

Nucleus[®] Paging Station I-20 Upgrade

Introduction

The WMtxp™ protocol by Glenayre is a superset of the standard ERMES I-20 interface protocol. The upgrade to I-20 Nucleus allows the Station Control Module (SCM) in the Nucleus and Nucleus II paging stations to communicate with the GL-C2000/C2010 transmitter controller from Glenayre. The procedures contained in this document cover the removal of the NIU, reference module (if installed), removal and installation of the SCM and Exciter modules, installation of the I-20 cable, and configuration of the Nucleus or Nucleus II paging station to work with the GL-C2000/C2010 transmitter controller.

The I-20 interface cable connects to the front of the SCM from the rear of the paging station. The I-20 interface is used only with SCM model number PTYN4059B or later. Earlier SCM models do not have the I-20 interface connector.

The interface cable may be installed in a low or high power Nucleus paging station. Procedures are provided for the installation on both Nucleus paging stations.

The Exciter module and SCM are a matched pair and have been aligned at the factory. They must be installed as a matched pair the same station at the same time.

Note: Read this entire upgrade procedure prior to beginning the installation.

Unpacking and Inspection

1. Inspect the shipping container for any external damage, and report or record as required by company standard operating procedures (SOP).
2. Open the shipping carton and save the box and packing materials for defect return, if applicable.
3. Verify that you received the proper kit and that the kit contains all parts required for the upgrade (see Table 1).
4. Visually inspect the equipment.

Required Equipment

The contents of the I-20 upgrade kit depend on the frequency of the Nucleus paging station being upgraded. Table 1 lists the equipment for each upgrade kit.

Table 1: Upgrade Parts List for I-20

If your Nucleus is: ...to upgrade to I-20, order:	Part Number
900 MHz - Matched Pair FRU - I-20 BSC Cable (if Glenayre) - BNC T connector and 50 ohm male terminator	- PTF1029A (includes PTKN4117A with 3086144G03, PTF1013A, PTGN4029A ¹ , and PTYN4059B) - PTKN1003A (includes 3086453G02) - PTLN4450A (includes 0909907D01 and 0909906D01)
280 MHz - Matched Pair FRU - I-20 BSC Cable (if Glenayre) - BNC T connector and 50 ohm male terminator	- PTF1030A (includes PTKN4117A with 3086144G03, PTTD1001A, PTGN4029A ¹ , and PTYN4059B) - PTKN1003A (includes 3086453G02) - PTLN4450A (includes 0909907D01 and 0909906D01)
VHF R1 (132–154 MHz) - Matched Pair FRU - I-20 BSC Cable (if Glenayre) - BNC T connector and 50 ohm male terminator	- PTF1031A (includes PTKN4117A with 3086144G03, PTTD1003A, PTGN4029A ¹ , and PTYN4059B) - PTKN1003A (includes 3086453G02) - PTLN4450A (includes 0909907D01 and 0909906D01)
VHR R2 (150–174 MHz) - Matched Pair FRU - I-20 BSC Cable (if Glenayre) - BNC T connector and 50 ohm male terminator	- PTF1032A (includes PTKN4117A with 3086144G03, PTTD1002A, PTGN4029A ¹ , and PTYN4059B) - PTKN1003A (includes 3086453G02) - PTLN4450A (includes 0909907D01 and 0909906D01)
UHF - Matched Pair FRU - I-20 BSC Cable (if Glenayre) - BNC T connector and 50 ohm male terminator	- PTF1033A (includes PTKN4117A with 3086144G03, TLE9082D, PTGN4029A ¹ , and PTYN4059B) - PTKN1003A (includes 3086453G02) - PTLN4450A (includes 0909907D01 and 0909906D01)

1. The Exciter front panel is shipped installed on the Exciter.

Additional equipment is required for the upgrade:

- *Nucleus® Paging Station Configuration for Operation with the Glenayre® Transmitter Controller*, document number 6881100F63
- *GL-C2010, Version 3.1, Transmitter Controller User Manual*, document number 9110.00930 Rev:1.1 (or later)
- Personal computer (PC) with PROCOMM® software (or equivalent terminal software)
- Service monitor, Motorola R2600 or equivalent
- Null modem cable
- Straight-through cable
- TORX® driver with a T15 TORX bit
- 10-mm nut driver or adjustable wrench
- Electrostatic wrist strap
- Antistatic work surface

Preinstallation

The Nucleus paging station must be powered down completely for the installation of the I-20 protocol cable. This procedure should be accomplished during a low usage time period to prevent interruption of paging services. Read this entire procedure prior to attempting to install the I-20 upgrade kit.

