### Connecting Customer–Defined Inputs to the CBIO

The unit provides eight customer–defined inputs for connection to external contacts. Each input (a signal/ground pair) is monitored for an "OPEN" (>50 k Ohms) or "CLOSED" (<3 Ohms) condition.

### RGPS or RF–GPS Installation

If RGPS is being installed, proceed to Table 4-36. If RF–GPS is being installed, proceed to Table 3-7.

### Cable Pinout

Figure 4-42 shows the connector pins on cables C and C1. Table 4-35 gives the pinout for cable C and C1.



**Figure 4-42:** Connector Pins Numbering for Cables C and C1

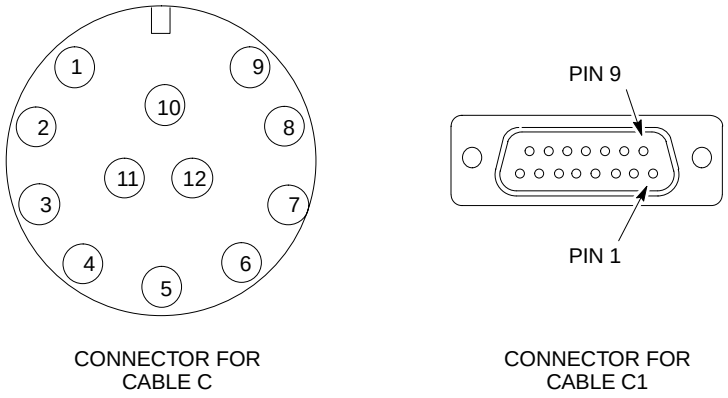



**Table 4-35:** Pinout for Cables C and C1

| Cable C | | Wire Color | Cable C1 |
|---|---|---|---|
| Pin | Signal | | Pin |
| 9 | DC Ground 1 | Blue–Black | 15 |
| 1 | Power 1 | Blue | 8 |
| 8 | DC Ground 2 | Yellow–Black | 14 |
| 10 | Power 2 | Yellow | 7 |
| 4 | Transmit Port (–) | Green–Black | 9 |
| 5 | Transmit Port (+) | Green | 1 |
| 2 | Receive Port (–) | White–Black | 12 |
| 3 | Receive Port (+) | White | 4 |
| 7 | No Connect | Red–Black | No Connect |

table continued on next page

| Table 4-35: Pinout for Cables C and C1 | | | |
|---|---|---|---|
| Cable C | | Wire Color | Cable C1 |
| Pin | Signal | | Pin |
| 6 | No Connect | Red | No Connect |
| 12 | PPS Timing (–) | Brown–Black | 10 |
| 11 | PPS Timing (+) | Brown | 2 |
| Wire colors are the same for both cables. | | | |



### Procedure to Install the RGPS Head

The RGPS is connected to the BTS via the RGPS connector on the CBIO Board. See Figure 4-41.

Site specific characteristics determine the GPS cabling that is installed. Install each cable by referring to the cabling diagram in Figure 4-41, and the procedure in Table 4-36. The lightning arrestor connections are shown in Figure 4-46.

Figure 4-43 and Figure 4-44 show the RGPS head. Be sure to factor in mounting considerations as described in Chapter 3.

**CAUTION**

The RGPS head must not make contact with any metal surface other than the provided hardware. Use only the equipment provided to mount the RGPS head. Failure to do so could damage the RGPS head.

| Table 4-36: Procedure for Installing the RGPS Head and Cabling | |
|---|---|
| Step | Action |
| 1 | Determine the mounting location. |
| 2 | △ **WARNING**<br>The structure of the wall should be verified by a qualified structural engineer.<br>Mounting the RGPS head and hardware to an inadequate wall structure and/or using inadequate installment methods can result in serious personal injury.<br>Use the appropriate mounting bolts for the mounting surface and install the two wall mounting brackets. Refer to Figure 4-43. |
| 3 | Remove RF–GPS cover plate from CBIO Board.<br>Remove protective connector cover. |
| 4 | Connect cables C and C1 into the punch block, as if they were part of the same cable, cut in the middle maintaining color code and signal integrity. Connect the same corresponding color on both sides of the punchblock (see Figure 4-41 and Table 4-35). |

| **Table 4-36:** Procedure for Installing the RGPS Head and Cabling | |
|---|---|
| **Step** | **Action** |
| 5 | Connect RGPS cable (cable C1) to D–connector.<br>Attach ferrite bead on the cable close to the BTS connector. |
| 6 | Route RGPS cable C (12–pin Deutsch connector) into the pipe. |
| 7 | Mate the 12–pin Deutsch connector of the RGPS Head cable and cable C. Refer to Figure 4-43. Tighten the spinning flange on the connector a quarter turn to secure the connection. |
| 8 | Insert the pipe into the threaded mount in the RGPS Head and carefully hand–tighten. |
| 9 | Place the assembly into the mounting brackets. Refer to Figure 4-43. Tighten the U–bolt clamps to secure the assembly. |



