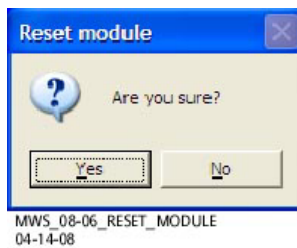
The files should be copied to a folder in the C:\Safetran\DT folder or another convenient folder on the PC that will be used to install the software.

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



**Figure 87: DT Startup Screen**

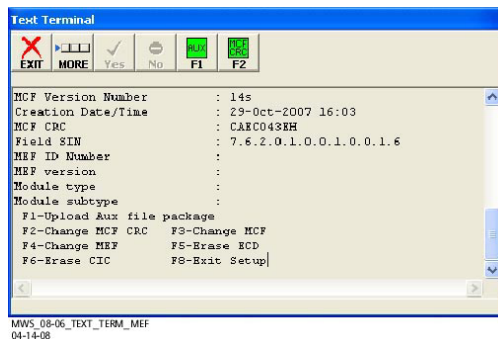
Select **COMM**, then select **Install Software**. A prompt window will ask if you want to RESET MODULE. Select



YES.

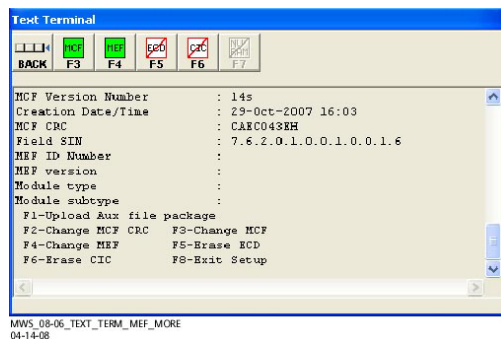
**Figure 88: Reset Module Screen**

The following Text Terminal Window will appear.



**Figure 89: Text Terminal Window**

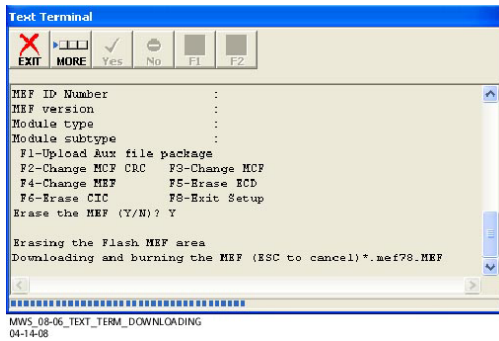
Press F4, or select MORE then the MEF/F4 button.



**Figure 90: Text Terminal Window – More Button Depressed**

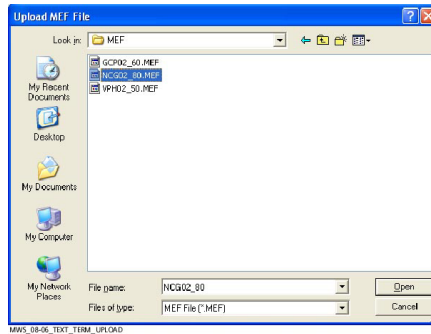
If the Erase the MEF (Y/N)? prompt is displayed, select **Y**. After erasing the previous MEF, the following window will appear.

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**Figure 91: Text Terminal Window – Download in Progress**

Select the file to be installed, in this example NCG02\_80.MEF. This may take a few minutes. While the file is downloading, progress will be indicated on the bottom

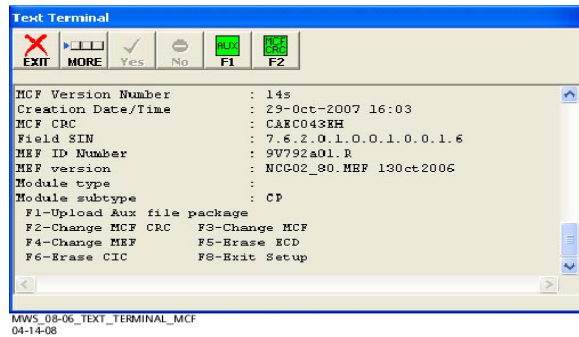


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line of the window.

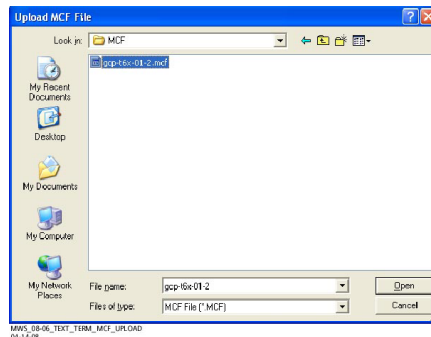
**Figure 92: Upload MEF Window**

When complete, the DT returns to the following screen:



**Figure 93: Text Terminal Window**

Select **MCF/F3** to proceed with installing the mcf file. When prompted to erase the MCF area, select **Y**. Then select the gcp\_t6x\_01\_2.mcf file.



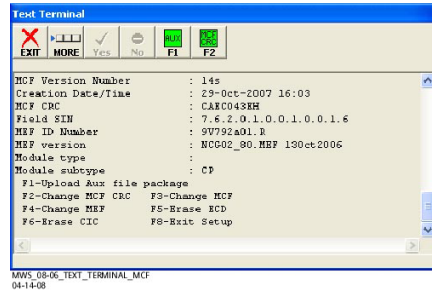
**Figure 94: Upload MCF Window**

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

**NOTE**

After the blue progress bar stops, the CPU loads a copy of the file to the ECD on the chassis. This will be indicated on the DT screen and on the 4 character display on the CPU as LOADING TO ECD. Wait until this process completes before proceeding.

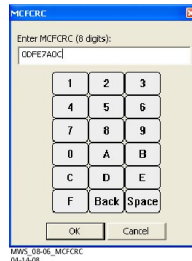
The next step is to change the CRC of the MCF. Select **F2**, or press **BACK** and then select **MCF CRC/F2**.



**Figure 95: Text Terminal Window – Change MCF CRC**

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

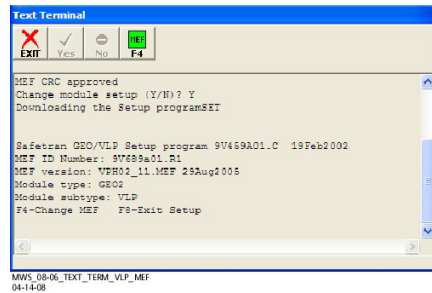
PROGRAMMING



**Figure 96: MFCRC Window**

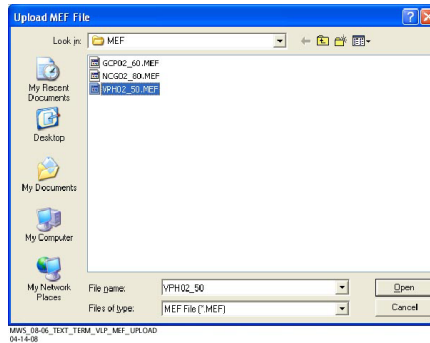
This completes the software installation on the DIAG (CP) port. Next, the software will be installed on the VLP port. **EXIT** the screen. Remove the cable from the DIAG port and connect it to the VLP port. Select **COMM** and **Install Software**.

The following screen appears.



**Figure 97: Text Terminal Window – Upload**

Select **F4** and select **Y** when asked to erase the MEF.



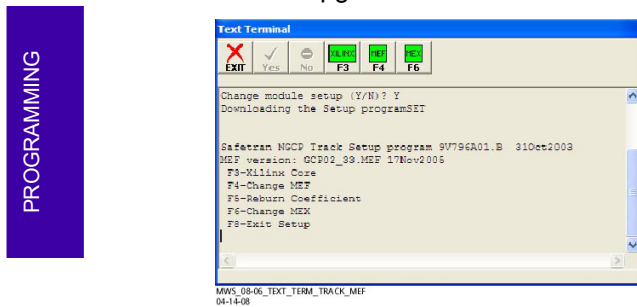
**Figure 98: Upload MEF File Window**

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

### Installing Software on Track Module

Per the instructions issued with the software revision, the next step is to install the GCP02\_60.MEF files on the Track Modules.

The track software upgrade screen is shown below.



**Figure 99: Text Terminal Window – Upload Track MEF**

Connect serial cable to DIAG Port on Track Module

From the **COMM** menu, select **Install Software**

Repeat the above steps when prompted.

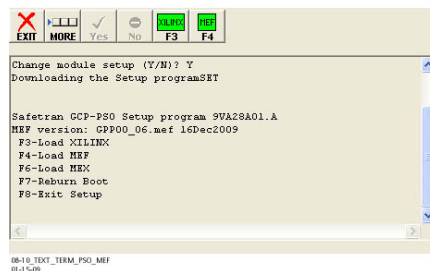
Repeat the procedure for the remaining Track Modules in the MAIN section of the GCP.

Repeat the procedure for installing all files on the STANDBY modules.

### Installing Software on PSO Module

Per the instructions issued with the software revision, the next step is to install the GPP00\_06.MEF files on the PSO Modules.

The PSO software upgrade screen is shown below.



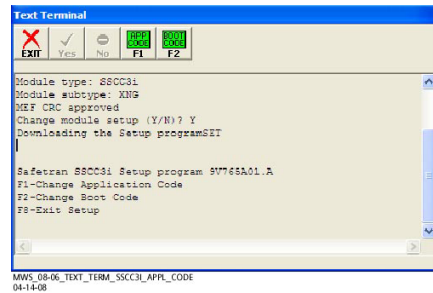
**Figure 100: Text Terminal Window – Upload PSO MEF**



Connect serial cable to DIAG Port on PSO Module  
 From the **COMM** menu, select **Install Software**  
 Repeat the above steps when prompted.  
 Repeat the procedure for the remaining Track Modules in  
 the MAIN section of the GCP.  
 Repeat the procedure for installing all files on the STANDBY  
 modules.

### Installing Software on SSCC3I Module

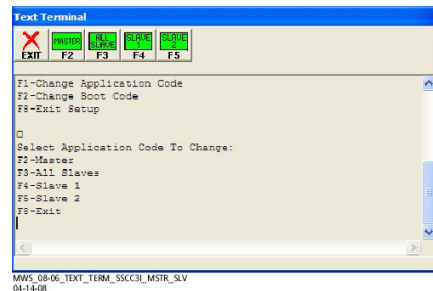
If the instructions issued with the software revision, call for  
 upgrading the software in the SSCC3I Module, the next step  
 is to install the specified MEF file on the SSCC modules.  
 The SSCC Modules have a master processor that controls  
 slave processors, which control the independent lamp  
 outputs. Therefore, there are separate MEFs for the master  
 and slave processors.  
 From the **COMM** menu, select **Install Software**.



**Figure 101: Text Terminal Window – Upload SSCC MEF**

Selecting F1 will change Application Code, which on the  
 SSCC are MEF files. When loading software for  
 Master/Slave operations, “Master” loads the MEF on the  
 Master processor and “All Slaves” loads the MEF on the  
 slave processors.

Based on the issued instructions, load the new software.  
 Repeat the procedure for the remaining SSCC3I Module.



**Figure 102: Text Terminal Window – Master and Slave  
 MEF Upload**

Loading software into the display module is discussed in  
 Appendix C - Changing Display Module Software.

### **WARNING**

**WHEN LOADING SOFTWARE INTO  
 SLAVE PROCESSORS, THE LIGHT ON  
 THE LOADING PROCESSOR WILL NOT  
 FLASH, BUT THE LIGHT ON THE  
 OTHER PROCESSOR WILL.**

## DISPLAY DT USB WIZARD

The USB Wizard is available only with the A80407-03 Display II Module based Diagnostic Terminal (DT) version 4.6.0 or higher and is not supported by the PC based DT. The USB Wizard allows GCP 4000 files to be saved to or uploaded from a USB drive. The following GCP 4000 file types can be saved to a USB drive connected to the Display Module:

Configuration Package Files (PAC files)

Train Move History Logs

Maintenance Logs

Status Logs

Summary Logs

SEAR2I

Reports

History

Incidents

The following GCP 4000 file types can be uploaded from a USB drive connected to the Display Module:

Configuration PAC files

Module Executable Files (MEF)

Module Configuration Files (MCF)

MCF Cyclical Redundancy Check (CRC)

SEAR2I

Executive Software

Control Description Language (CDL)

Ladder Logic Executive file (LLW)

Ladder Logic Label file (LLB)

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### USB WIZARD MENU

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

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

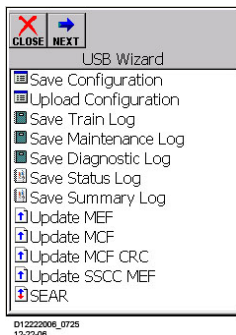


Figure 103: USB Wizard Window

### Saving Files to USB Drive

To save a file to the USB drive:

Insert USB drive in port,

Touch the appropriate function name on the USB Wizard menu and

Then press **NEXT**.

## **CAUTION**

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

## **NOTE**

The SAVE function will default to a File Name of the file type to be saved. The "save as" file name may be edited.

To edit the name of the file:

Use the stylus to pick the location of added text in the file name.

Use the keyboard to backspace, add spaces or enter letters and numbers (process similar to editing names on a cell phone).

## **Save Configuration**

Select **Save Configuration** from the USB Wizard menu. Press **NEXT**. A file save screen is displayed.

The name of the currently installed PAC file appears in the **File:** field. (Edit if necessary.)

## **NOTE**

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

Press **SAVE** button.



**Figure 104: Save Configuration Window**

## **NOTE**

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

## **Save Train/Maintenance/Diagnostic Log**

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

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



**Figure 105: Save Maintenance Log Window**

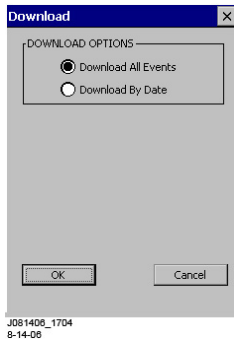
The default file name for the selected log type appears in the **File Name:** field on the log screen. (Edit if necessary.) Press **SAVE** button

**Save Status/Summary Log**

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

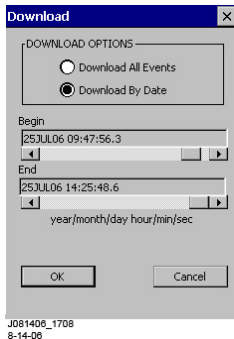
Select **Save Status / Summary Log** from USB Wizard menu, then press **NEXT**. The Download screen appears.

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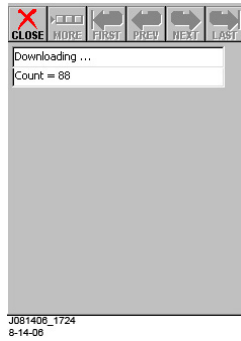
**Figure 106: Download All Events Window**

Select the Download Option.  
If Download By Date is selected, Begin and End date sliders appear.  
Move sliders to select download range.



**Figure 107: Download By Date Window**

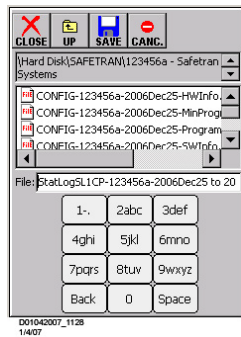
Press **OK** button.  
During download, a download status screen is displayed.



**Figure 108: Download In Process Window**

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

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

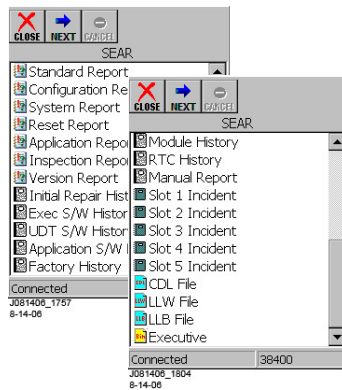


**Figure 109: Save Status/Summary Log Window**

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### Saving SEAR2I Reports and Files

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

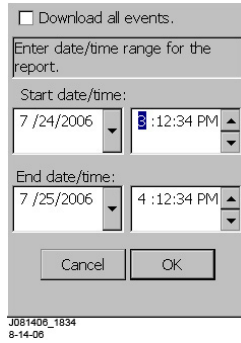


**Figure 110: SEAR Report Windows**

### Save SEAR Standard / Application Report

The **Standard Report** and **Application Report** save functions are identical.  
Select Standard Report / Application Report from SEAR report screen.  
Press the **NEXT** button.  
The event download screen appears.

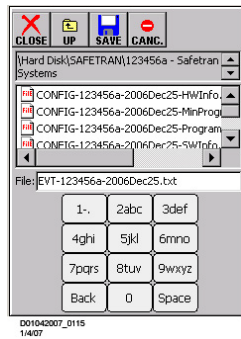
Select the Download all events check box at the top of the screen or  
 Edit Start and End dates, if desired, by selecting the browse button located to the right of the date field.  
 Edit Start and End times, if desired, by selecting the up and down arrows located to the right of the time field.  
 Press the **OK** button.



**Figure 111: SEAR Event Download Window**

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

PROGRAMMING



**Figure 112: Save Event Window**

**Saving Miscellaneous SEAR Report and History Files**

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

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

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

## NOTE

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

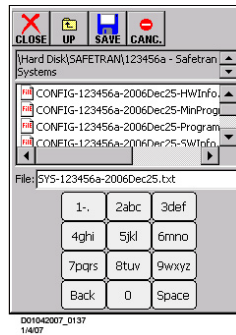


Figure 113: Save Miscellaneous Events Window

### Uploading Software From the USB Drive

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

CDL File    LLB File    LLW File

Select desired software file entry (see list above) from SEAR report screen.

Press the **NEXT** button.

On the software file select screen (see typical below), touch the desired file name in the upper window.

The file name appears in the **File:** field.

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

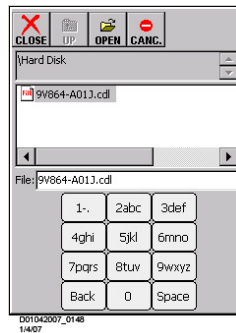


Figure 114: Upload Software Window

### Uploading SEAR Executive (.bin file)

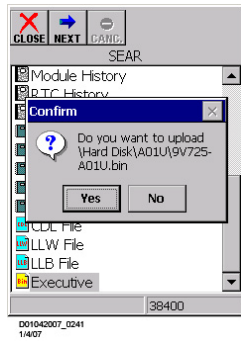
Select **SEAR** from USB Wizard menu.

Press **NEXT**. The SEAR report screen appears.

Scroll to the end of the menu and select **Executive**.

Press **NEXT**.

(This step is not necessary with Display Module A80407-03 Display II Module) Verify that Null Modem adapter is attached to the DIAG port on the Display Module. Connect the DB9 cable between the Display Module and the SEAR USER port.



**Figure 115: Update SEAR Executive Software Window**

**NOTE**

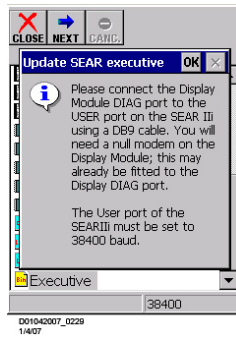
Verify that the SEAR USER port baud rate is set to 38,400 bits per second.

Press **OK**.

On the software file select screen (see typical below), touch the desired **bin** file name in the upper window.

The file name appears in the **File:** field.

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**Figure 116: Software File Select Window**

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

Confirm the correct bin file selection by pressing **Yes**.



**Figure 117: Bin File Selection Confirmation Window**

The SEAR resets and then the new executive file is sent to the SEAR (status appears at bottom of screen).

When the upload is complete the following screen appears.

Press **CLOSE**.





**Figure 118: SEAR Executive Upload Window**

**Uploading Configuration, Updating MCF and MEF**

**WARNING**

**UPLOADING A NEW CONFIGURATION, MEF, OR MCF WILL PLACE THE GCP IN A RESTRICTIVE STATE AND ACTIVATE THE CROSSING WARNING SYSTEM.**

**WHEN USING MCF GCP-T6X-01-2.MCF OR EARLIER GATES WILL BEGIN TO LOWER IMMEDIATELY (WITH GATE DELAY)**

**BEFORE UPLOADING BEGINS, TAKE ADEQUATE PRECAUTIONS TO WARN ANY PEDESTRIANS, PERSONNEL, TRAINS, AND VEHICLES IN THE AREA UNTIL PROPER SYSTEM OPERATION IS VERIFIED.**

**TESTS MUST BE PERFORMED TO VERIFY PROPER OPERATION OF GCP PRIOR TO PLACING THE SYSTEM BACK IN SERVICE**

**CAUTION**

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

**NOTE**

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

## Uploading Configuration (PAC file)

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

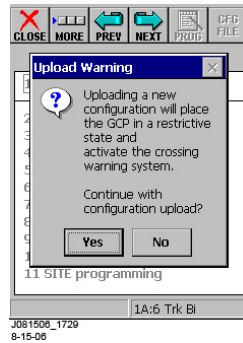


Figure 119: Upload PAC File Warning Window

### WARNING

UPLOADING A NEW CONFIGURATION WILL PLACE THE GCP IN A RESTRICTIVE STATE AND ACTIVATE THE CROSSING WARNING SYSTEM.

BEFORE UPLOADING BEGINS, TAKE ADEQUATE PRECAUTIONS TO WARN ANY PEDESTRIANS, PERSONNEL, TRAINS, AND VEHICLE IN THE AREA UNTIL PROPER SYSTEM OPERATION IS VERIFIED.

TESTS MUST BE PERFORMED TO VERIFY PROPER OPERATION OF GCP PRIOR TO PLACING THE SYSTEM BACK IN SERVICE

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Press **YES** to continue  
A prompt to save the current configuration is displayed.  
Select **YES** to save the current configuration (see **Save Configuration** on page 131).  
Select **NO** to continue without saving the current configuration.

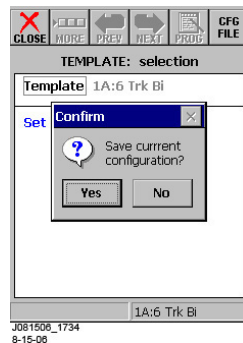


Figure 120: Save Configuration Window

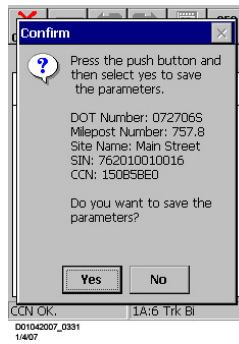
When the PAC file select screen appears, select the Configuration PAC File that is to be copied by touching the name on the display. The name will appear in the **File:** field. Press the **OPEN** button to upload the file.



**Figure 121: PAC Configuration Upload Window**

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

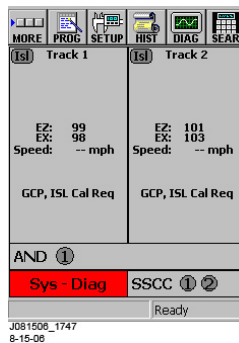
PROGRAMMING



**Figure 122: PAC Configuration Confirmation Window**

**NOTE**

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



**Figure 123: GCP 4000 DT Window**

## Checking CCN and OCCN

### **NOTE**

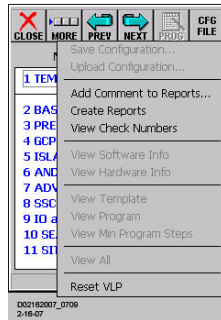
Display II Modules running Display Terminal (DT) software version 4.8.0 will display two OCCNs. The first will be the OCCN for systems using DT version 4.6.0 or older, and the second will display the OCCN for DT version 4.8.0 or newer.