Current Configuration Settings

The SIMM located on the TRN7815 Station Control Board (SCB) is set for customer-specific parameters, such as channel frequency and power output. Using the control panel keypad, log the current station configuration parameters in the table provided (see Table 3) so the parameters can be reconfigured into the new PTYN4059B SCM after installation.

While logging the station parameters, set Paging Access to disable.

Control Panel Keypad Functions

The keypad has 15 keys (see Figure 1-2). The top 12 keys serve two functions:

- Menu functions (in the menu select mode)
- Date entry functions (in the edit mode)

Three keys at the bottom of the keypad provide additional control.

Menu Select Mode

The menu select mode accesses a station menu or submenu (see Figure 1-2). The station is in the menu select mode when the LED display shows the READY prompt. In this mode, any key has the value of a menu option. Press a key to select a menu.

Press <up arrow>, <down arrow>, or <TOG> to move from one menu to another. Press <EXIT> to return to the previous menu level.

Edit Mode

The edit mode adds or modifies data in station memory. The station is in the edit mode when the LED display is flashing. In this mode any key has the value of the number on it. Enter values as appropriate. Press <ENT> to store a value.

Note: If you toggle to the menu select mode without storing the value, the system uses the previously entered value.



Reset Pressing the 1/STN and 3/TX keys simultaneously causes the station to reinitialize, perform power-up diagnostics and resets all RAM values to their default settings.

- 1** STN **Edit Mode:** Press to enter value of 1. **Menu Select Mode:** Use STN to set up station parameters.
- 3** TX **Edit Mode:** Press to enter value of 3. **Menu Select Mode:** Use TX to set up parameters for transmitting.
- 5** OPT2 **Edit Mode:** Press to enter value of 5. **Menu Select Mode:** Use OPT 2 for access to communication option parameters.
- 7** STAT **Edit Mode:** Press to enter value of 7. **Menu Select Mode:** Use STAT to display station status.
- 9** ALMS **Edit Mode:** Press to enter value of 9. **Menu Select Mode:** Use ALMS to view alarms, clear alarms, or both.
- ▲** SERV **Edit Mode:** Press ▲ to move up to the next menu selection. **Menu Select Mode:** Use SERV to enter the service mode or key and read power.
- EXIT** Use EXIT to return to the READY mode, move upward one menu level, or abort an edit session.
- ENT** Use ENT to store keyed-in values, move inward one menu level, or begin an edit session.

- 2** RX **Edit Mode:** Press to enter value of 2. **Menu Select Mode:** Use RX to set up parameters of the received audio and receiver applications.
- 4** OPT1 **Edit Mode:** Press to enter value of 4. **Menu Select Mode:** Use OPT 1 to access station option parameters.
- 6** ASET **Edit Mode:** Press to enter value of 6. **Menu Select Mode:** Use ASET to set up alarms.
- 8** CNFG **Edit Mode:** Press to enter value of 8. **Menu Select Mode:** Use CONFIG to setup and view configuration parameters.
- 0** DIS **Edit Mode:** Press to enter value of 0. **Menu Select Mode:** Use DIS to disable remote keypad while allowing local keypad; also to view disable status.
- ▼** ALGN **Edit Mode:** Press ▼ to move down to the next menu selection. **Menu Select Mode:** Use ALGN to perform station alignment.
- TOG** Use TOG to change values or selections.