**Figure 4-43:** Installing the Remote GPS Head

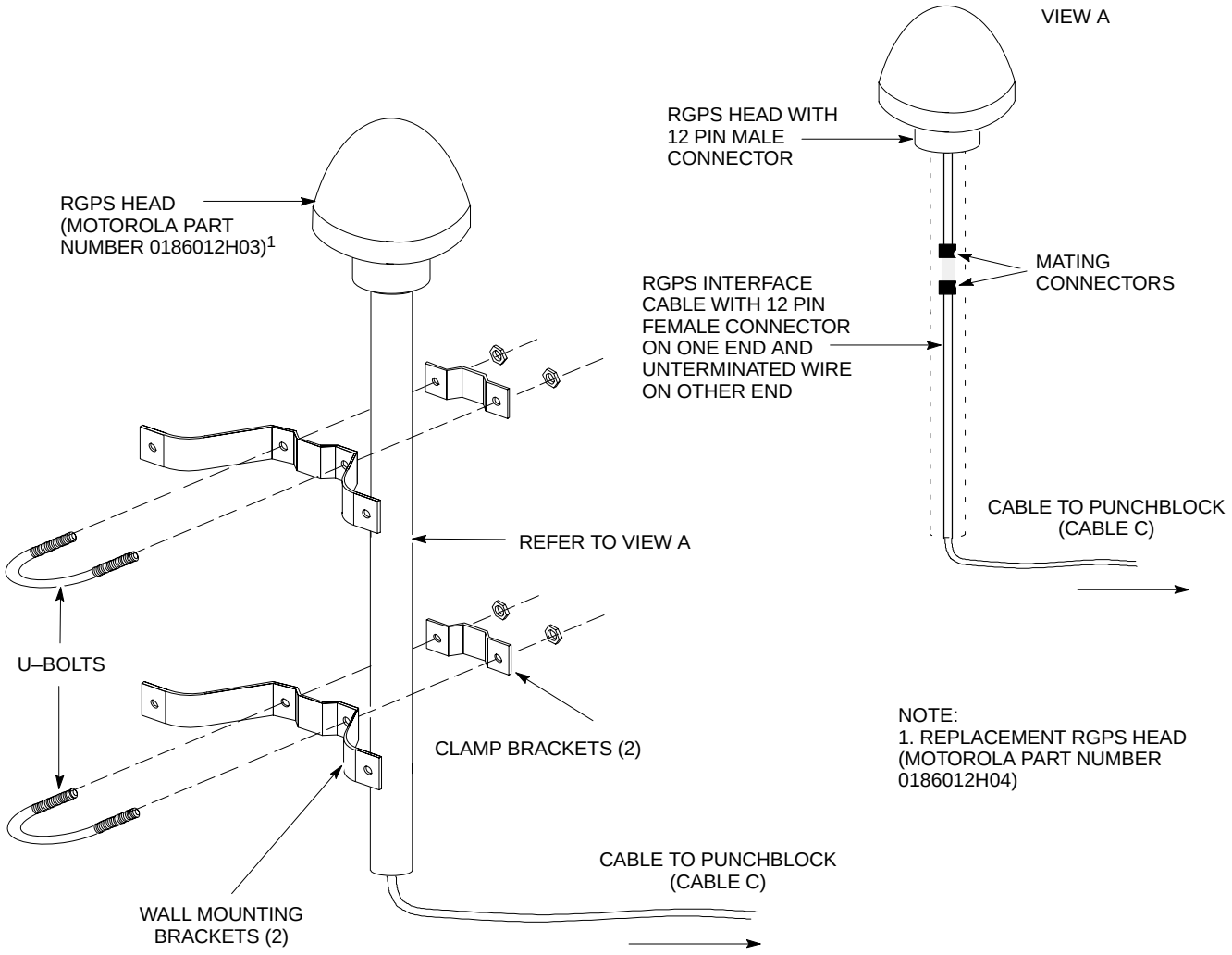
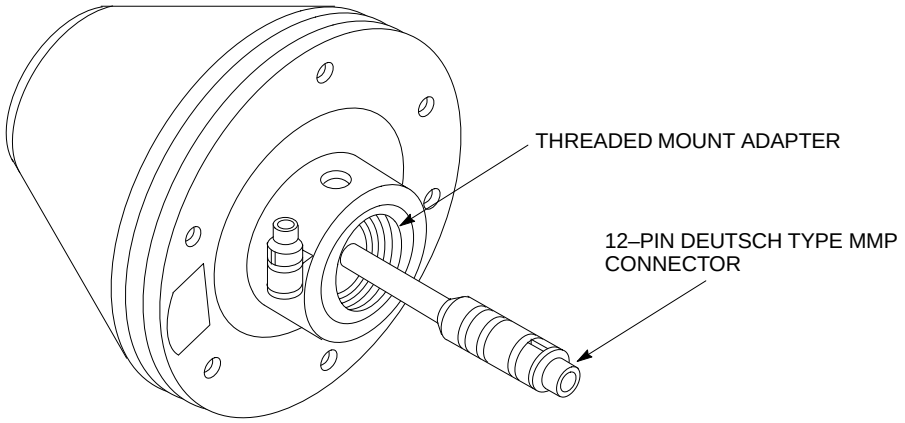