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

Press the **PROG** button at the top of the Main Status screen.

Press the **CFG FILE** button at the top of the MAIN PROGRAM menu screen.

Select '**View Check Numbers**' from the menu.

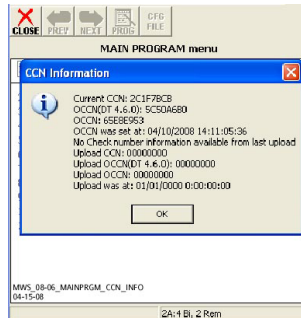


**Figure 124: View Check Numbers Window**

### **NOTE**

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

PROGRAMMING



**Figure 125: CCN Information Window**

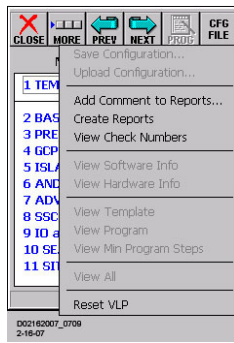
When the **CCN Information** screen appears, compare the current CCN and OCCN values to the ones presented in the Minimum Program Steps report. They should be the same. Press **OK** to return to the MAIN PROGRAM menu screen.

### **NOTE**

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

Press the **CFG FILE** button at the top of the MAIN PROGRAM menu screen.

Select '**Create Reports**' from the menu.

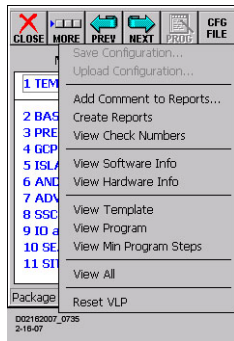


**Figure 126: Create Reports Window**

**NOTE**

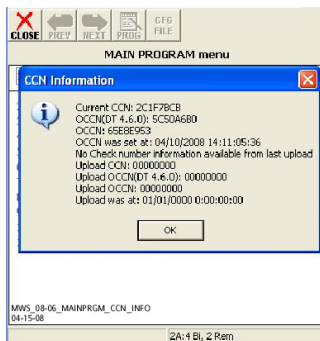
Report generation may take 3 or 4 minutes. Status is displayed in the left half of the DT status bar. When the reports are ready, 'Reports created' appears at the left end of the DT status bar.

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



**Figure 127: View Min Program Steps Window**

The Minimum Program Steps Report menu appears.  
 Minimum Program Steps Report Window  
 Select '**Check Numbers**' from the menu.  
 The OCCN and CCN are displayed at the top of the Check Numbers Window.



**Figure 128: CCN Information Window**

## Update MEF

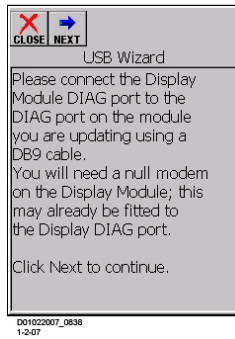
### NOTE

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

Select **Update MEF** (or **Update SSCC MEF** if appropriate) in the USB Wizard menu.

Press the **NEXT** button.

A prompt screen appears instructing user to connect a DB9 serial cable between the Display Module DIAG port and the DIAG port of the module to be updated.



**Figure 129: USB Wizard Message Window**

PROGRAMMING

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

Press NEXT.

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

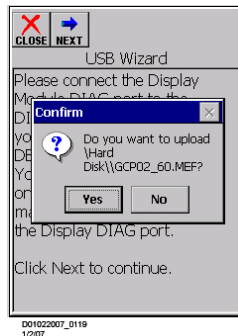


box.

**Figure 130: Copy MEF Window**

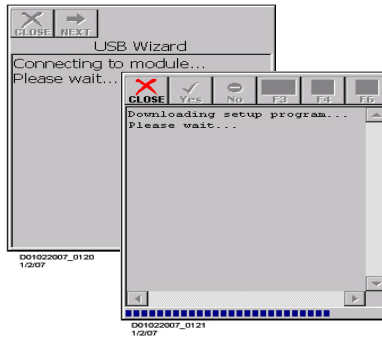
Press the **OPEN** button.

Confirm the correct MEF selection by pressing **Yes**.



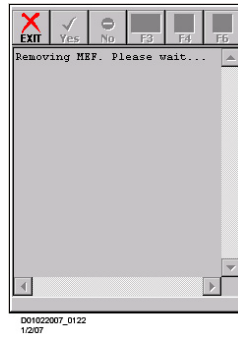
**Figure 131: Confirm MEF Upload Window**

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



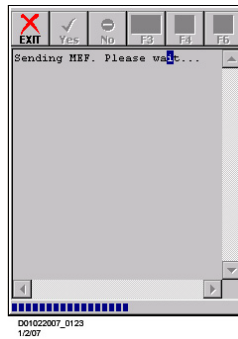
**Figure 132: Upload Progress Window**

The old MEF is removed,



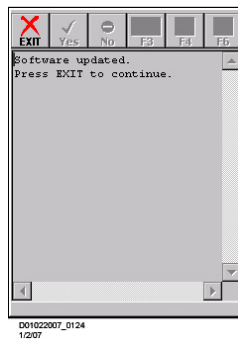
**Figure 133: Removing MEF Window**

And the new MEF is sent to the module.



**Figure 134: Sending New MEF Window**

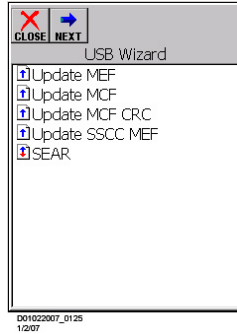
The file download may take several minutes and the blue progress bar indicates the download status. When the MEF download is complete, the software is updated. Press **EXIT** to continue.



**Figure 135: Press Exit to Continue Window**

PROGRAMMING

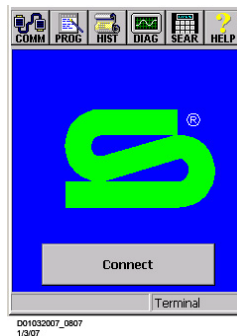
When the USB Wizard screen appears, either select another file type for update or press **CLOSE**.



**Figure 136: USB Wizard Window**

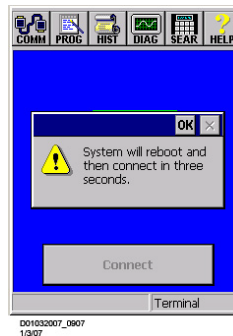
When **CLOSE** is pressed, a screen with a **Connect** button is displayed. Press the **Connect** button to reconnect the Display with the system.

PROGRAMMING



**Figure 137: DT Connect Window**

When the USB Wizard screen appears, either select another file type for update or press **CLOSE**. A message is displayed indicating that the system will reboot and connect with the Display in 3 seconds.



**Figure 138: System Reboot Window**

### Update MCF

Select **Update MCF** in the USB Wizard menu. Press the **NEXT** button.

A prompt screen appears instructing user to connect a DB9 serial cable between the Display Module DIAG port and the DIAG port of the CPU module to be updated.

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

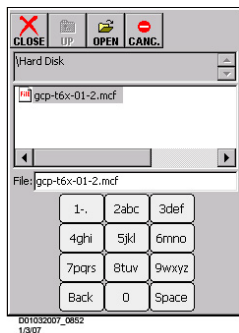




**Figure 139: USB Wizard Null Modem Window**

Press **NEXT**.

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

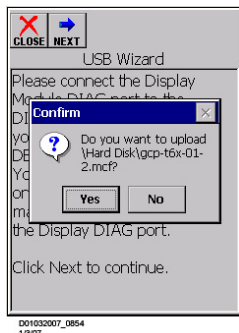


**Figure 140: Select MCF Window**

Press the **OPEN** button.

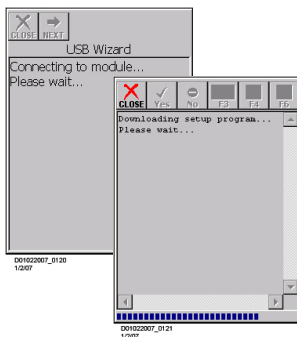
Confirm the correct MCF selection by pressing **Yes**.

PROGRAMMING



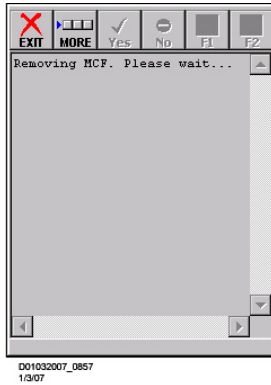
**Figure 141: Upload MCF Confirmation Window**

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



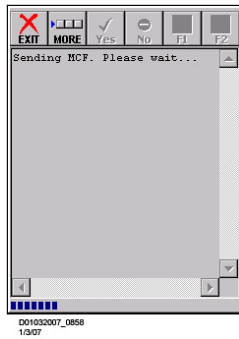
**Figure 142: Downloading SETUP Window**

The old MCF is then removed,



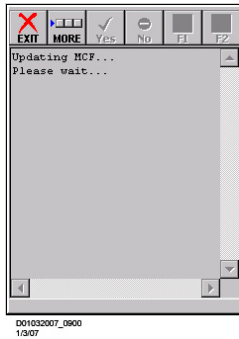
**Figure 143: Removing MCF Window**

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



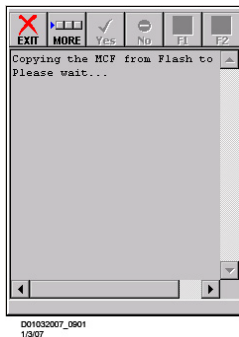
**Figure 144: Sending MCF Window**

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



**Figure 145: Updating MCF Window**

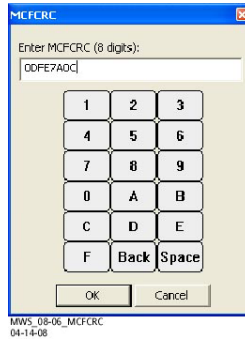
Following MCF update, the MCF is copied from Flash memory to the ECD. This may take several minutes. "COPYING MCF TO ECD" scrolls on CPU display during this process.



**Figure 146: Copying the MCF To ECD Window**

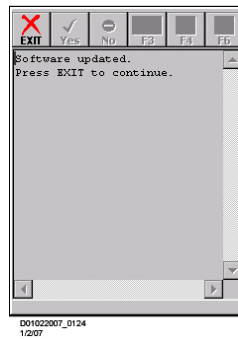
PROGRAMMING

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



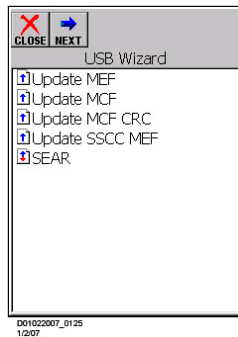
**Figure 147: MCFCRC Window**

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



**Figure 148: Update Complete Window**

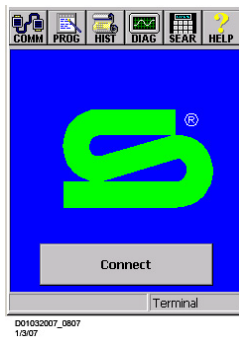
When the USB Wizard screen appears, either select another file type for update or press **CLOSE**.



**Figure 149: USB Wizard Window**

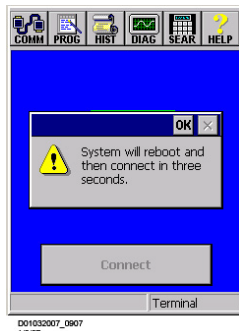
When **CLOSE** is pressed, a screen with a **Connect** button is displayed. Press the **Connect** button to reconnect the Display with the system.

PROGRAMMING



**Figure 150: DT Connect Window**

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



**Figure 151: System Reboot Window**

PROGRAMMING

### Update MCF CRC

Select **Update MCF CRC** in the USB Wizard menu.  
Press the **NEXT** button.

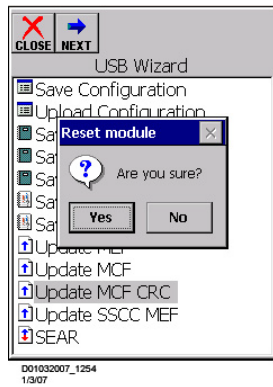
A prompt screen appears instructing user to connect a DB9 serial cable between the Display Module DIAG port and the DIAG port of the CPU module to be updated.  
Verify that the Null Modem Adapter is attached to the Display Module DIAG port, and then make the cable connection.



**Figure 152: USB Wizard Null Modem Window**

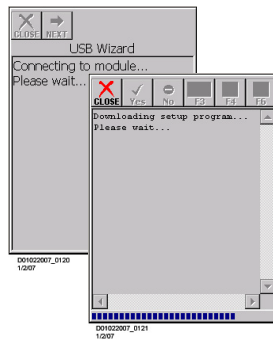
Press **NEXT**.

At the prompt to "Reset module", press **Yes**.



**Figure 153: Reset Module Confirmation Window**

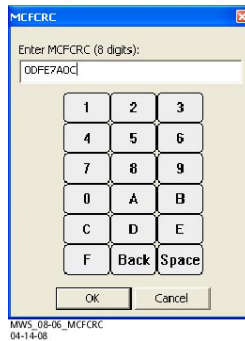
The Display connects to the CPU module that the MCF CRC is being updated for and the setup program is downloaded.



**Figure 154: Downloading SETUP Window**

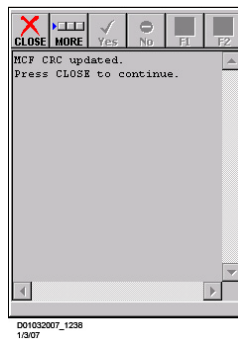
Enter the new MCF CRC using the stylus and the displayed keypad. Then press **OK**.

PROGRAMMING



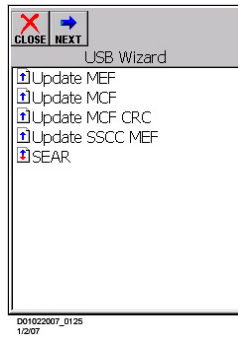
**Figure 155: MCFCRC Window**

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



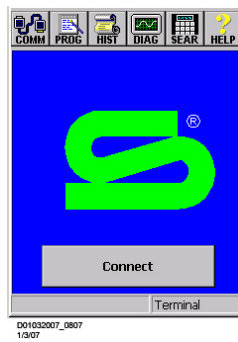
**Figure 156: Upload Complete Window**

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



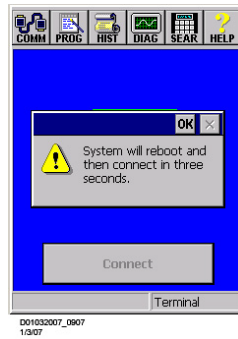
**Figure 157: USB Wizard Window**

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



**Figure 158: DT Connect Window**

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



**Figure 159: System Reboot Window**

PROGRAMMING

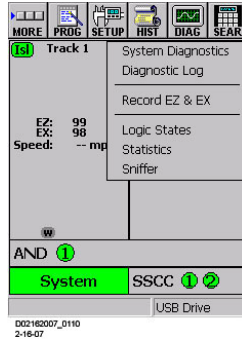
## EZ/EX RECORDING

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

### NOTE

This is not a function of the USB Wizard.

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



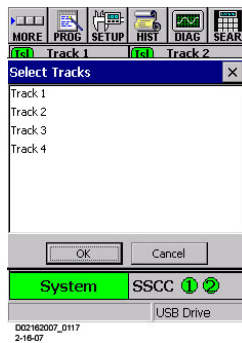
**Figure 160: DT Diagnostics Window**

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



**Figure 161: EZ/EX Recording Window**

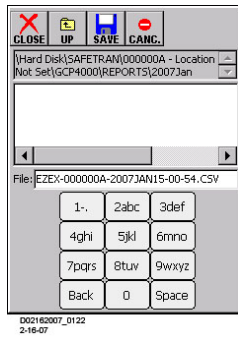
On the screen that appears select the tracks to monitor for EZ and EX.



**Figure 162: Select Tracks Window**

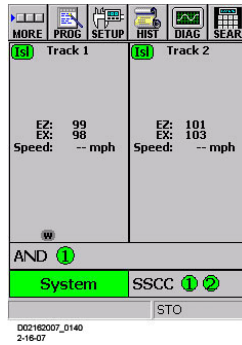
Press **OK**.

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



**Figure 163: Report File Screen**

Press **Save**.

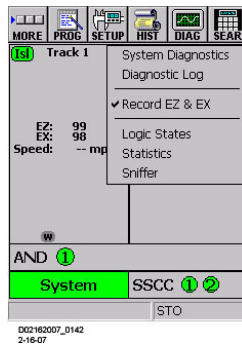


**Figure 164: GCP 4000 DT Window**

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

To stop EZ / EX recording, press **DIAG**.

Select '**Record EZ & EX**' from the menu.



**Figure 165: Start Record EZ & EX Selection Window**

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



**Figure 166: Stop Record EZ & EX Selection Window**

The Main Status screen is displayed.



## Using Recorded EZ & EX Files

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

To view .csv files open Microsoft Excel.

Select File \Open.

On the Open window, select 'Text files (\*.prn; \*.txt; \*.csv)' in the Files of type: field.

Type of select the file name to be viewed.

Press **Open**.

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

	A	B	C	D	E	F	G	H
1	Count	DateTime	T1 Ez	T1 CheckE	T1 Ex	T1 Isl Occ	T1 Prime	AND1 XR
2	0	#####	99	99	93	125	140	155
3	1	#####	99	99	93	125	140	155
4	2	#####	99	99	93	125	140	155
5	3	#####	99	100	93	125	140	155
6	4	#####	100	99	93	125	140	155
7	5	#####	95	91	98	125	140	155
8	6	#####	81	97	99	125	140	155
9	7	#####	93	94	93	125	140	155
10	8	#####	93	92	93	125	140	155
11	9	#####	92	90	93	125	140	155
12	10	#####	90	88	93	125	140	155
13	11	#####	87	85	93	125	140	155

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2-16-07

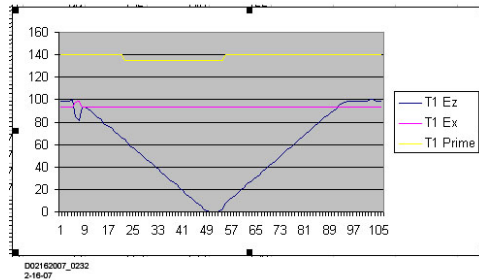
**Figure 167: Data File Layout Example**

Select a column to graph by clicking on the column header (A through H in the figure above).

To select multiple columns, click the first column header then hold down the Ctrl key and click the additional column headers. Columns C, E and G selected in the figure above.

Select **Insert \Chart \ Line Chart**. Select a chart sample and then click **Finish**.

A chart similar to the one below is displayed.



**Figure 168: Prime, EZ, and EX Chart Example**

## INSTALLING DT SOFTWARE USING THE USB DRIVE

As DT software upgrades are issued, the procedures for updating the 80407-03 Display II Module will be distributed with the upgrade.

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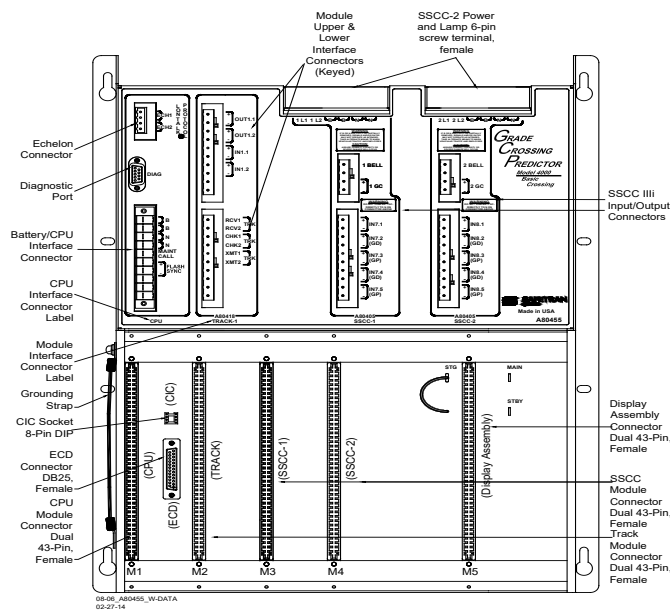
## CHASSIS CONFIGURATIONS

### Common Chassis Components

- The various 4000 GCP chassis encountered in the field will have the following similarities (see Figure 169):
- Echelon connector location
- Chassis diagnostic port location, same as the DIAG (CP) port of the active CPU in dual units
- Battery/CPU interface connector location
- CPU Module connector location (left most card slot)
- CIC (Chassis Identification Chip) location
- ECD (External Configuration Device) location
- Grounding strap location
- Keyed Interface Connectors

### NOTE

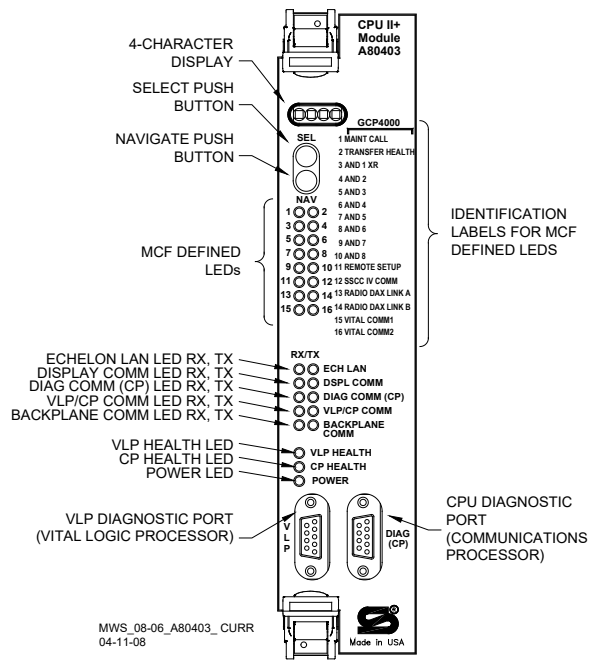
The keyed interface connectors used on the 4000 GCP front panel consist of both screw-down type and cage-clamp type connectors. Refer to page 16 for wire preparation and insertion instructions.