Figure 1-2: SCM and NAC Front Panel Keypad

Table 3: Station Configuration Parameters (Sheet 1 of 3)

Parameter	Current Reading	
STN-Station		
System Timer Alarm	Disable	60 Min
	2 Min	90 Min
	15 Min	120 Min
	30 Min	180 Min
Front Panel Password		Enabled
		Disabled
Factory Default Password		6000
TX-Transmit		
Channel Freq	CHN 1 FREQ _____	CHN 11 FREQ _____
	CHN 2 FREQ _____	CHN 12 FREQ _____
	CHN 3 FREQ _____	CHN 13 FREQ _____
	CHN 4 FREQ _____	CHN 14 FREQ _____
	CHN 5 FREQ _____	CHN 15 FREQ _____
	CHN 6 FREQ _____	CHN 16 FREQ _____
	CHN 7 FREQ _____	CHN 17 FREQ _____
	CHN 8 FREQ _____	CHN 18 FREQ _____
	CHN 9 FREQ _____	CHN 19 FREQ _____
	CHN 10 FREQ _____	CHN 20 FREQ _____
TX Deviation Setup	Nominal Binary Deviation _____	
Special TX Setup	TX=Data Invert	Enabled
		Disabled
	TX=EQ RX State	Enabled
		Disabled

Table 3: Station Configuration Parameters (Sheet 2 of 3)

Parameter	Current Reading
CFG-Station Configuration	
Operating PWR _____	
Battery Revert Setup	
	Battery Type
	Sealed Lead Calcium
	Battery Revert Disabled
	Backup
	Backup Station (low Power Only)
	Backup Control
EXT Wattmeter Type	
	None
	EXT Class 1
Control	
	External SYNC Local CTRL
Special Key Select	
	EXT High (Preferred)
OPT1-Station	
Antenna Relay	
	Enabled (Preferred)
EXT Circulator	
	Present
	Not Present
STAT-Station Status	
Software Versions	
	Application _____
	Exciter _____
	BOOT _____
	Alignment ID
	SCM _____
	Exciter _____

Table 3: Station Configuration Parameters (Sheet 3 of 3)

Parameter	Current Reading
DIS-Access Disable	
Maint Access	Enabled (to perform Maint) Disabled (to TX & Page)
<i>Note: Paging Access must be set to disable.</i>	
Paging Access	Enabled (to TX & Page) Disabled (to perform Maint)

SCM and NIU Removal

Removal of the SCM is necessary to install the I-20 upgrade kit. With the installation of the I-20 upgrade kit, there is no need for the NIU. If a reference module is currently installed, remove the module and Global Positioning System (GPS) cable. Removal of the modules are covered in this procedure:

1. Disconnect the I-20 transmitter controller from the network.
2. If the station has AC power with a battery revert option (X30 or X43), disconnect the batteries by removing the positive (+) lead from the positive (+) battery terminal.
3. At the front of the paging station, place the ON/OFF power switch on the power supply(s) in the off (0) position (see Figure 1).
4. Plug your wrist strap into one of the receptacles located on either side of the station chassis.
5. Using a TORX® driver with a T15 TORX bit, remove the two screws securing the control panel of the Nucleus paging station to the chassis (see Figure 1).



Electronic devices are susceptible to damage from electrostatic discharge. Failure to use an approved electrostatic wrist strap may result in equipment damage.

6. Remove the control panel and disconnect the control cable from the control panel.
7. Using the control panel, insert the rear flange of the control panel in the slot of the SCM (see Figure 2) and gently pull the SCM out of the chassis.

Note: Skip Step 8 through Step 11 if the SCM does not contain a CRIB daughter board.

8. Place the SCM module component side down on an antistatic surface.

9. Using a screwdriver or equivalent tool, gently press the four posts holding the CRIB daughter board out of the SCM board (see Figure 3).
10. Obtain the new SCM board and place on a antistatic work surface or antistatic bag.
11. Align the connector pins of the CRIB with the connector on the SCM. Align the four mounting posts of the CRIB with the matching holes in the New SCM board and firmly press in place.

Note: IF the I-20 cutover is not going to be accomplished immediately after completion of this installation procedure, skip Step 13 through Step 15.