**Figure 4-44:** RGPS Head




4

## Connecting the RGPS Cable to Lightning Arrestor

Figure 4-45 is a detail of the RGPS connections. Figure 4-46 is a detail of the Lightning Arrestor connections.

**Figure 4-45:** RGPS to *SC*480 Connection Diagram

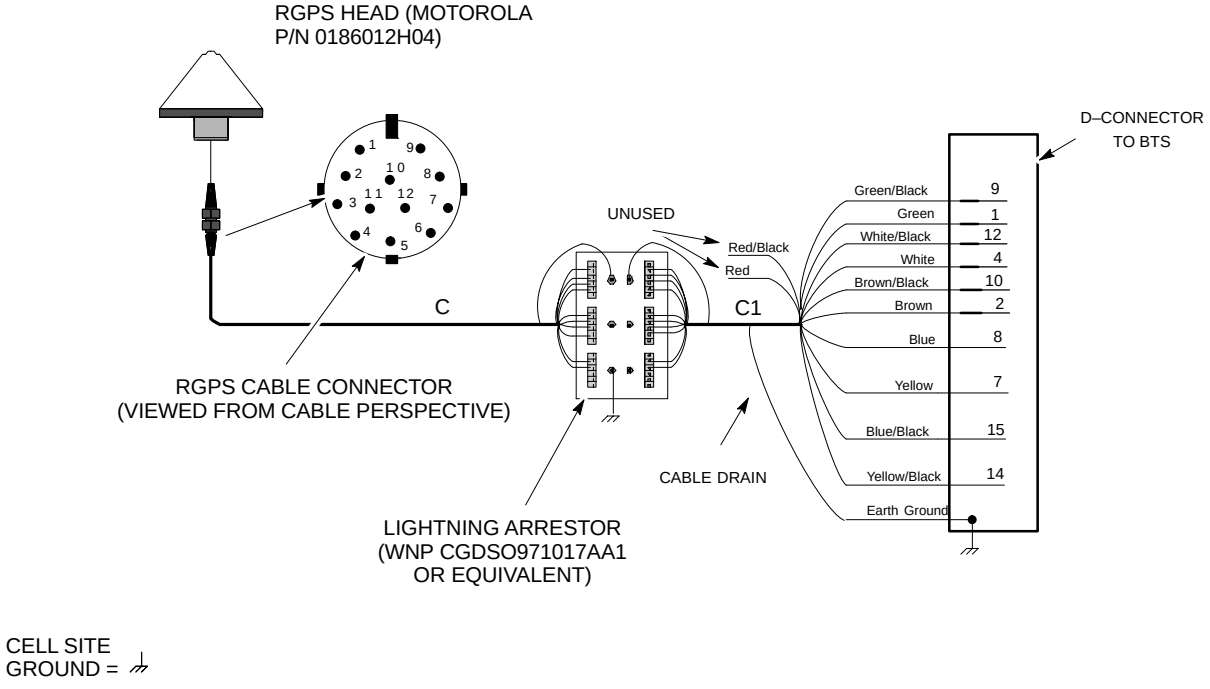
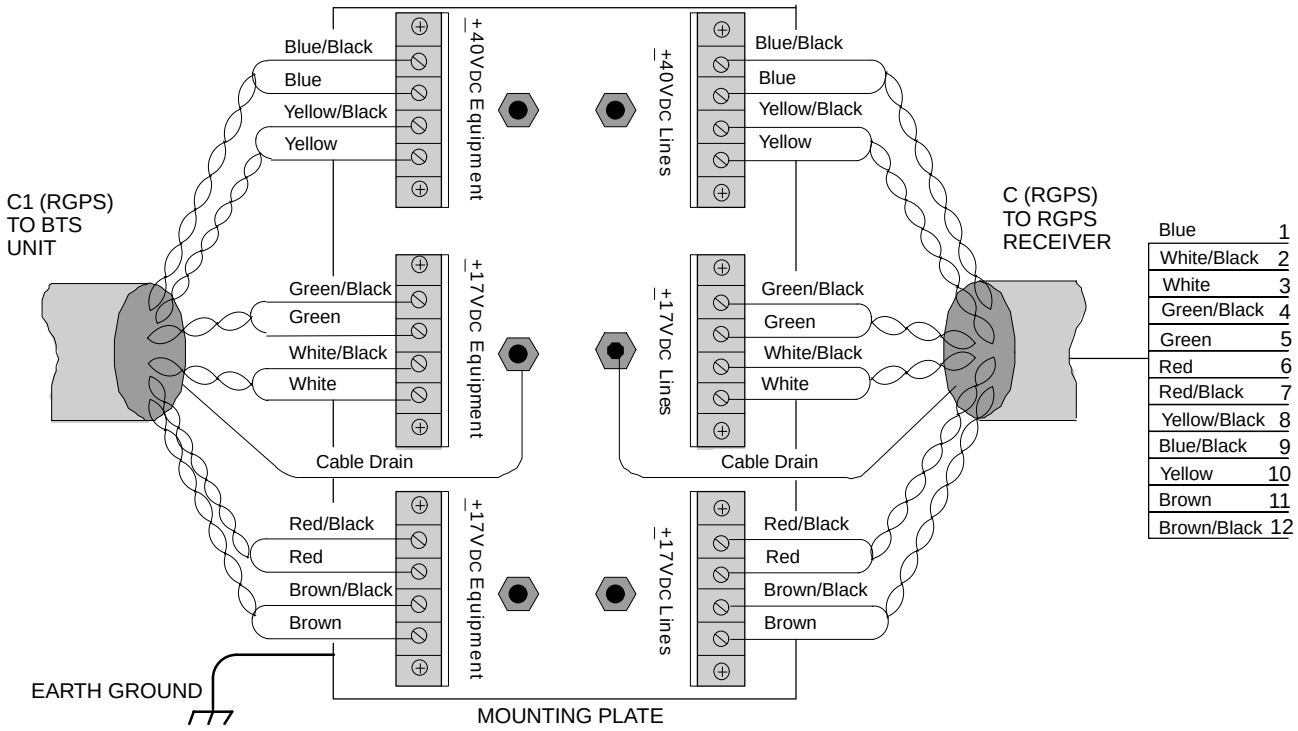