APP A - HARDWARE

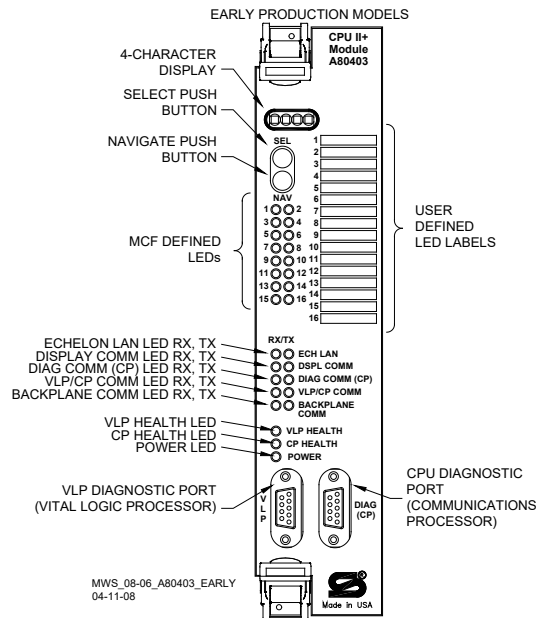
Figure 169: Common Chassis Component Locations

# CPU MODULE USER INTERFACE (A80403)



**Figure 170: Central Processing Unit (CPU II+) Module, A80403, Current Production Units**

APP A - HARDWARE



**Figure 171: Central Processing Unit (CPU II+) Module, A80403, Early Production Units**

**Table 38:  
CPU Module LED Descriptions**

LED		Function	Description
NAME	Color		
1 MAINT CALL	Red	Maintenance Call See page 83	On – maintenance call output on Off - maintenance call output off
2 TRANSFER HEALTH	Red	Transfer Output see page 83	On – transfer signal is being generated transfer card should not be counting down Off – transfer signal is not being generated If transfer card is in <b>AUTO</b> it should be counting down
3 AND 1 XR	Red	AND 1 XR	On – AND 1 XR is energized Off – AND 1 XR is De-energized
4 to 10 AND 2 through AND 8	Red	AND 2 through AND 8	On – AND is Energized Off – AND is De-energized or Not Used
11 REMOTE SETUP	Red	Remote Setup Session	On – The GCP has been primed for a remote one-person setup (see Appendix F) Flashing – Remote setup in progress Off – No remote setup is in progress
12 SSCC IV COMM	Red	SSCCIV Echelon Active	On – External SSCC IV Echelon is in session Off – External SSCC IV Echelon not used or not in session
13 RADIO DAX LINK A	Red	Radio DAX Link A	On – Radio DAX Link A is in session Off – Radio DAX Link A not used or not in session
14 RADIO DAX LINK B	Red	Radio DAX Link B	On – Radio DAX Link B is in session Off – Radio DAX Link B not used or not in session
15 VITAL COMM1	Red	Vital Comm 1	On – Vital Comm1 is in session
16 VITAL COMM2	Red	Vital Comm 2	On – Vital Comm2 is in session

**Table 38:  
CPU Module LED Descriptions**

LED		Function	Description
NAME	Color		
<b>ECH LAN RX</b>	Grn	Echelon Message Received	Flashes when the CPU is receiving an ATCS message via the Echelon LAN.
<b>ECH LAN TX</b>	Red	Echelon Message Sent	Flashes when the CPU is transmitting an ATCS message via the Echelon LAN.
<b>DSPL COMM RX</b>	Grn	Display Port Message Received	Flashes when the CPU is receiving data from the display module.
<b>DSPL COMM TX</b>	Red	Display Port Message Sent	Flashes when the CPU is sending data to the display module.
<b>DIAG COMM (CP) RX</b>	Grn	Diag Port Message Received	Flashes when the CPU is receiving data from the communications processor diagnostic ( <b>DIAG CP</b> ) serial port.
<b>DIAG COMM (CP) TX</b>	Red	Diag Port Message Sent	Flashes when the CPU is transmitting data on the communications processor diagnostic ( <b>DIAG CP</b> ) serial port.
<b>VLP/CP COMM RX</b>	Grn	Comm Message Received	Flashes when the VLP is receiving data from the CP.
<b>VLP/CP COMM TX</b>	Red	Comm Message Sent	Flashes when the VLP is transmitting data to the CP.
<b>BACK-PLANE COMM RX</b>	Grn	Backplane Message Received	Flashes when the VLP is receiving data from the serial bus.
<b>BACK-PLANE COMM TX</b>	Red	Backplane Message Sent	Flashes when the VLP is sending data onto the serial bus.
<b>VLP HEALTH</b>	Yel	VLP Health Status	Flashes slowly (1Hz) when the CPU VLP is functioning normally.
			Flashes fast (4Hz) when the VLP is unhealthy
<b>CP HEALTH</b>	Yel	CP Health Status	Flashes slowly (1Hz) when the CP is functioning normally.
<b>POWER</b>	Grn	Power Indication	On steadily when power is applied to the module.

**Table 39:  
CPU Module Display Messages**

<b>Display</b>	<b>Mode</b>	<b>Meaning</b>	<b>System State</b>
<b>MCF Name;</b> e.g. GCP-T6X-02-1	Scrolling	VLP is healthy	CPU is healthy.
<b>BOOT</b>	Steady	CPU is booting up.	CPU is booting up. Crossing is activated.
<b>CRC*</b>	Steady	MCF CRC is incorrect for the current MCF	Entered CRC does not match CRC of MCF. Crossing is activated.
<b>MCF*</b>	Steady	CPU is not healthy because the MCF is not valid.	Reboot CPU or reload MCF. Crossing is activated.
<b>SIN*</b>	Steady	Site Identification Number is invalid.	Enter valid SIN. Crossing is activated.
<b>VLP UCFG</b>	Scrolling	VLP is unconfigured.	No comm to I/O modules. Crossing is activated.
<b>VLP INITIAL</b>	Scrolling	The CP is transferring the configuration from NVRAM to the VLP.	No comm to I/O modules. Crossing is activated.
<b>CMCF / *MCF</b>	Scrolling	The CP is copying the MCF from the ECD into flash memory.	No comm to I/O modules. Crossing is activated.
<b>NO VLP COMMS</b>	Scrolling	The CP is not communicating with the VLP. VLP could be rebooting or performing its initial configuration checks	No comm to I/O modules. Crossing is activated.
<b>EFLA</b>	Steady	Erasing its flash memory in preparation for copying the MCF from the ECD into flash memory.	No comm to I/O modules. Crossing is activated.
<b>ADR*</b>	Steady	The radio DAXing neighbor ATCS address is invalid	Address of DAX session cannot be computed. Enter valid SIN
<b>INI*</b>	Steady	Rebooting	System Reboot - Crossing is activated.
<b>Exxx</b>	Steady	Internal error, System will reboot. xxx is 3 digit hex number	Reload MCF - Crossing is activated.

**Table 39:  
CPU Module Display Messages**

Display	Mode	Meaning	System State
LMCF	Steady	Rebooting	System Reboot - Crossing is activated.
ICHK	Steady	Rebooting	System Reboot - Crossing is activated.

Note: Steady messages may alternate with other messages  
The CPU has two processors: the Communications Processor (CP) and the Vital Logic Processor (VLP). When new software is installed into the CP, the VLP continues running without interruption until the CP setup is complete. This means that if the GCP 4000 system is healthy and the crossing is not active, the VLP continues to correctly control the crossing while the new software installation into the CP is in progress. However, while the software transfer is in progress, the CP is not capable of logging state changes or communicating to the SEAR21.

**Table 40:  
Setup Menu Display**

Indication	Mode	Meaning
<b>DOWNLOAD-ING SETUP</b>	Scrolls	The setup program is being downloaded into the CP.
<b>SETUP</b>	Scrolls	The CP is in setup mode; i.e., MCF, MCF CRC, or CP MEF is being changed.
<b>WAIT</b>	Steady	CP is erasing flash memory.
<b>WAITING FOR MEF</b>	Scrolls	CP is waiting for a new MEF.
<b>DOWNLOAD-ING MEF</b>	Scrolls	A new MEF is being downloaded into the CP.
<b>WAITING FOR MCF</b>	Scrolls	CP is waiting for a new MCF.
<b>DOWNLOAD-ING MCF</b>	Scrolls	A new MCF is being downloaded into the CP.
<b>DONE</b>	Steady	Setup mode is ending.
<b>BOOT</b>	Steady	The CP is rebooting.



## TRACK MODULE USER INTERFACE (A80418)

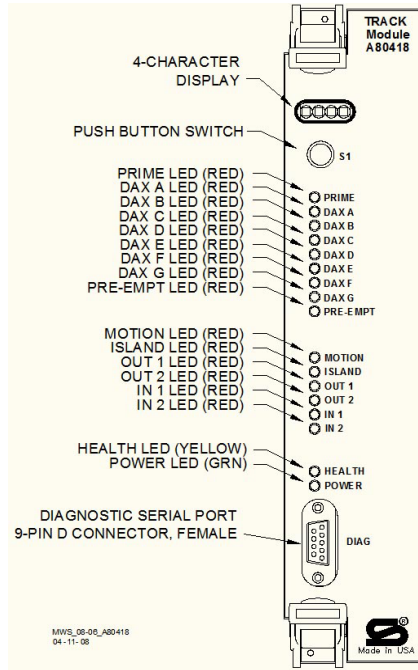


Figure 172: Track Module, A80418

Table 41:  
Track Module LED Descriptions

LEDs		DESCRIPTION
NAME	COLOR	
<b>PRIME</b>	Red	On – Prime predictor is energized Off – Prime predictor is de-energized or not used Flashing - Prime predictor is running the programmed pickup delay
<b>DAX A</b>	Red	On – DAX A predictor is energized Off – DAX A predictor is de-energized or not used Flashing – DAX A predictor is running its pickup delay
<b>DAX B</b>	Red	On – DAX B predictor is energized Off – DAX B predictor is de-energized or not used Flashing – DAX B predictor is running its pickup delay
<b>DAX C</b>	Red	On – DAX C predictor is energized Off – DAX C predictor is de-energized or not used Flashing – DAX C predictor is running its pickup delay
<b>DAX D</b>	Red	On – DAX D predictor is energized Off – DAX D predictor is de-energized or not used Flashing – DAX D predictor is running its pickup delay

**Table 41:  
Track Module LED Descriptions**

LEDs		DESCRIPTION
NAME	COLOR	
<b>DAX E</b>	Red	On – DAX E predictor is energized Off – DAX E predictor is de-energized or not used Flashing – DAX E predictor is running its pickup delay
<b>DAX F</b>	Red	On – DAX F predictor is energized Off – DAX F predictor is de-energized or not used Flashing – DAX F predictor is running its pickup delay
<b>DAX G</b>	Red	On – DAX G predictor is energized Off – DAX G predictor is de-energized or not used Flashing – DAX G predictor is running its pickup delay
<b>PREEMP T</b>	Red	On – Preempt predictor is energized Off – Preempt predictor is de-energized or not used Flashing – Preempt predictor is running its pickup delay
<b>MOTION</b>	Red	On – GCP has not detected motion Flash – GCP has detected motion below motion threshold Off – GCP has detected motion
<b>ISLAND</b>	Red	On – Island is unoccupied Off – Island is occupied Flashing – Island is running its pickup delay
<b>OUT 1</b>	Red	On – output energized Off – output de-energized or failed
<b>OUT 2</b>	Red	On – output energized Off – output de-energized or failed
<b>IN 1</b>	Red	On – input energized Off – input de-energized or failed
<b>IN 2</b>	Red	On – input energized Off – input de-energized or failed
<b>ISL Selected</b>	Green	On – Island Transmitter is enabled Off – Island Transmitter is disabled
<b>TX Selected</b>	Green	On – PSO Transmitter is enabled Off – PSO Transmitter is disabled
<b>HEALTH</b>	Yellow	Slow (1Hz) – module is healthy and communicating with CPU. Fast (2Hz) – module is healthy but not communicating with CPU. Very Fast (4Hz) – module is unhealthy and communicating with CPU.
<b>POWER</b>	Green	On steadily when power is applied to the module

**Table 41:  
Track Module LED Descriptions**

LEDs		DESCRIPTION
NAME	COLOR	
<b>*GCP</b>	*blinks on and off, GCP steady	Module is healthy MS/GCP Operation is on No trains are detected on the approach
<b>*ISL</b>	*blinks on and off, ISL steady	Module is healthy MS/GCP Operation is programmed "not used" Island Operation is used
<b>Innn</b> e.g. I085	Steady	The module has detected inbound motion. EZ is given by the value 'nnn'
<b>Snnn</b> e. g. S045	Steady	The module has not detected inbound or outbound motion. EZ is given by the value 'nnn'
<b>Onnn</b> e.g. O049	Steady	The module has detected outbound motion. EZ is given by the value 'nnn'
<b>*CAL</b>	Switches between *CAL and GCAL or ICAL	GCP Calibration in progress

**Table 42:  
Track Module Indications (Operational)**

Indication	Mode	Meaning	Module State
<b>*APP</b>	Switches between *APP and GAPP	GCP Approach calibration in progress	All predictors are de-energized
<b>*LIN</b>	Switches between *LIN and GLIN	GCP Linearization in progress.	All predictors are de-energized
<b>ICAL</b>	Blinks on and off	Island Calibration in progress	Island is de-energized

**Table 43:  
Boot-up Messages**

Indication	Mode	Meaning	Module State
<b>BOOT</b>	Steady	The module is rebooting	All predictors, island, inputs and outputs are deenergized
<b>INIT</b>	Steady	The module is performing its initialization	All predictors, island, inputs and outputs are deenergized

**Table 44:  
Module State During Boot-up**

Indication	Module State
<b>BOOT</b>	Rebooting
<b>INIT</b>	Initializing
<b>GHWR</b>	Checking Hardware
<b>UCFG</b>	The module is unconfigured and awaiting its configuration from the CPU.
<b>GSTB /ISTB</b>	The GCP and Island are stabilizing
<b>*GCP</b>	Module is healthy

**Table 45:  
Software Installation Messages**

Indication	Mode	Meaning
<b>BOOT</b>	Steady	The setup program is loaded into the CP, the module is in setup mode, or the module is having a new MEF Downloaded

# PHASE SHIFT OVERLAY (PSO) MODULE USER INTERFACE (A80428-03)

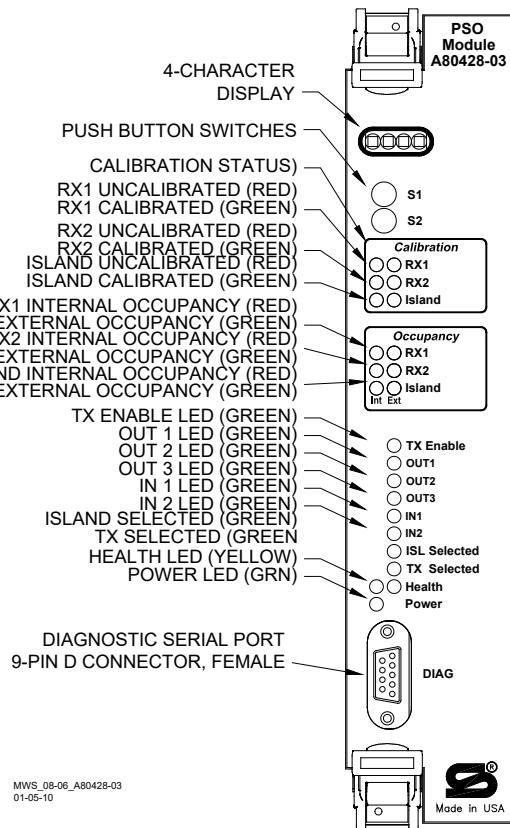


Figure 173: PSO Module, A80428-03

Table 46:  
PSO Module LED Descriptions

LEDs		DESCRIPTION
NAME	COLOR	
RX1	Red	RX1 not calibrated
RX1	Green	RX1 is calibrated
RX2	Red	RX2 not calibrated
RX2	Green	RX2 is calibrated
Island	Red	Island not calibrated
Island	Green	Island is calibrated
RX1 (Int)	Red	On – RX1 Internal track circuit is unoccupied Off – RX1 Internal track circuit is occupied Flashing – RX1 Internal track circuit is running its pickup delay
RX1 (Ext)	Green	On – RX1 External track circuit is unoccupied Off – RX1 External track circuit is occupied Flashing – RX1 External track circuit is running its pickup delay
RX2 (Int)	Red	On – RX2 Internal track circuit is unoccupied Off – RX2 Internal track circuit is occupied Flashing – RX2 Internal track circuit is running its pickup delay

**Table 46:  
PSO Module LED Descriptions**

LEDs		DESCRIPTION
NAME	COLOR	
<b>RX2 (Ext)</b>	Green	On – RX2 External track circuit is unoccupied Off – RX2 External track circuit is occupied Flashing – RX2 External track circuit is running its pickup delay
<b>Island (Int)</b>	Red	On – Island Internal track circuit is unoccupied Off – Island Internal track circuit is occupied Flashing – Island1 Internal track circuit is running its pickup delay
<b>Island (Ext)</b>	Green	On – Island External track circuit is unoccupied Off – Island External track circuit is occupied Flashing – Island External track circuit is running its pickup delay
<b>TX Enable</b>	Green	On – TX is enabled Off – TX is disabled
<b>OUT 1</b>	Red	On – output energized Off – output de-energized or failed
<b>OUT 2</b>	Red	On – output energized Off – output de-energized or failed
<b>OUT 3</b>	Red	On – output energized Off – output de-energized or failed
<b>IN 1</b>	Red	On – input energized Off – input de-energized or failed
<b>IN 2</b>	Red	On – input energized Off – input de-energized or failed
<b>HEALTH</b>	Yellow	Slow (1Hz) – module is healthy and communicating with CPU. Fast (2Hz) – module is healthy but not communicating with CPU. Very Fast (4Hz) – module is unhealthy and communicating with CPU.
<b>POWER</b>	Green	On steadily when power is applied to the module
<b>*PSO</b>	*blinks on and off, PSO steady	Module is healthy No trains are detected on the approach
<b>*CAL</b>	Switches between *CAL and GCAL or ICAL	GCP Calibration in progress

**Table 47:  
Track Module Indications (Operational)**

Indication	Mode	Meaning	Module State
*CAL	Blinks on and off	Island Calibration in progress	Island is de-energized

**Table 48:  
Boot-up Messages**

Indication	Mode	Meaning	Module State
BOOT	Steady	The module is rebooting	All sticks, island, inputs and outputs are deenergized
INIT	Steady	The module is performing its initialization	All sticks, island, inputs and outputs are deenergized

**Table 49:  
Module State During Boot-up**

Indication	Module State
BOOT	Rebooting
INIT	Initializing
UCFG	The module is unconfigured and awaiting its configuration from the CPU.
*GCP	Module is healthy

**Table 50:  
Software Installation Messages**

Indication	Mode	Meaning
BOOT	Steady	The setup program is loaded into the CP, the module is in setup mode, or the module is having a new MEF Downloaded

## DISPLAY MODULE, A80485-1

The A80485-1, Display Module, is a replacement for the A80407-03 Display II Module, which has been replaced due to obsolescence. The RJ-45 Ethernet ports, other than the Laptop port, are inoperable and not used on the GCP4000.

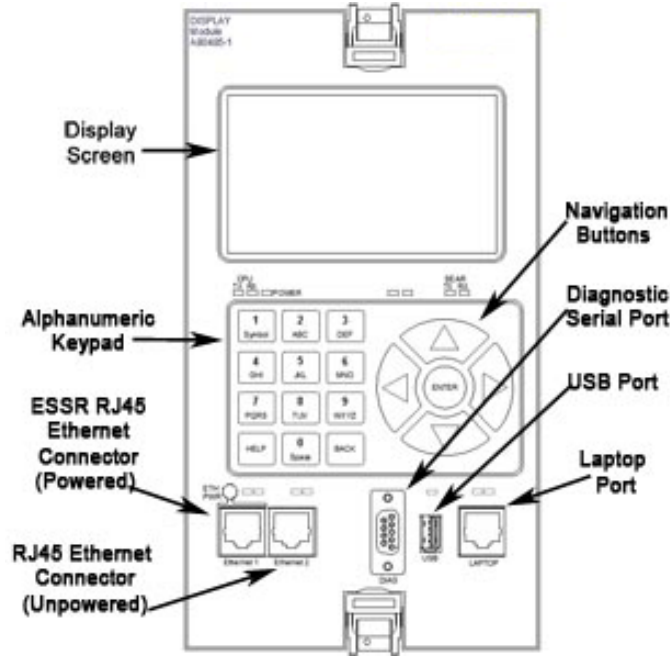


Figure 174: Display II Module, A80485-1

## DISPLAY II MODULE, A80407-03 (OBSOLETE)

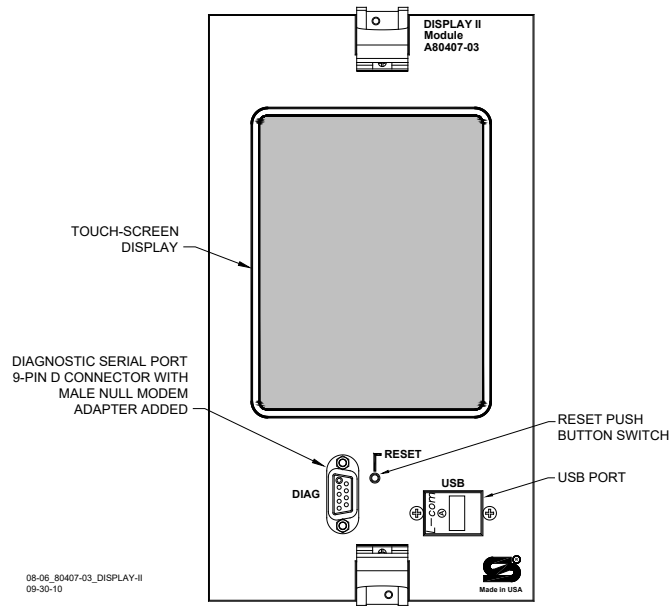


Figure 175: Display II Module, A80407-03 (OBSOLETE)

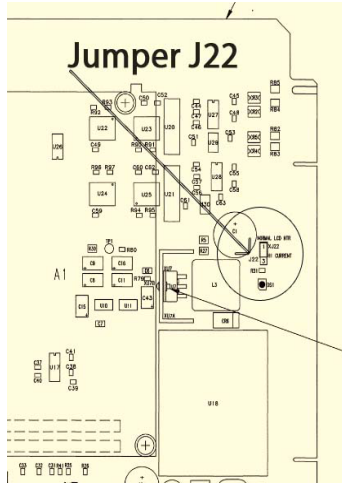


## Display Module Heater

The Rev. B and newer 80407 Display Modules and all 80407-03 Display II Modules have a built-in heater for the LCD screen. Disabling the heater may result in poor LCD performance at cold temperatures. The heater turns on when temperature drops below approximately 41 °F (5 °C).

The jumper that controls the heater is located in different locations for each revision level. Look on the side of the Display Module at the data plate. The ASSY REV block states the revision level of the module.

### Rev. B 80407 Display Modules:



**Figure 176: Jumper J22 Location on Revision B Board**

It is not necessary to remove the cover of the Display Module to access the Jumper. Jumper J22 is located near the edge of the card that plugs into the chassis,

immediately above the Caalex DC/DC Converter U18 and to the right of capacitor C1.