12. At the rear of the station chassis, open the fan cowling.
13. Remove the C-LAN cable from the NIU (if connected).
14. Using the control panel, insert the rear flange of the control panel in the slot of the NIU module (see Figure 2) and gently pull the NIU out of the chassis.
15. Place the NIU on a protected antistatic work surface or antistatic bag for proper storage.

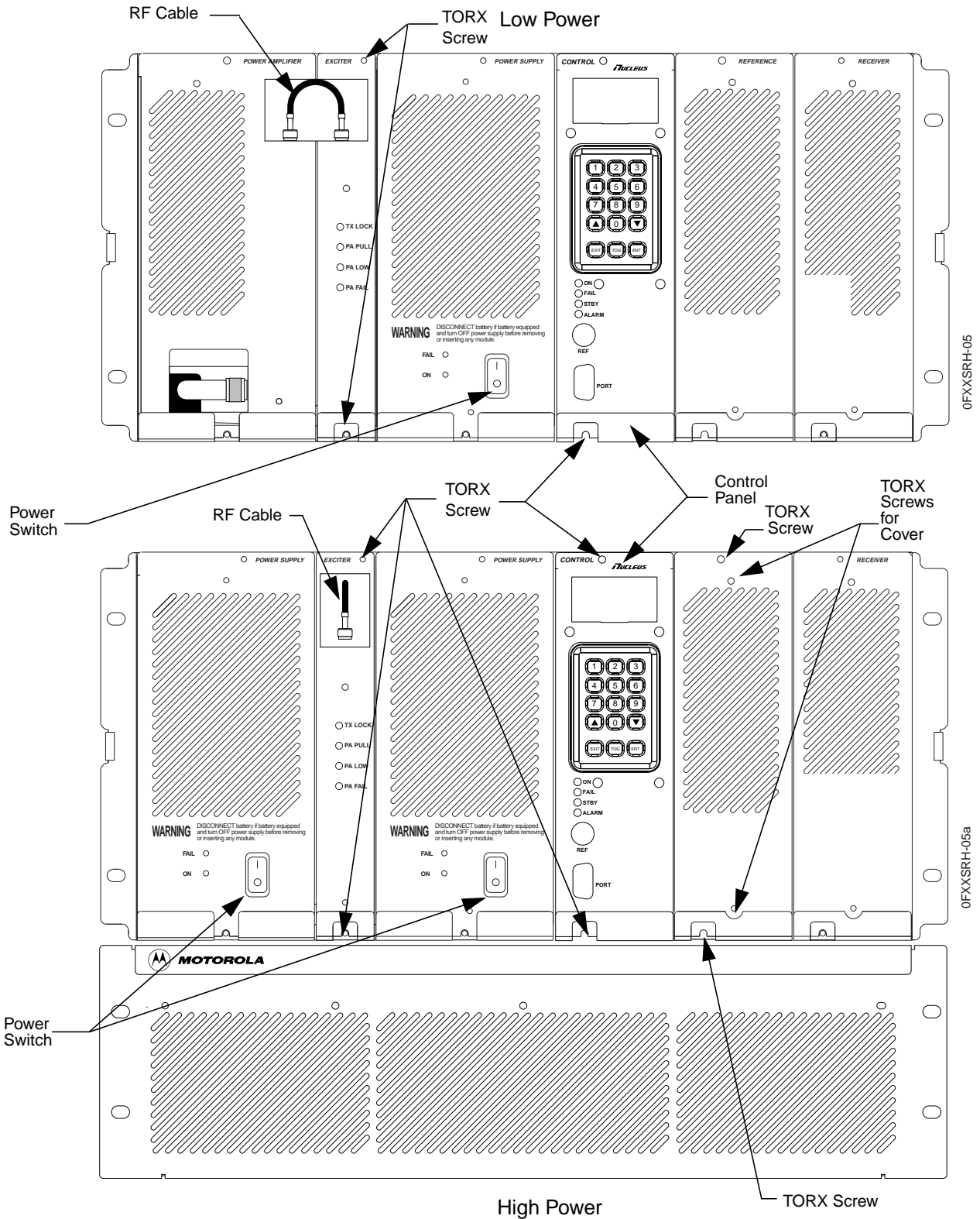


Figure 1: Typical Nucleus Paging Station

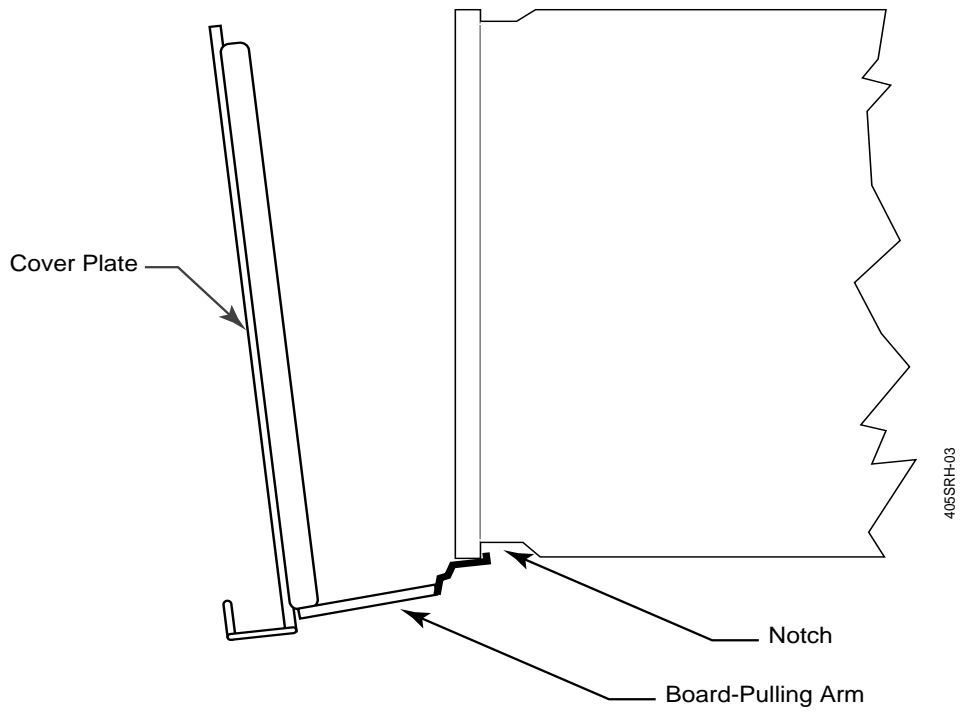


Figure 2: SCM and NIU Removal

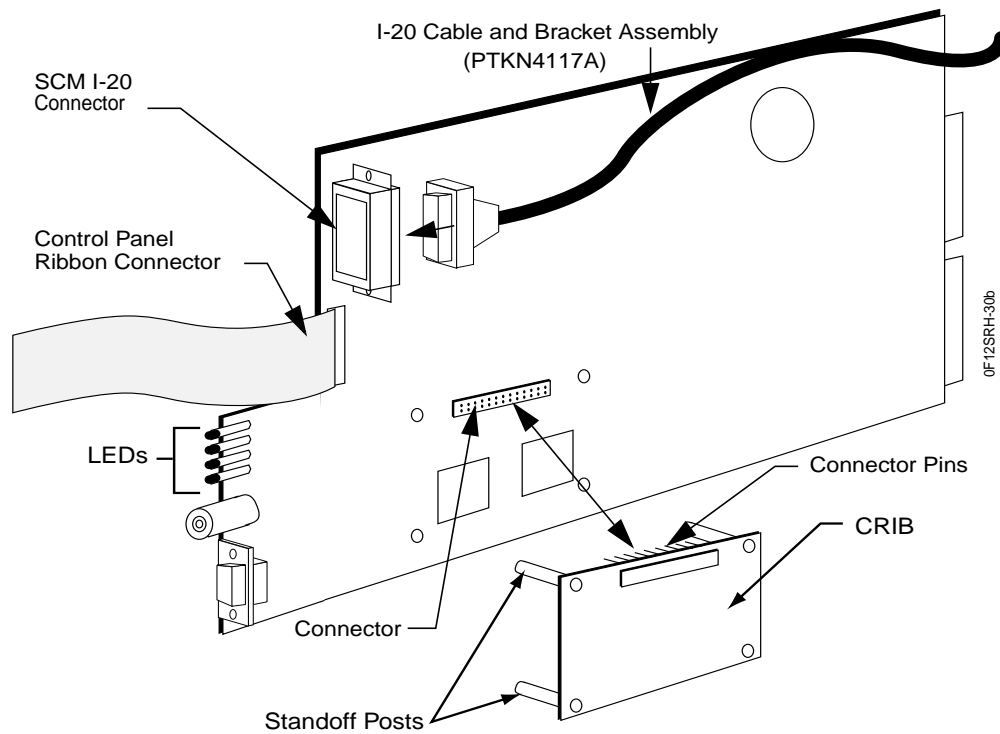


Figure 3: Station Control Module, Part Number PTYN4059B With I-20 Cable and CRIB

Reference Module Removal

Remove the reference module from the paging station, if it is installed, as follows.

1. At the front of the paging station, remove the two TORX screws securing the reference module to the chassis using a TORX driver and a T15 bit (see Figure 1).