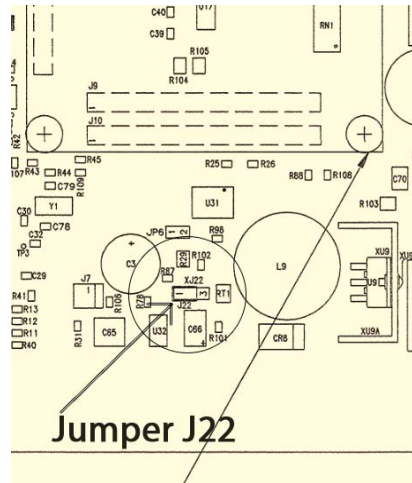
The heater selection jumper JP7 is located near the edge of the card that plugs into the chassis, immediately below the Caalex DC/DC Converter and slightly above the Junction Diode CR1. The heater has three positions:

NORMAL LCD HTR – Place the jumper across pins 1 & 2 (this is the default position)

HI CURRENT – Place the jumper across pins 2 & 3

OFF – Remove the jumper from pins 1 & 2

## Rev. C 80407 Display Modules:



**Figure 177: Jumper J22 Location on Revision C Board**

Remove the cover of the Display Module to access the Jumper. Jumper J22 is located immediately below the Bitsy Board, between capacitor C3 and inductor L9. The heater has three positions:

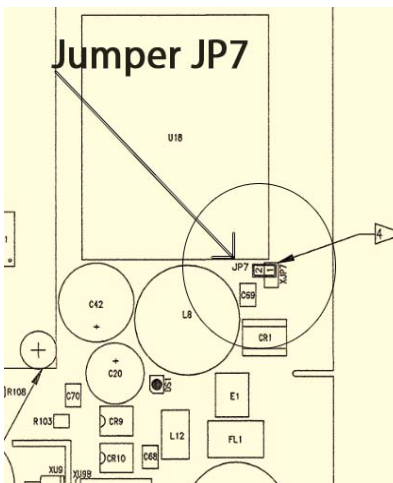
NORMAL LCD HTR – Place the jumper across pins 1 & 2 (this is the default position)

HI CURRENT – Place the jumper across pins 2 & 3

OFF – Remove the jumper from pins 1 & 2

## Rev. D 80407 Display Modules and all 80407-03 Display II Modules:

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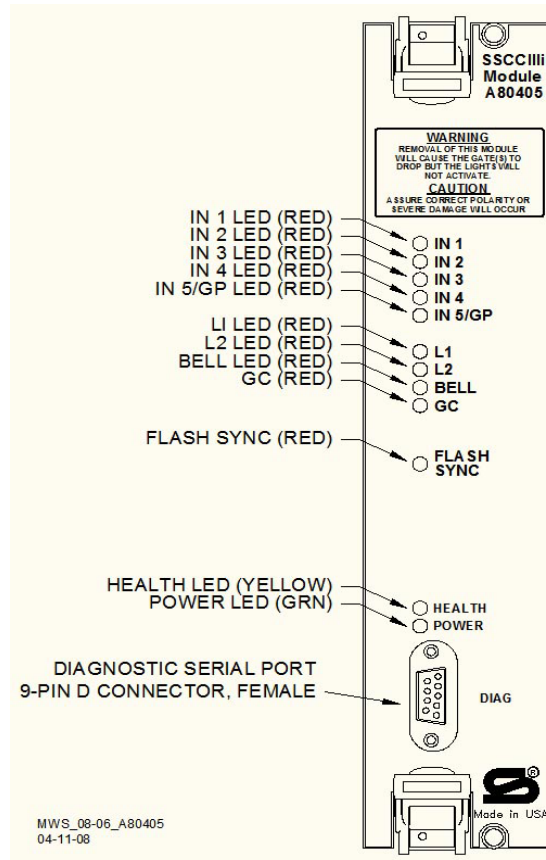
**Figure 178: Jumper JP7 Location on Revision D Board**

The heater selection jumper JP7 is located near the edge of the card that plugs into the chassis, immediately below the Calex DC/DC Converter U18 and slightly above the Junction Diode CR1. The Revision D and newer board jumper is significantly changed from that of Revisions B & C:

HEATER ON: Remove jumper from pins 1 and 2.

HEATER OFF: Place jumper across pins 1 and 2.

# SOLID-STATE CROSSING CONTROLLER (SSCC3I) MODULE USER INTERFACE (A80405)



**Figure 179: Solid State Crossing Controller IIIi (SSCC3I) Module, A80405**

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**Table 51:  
SSCC3I LED Descriptions**

LED		Description
Name	Color	
<b>IN 1</b>	Red	On – input 1 energized Off – input 1 de-energized
<b>IN 2</b>	Red	On – input 2 energized Off – input 2 de-energized
<b>IN 3</b>	Red	On – input 3 energized Off – input 3 de-energized
<b>IN 4</b>	Red	On – input 4 energized Off – input 4 de-energized
<b>IN 5/GP</b>	Red	On – input 5 energized Off – input 5 de-energized
<b>L1</b>	Red	On – Lamp Output L1 is on Off – Lamp Output L1 is off
<b>L2</b>	Red	On – Lamp Output L2 is on Off – Lamp Output L2 is off
<b>BELL</b>	Red	On – bell output is on Off – bell output is off
<b>GC</b>	Red	On – gate control (GC) output is energized Off – gate control (GC) output is de-energized
<b>FLASH SYNC</b>	Red	Flashes when sync pulse is present at <b>FLASH SYNC</b> input/output
<b>HEALTH</b>	Yellow	Slow (1Hz) – module fully operational and communicating with CPU Fast (2Hz) – not communicating with CPU Very Fast (4Hz) – fault detected within the module
<b>POWER</b>	Green	On steadily when power is applied to the SSCC3I module

### SSCC3I GENERAL INFORMATION

The A80405 Solid-State Crossing Controller IIIi (SSCC3I), Figure 179, is a plug-in module for the 4000 Grade Crossing Predictor (GCP). All multi-track 4000 GCP cases accommodate two A80405 modules. Each module provides:  
up to 20-amperes of lamp drive  
gate and bell control

A80405 module Interface is through GCP front-panel connectors.

The A80405 module generally operates from a separate battery than the GCP portion of the system

The SSCCIIIi modules are integrated into the 4000 GCP system. Wiring between the GCP, the SSCC3I, and the SEAR2I is eliminated.

not redundant

## Unit Overview

The A80405 module is programmed, calibrated, and tested from the Display module of the 4000 GCP, is activated by internal logic from the 4000 GCP, monitors gate position inputs from the crossing gate mechanism, and provides activation for the bell, lamps, and gates of a crossing warning system

## Module Function Control

The following A80405 module functions may be programmed:

lamp flash rate

gate control delay

low battery threshold indication

control maintenance call output

test timer intervals

crossing and lamp tests

lamp flashing synchronization between the A80405 modules of multiple 4000 GCPs

disabling of crossing bells while the gates are rising

disabling of crossing bells while the gates are down

requires gate down inputs to be energized

## Crossing Controller Regulation for Lamp Voltage Outputs

The circuits of the A80405 use pulse width modulation regulation

The pulsed output frequency is approximately 500 Hz.

The peak voltage of the pulse is approximately 1 volt below the battery input voltage.

Depending on the voltage in, the pulse width is automatically varied to give a regulated output.

The following examples assume the desired output is 10 volts:

Example 1: 16 volts in, the pulse is 15 volts and on 66% of the cycle.

Example 2: 13 volts in, the pulse is 12 volts and on 83% of the cycle.

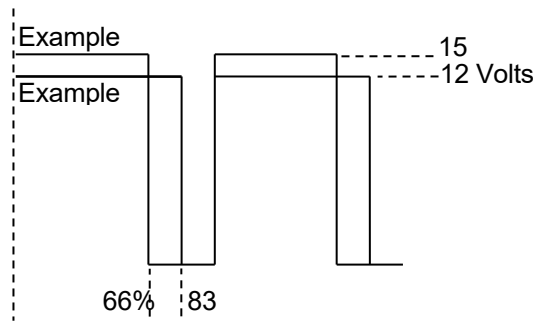


Figure 180: Pulse Width Modulation – Examples

## **NOTE**

The regulated lamp drive is a pulse-width modulated voltage with an AC component and a DC component. A True RMS AC+DC meter is required to accurately read the pulse-modulated lamp voltage (i.e., Agilent model U1252A). Conventional multimeters may be used, however, the voltage reading will vary from the true rms value. The variance is not a set percentage and is dependent on battery voltage.

A conversion chart cross-referencing several conventional meters is in Using a Conventional Meter on Table 18.

### **Module Health**

The CPU of the A80405 module provides an output that controls the HEALTH LED on the module front panel.

Yellow HEALTH LED reflects the health of the module:

Flashes at 1 Hz rate when module fully operational.

Flashes at 2 Hz rate when module not communicating with CPU module.

Flashes at 8 Hz rate when fault is detected within the module.

### **Battery Surge Protection and Power Wiring**

Battery surge protection for the SSCC is shown in Figure 181 below.

Primary surge protection for SSCC modules provided on SSCC battery (see inside dotted line)

Primary surge protection for I/O interconnect provided on lighting surge panels (see Page 175).

Provide power wiring to A80405 SSCC3I modules:

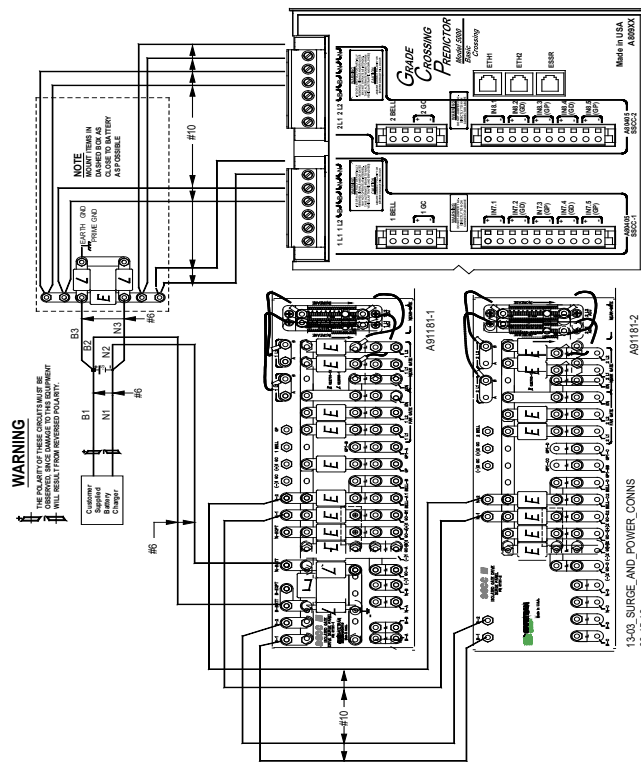
via **B** and **N** contacts of the respective crossing controller connectors on 4000 GCP front panel.

using poly-jacketed #10 AWG wire (recommended) for DC power and return between battery surge protection and the 4000 GCP crossing controller connectors.

Provide power wiring to the lighting surge panels:

using poly-jacketed #6 AWG wire (recommended) for DC power and return between the A91181–1 lighting surge panel and the crossing gate battery posts.

using poly-jacketed #10 AWG wire (recommended) for DC power and return between the A91181–1 lighting surge panel and the A91181–2 lighting surge panel.



**Figure 181: Surge & Power Connections to SSCC Modules & Lighting Surge Panels**

### Lighting Surge Panels

The A80405 modules use either of two SSCC III Lighting Surge Panel configurations to provide external I/O primary surge protection.

A91181-1, -2 isolated gate control, Figure 182A and Figure 182B

The Surge Panel configuration provides surge protection on all external I/O interconnects.

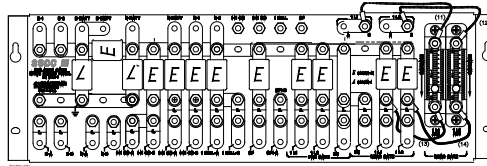
The SSCC III Lighting Surge Panels provide:

- arresters and equalizer for surge protection from transients on underground-cable battery voltage
- protection on all other I/O underground cable connections
- insulated links in the underground cable connections
- adjustable resistors in the **NEAR GATE** Lamp 1 (**1 L1**) and Lamp 2 (**1 L2**) circuits
- steering diodes for the Crossing Controller Gate Control output to provide isolation between the two crossing gate controls (see Figure 182)

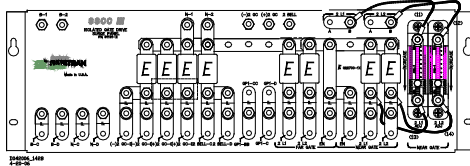
For isolated gate control, a single A91181-1 panel (Figure 182A) is used for 20-ampere operation and both an A91181-1 and an A91181-2 panel (Figure 182B) are generally used for 21 to 40-ampere operation. Refer to Figure 183 for typical isolated gate control wiring.

### NOTE

For information on the selection and installation of the 91181-1 SSCC III Lighting Surge Panels, refer to Page 175.

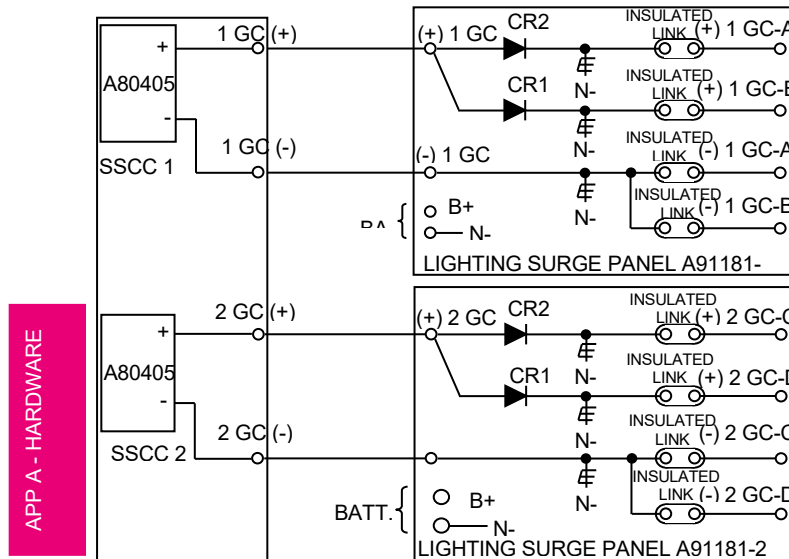


**A: A91181-1**



**B: A91181-2**

**Figure 182: Isolated Return Lighting Surge Panels, A91181-1 & A91181-2**



**Figure 183: Typical Isolated Gate Control**

**SSCC3I OPERATION**

The A80405 module provides drive for up to 20 amps of lamp current.

**Failure Operation**

The A80405 module continually performs self-diagnostic tests that result in complete on-line testing of module operation.

If a critical failure is detected, the appropriate signal states are generated to immediately flash the crossing lamps and bring down the gates.

**WARNING**

**REMOVING INPUT POWER FROM THE A80405 MODULE CAUSES THE GATES TO DROP BUT THE LAMPS ARE NOT ACTIVATED.**

**IF B OR N ARE FULLY OR PARTIALLY REMOVED, SIGNALS AND/OR GATES MAY NOT OPERATE AS INTENDED. TAKE ALTERNATE MEANS TO WARN**



## VEHICULAR TRAFFIC, PEDESTRIANS AND EMPLOYEES.

### Crossing Controller Module Installation

Two non-redundant A80405 Solid-State Crossing Controller IIIi (SSCC3I) modules can be installed in the 4000. Crossing Controller lamp and bell circuit wiring includes:

Installation of wiring between the 4000 GCP Crossing Controller connectors and the SSCC III Lighting Surge Panels

Installation of underground wiring between the SSCC III Lighting Surge Panels and the crossing Mast Junction Boxes

Use of SSCC III Lighting Surge Panel(s)

Where one signal is controlled by each Controller Module, one surge panel (-1) may be used for both modules.

#### **WARNING**

**WHEN ONE FLASHING LIGHT SIGNAL IS CONTROLLED BY EACH SSCC MODULE, A SINGLE SURGE PANEL MAY BE USED. JUMPER LINKS FROM A TO B MUST BE REMOVED IN TWO PLACES.**

**WHEN TWO FLASHING LIGHT SIGNALS ARE CONTROLLED BY A SINGLE SSCC MODULE, A SINGLE SURGE PANEL MAY BE USED. JUMPER LINKS FROM A TO B MUST BE INSTALLED IN TWO PLACES.**

Where two signals are controlled by a single Crossing Controller Module, one surge panel (-1) may be used.

Where multiple signals are controlled by each Crossing Controller Module, an additional -2 surge panel is required and is wired and jumper links installed but connected to the second SSCC module connector.

### Crossing Controller Connectors

The 4000 GCP Crossing Controller connectors accommodate all wiring between the A80405 module(s) and the 91181 SSCC3I Lighting Surge Panel(s).

Recommended crossing controller connector wire sizes are listed in Table 52.

Use of stranded wire is recommended

**Table 52:  
Minimum Recommended Crossing Controller Wire  
Sizes**

External Wiring Connector	Pin	Connector Type	Wire Size
SSCC-1	<b>1L1</b>	6-pin screw terminal	10AWG
	<b>1L2</b>	6-pin screw terminal	10AWG
	<b>B</b>	6-pin screw terminal	10AWG
	<b>N</b>	6-pin screw terminal	10AWG
	<b>1BELL</b>	4-pin cage clamp	16AWG
	<b>+1GC</b>	4-pin cage clamp	16AWG
	<b>-1GC</b>	4-pin cage clamp	16AWG
	<b>+1IN7.1</b>	4-pin cage clamp	16AWG
	<b>-1IN7.1</b>	10-pin cage clamp	16AWG
	<b>+IN7.2 (GD)</b>	10-pin cage clamp	16AWG
	<b>-IN7.2 (GD)</b>	10-pin cage clamp	16AWG
	<b>+IN7.3 (GP)</b>	10-pin cage clamp	16AWG
	<b>-IN7.3 (GP)</b>	10-pin cage clamp	16AWG
	<b>+IN7.4 (GD)</b>	10-pin cage clamp	16AWG
	<b>-IN7.4 (GD)</b>	10-pin cage clamp	16AWG
	<b>+IN7.5 (GP)</b>	10-pin cage clamp	16AWG
	<b>-IN7.5 (GP)</b>	10-pin cage clamp	16AWG
	SSCC-2	<b>2L1</b>	6-pin screw terminal
<b>2L2</b>		6-pin screw terminal	10AWG
<b>B</b>		6-pin screw terminal	10AWG
<b>N</b>		6-pin screw terminal	10AWG
<b>2BELL</b>		4-pin cage clamp	16AWG
<b>+2GC</b>		4-pin cage clamp	16AWG
<b>-2GC</b>		4-pin cage clamp	16AWG
<b>+IN8.1</b>		4-pin cage clamp	16AWG
<b>-IN8.1</b>		10-pin cage clamp	16AWG
<b>+IN8.2 (GD)</b>		10-pin cage clamp	16AWG
<b>-IN8.2 (GD)</b>		10-pin cage clamp	16AWG
<b>+IN8.3 (GP)</b>		10-pin cage clamp	16AWG
<b>-IN8.3 (GP)</b>		10-pin cage clamp	16AWG
<b>+IN8.4 (GD)</b>		10-pin cage clamp	16AWG
<b>-IN8.4 (GD)</b>		10-pin cage clamp	16AWG
<b>+IN8.5 (GP)</b>		10-pin cage clamp	16AWG
<b>-IN8.5 (GP)</b>		10-pin cage clamp	16AWG

APP A - HARDWARE

### **CAUTION**

CROSSING WIRING MUST CONFORM TO APPROVED RAILROAD SCHEMATICS.

WHEN INSTALLING B AND N PIN WIRES, OBSERVE CORRECT POLARITY OR SEVERE DAMAGE TO THE A80405 MODULE WILL OCCUR. USE THE CORRECT SCREWDRIVER BLADE SIZE TO AVOID CONNECTOR DAMAGE. FOR WIRE PREPARATION AND INSERTION INSTRUCTIONS, REFER TO APPENDIX B.

#### **Lamp and Bell Wiring to the Lighting Surge Panel**

Recommended wire size for L1 and L2 between the Lighting Surge Panel and the 4000 SSCC power connector is number 10 AWG.

Recommended wire size between the Lighting Surge Panel and the Mast Junction Box is number 6 AWG.

The Lighting Surge Panel should be mounted as close as practical to the 4000 GCP.

### **WARNING**

**USE CAUTION WHEN SETTING BATTERY VOLTAGE, ESPECIALLY WHEN USING TEMPERATURE COMPENSATED BATTERY CHARGERS:**

**EXCEEDING 16.5 VDC ON CROSSING CONTROLLER POWER TERMINALS MAY RESULT IN INTERMITTENT FALSE ACTIVATIONS.**

**EXCEEDING 18 VDC WILL RESULT IN CONTROLLER DAMAGE.**

**OBSERVE CORRECT POLARITY WHEN CONNECTING BATTERY POWER TO THE B AND N CONTACTS ON THE CROSSING CONTROLLER CONNECTOR(S). INCORRECT POLARITY WILL RESULT IN SEVERE DAMAGE TO THE A80405 MODULE(S).**

#### **Crossing Controller DC Power Connections**

The A80405 modules receive power via the Lighting Surge panel and the **CROSSING CONTROLLER** connectors as shown in Figure 181:

Surge panel provides primary battery surge protection.

Secondary surge protection provided by each A80405 module

Make power connections to each A80405 module via the **B** and **N** contacts of the respective **CROSSING CONTROLLER** connectors:

Poly-jacketed 10AWG wire is recommended for DC power and return between the lighting surge panel and the 4000 GCP.

Poly-jacketed 6AWG wire is recommended for DC power and return between the lighting surge panel and the crossing battery.

### **Connecting Power at Initial Cutover or After Changes to Warning Device Wiring**

Once the system has booted up, the SSCC3I module has internal short circuit protection for lamp, bell and gate control outputs. Therefore, at the initial cutover it is important to boot up the system prior to connecting external loads.

After external wiring is complete, the connectors must be applied as instructed in the following CAUTION before applying power to the 4000 GCP SSCC3I module(s).

#### **WARNING**

**DURING THE SSCC3I BOOT-UP PROCESS AND AFTER ALL WIRING IS CONNECTED:**

**THE CROSSING GATES WILL BE DOWN WITH CROSSING LAMPS FLASHING AND BELLS RINGING; A80405 MODULE(S) WILL NOT BE RESPONSIVE TO CROSSING CONTROL INPUT FROM THE 4000 GCP. TAKE ADEQUATE PRECAUTIONS TO WARN ANY PEDESTRIANS, PERSONNEL, TRAINS, AND VEHICLES IN THE AREA UNTIL PROPER SYSTEM OPERATION IS VERIFIED.**

#### **CAUTION**

THE WIRING AND CONNECTORS MUST BE APPLIED IN THE FOLLOWING SEQUENCE TO AVOID DAMAGE:

OPEN THE LAMP, GATE GC CONTROL, GP INPUTS, GD INPUTS AND BELL CIRCUITS AT THE SURGE PANEL(S).

VERIFY POLARITY ON POWER CONNECTOR(S).

CONNECT THE SCREW-LOCK POWER CONNECTOR FOR EACH SSCC3I MODULE AND LOCK BY TIGHTENING SCREWS.

WAIT APPROXIMATELY 40 SECONDS FOR SSCC3I MODULE(S) TO BOOT UP.

CONNECT THE GC/BELL AND GP/GD CAGE-CLAMP CONNECTORS FOR THE APPROPRIATE SSCC3I.

CLOSE THE LAMP, GATE CONTROL, GP/GD INPUTS AND BELL CIRCUITS ON THE SURGE PANEL(S).