2. Grasp the handle of the reference module and pull the module partially out of the chassis.
3. Disconnect the RF cable (if present) from the reference module and pull the module out of the chassis.
4. Replace the reference module cover on the chassis:
 - a. Using a TORX driver and a T15 bit, remove the cover from the reference module.
 - b. Place the reference module cover in position on the chassis and secure in place using the two screws removed in Step 1.
5. At the rear of the paging station, pull the RF cable out through the backplane opening of the station.
6. Using a 10 mm nut driver or an adjustable wrench, remove the nut securing the ground cable to the ground lug on the antenna relay mounting bracket (see Figure 4).
7. Using a 10 mm nut driver or an adjustable wrench, remove the nut securing the antenna relay mounting bracket to the chassis (see Figure 4).
8. Remove the GPS RF cable (if present):
 - a. Use a TORX driver and a T15 bit to remove the two screws securing the GPS RF cable to the antenna mounting bracket.
 - b. Place the cable and screws to the side for proper disposal.
9. Place the antenna mounting bracket in position on the backplane and secure in place with the 10 mm nut removed earlier (see Figure 4).
10. Place the ground cable connector in position on the ground lug and secure in place with the 10 mm nut removed earlier (see Figure 4).

Exciter Module Removal

1. Using a TORX driver with a T15 TORX bit, remove the two screws securing the Exciter module to the chassis (see Figure 1).
2. Remove the RF cable from the connector on the Exciter module.
3. Grasp the handle on the Exciter module and carefully pull the Exciter module out of the chassis.
4. Place the Exciter module to the side on a protected antistatic work surface or antistatic bag.