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

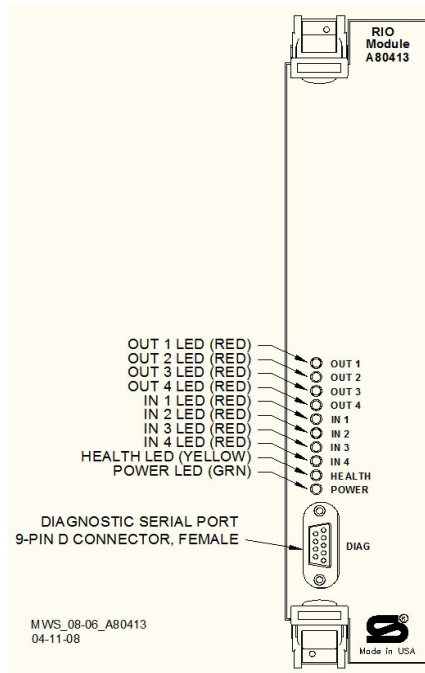


Figure 184: Relay Input Output Module (RIO), A80413

Table 53:  
RIO Module LED Descriptions

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

## **TRANSFER MODULES (A80406, A80468)**

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

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

A80468 Transfer Module - used on the Dual Two Track Chassis, A80465.

The Timer Controls, LEDs, and Timer Display on each module function the same. Refer to Figure 185 and Figure 186 for control, LED and display locations.

### **WARNING**

**AT CROSSINGS USING MEFS XNG02\_00.MEF AND EARLIER, GATES WILL BEGIN TO LOWER IMMEDIATELY (WITHOUT GATE DELAY TIME) WHEN THE TRANSFER SWITCH IS USED TO SWAP BETWEEN HEALTHY UNITS. USE CAUTION WHEN TRANSFERRING CONTROL TO AVOID GATES HITTING VEHICLES OR PEDESTRIANS.**

### **NOTE**

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

## Transfer Module User Interfaces

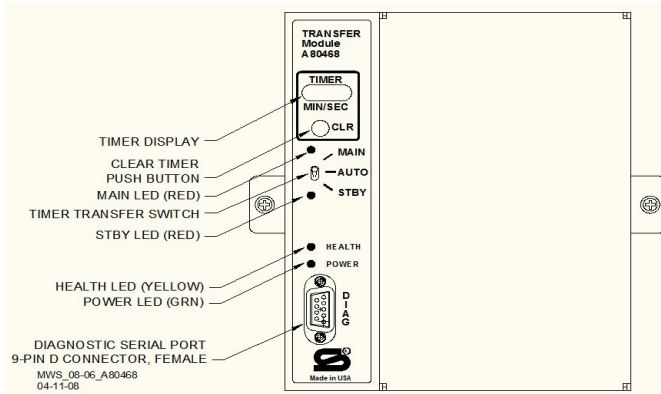


Figure 185: Transfer Module A80468, Front Panel

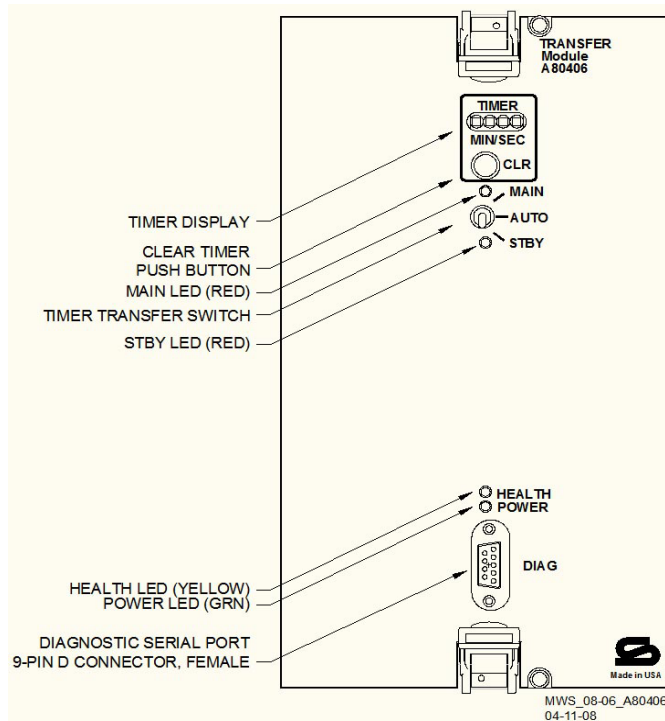


Figure 186: Transfer Module, A80406, Front Panel

APP A - HARDWARE

Table 54:  
Transfer Module LED Descriptions

LED		Description
Name	Color	
<b>MAIN</b>	Red	On – Main modules enabled while Transfer Timer Switch is set to <b>AUTO</b> or Transfer Timer Switch is set to <b>MAIN</b> Off – Main side is currently not powered
<b>STBY</b>	Red	On – Standby modules enabled while Transfer Timer Switch is set to <b>AUTO</b> or Transfer Timer Switch is set to <b>STBY</b> Off – Standby side is currently not powered

**Table 54:  
Transfer Module LED Descriptions**

LED		Description
Name	Color	
<b>HEALTH</b>	Yellow	Slow (1Hz) – Module is functioning normally
<b>POWER</b>	Green	On steadily when power is applied to the Transfer module

When transfer delay is set using DIP switch S3, the Transfer Module 4-character display shows the:  
 set transfer delay time in minutes and seconds  
 transfer timer delay count down in 1 sec. increments  
 selected module set (MAIN or STBY)

**Table 55:  
Transfer Module Timer Display Indications**

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

APP A - HARDWARE



**Table 56:  
Transfer Module Timer Controls**

Item	Function
<b>CLR</b> (Clear Timer) push button	Clears transfer delay time from counter. When pressed during timer countdown: Sets the timer to the selected Transfer Delay Interval, and Initiates immediate transfer of GCP operation to opposite modules. Switches MAIN to STANDBY or Switches STANDBY to MAIN
<b>Timer Transfer Switch</b>	Three-position toggle switch: <b>MAIN</b> position enables only main module operation and will not automatically transfer. <b>AUTO</b> position enables automatic switch over to opposite set of modules: transfers from main modules to standby modules when main module failure is detected, or transfers from standby modules to main modules when standby module failure is detected. <b>STBY</b> position enables only standby module operation and will not automatically transfer. To switch from one set of modules ( <b>MAIN</b> or <b>STBY</b> ) to the other set of modules <u>when the transfer time is not counting down</u> , move the switch from <b>AUTO</b> to the desired position ( <b>MAIN</b> or <b>STBY</b> ). Then turn switch to <b>AUTO</b> .

**Transfer Delay Interval Selection**

The transfer delay interval for the transfer modules is set by the positions of the switch segments on switch assembly 3, (S3). The switch positions required to set the desired number of minutes are shown in Table 57; a similar table is located on each module. The delay range is 0 to 31 minutes, in 1 minute increments. The factory setting is 3 minutes.

**NOTE**

When viewing switch S3 with the transfer module in the normal operating position, the orientation of S3 on the A80468 module is inverted compared to the orientation of S3 on the A80406 module. This changes the location of switch position S3-0. Refer to Figure 187 and Figure 188 for switch position locations.

**NOTE**

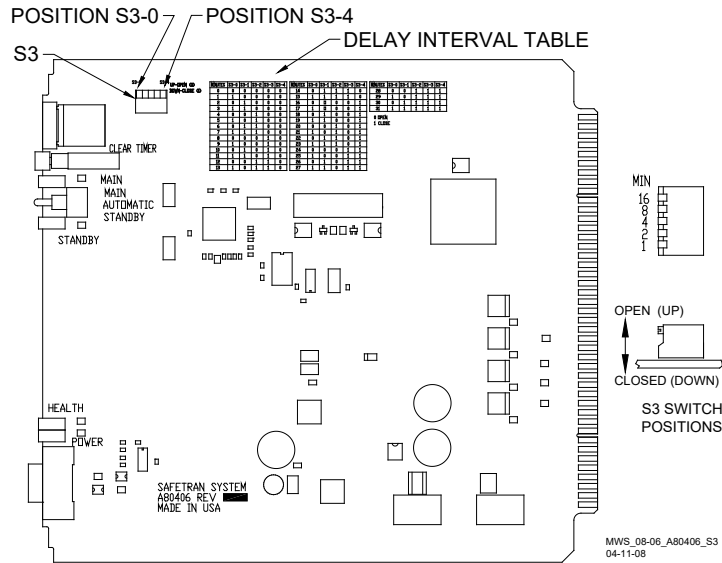
After changing switches on S3, verify timer setting by switching the timer transfer switch to AUTO. The transfer time (MM:SS) will be displayed in minutes and seconds on the 4-character display.

**Table 57:  
Transfer Delay Interval Settings**

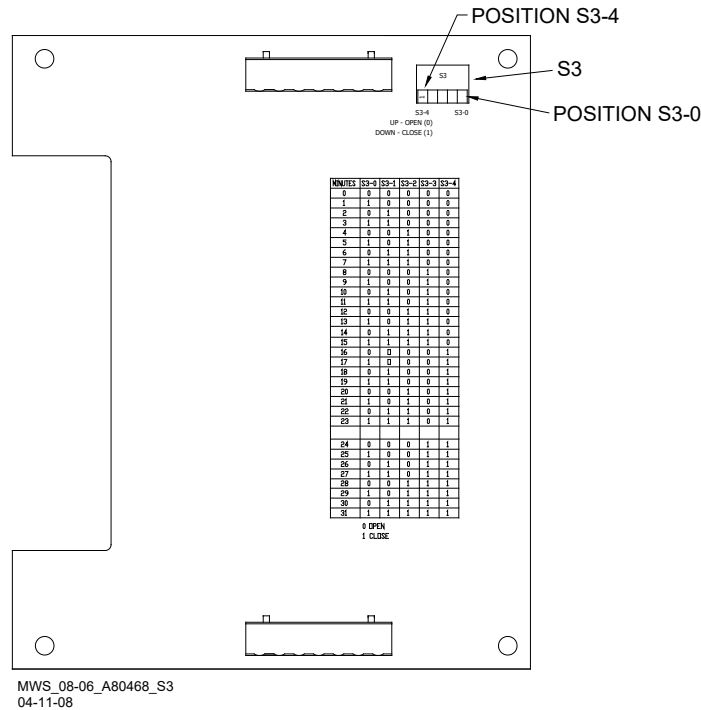
<b>MINUTES</b>	<b>S3-0</b>	<b>S3-1</b>	<b>S3-2</b>	<b>S3-3</b>	<b>S3-4</b>
0	0	0	0	0	0
1	1	0	0	0	0
2	0	1	0	0	0
3	1	1	0	0	0
4	0	0	1	0	0
5	1	0	1	0	0
6	0	1	1	0	0
7	1	1	1	0	0
8	0	0	0	1	0
9	1	0	0	1	0
10	0	1	0	1	0
11	1	1	0	1	0
12	0	0	1	1	0
13	1	0	1	1	0
14	0	1	1	1	0
15	1	1	1	1	0
16	0	0	0	0	1
17	1	0	0	0	1
18	0	1	0	0	1
19	1	1	0	0	1
20	0	0	1	0	1
21	1	0	1	0	1
22	0	1	1	0	1
23	1	1	1	0	1
24	0	0	0	1	1
25	1	0	0	1	1
26	0	1	0	1	1
27	1	1	0	1	1
28	0	0	1	1	1
29	1	0	1	1	1
30	0	1	1	1	1
31	1	1	1	1	1

APP A - HARDWARE

0 is OPEN (UP, away from board).  
1 is CLOSED (DOWN, towards board)



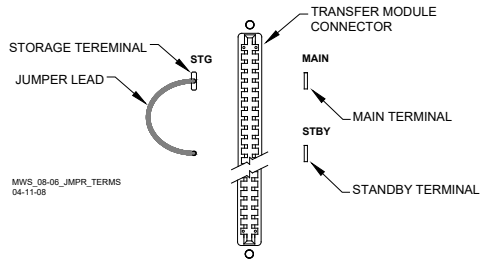
**Figure 187: Transfer Module, A80406, S3 Switch Positions**



**Figure 188: Transfer Module, A80468, S3 Switch Positions**

**Operation Without Transfer Module A80406**

To disable the A80406 Transfer Module, remove the module from the chassis and move the jumper from the storage position, STG, to the MAIN or standby (STBY) position (see Figure 189).

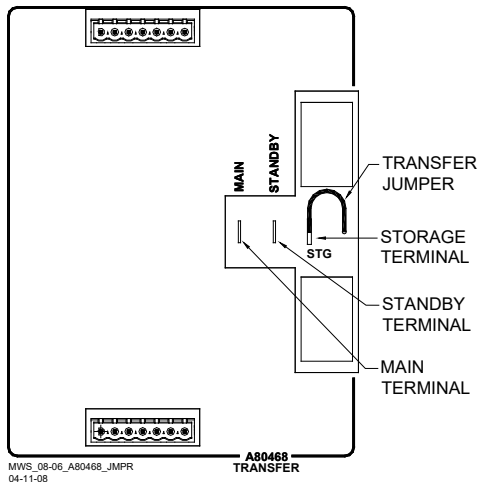


**Figure 189: Transfer Module (A80406) Jumper Positions**

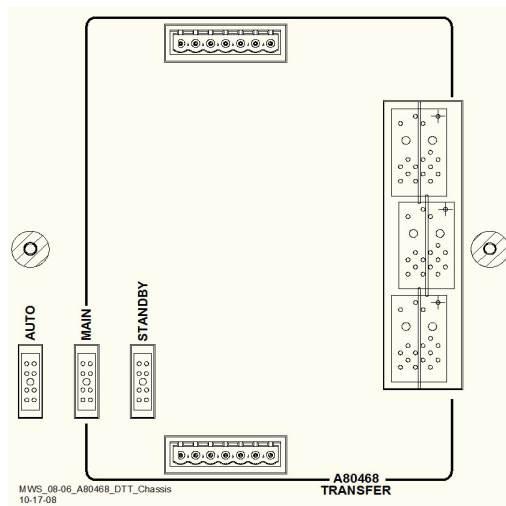
**Operation Without Transfer Module A80468**

To disable the A80468 Transfer Module, remove the module from the chassis and move the jumper from the storage position, STG, to the MAIN or standby (STBY) position (see Figure 190 for all cases except A80475 or Figure 191 for the A80475).

APP A - HARDWARE



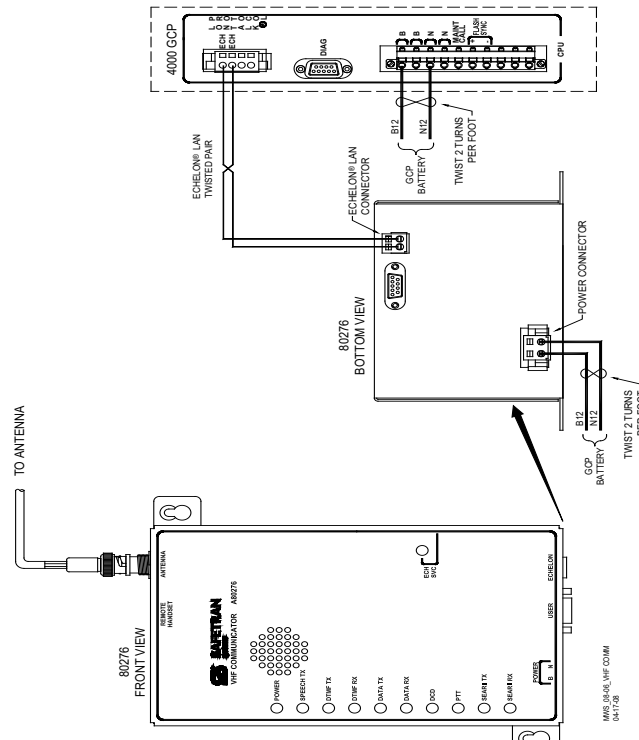
**Figure 190: Transfer Module (A80468) Jumper Positions (All cases except A80475)**



**Figure 191: Transfer Module (A80468) Jumper Positions (Case A80475 Only)**

## APPENDIX B – OPTIONAL REMOTE CALIBRATION AND REMOTE CROSSING LAMP VOLTAGE ADJUSTMENT PROCEDURES

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



**Figure 192: Connecting the VHF Communicator,  
A80276**

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

1. Siemens VHF Communicator (A80276) programmed and connected to the GCP Echelon LAN.  
VHF Communicator is a VHF Radio interface to the 4000 GCP that sends setup and calibration options to remote radio.  
VHF Communicator set to a railroad VHF frequency.
2. Hand-held VHF radio with DTMF keypad.  
Person doing remote calibration responds to options and sends commands to GCP.

Set to same frequency as VHF communicator.

Hardwire test shunt for calibration and appropriate voltmeter for lamp adjustments.

Obtain a one-time password from the GCP for remote operation.

Password expires in 60 minutes unless another setting is selected by user.

Previously during the programming stage, the DOT Crossing Number must be entered in the Location

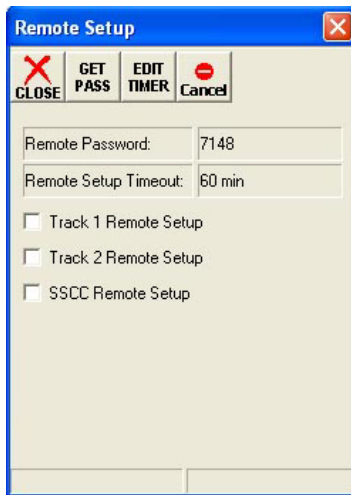
Information on the SITE INFO screen. During remote calibration, the DOT number is used to identify that the proper location is being calibrated.

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

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

**NOTE**

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



MWS\_08-06\_REMOTE\_SETUP  
04-17-08

**Figure 193: Remote Setup Window**

**Table 58:  
Remote Calibration Setup**

APP B – REMOTE CALIBRATION

<b>Step 1</b>	Select the <b>Setup</b> button from the DT Buttons at the top of the status Screen.
<b>Step 2</b>	From the menu that appears, select <b>REMOTE SETUP</b> . The <b>Remote Setup</b> dialog box displays.
<b>Step 3</b>	Select the <b>GET PASS</b> button. A <b>Push button</b> message appears in the message box at the bottom of the window.
<b>Step 4</b>	Press the <b>SEL</b> pushbutton on the front panel of the CPU module. The <b>Remote Setup</b> dialog box changes. A four-digit password appears in the <b>Remote Password</b> value field (see Figure XXXX). Check boxes for each used track module and the SSCC appear below the <b>Remote Password</b> value field.
<b>Step 5</b>	Record the four-digit password.

**Table 58:  
Remote Calibration Setup**

<b>Step 6</b>	If the default 60-minute timeout is not long enough, select the <b>EDIT TIMER</b> button. The Set Timer dialog box displays.
<b>Step 7</b>	Using the keypad numbers, enter the required Setup Timeout value (range 1 – 120 minutes) into the <b>New Value</b> field.
<b>Step 8</b>	Select the <b>Update</b> button. The dialog box closes and the <b>Remote Setup</b> dialog box appears. The new Remote Setup Timeout value displays.
<b>Step 9</b>	Individually select each field of the Track and SSCC to be calibrated. A check appears in the check box of each selected field.
<b>Step 10</b>	Select the <b>CLOSE</b> button. The Status Screen displays.
<b>Step 11</b>	To perform an Island Calibration, go to the Island Calibration screen and record the shunt placement distance for shunting sensitivity.

**WARNING**

**AFTER PERFORMING REMOTE GCP CALIBRATION USING THE VHF COMMUNICATOR, RETURN TO THE 4000 GCP AND VERIFY THAT EACH CALIBRATION IS PROPERLY IMPLEMENTED. REVIEW THE MAINTENANCE LOG OR THE CPU STATUS LOG AS PART OF THE VERIFICATION PROCESS.**

**Table 59:  
Remote Calibration**

<b>Step 1</b>	Press and Hold the Transmit button of the hand-held VHF radio.
<b>Step 2</b>	Enter *# followed by the password recorded in step 5 of Table 58.
<b>Step 3</b>	Release the Transmit button of the hand-held VHF radio. An assigned Department Of Transportation (DOT) number ( <b>XXX</b> ) is verbally announced. The Root menu options are announced: "For location press 1" "For GCP press 2" "For SSCC press 3" "For Help press 4"
<b>Step 4</b>	Press and Hold the Transmit button then Press <b>2</b> . GCP is selected.
<b>Step 5</b>	Release the Transmit button. An "Enter track number" message is announced

**Table 59:  
Remote Calibration**

<b>Step 6</b>	Press and Hold the Transmit button. Enter the track number (N) to be calibrated (N = 1 to 6).
<b>Step 7</b>	Release the Transmit button. The Track Menu options are announced: "For GCP calibration press 1" "For approach calibration press 2" "For linearization press 3" "For island calibration press 4" "To monitor EZ EX press 5" "To monitor island press 6"

**NOTE**

Figure 194 through Figure 198 provide a detailed flow chart of the "Remote User Interface Menu".

**Table 60:  
Remote GCP Calibration**

<b>Step 1</b>	To perform the GCP Calibration: Press and Hold the Transmit button then press <b>3</b> . GCP calibration is selected.
<b>Step 2</b>	Release the Transmit button. The Calibration Menu options are announced: "To start track N GCP calibration press 1" "To monitor EZ EX press 2"
<b>Step 3</b>	Press and Hold the Transmit button then Press <b>1</b> .
<b>Step 4</b>	Release the Transmit button. "Enter password for DOT XXX" is announced.
<b>Step 5</b>	Press and Hold the Transmit button then enter the password recorded in step 5 of Table 58.
<b>Step 1</b>	Release the Transmit button. The following information messages are sequentially announced: "Initiating track N GCP calibration" "Track N GCP calibration in progress" If GCP calibration passes: The information messages are concluded with: "Track N GCP calibration passed" "EZ is ___" "EX is ___" The Track Menu options in step 7 of Table 59 are repeated. If GCP calibration fails: The information messages conclude with: "Track N GCP calibration failed" The calibration menu of step 2 is repeated. Refer to Section 7 for troubleshooting procedures. When the cause of the failure is corrected, repeat this procedure starting at step 3. If the Remote Setup Timeout selected in Table 58 step 6 expires, start again from Table 58

APP B – REMOTE CALIBRATION



**Table 61: Remote Approach and Linearization Calibration**

<b>Step 1</b>	Temporarily place a hardwire shunt across the termination shunt. For bidirectional installations, use the termination shunt farthest from the crossing
<b>Step 2</b>	Press and Hold the Transmit button then Press <b>2</b> . Approach calibration is selected.
<b>Step 3</b>	Release the Transmit button. The Calibration Menu options are announced: "To start track N approach calibration press 1" "To monitor EZ EX press 2"
<b>Step 4</b>	Press and Hold the Transmit button. Then Press <b>1</b> .
<b>Step 5</b>	Release the Transmit button. "Enter password for DOT ____" is announced.
<b>Step 6</b>	Press and Hold the Transmit button then enter the password recorded in step 5 of Table 58.
<b>Step 7</b>	Release the Transmit button. The following information messages are sequentially announced: "Initiating track N approach calibration" "Track N approach calibration in progress" If approach calibration passes: The information messages conclude with: "Track N approach calibration passed" "Computed approach distance ____ ft" Record this distance as the first approach distance. The Track Menu options in step 7 Table 59 are repeated. If approach calibration fails: The information messages conclude with: "Track N approach calibration failed" The calibration menu in step 3 is repeated. Refer to Section 7 for troubleshooting procedures. When the failure is corrected, repeat the procedure starting at step 3. If the Remote Setup Timeout selected in Table 58 step 6 expires, start again from Table 58.
<b>Step 8</b>	Accurately (within 1%) locate the midpoint of the longest approach and move the hardwire shunt to that point on the rails.
<b>Step 9</b>	Press and Hold the Transmit button and then Press <b>4</b> . Linearization is selected.
<b>Step 10</b>	Release the Transmit button. The Calibration Menu options are announced: "To start track N linearization press 1" "To monitor EZ EX press 2"
<b>Step 11</b>	Press and hold the Transmit button then Press <b>1</b> .
<b>Step 12</b>	Release the Transmit button. An "Enter password for DOT ____" directive is announced

APP B – REMOTE CALIBRATION

**Table 61: Remote Approach and Linearization Calibration**

<b>Step 13</b>	Press and hold the Transmit button and then enter the password recorded in step 5 of Table 58.
<b>Step 14</b>	<p>Release the Transmit button.</p> <p>The following information messages are sequentially announced:          "Initiating track N linearization"          "Track N linearization in progress"          If linearization passes:              the information messages conclude with:          "Track N linearization passed"          "Linearization number ____"              Record this number as the first approach value.</p> <p>The Track Menu options, step 7, Table 59, are repeated.</p> <p>If approach linearization fails:          The information messages are concluded with:          "Track N linearization failed"          Release the Transmit button.              The calibration menu from step 10 is repeated.</p> <p>Refer to Section 7 for troubleshooting procedures.</p> <p>When the failure is corrected, repeat the procedure from step 10.</p>
<b>Step 15</b>	Remove the hardwire shunt from the track.
<b>Step 16</b>	<p>If the approach is unidirectional or simulated bidirectional, go to step 38.</p> <p>If the track is bidirectional and the measured distance to the other termination shunt is within 10 % of the first approach go to step 17.</p> <p>Otherwise, if distance is clearly shorter, go to step 38.</p>
<b>Step 17</b>	Temporarily place a hardwire shunt across the termination shunt of the other approach.
<b>Step 18</b>	<p>Press and Hold the Transmit button then Press <b>2</b>.</p> <p>Approach calibration is selected.</p>
<b>Step 19</b>	<p>Release the Transmit button.</p> <p>The Calibration Menu options are announced:          "To start track N approach calibration press 1"          "To monitor EZ EX press 2"</p>
<b>Step 20</b>	Press and Hold the Transmit button. Then Press <b>1</b> .
<b>Step 21</b>	<p>Release the Transmit button.</p> <p>"Enter password for DOT ____" is announced</p>
<b>Step 22</b>	Press and Hold the Transmit button then enter the password recorded in step 5 of Table 58.

APP B – REMOTE CALIBRATION

**Table 61: Remote Approach and Linearization Calibration**

<b>Step 23</b>	<p>Release the Transmit button.          The following information messages are sequentially announced:          “Initiating track N approach calibration”          “Track N approach calibration in progress”          If approach calibration passes:          The information messages conclude with:          “Track N approach calibration passed”          “Computed approach distance ____ ft”              Record this distance as the second approach distance value.          The Track Menu options in step 7 of Table 59 are repeated.          If approach calibration fails:          The information messages conclude with:          “Track N approach calibration failed”          The calibration menu in step 3 is repeated.          Refer to Section 7 for troubleshooting procedures.          When the failure is corrected, repeat the procedure starting at step 3.          If the Remote Setup Timeout selected in Table 58 step 6 expires, start again from Table 58.</p>
<b>Step 24</b>	<p>Accurately (within 1%) locate the midpoint of this approach and move the hardwire shunt to that point on the rails.</p>
<b>Step 25</b>	<p>Press and Hold the Transmit button and then Press <b>4</b>.          Linearization is selected.</p>
<b>Step 26</b>	<p>Release the Transmit button.          The Calibration Menu options are announced:          “To start track N linearization press 1”          “To monitor EZ EX press 2”</p>
<b>Step 27</b>	<p>Press and hold the Transmit button then Press <b>1</b>.</p>
<b>Step 28</b>	<p>Release the Transmit button.          An “Enter password for DOT ____” directive is announced</p>
<b>Step 29</b>	<p>Press and hold the Transmit button and then enter the password recorded in step 5 of Table 58.</p>

APP B – REMOTE CALIBRATION

**Table 61: Remote Approach and Linearization Calibration**

<b>Step 30</b>	<p>Release the Transmit button.</p> <p>The following information messages are sequentially announced:          “Initiating track N linearization”          “Track N linearization in progress”          If linearization passes:              the information messages conclude with:          “Track N linearization passed”          “Linearization number _____”              Record this number as the second approach linearity value.</p> <p>The Track Menu options, step 7, Table 59, are repeated.</p> <p>If approach linearization fails:          The information messages are concluded with:          “Track N linearization failed”          Release the Transmit button.              The calibration menu from step 10 is repeated.</p> <p>Refer to Section 7 for troubleshooting procedures.          When the failure is corrected, repeat the procedure from step 10.</p>
<b>Step 31</b>	<p>Remove the hardwire shunt from the track.</p>
<b>Step 32</b>	<p>If the Lin Steps value for the second approach is greater than or the same as the value recorded for the first approach in step 14, record the Lin Steps value.          Go to step 38.</p> <p>If the Lin Steps value for the second approach is less than the value recorded in step 14, return to the bungalow and select the <b>EDIT</b> button of the track Linearization calibration menu.          The Linearization Steps dialog box displays.</p>
<b>Step 33</b>	<p>Enter the Lin Steps value recorded for the first approach in step 14 into the <b>New Value</b> field using the keypad numbers and select <b>UPDATE</b>.</p>
<b>Step 34</b>	<p>Select the <b>GCP APP</b> button.          The GCP Approach Window appears.</p>
<b>Step 35</b>	<p>Select the <b>EDIT</b> button.          The Computed Approach Distance dialog box appears.</p>
<b>Step 36</b>	<p>Enter the computed approach distance (<b>Comp Dist</b>) value recorded for the first approach in step 5 into the <b>New Value field</b> using the keypad numbers and select <b>UPDATE</b>.          The Calibration Select Window appears.</p>
<b>Step 37</b>	<p>Verify that the computed approach distance (<b>Comp Dist</b>) and the linearization steps (<b>Lin Steps</b>) values recorded for the first approach in steps 14 and 30 are the same as those displayed on the <b>Calibration Select</b> window</p>

APP B – REMOTE CALIBRATION

**Table 61: Remote Approach and Linearization Calibration**

<b>Step 38</b>	Enter the distance and linearity values recorded for the first and second (if applicable) approach(es) on the <b>CALIBRATION VALUES</b> history on page 21 of the Application History card.
<b>Step 39</b>	This completes Approach and Linearization calibration. To record the reason for the Calibration and store it in the Maintenance log, select the <b>ADD LOG ENTRY</b> button. Type any notes about the calibration and select OK to save the entry.

**Table 62:  
Remote Island Calibration**

<b>Step 1</b>	Temporarily install a hardwire shunt beyond the island receiver rail connections. Place the shunt at the distance recorded in Table 58, step 12.
<b>Step 2</b>	Press and Hold the Transmit button then press <b>6</b> . Island calibration is selected.
<b>Step 3</b>	Release the Transmit button. The Calibration Menu options are announced: "To start track N island calibration press 1" "To monitor island signal level press 2"
<b>Step 4</b>	Press and Hold the Transmit button then press <b>1</b> .
<b>Step 5</b>	Release the Transmit button. An "Enter password for DOT ____" message is announced
<b>Step 6</b>	Press and Hold the Transmit button and enter the password recorded in step 5 of Table 58.
<b>Step 7</b>	Release the Transmit button. The following information messages are sequentially announced: "Initiating track N island calibration" "Track N island calibration in progress" If island calibration passes: The information messages conclude with: "Track N island calibration passed" <b>"Island signal level n"</b> (where n is around 100). The Track Menu options in step 7 Table 59 are repeated. If island calibration fails: The information messages conclude with: "Track N island calibration failed" Release the Transmit button. The calibration menu from step 3 is repeated. Refer to the Maintenance and Troubleshooting section for troubleshooting procedures. When the failure is corrected, repeat the procedure starting at step 2.
<b>Step 8</b>	Remove the hardwire shunt.

APP B – REMOTE CALIBRATION

**NOTE**

Before performing the remote lamp voltage adjustment procedure, the crossing controllers must be inactive; i.e. gates up, lamps off, and bell off. If a train approaches during lamp adjustment, the crossing controllers will activate and the lamps will flash.

**Table 63:  
Remote Lamp Voltage Adjustments**

<b>Step 1</b>	Press and Hold the Transmit button. Press <b>3</b> . The remote SSCC menu is selected.
<b>Step 2</b>	Release the Transmit button. The SSCC Menu options are announced: "SSCC 1 press 1" "SSCC 2 press 2" "Crossing press 3"
<b>Step 3</b>	Press and Hold the Transmit button. Then Press <b>1</b> . The SSCC Lamp 1 Menu is selected.
<b>Step 4</b>	Release the Transmit button. The SSCC 1 Lamp Menu options are announced: "Lamp 1 press 1" "Lamp 2 press 2" "Lamp 1 voltage press 3" "Lamp 2 voltage press 4"
<b>Step 5</b>	Press and Hold the Transmit button. Then Press <b>3</b> .
<b>Step 6</b>	Release the Transmit button. " <b>SSCC 1 lamp 1 voltage ___ volts</b> " is announced
<b>Step 7</b>	Press and Hold the Transmit button. Then Press <b>*</b> . The SSCC 1 Lamp 1 Voltage Menu is selected.
<b>Step 8</b>	Release the Transmit button. "SSCC 1 Lamp 1 Voltage" is announced, followed by: "up 1 volt press 1" "up one-half volt press 2" "up one-tenth volt press 3" "down 1 volt press 4" "down one-half volt press 5" "down one-tenth volt press 6" SSCC 1 lamp 1 output is on and steady.
<b>Step 9</b>	Press and Hold the Transmit button. Then Press the number required to appropriately increment the voltage level at lamp 1.

APP B – REMOTE CALIBRATION

**Table 63:  
Remote Lamp Voltage Adjustments**

<b>Step 10</b>	Release the Transmit button. “SSCC 1 lamp 1 voltage ___ volts” is announced.
<b>Step 11</b>	Repeat step 9 and 10 until the specified voltage reading is obtained at lamp 1. Measure the voltage at lamp 1 using the correct meter (see Section 8).
<b>Step 12</b>	Press and Hold the Transmit button. Then Press *. The SSCC 1 Lamp Menu is selected.
<b>Step 13</b>	Release the Transmit button. The new lamp 1 voltage value is saved. The lamp 1 output is turned off. The SSCC 1 Lamp Menu options are announced: “Lamp 1 press 1” “Lamp 2 press 2” “Lamp 1 voltage press 3” “Lamp 2 voltage press 4”
<b>Step 14</b>	Press and Hold the Transmit button. Then Press 4.
<b>Step 15</b>	Release the Transmit button. “SSCC 1 lamp 2 voltage ___ volts” is announced
<b>Step 16</b>	Press and Hold the Transmit button. Then Press *. The SSCC 1 Lamp 2 Voltage Menu is selected.
<b>Step 17</b>	Release the Transmit button. “SSCC 1 Lamp 2 Voltage” is announced, followed by: “up 1 volt press 1” “up one-half volt press 2” “up one-tenth volt press 3” “down 1 volt press 4” “down one-half volt press 5” “down one-tenth volt press 6” SSCC 1 lamp 2 output is on and steady.
<b>Step 18</b>	Press and Hold the Transmit button. Then Press the number required to appropriately increment the voltage level at lamp 2.
<b>Step 19</b>	Release the Transmit button. “SSCC 1 lamp 2 voltage ___ volts” is announced.
<b>Step 20</b>	Repeat steps 18 and 19 until the specified voltage reading is obtained at lamp 2. Measure the voltage at lamp 2 using the correct meter (see Section 8).

**Table 63:  
Remote Lamp Voltage Adjustments**

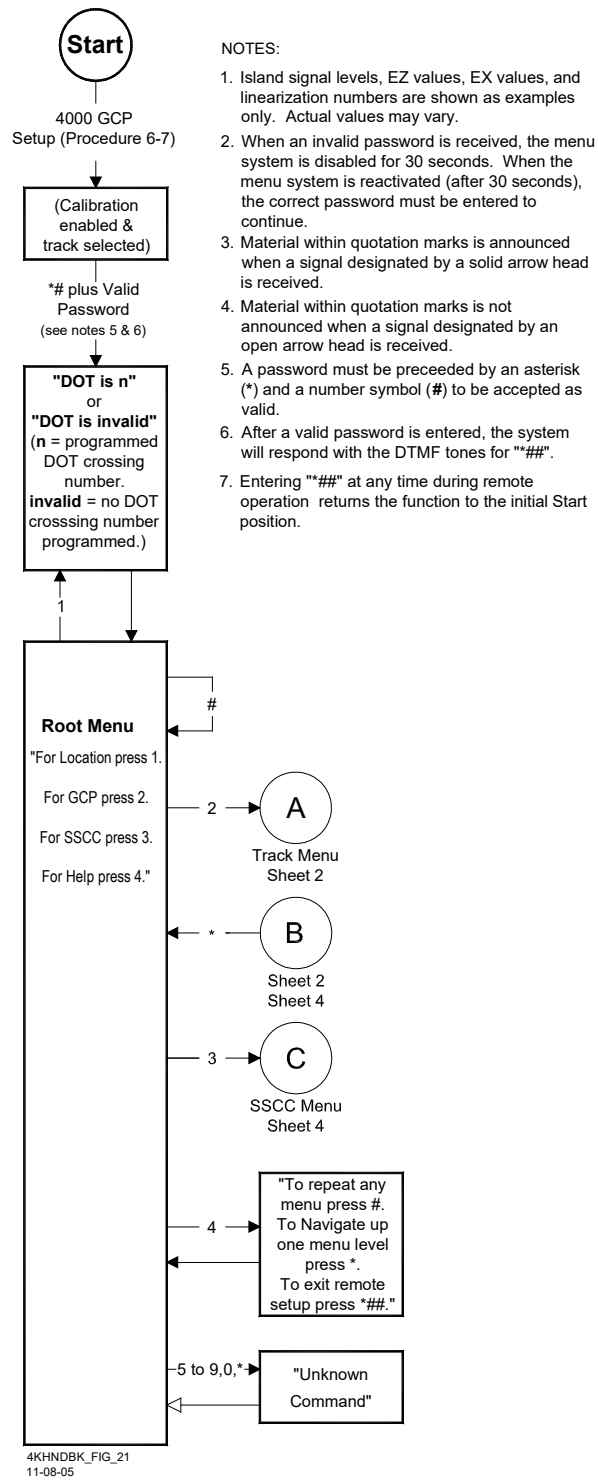
<b>Step 21</b>	Press and Hold the Transmit button. Then Press *. The SSCC 1 Lamp Menu is selected.
<b>Step 22</b>	Release the Transmit button. The new voltage value is saved. The lamp 1 output is turned off. The SSCC 1 Lamp Menu options are announced: "Lamp 1 press 1" "Lamp 2 press 2" "Lamp 1 voltage press 3" "Lamp 2 voltage press 4"
<b>Step 23</b>	Press and Hold the Transmit button. Then Press *. The SSCC Menu is selected.
<b>Step 24</b>	Release the Transmit button. The SSCC Menu options are announced: "SSCC 1 press 1" "SSCC 2 press 2" "Crossing press 3"
<b>Step 25</b>	Press and Hold the Transmit button. Then Press 2.
<b>Step 26</b>	Release the Transmit button. The SSCC 2 Lamp Menu options are announced: "Lamp 1 press 1" "Lamp 2 press 2" "Lamp 1 voltage press 3" "Lamp 2 voltage press 4"
<b>Step 27</b>	Repeat steps 5 through 20 for SSCC 2.

**Table 64:  
Completing Remote Calibration**

<b>Step 1</b>	Repeat all remote procedures for each track module selected in the Remote Calibration steps.
<b>Step 2</b>	To terminate the remote session: Press and Hold the Transmit button then press *##.
<b>Step 3</b>	Release the Transmit button. The remote setup is finished
<b>Step 4</b>	Return to the bungalow and check the Status log to ensure that the tracks were correctly calibrated. To access the Status Log, press the History Button on the display, then select Status Log.

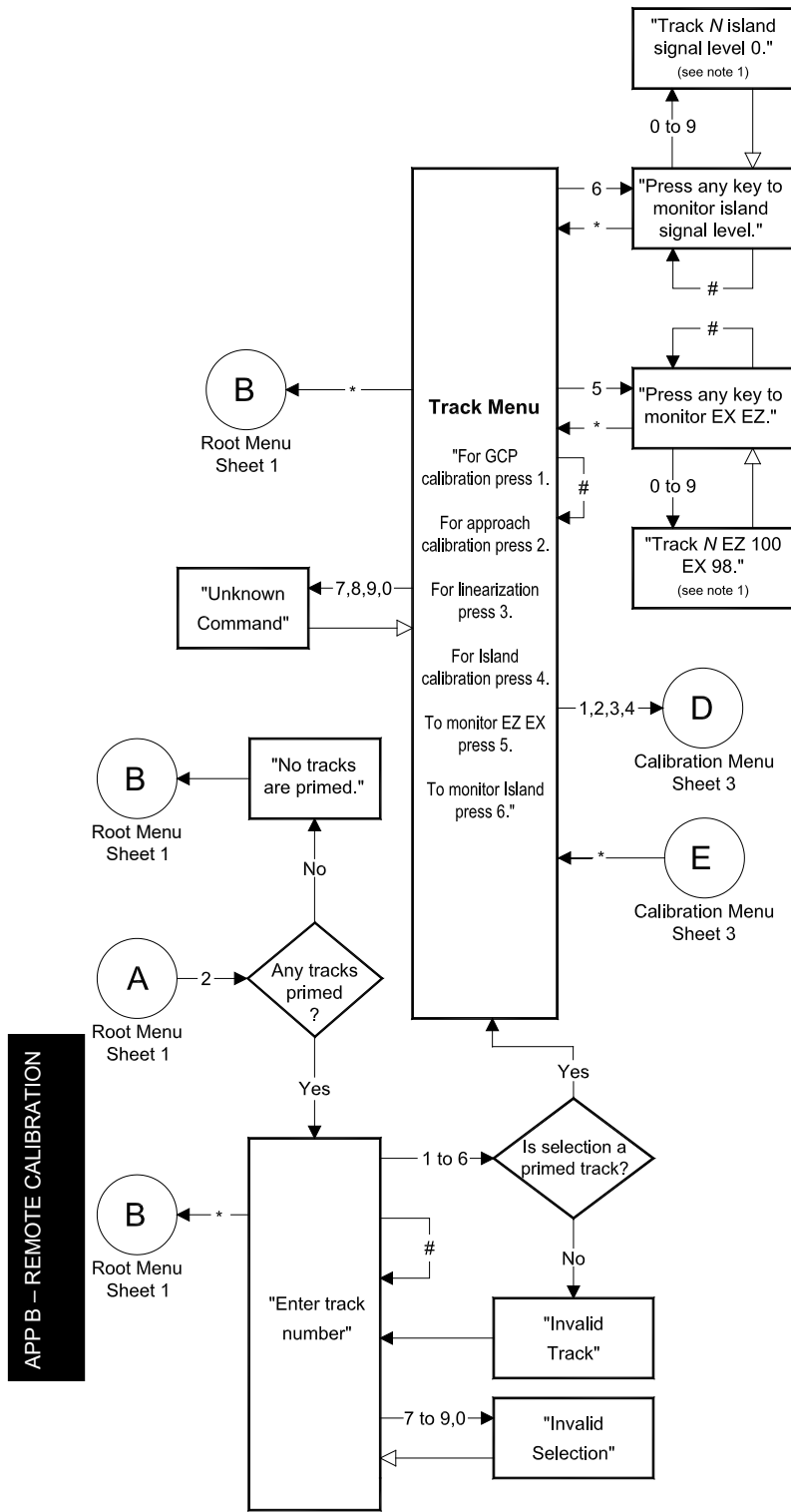


# REMOTE USER INTERFACE MENU

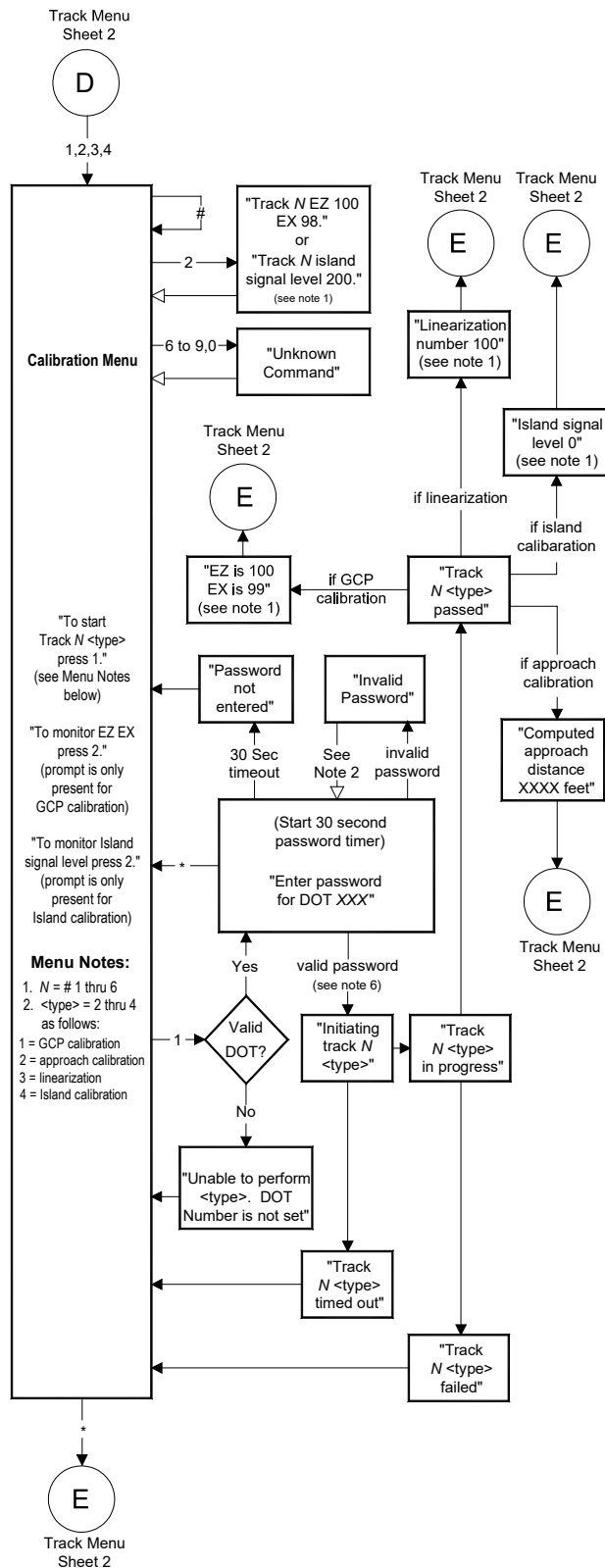


APP B – REMOTE CALIBRATION

Figure 194: Remote User Interface Menu, Sheet 1



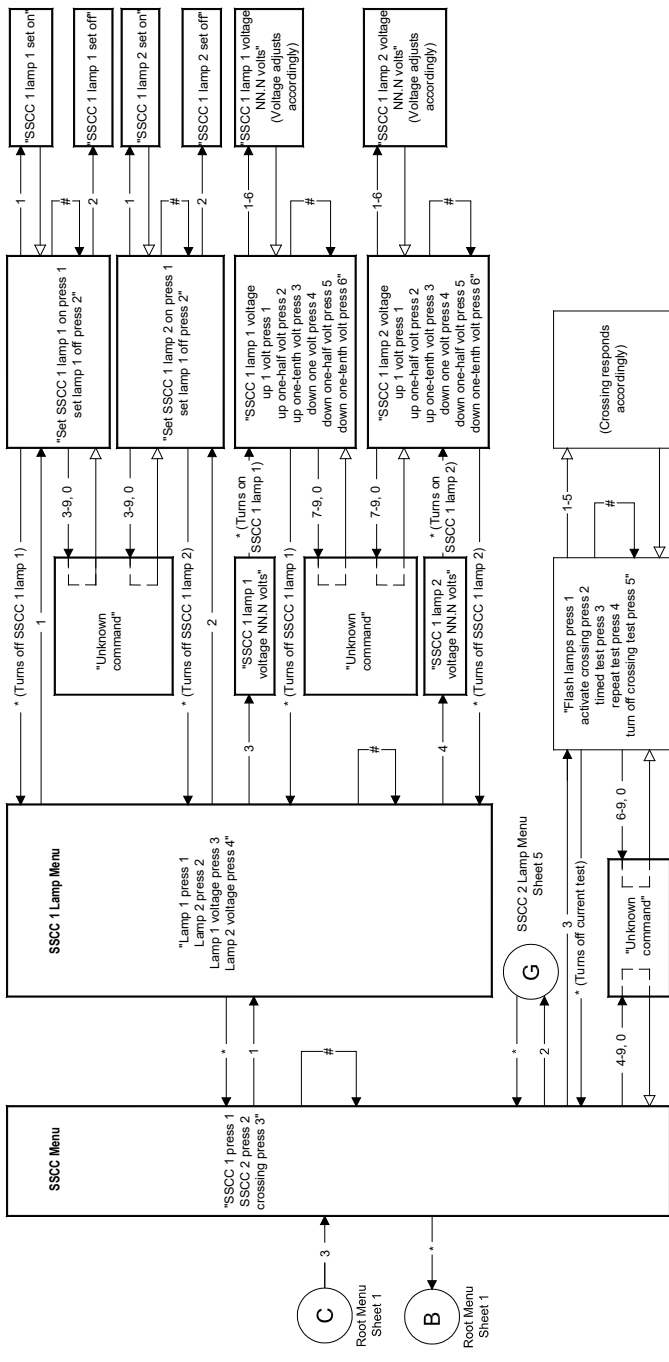
**Figure 195: Remote User Interface Menu, Sheet 2**