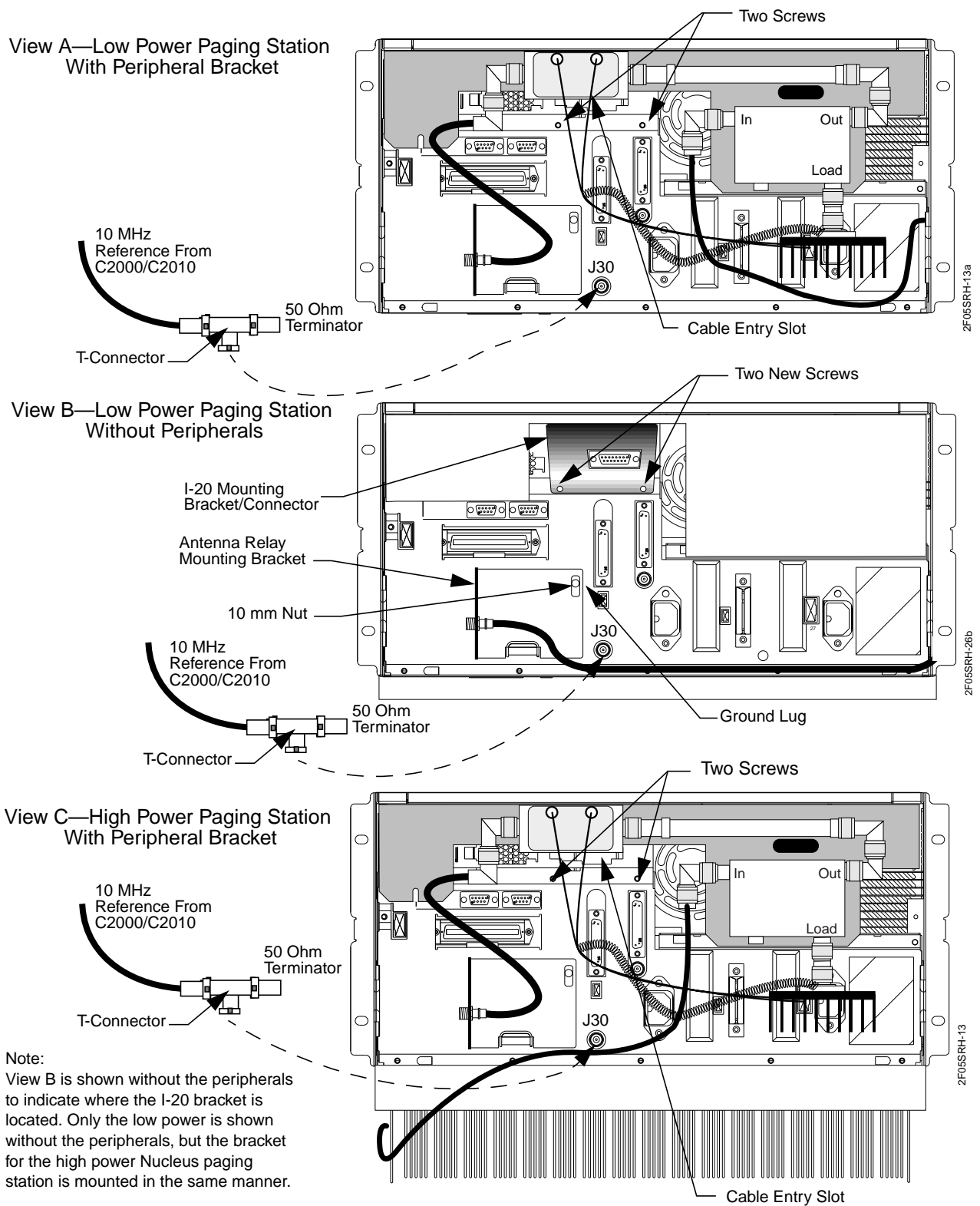


Figure 4: Nucleus Paging Station (Rear View)

I-20 Upgrade Kit Installation

The I-20 upgrade kit contains a cable attached to a mounting bracket, an SCM board, and an Exciter module (matched pair). Install the kit using the following procedures.

SCM and I-20 Interface Cable Installation

The cable mounting bracket mounts to the rear connector panel of the Nucleus paging station. The I-20 interface cable is fed through the rear of the chassis into the slot normally occupied by the SCM. Install the I-20 interface cable kit as follows:

1. At the rear of the paging station, remove the two screws located below the cable entry slot using a TORX driver with a T15 TORX bit (see Figure 4). Discard the two screws.
2. Insert the connector end of the cable kit through the slot in the chassis.
3. Attach the I-20 mounting bracket (part of PTKN4117A cable and bracket assembly) to the chassis with the two black screws provided in the cable and bracket assembly using a TORX driver with a T15 TORX bit.
4. At the front of the paging station, insert the rear of the SCM into the mounting slots of the chassis and slide it half way into the chassis.
5. With the SCM halfway into the chassis, connect the I-20 cable (part 3086144G03 cable and bracket assembly) to the I-20 interface connector located on the SCM (see Figure 3). Ensure the SCM cable is properly seated by listening for a slight click as the connector is seated.