APP B – REMOTE CALIBRATION

Figure 196: Remote User Interface Menu, Sheet 3

**APP B—REMOTE CALIBRATION**



**Figure 197: Remote User Interface Menu, Sheet 4**

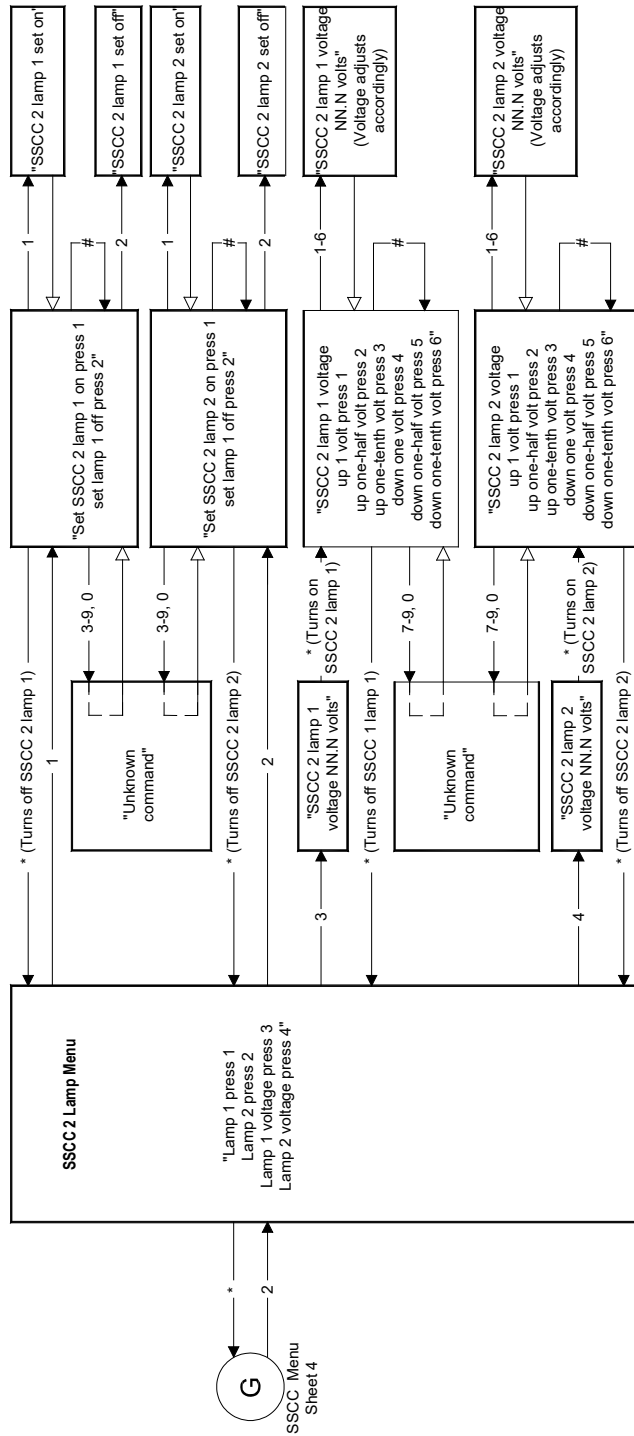


Figure 198: Remote User Interface Menu, Sheet 5

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APP B – REMOTE CALIBRATION

**NOTE**

Changing Display Module Software applies only to those GCP 4000s using Display Modules, P/N A80407-01 or P/N A80407-02 using Display Terminal (DT) software version 4.6.0 or earlier. If the GCP 4000 has a Display II Module, P/N A80407-03 using DT software version 4.8.0 or newer, follow the procedures outlined in Appendix C – Display DT USB Wizard

The installation of software on the Display Module is a two-part process.

The DT Display Module software must be copied to a CompactFlash® card.

The DT software must be installed in the Display Module using the CompactFlash® Card and CompactFlash® to PCMCIA adapter (CompactFlash® PC Card Adapter).

**INSTALLING SOFTWARE ON THE DT**

**Installation of DT to Compactflash® Card**

Tools Needed:

CD containing DT Display software

CompactFlash® Card (minimum 32 MB)

CompactFlash® PC Card Adapter (if needed)

Computer equipped with one of the following:

CompactFlash® Card slot

Peripheral device with a CompactFlash® Card slot  
(CompactFlash® Reader)

A PC Card slot (use CompactFlash® Card Adapter)

**NOTE**

CompactFlash® Cards up to 2 GB may be used for this application. However, any CompactFlash® Card used must be formatted for FAT (FAT 16) file format. In Windows® XP, go to **My Computer** and select the CompactFlash® Card. From the **File** menu select **Format>FAT**.

Insert CompactFlash® Card into computer/adapter and confirm using Windows Explorer that the CompactFlash® Card is available.

Insert CD into CDROM drive. If auto run does not start the installation program, use Windows Explorer and navigate to the Setup.exe located on the installation CD. Start the Setup.exe application.

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

Using Windows Explorer, navigate to the drive identified as the CompactFlash® Card. Using the Mouse, select the

CompactFlash® Card with a right click and select “Eject” in the popup menu. Confirm that no error messages are produced.

Remove the CompactFlash® Card from the computer. If a CompactFlash® PC Card Adapter was used, remove adapter and CompactFlash® Card together.

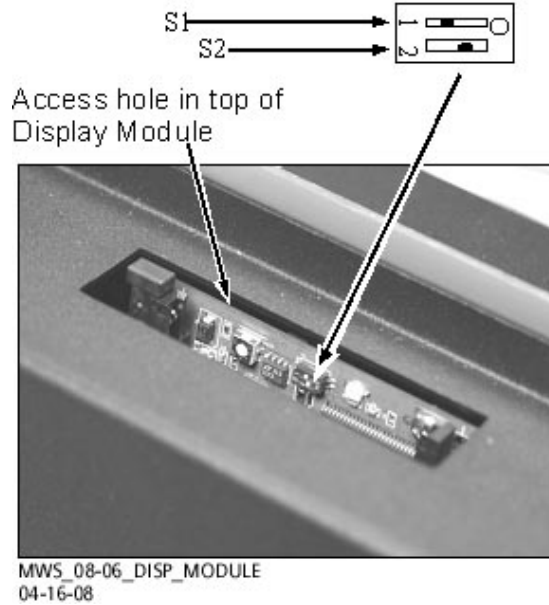
### Installation of DT from Compactflash® Card to A80407 Display Module

Tools Needed for A80407 Display Module:

CompactFlash® Card with DT files

CompactFlash® PC Card Adapter

Remove the A80407 Display Module from the GCP chassis.



**Figure 199:**

#### Top of Display Module A80407-01, -02, and some -03

Locate boot DIP switch and turn off number 2 switch on A80407 Display Module (number 1 switch should already be off). See figure above.

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



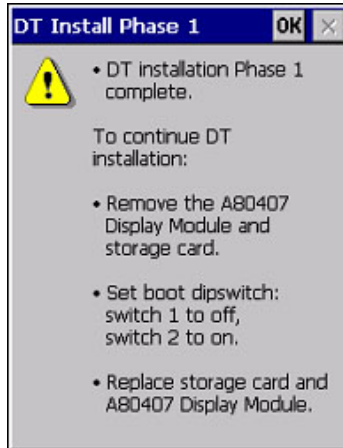
**Figure 200: Display Module with CompactFlash® Card**



Insert A80407 Display Module into appropriate slot in GCP chassis.

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

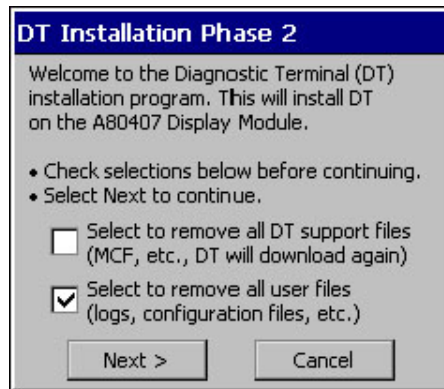
After stylus calibration screen closes, the following dialog should display:



**Figure 201: DT Install Phase 1 Window**

Follow the instructions on the dialog. Note that the adapter with CompactFlash® Memory card (Storage card) must be returned to the PCMCIA slot.

After the A80407 Display Module boots up again, the following dialog should display:



**Figure 202: DT Installation Phase 2 Window**

It is recommended that all files be removed (select both options). Select “Next >” when ready. Select “Yes” for confirm dialog (this will start installation).

After several minutes, a dialog should display that indicates installation is complete. Select Finish when ready. Remove CompactFlash® Card and adapter from A80407 Display Module. Replace the Display Module to start DT.

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## APPENDIX D – 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.
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.
Approach Clear EZ Value	The EZ value setting that is programmed to keep a directional stick set during Bidirectional DAX (BIDAX) operations; the directional stick is held while the train exits the approach. The Approach Clear EZ is set where the BIDAX system's approach terminates in the outer approach of the adjacent bi-directional DAX system.
Approach Clear Time	The length of time, measured in seconds, that is set in Bidirectional DAX (BIDAX) operations that allows the directional stick to be held until the maximum speed train clears the bidirectional approach.
ATCS:	Advanced Train Control System – An industry standard used in the 4000 GCP for communications.
BIDAX	Bidirectional Downstream Adjacent Crossing
BIDAX TO RX	Programming window used when the PSO track connections are located on the Receive side of the crossing.
BIDAX TO TX	Programming window used when the PSO track connections are located on the Transmit side of the crossing.
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.

## GLOSSARY

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 CPU11+ module, processes external communications for the GCP 4000.
CRC:	Cyclical Redundancy Check - Used to determine that data has not been corrupted.
CRTU:	Cellular Remote Telemetry Unit
DAX:	Acronym for Downstream Adjacent Crossing (Xing). DAX outputs are used to send prediction information from an upstream GCP to a downstream GCP when insulated joints are in the approach circuit.
DAX Direction	The software parameter that tells the system which direction to transmit the DAX signal in BIDAX applications, i.e., to the TX side or to the RX side of the crossing.
DIAG:	Diagnostic
Directionally Wired	Setting used to enable the GCP to determine train direction.
Directional Stick Logic	The logic function used to determine direction of train movement. The output of this function is used to activate/deactivate associated signal systems.
DOT Number:	Department Of Transportation crossing inventory number assigned to every highway-railroad crossing that consists of six numbers with an alpha suffix.
Drop Delay	An internal delay time between when a function is ordered off and when it actually de-energizes.

## GLOSSARY

DT:	Diagnostic Terminal – The Diagnostic Terminal (DT) is an 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 4000 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.

## GLOSSARY

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.
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 SEAR2I.
GP:	Gate Position – Input energized when gate is vertical.
GU:	Gate Up – Used in a user defined SEAR2I 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

## GLOSSARY

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, SSCC3I.
LAMP 2 VOLTAGE:	Voltage on the lamp 1L2 or 2L2 lamp output of the crossing controller module, SSCC3I.
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

## GLOSSARY

MCF:	Module Configuration File – The GCP application logic file.
MEF:	Module Executable File – The GCP executive software program.
MS:	Motion Sensor – A train detection device used as part of a highway-railroad grade crossing warning system to provide a detection of a train approach.
MTSS:	Mini Trackside Sensor – A device located in the gate mechanism that combines input information from gate contacts, bell, and gate tip sensor and sends the information to the SEAR2I.
NEAR GATE:	On the same surge panel, the 'near gate' is the flashing light signal or gate with the lowest voltage drop in the cable circuit. In general, if both signals have the same number and type of lamps and the same size cable conductors, the 'near gate' is the location with the shortest cable run. The 'near gate' circuit on the surge panel has an adjustable resistor in series with L1 and L2 that provides additional voltage adjustment.
OCCN:	Office Configuration Check Number – The 32 bit CRC of the configuration data, excluding items 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 4000 system.
Offset Distance:	The distance between the track circuit connections of the remote GCP (sending DAX information) to the island track connections of the UAX GCP (receiving the information).
Out Of Service:	The process for taking one or more GCP approach circuits and / or approach and island circuits out of service.
Pac File:	A GCP 4000 configuration Package File that can either be created in the office using the OCE, or downloaded from a GCP 4000 system via the CP
PCN	PSO Check Number (PCN) is used to track changes due to re-calibration and adjustments made to key PSO setup variables.
Pick Up Delay:	An internal delay time between when an input receives the signal to pickup and when it actually responds.



## GLOSSARY

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:	<b>Different models of Siemens's 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.</b>
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
RX Wire Side Connection	Used in multiple BIDAX operation. This setting enables the system to transmit DAX signals to the Receive Wire side of the crossing.
SEAR2I Application Program:	Programming for SEAR2I 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.
Stick EZ	The value below which a BIDAX output or Occupation Code (Code C) is transmitted after prediction has begun.

## GLOSSARY

Stick Release Time	The length of time, measured in minutes, that is set in Bidirectional DAX (BIDAX) operations that allows the directional stick to be held while the train is on the approach.
Supervisor Password	The password set that allows application design personnel access to office <b>editable parameters</b> .
TCN	Track Check Number (TCN) is used to track changes due to re-calibration and adjustments made to key Track Modules specific setup variables.
True RMS AC+DC:	A scale on a multimeter that measures the effective combined AC and DC portions of the total voltage. Used to measure the pulsed output of a crossing controller.
TX:	Transmit
TX Wire Side Connection	Used in multiple BIDAX operation. This setting enables the system to transmit DAX signals to the Transmit Wire side of the crossing.
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 is commonly called flash drive or memory stick.
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.
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.

## GLOSSARY

WCM:	Wayside Control Module – The Safetran A53105 assembly that centrally controls the functions of a Wayside Communications Package (WCP).
Wrap:	Common reference for a track circuit, or combination of track circuits that extend to or beyond the limits of a GCP approach, which provides train detection. Used to signify that a certain system function is being overridden based upon the state of a vital input.
Z Level:	An Island calibration value. A calibrated island will have a nominal Z Level of approximately 250. The Z Level approaches 0 when shunted.

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## APPENDIX E – GCP DISPLAY TERMINAL OPERATIONS

Beginning in version 5.0.7, expanded capabilities are available for use with the Display Terminal (DT). The DT can still be used to program as it was in earlier versions and the functionality of the top row buttons remains largely as it was before as well. However, there are new methods available to program and exercise the full functionality of the GCP 4000. The areas affected by these changes are as follows:

Programming – which is either done by use of the following buttons:

Classic DT – the typical main menu and sub-menu pages present in earlier versions of the DT.

Express DT – an abbreviated set of menus that allows users to quickly place a GCP 4000 into operation.

Configuration – a set of buttons that allow quick access to specific portions of the menus to configure the following items:

- SEAR
- Internal IO
- Comm
- SSCC Setup
- Track Setup
- Chassis Setup

Calibration and Adjustment – which allows the user to perform the following operations:

- Calibration
- SSCC testing and operation
- Out of Service operation

Diagnostics and Review

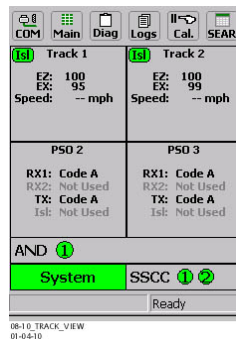
Diagnostics – provides status of GCP components

Logs – access to all system logs

Tools – stylus calibration screens

### PROGRAMMING

As with earlier versions, programming begins by selecting a button on the Track View window.



**Figure 203: The Track View Window**

Select the Main button, and the Main programming window opens.

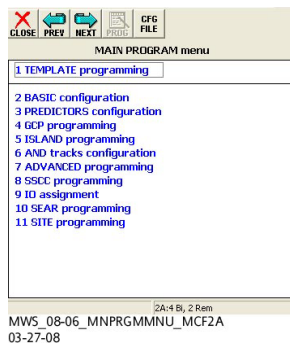


**Figure 204: The Main Programming Window**

To program the GCP, select either the Classic DT or the Express DT button.

**The Classic DT Button**

Selecting the Classic DT button opens the Main Program window.



**Figure 205: MAIN PROGRAM menu Window**

Program the GCP 4000 using the Main Program window as in earlier DT versions

**The Express DT Button**

The Express Programming Menu allows users to quickly and easily place a GCP 4000 into operation with minimal effort.

To use the Express Programming menu, select the Main button.

When the Main Program Window opens, select the Express DT button

**Express: Module Configuration Window**

When the Express button is selected, it opens the Express: Module Configuration Window

Once the user has left the Express: Module Configuration window, the standard appearance of all Express

Programming windows depicts the configured Track and RIO modules listed across the top of the window as active buttons. PSO modules and unused modules are inactive and grayed out. They cannot be selected.

Across the bottom of all Express Programming windows are the following buttons:

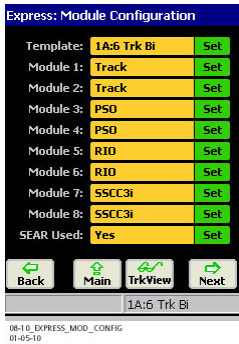
Back – This button returns the user to the last screen in the order of presentation. If the user navigates into the menu from a Configuration and Programming button, it will not return the user to the Main Programming Menu. To return

to the Main Programming Menu, the user must select the Main button.

Main – This button returns the user to the Main Programming window.

Trk View – This button returns the user to the Track View window, which is the top level DT window.

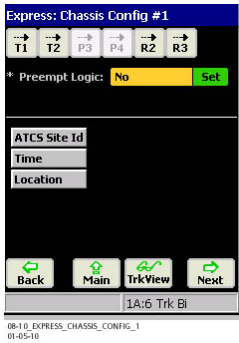
Next – The Next button navigates the user to the next menu in the queue.



**Figure 206: The Express: Module Configuration Window**

The Express: Module Configuration Window is the top level window of the Express Programming menu. The Express: Module Configuration Window allows rapid selection of Template, Track/PSO/RIO module assignments, SSCC utilization and SEAR utilization. Once the modules have all been configured, select the Next button to open the Express: Chassis Config #1 window.

**Express: Chassis Config #1 Window**



**Figure 207: The Express: Chassis Config #1 Window**

The Express: Chassis Config #1 is the window that opens when the Chassis Set. Button on the Main Program Menu's Configuration and Programming section is selected. The Express: Chassis Config #1 allows users to select whether or not Preempt Logic is used with each Track Module. It also allows the setting of the ATCS Site Id, Time, and Location information into the system. When the Next button is selected, the Express: Chassis Config #2 Window opens.

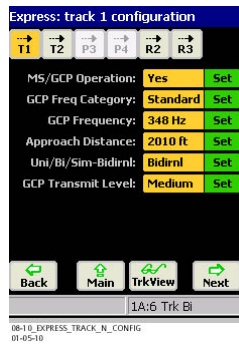
## Express: Chassis Config #2 Window



**Figure 208:**  
**The Express: Chassis Configuration #2 Window**

The Express: Chassis Config #2 Window is used to enable or disable MS/GCP Restart. When the Next button is selected, the Express: track “n” configuration window opens.

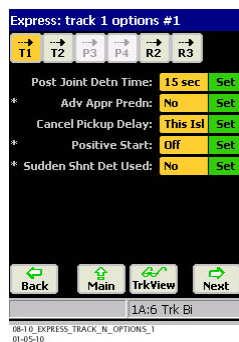
## Express: track ‘n’ configuration Window



**Figure 209:**  
**The Express: Track “N” Configuration Window**

The Express: track “n” configuration window is the window that opens when the Track Setup Button on the Main Program Menu’s Configuration and Programming section is selected and the Track Options window is further selected. The Express: track “n” configuration allows the user to program the Track Module for operation. When the Next button is selected, the Express: track “n” options #1 window opens.

## Express: track ‘n’ options #1 Window

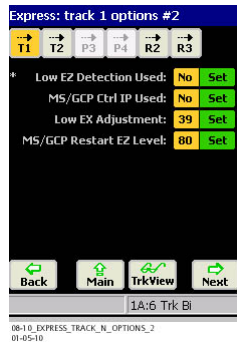


**Figure 210:**  
**The Express: Track “N” Options #1 Window**



The Express: track “n” options #1 window allows users to set perform advanced programming on the Track Module. When the Next button is selected, the Express: track “n” options #2 window opens.

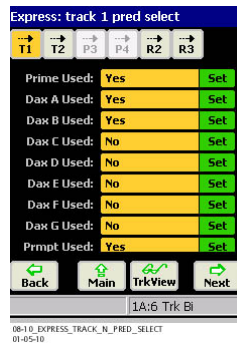
### Express: track ‘n’ options Window



**Figure 211:**  
**The Express: Track “N” Options #2 Window**

The Express: track “n” options #2 window allows users to complete advanced programming of the Track Module. When the Next button is selected, the Express: track “n” pred select window opens.

### Express: track ‘n’ pred select Window



**Figure 212:**  
**The Express: Track “N” Pred Start Window**

The Express: track “n” pred window allows users to program the Prime Prediction, the seven DAX’s and allows the user to program basic Preemption if that option was not selected earlier.

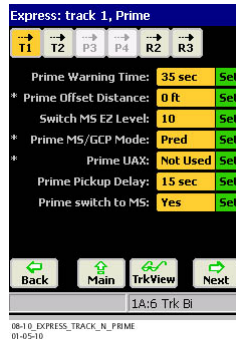
At this point, the selections made in this window determine which window will open when the Next button is selected. If: Prime is enabled, then the Express: track “n”, Prime window opens

Any of the DAX’s are selected, then the Express: track “n”, Dax A-G opens in alphabetically sequential order.

Preempt Used is enabled, then the Express: track “n”, Preempt window opens.

If none of the above options are selected, then the Next button will open the Express: track “n”, Island window

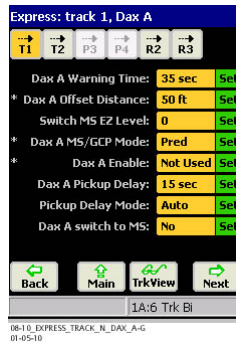
## Express: track 'n' Prime Window



**Figure 213: The Express: Track “N”, Prime Window**

The Express: track “n”, Prime window allows the user to program Prime Prediction Offset when an Island is not used. The Next button acts as described in the bullets above.

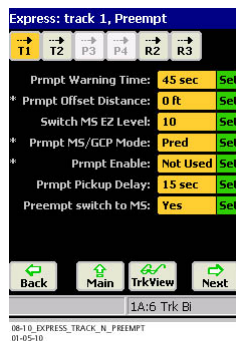
## Express: track 'n', Dax A – G Window



**Figure 214: The Express: track “n”, DAX A-G Window**

The Express: track “n”, DAX A-G window allows the user to program DAX’s for use. The Next button acts as described in the bullets above.

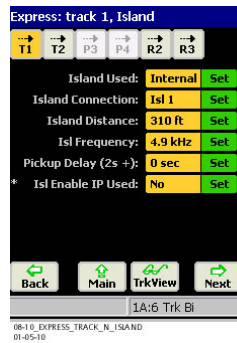
## Express: track 1, Preempt



**Figure 215: The Express: Track “n”, Preempt Window**

The Express: track “n”, Preempt window allows the user to program Preemption when Traffic Signals are near the crossing. The Next button will open the Express: track “n”, Island window.

## Express: track 'n' Island



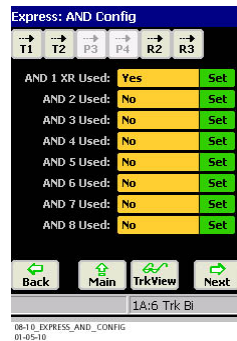
**Figure 216: The Express: Track “N”, Island Window**

The Express: track “n”, Island window allows the user to fully program the system when an Island is associated with a Track Module.

If two or more Track Modules are configured, the Next button will advance the user to the next module in sequential order to begin programming of that track.

If only one Track Module is configured, or once the last Track Module has been configured, when the Next button is selected, the Express: AND Config window opens.

## Express: AND Config Window



**Figure 217: The Express: AND Config Window**

The Express: AND Config window allows the user to program the AND 1 – 8 functionality of the GCP 4000.

If AND 1 XR was enabled, when the Next button is selected, the Express: AND 1 XR window opens.

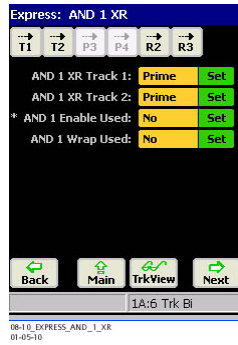
If AND 1 XR was not enabled, but other AND functions were enabled, when the Next button is selected, the Express: AND “n” window opens.

If no AND functionality was enabled, when the Next button is selected, the Express: Track “n” I/O window opens.

### **WARNING**

**AND FUNCTIONALITY IS CRITICAL TO PROPER WARNING SYSTEM OPERATION. USERS MUST ENSURE THAT AND FUNCTIONS ARE PROPERLY PROGRAMMED.**

## Express: AND 1 XR Window

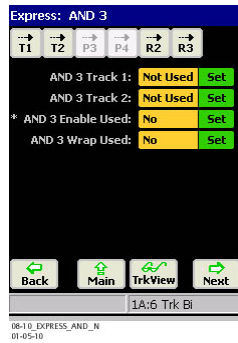


**Figure 218: The Express: AND 1 XR Window**

The Express: AND 1 XR Window allows the user to program the AND 1 XR functionality to any and/or all configured Track Modules.

If additional AND functions were enabled, when the Next button is selected, the Express: AND “n” window opens. If no other AND functionality was enabled, when the Next button is selected, the Express: Track “n” I/O window opens.

## Express: AND ‘n’ Window

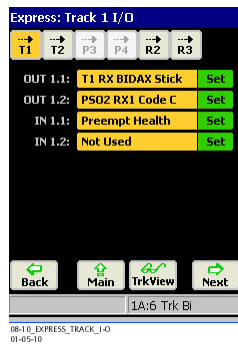


**Figure 219: The Express: AND “N” Window**

The Express: AND “N” Window allows the user to program the AND “N” functionality to any and/or all configured Track Modules.

When the Next button is selected, the Express: Track “n” I/O window opens.

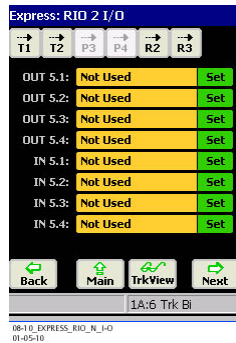
## Express: Track ‘n’ I/O Window



**Figure 220: The Express: Track “N” I/O Window**

The Express: Track “N” I/O Window allows users to program inputs and outputs. If RIOs have been programmed for use, when the Next button is selected each RIO window in sequence will open.

**Express: RIO ‘n’ Window**



**Figure 221: The Express: RIO “N” Window**

The Express: RIO “N” Window allows users to program any and/or all configured RIO inputs and outputs. This is the last window in the Express Programming window. When the Next button is selected from here, it opens the Express: Module Configuration window.

**SEAR Programming and Operation**

Selecting the SEAR button opens the SEAR Configuration Window.



**Figure 222: The SEAR Ili Top Level Window**

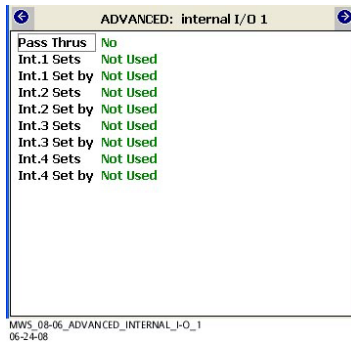
For information relating to SEAR Ili programming and planning procedures, refer to Siemens’s SEAR Ili Internal Event Recorder Field Manual, SIG-00-08-13.

**CONFIGURATION**

Selecting the Configuration Buttons opens the Classic DT windows required for the desired function.

### The Internal IO Button

Selecting the Internal IO Window opens the ADVANCED: internal I/O 1 window

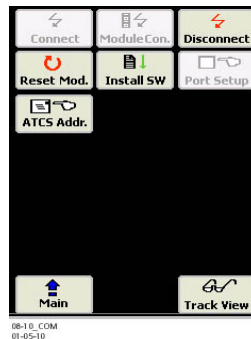


**Figure 223: The ADVANCED: internal I/O 1 Window**

Selecting the NEXT button will open the ADVANCED: internal I/O 2 window. Continued selection of the NEXT button will progress through the subsequent menus of the Classic DT menu.

### The Comm Button

Selecting the Comm Button opens the GCP 4000 – Communication Menu Window.



**Figure 224: The GCP 4000 Communication Menu Window**

The functions of the buttons on the GCP 4000 Communications Window are as described in Siemens's Model 4000 Grade Crossing Predictor Field Manual, SIG-00-08-10 in the section titled Diagnostic Terminal – Installing software on GCP 4000.

### The SSCC Setup Button

Selecting the SSCC Setup Button opens SSCC Window.

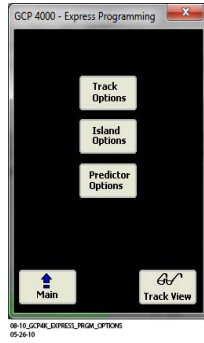


**Figure 225: The SSCC Window**

Selecting the NEXT button will open the SSCC 1 window. Continued selection of the NEXT button will progress through the subsequent menus of the Classic DT menu.

### The Track Setup Button

Selecting the Track Setup Button opens the GCP 4000 Express Programming Options window.



**Figure 226:**  
**The GCP 4000 – Express Programming Options Window**

Selecting the buttons on the GCP 4000 – Express Programming Options window opens the associated windows as stated:

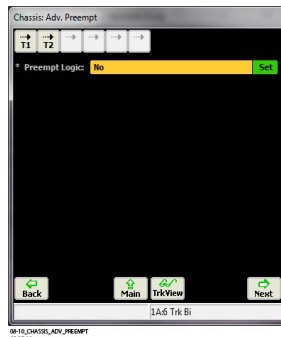
Track Options – Express: track 1 configuration (See Page 224)

Island Options – Express: track 1, Island (See page 227)

Predictor Options – Express: track 1 pred select (See Page 225)

### The Chassis Set. Button

Selecting the Chassis Set. Button opens the Chassis: Adv. Preempt window



**Figure 227: The Chassis: Adv Preempt Window**

Selecting the NEXT button opens the remaining Chassis: windows in succession (i.e., Chassis: Location and Date, Chassis: MS Restart, Chassis: AND Config, and Chassis: AND 1 XR).

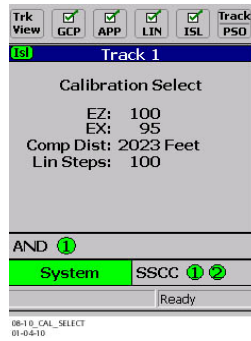
## CALIBRATION AND ADJUSTMENT

The top row of buttons displayed on the Main Menu is used for Calibration and Adjustment of the track circuit.

### The Calibration Button

Selecting the Calibration Button opens the Calibration Select Window.

## The Calibration Select Window

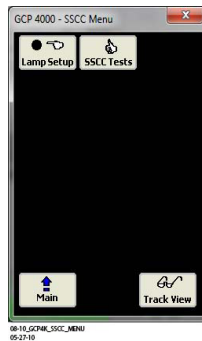


**Figure 228: The Calibration Select Window**

Operation of the Calibration function of the GCP 4000 is as described in pages 18 – 34.

### The SSCC Button

Selecting the SSCC Button opens the GCP 4000 – SSCC Menu Window.



**Figure 229: The GCP 4000 – SSCC Menu Window**

Selecting the Lamp Setup Button opens the Lamp Setup window, which is described on pages 40 – 42.

Selecting the SSCC Tests Button opens the Test Setup window, which is described in pages 46 – 48.

### The Out of Serv. Button

Selecting the Out of Serv. Button opens the Out of Service window.



**Figure 230: The Out of Service Window**

Operation of the Out of Service function is as described in Siemens's Model 4000 Grade Crossing Predictor Field Manual, SIG-00-08-10, Out of Service Feature (See pages 94 – 98).



## DIAGNOSTICS AND REVIEW

The Diagnostics and Review section is comprised of three buttons:  
Diagnostics  
Logs  
Tools

### The Diagnostics Button

Selecting the Diagnostics button opens the GCP 4000 Diagnostics window.



Figure 231: The GCP 4000 Diagnostics Window

### The Module IO Button

Selecting the Module IO button opens the Module IO Window. When selecting this button on the DT, it opens a tab for each slot on the case, starting with Slot 1.

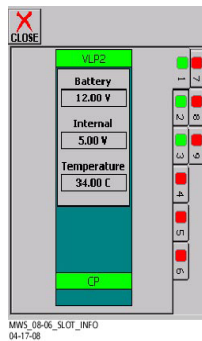
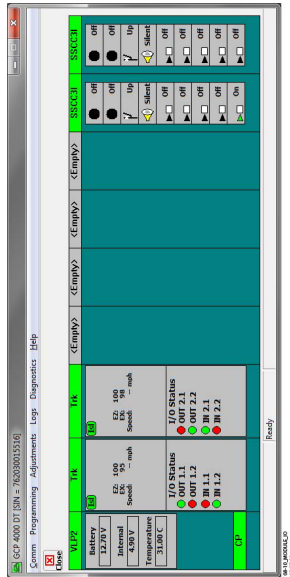


Figure 232: The GCP 4000 Slot 1 IO Window

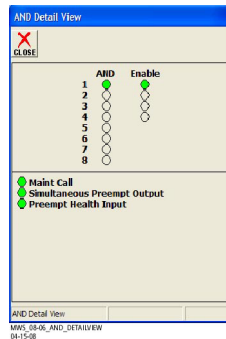
When selecting this button on a computer based DT, the window appears as follows:



**Figure 233: The Module 4000 GCP Module IO Window**

### The AND Detail Button

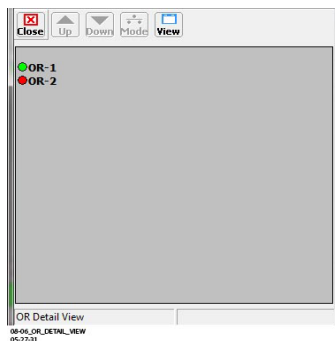
Selecting the AND Detail button opens the AND Detail View window.



**Figure 234: The AND Detail View Button**

### The OR Detail Button

Selecting the OR Detail button opens the OR Detail View window.

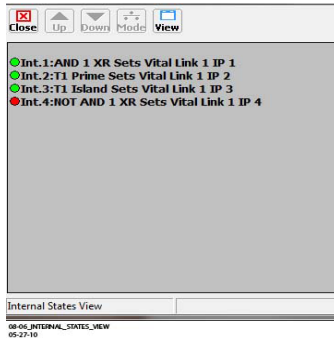


**Figure 235: The OR Detail View Window**

Functionality of the OR logic is explained in Section 6 of Siemens's Microprocessor Based Grade Crossing Predictor Model 4000 Family Application Guidelines, SIG-00-08-06.

## The Internal IO Button

Selecting the Internal IO Button opens the Internal States View Window. This window reflects the status of all assigned Internal IO parameters.

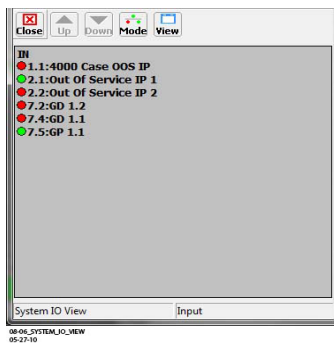


**Figure 236: The Internal States View Window**

Functionality of the Internal IO is explained in Section 6 of Siemens's Microprocessor Based Grade Crossing Predictor Model 4000 Family Application Guidelines, SIG-00-08-06.

## The System IO Button

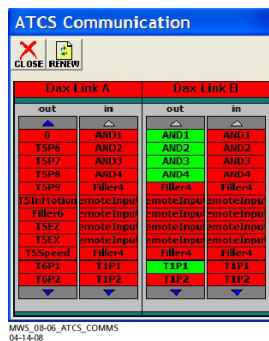
Selecting the System IO Button opens the System IO View Window. This window reflects the status of all assigned System IO parameters.



**Figure 237: The System IO View Window**

## The ATCS Com Button

Selecting the ATCS Com Button opens the ATCS Communication Link Window.



**Figure 238: The ATCS Communications Window**

### The SW Info Button

Selecting the SW Info Button opens the Card Version Window.

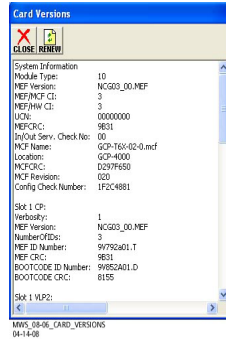


Figure 239: The Card Versions Window

### The Logic States Button

Selecting the Logic States Button opens the Logic States Window.

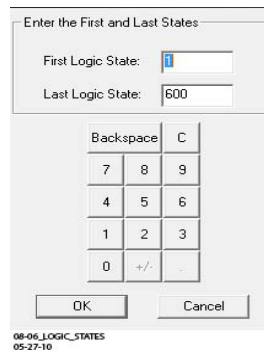


Figure 240: The Logic States Window

### The Statistics Button

Selecting the Statistics Button opens the DT Statistics Window.

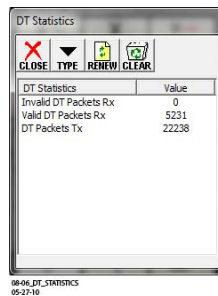


Figure 241: The DT Statistics Window

## The System Diag Button

Selecting the System Diag button opens the System Diagnostics window.

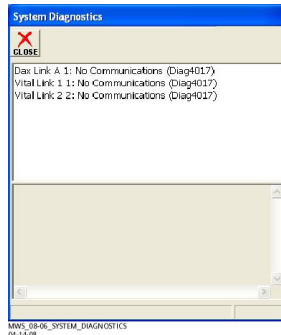


Figure 242: The System Diagnostics Window

## The Track Diag Button

The Track Diag button opens a window that greatly resembles the System Diagnostics window, but reflects only data pertaining to that individual track.

## The Rec EZ/EX Button

Selecting the Rec EZ/EX button will open a series of dialog boxes that verify that recording should start or stop. When started, a text file is populated until the stop button is selected. For further information refer to pages 148-150.

## The Sniffer Button

Selecting the Sniffer Button opens the Sniffer Window.

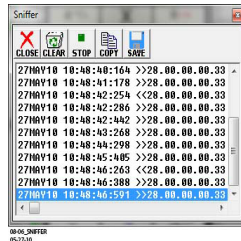


Figure 243: The Sniffer Window

## The Logs Button



Figure 244: The Logs Window

When the Logs Button is selected, it opens the Logs Window. The following buttons appear on the Logs Window:

- Train Log
- Maint. Log
- Status Log
- Diag Log
- Download All
- SEAR

## The Train Log Button

Time	Trk	WT	Det	Isl
05 Jan 18:11:17 T	2	38	31	31
05 Jan 18:11:17 X	1	90	-	30
04 Jan 12:41:10 T	2	38	31	31
04 Jan 12:41:10 X	2	38	-	31
04 Jan 12:38:56 T	2	37	31	31
04 Jan 12:38:56 X	1	96	-	30
23 Dec 08:53:1...	1	36	31	31
23 Dec 08:53:1...	1	36	-	31
23 Dec 08:49:2...	1	37	31	31
23 Dec 08:49:2...	1	37	-	31
23 Dec 06:37:3...	1	26	46	46
23 Dec 06:37:3...	1	26	-	46
22 Dec 19:06:2...	1	26	44	46
22 Dec 19:06:2...	1	26	-	46

Units: WTime (sec), Det/Isl Speed (mph)

08-10\_DT\_TRAIN\_LOG  
06-18-10

**Figure 245: The Train Log Window**

Refer to the information presented accompanying Figure 19 and Figure 20 for an explanation of the purpose and utilization of the Train Log.

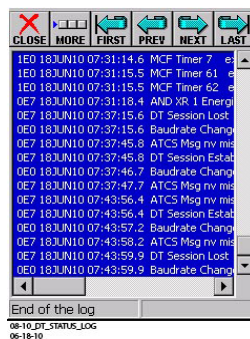
## The Maint. Log Button



**Figure 246: The Maint. Log Window**

Refer to the information presented accompanying Figure 21 for an explanation of the purpose and utilization of the Maint. Log.

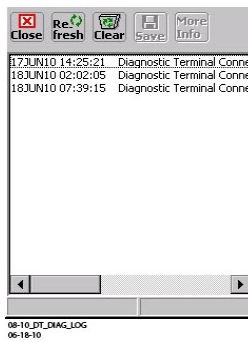
## The Status Log Button



**Figure 247: The Status Log Window**

Refer to the information presented accompanying Figure 22 for an explanation of the purpose and utilization of the Status Log

## The Diag Log Button



**Figure 248: The Diag Log Window**

The Diag Log Window reflects the DT connection data stored onboard the system.

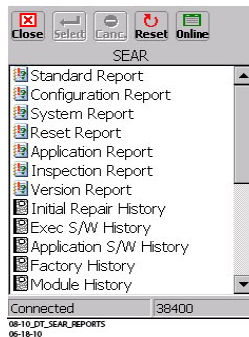
## The Download All Button



**Figure 249: The Download All Window**

The Download All Window is used to select which active elements present on the system will be downloaded into the log.

## The SEAR Button



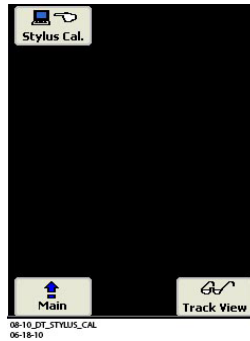
**Figure 250: The SEAR Reports Window**

Selecting the SEAR button from within the Logs Window will open the SEAR Reports Window.

## The Tools Button

Selecting the Tools Button opens the Tools Window. The user may calibrate the DT Stylus when using this command.

## The Stylus Ca. Button

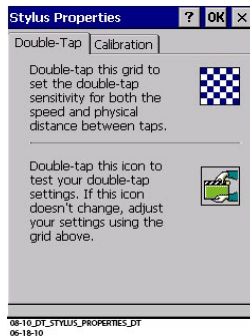


**Figure 251: The Stylus Cal. Window**

Selecting the Stylus Cal. Button opens the Stylus Cal. Window. There are two tabs that appear when the Stylus Properties window opens:

- Double-Tap
- Calibration

## The Stylus Properties Button



**Figure 252: The Stylus Properties – Double-Tap Window**

The Stylus Properties – Double-Tap tab allows the user to adjust the DT to accept typical double strikes with the stylus.

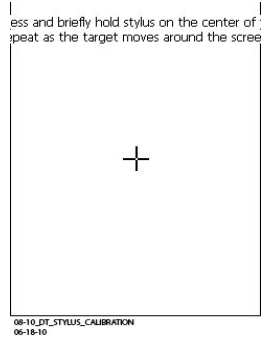


**Figure 253: The Stylus Properties – Calibration Window**

The Stylus Properties – Calibration window is the default tab that appears when the Stylus Cal. Button is selected. This tab allows the user to recalibrate the DT Screen with the stylus by selecting the Recalibrate Button.



## The Recalibrate Button



**Figure 254: The Stylus Calibration Window**

The Stylus Calibration Window opens after the Recalibrate button on the Stylus Properties – Calibration window is selected. It allows the user to calibrate the stylus location with a target in five separate locations.

**Siemens Mobility, Inc.**  
939 S. Main Street  
Marion, Kentucky 42064  
(800) 626-2710

**Siemens Mobility, Inc.**  
2400 Nelson Miller Parkway  
Louisville, Kentucky 40223  
(502) 618-8800