Ensure the cable is securely seated in the SCM board connector. Failure to ensure proper connection will cause improper operation.

6. With the I-20 cable connected to the I-20 SCM connector, carefully slide the SCM into the chassis and firmly into the backplane connector to ensure proper connection.
7. Connect the ribbon cable of the control panel to the connector on the front of the SCM (see Figure 3).
8. Install and secure the control panel in position on the chassis with the two TORX screws removed in paragraph, "SCM and NIU Removal", Step 5 using a TORX driver with a T15 TORX bit (see Figure 1).

Exciter Module Installation

Install the new Exciter module (part PTTF1013A with PTGN4029A front panel) as follows:

1. At the front of the paging station, insert the replacement Exciter module in the slot provided.
2. Slide the Exciter module half way into the chassis.
3. Connect the RF cable removed in paragraph, "Exciter Module Removal", Step 2 to the RF connector on the Exciter module. Make sure the male/female connectors are properly aligned before tightening.
4. Push the Exciter firmly into the backplane connector.
5. Secure the Exciter in the chassis with two TORX screws using a TORX driver with a T15 TORX bit (see Figure 1).

I-20 Transmitter Controller Connection

Connect the Nucleus paging station to the I-20 (Glenayre GL-C2000/C2010) transmitter controller as follows:

1. At the rear of the paging station, connect the I-20 BSC interface cable (15-pin connector), part number 3086453G02 (a component of PTKN1003A) to the SCM I-20 connector (see Figure 4).
2. Connect the other end of the I-20 interface cable (44-pin connector) to the I-20 transmitter controller Exciter connector [see *GL-C2000/C2010 Transmitter Controller Version 3.1 User Manual* (software version 3.1 or later) for location of the Exciter connector].
3. Connect the center connector of the T-Connector with the 50 ohm terminator to J30 on the backplane (see Figure 4).
4. Connect the 10 MHz reference cable to the open end of the T-Connector on the rear of the paging station (see Figure 4).
5. Place the On/Off switch located on the power supplies of the paging station in the on (|) position.

Note: The LEDs located on the SCM and the Exciter module momentarily flash on and off except for the On LED of the SCM.

6. If the station has a battery revert option, reconnect the batteries.

Note: If the Glenayre wattmeter option is desired, the station external wattmeter option must be disabled.

Repackaging and Returning Defective Equipment

Defective equipment is due back a Motorola within two weeks of receipt of replacement equipment. To return defective equipment, follow these steps:

1. Pack and return the defective assembly in the same packing and box from the replacement module.
2. Include a copy of the return material authorization (RMA) or repair authorization (RA) paperwork in the box.
3. Mark the RMA or RA number on the outside of the box.
4. Ship the package to the following address:

Motorola Warranty
5401 North Beach Street
Fort Worth, Texas, USA 76137-2794

Note: You must provide a purchase order for the price of the replacement assembly for defective equipment not returned within two weeks.

Motorola Service

Refer questions concerning the contents of this manual or requests for related circuit board information to the following location:

Motorola, Inc.
Paging Systems Group
Multimedia Publications Department
5401 North Beach St., MS E230-A
Fort Worth, TX 76137-2794

or telephone: (817) 245-2824

For service information, contact your local Motorola representative or the Paging One-Call-Support™ Center:

Motorola, Inc.
Paging One-Call-Support Center
5401 North Beach St., MS E112
Fort Worth, TX 76137-2794

telephone: (800) 520-7243 or
(817) 245-4663

facsimile: (817) 245-2141

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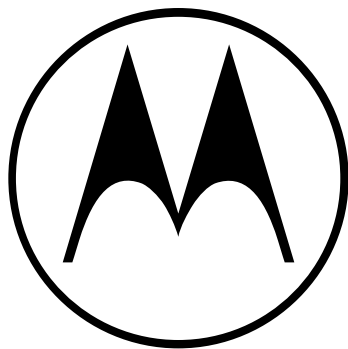
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