**Figure 4-46:** RGPS Lightning Arrestor Wiring




### Connecting the RF–GPS Cable

Figure 4-47 shows the components of the RF–GPS. The RF–GPS is connected to the BTS via the RF–GPS module through the RGPS connector on the CBIO Board. See Figure 4-48.

### Procedure

Use the procedure in Table 4-37 to install the RF–GPS system.

**Table 4-37:** Procedure for Installing RF–GPS Antenna and Cabling

| Step | Action |
|---|---|
| 1 | Determine the mounting location (see RF–GPS Mounting Considerations, Table 6-34). |
| 2 | Install the mounting kit at the RF–GPS location of choice. Use the appropriate mounting bolts for mounting surface. |
| 3 | **△ WARNING**<br>The roof structure on which the mounting pole is attached should be verified by a qualified structural engineer for the weight of the RF–GPS engine and mounting hardware or under adverse conditions for the installation area<br><br>Mounting the RF–GPS antenna and hardware to an inadequate roof surface and/or using inadequate installation methods can result in serious injury. |
| 4 | Attach the RF–GPS head assembly to the post mounting assembly and secure the assembly to the assembly to the mounting kit using the screws and nuts supplied (see Figure 4-47). |

| Table 4-37: Procedure for Installing RF–GPS Antenna and Cabling | |
|---|---|
| **Step** | **Action** |
| 5 | Attach the grounding kit to the mounting pole. |
| 6 | Connect one (1) N connector of the 50–feet superflex cable to the N jack of the RF–GPS antenna cable and route the other end of the cable down to the frame. |
| 7 | If not already done, attach RF–GPS Module to CBIO Board and secure using 4 M4 screws. |
| 8 | Route the cable to the RF–GPS connector at the rear of the BTS. |
| 9 | Connect cable to RF–GPS connector. See Figure 4-48. |

**Figure 4-47:** RF–GPS Installation and Components

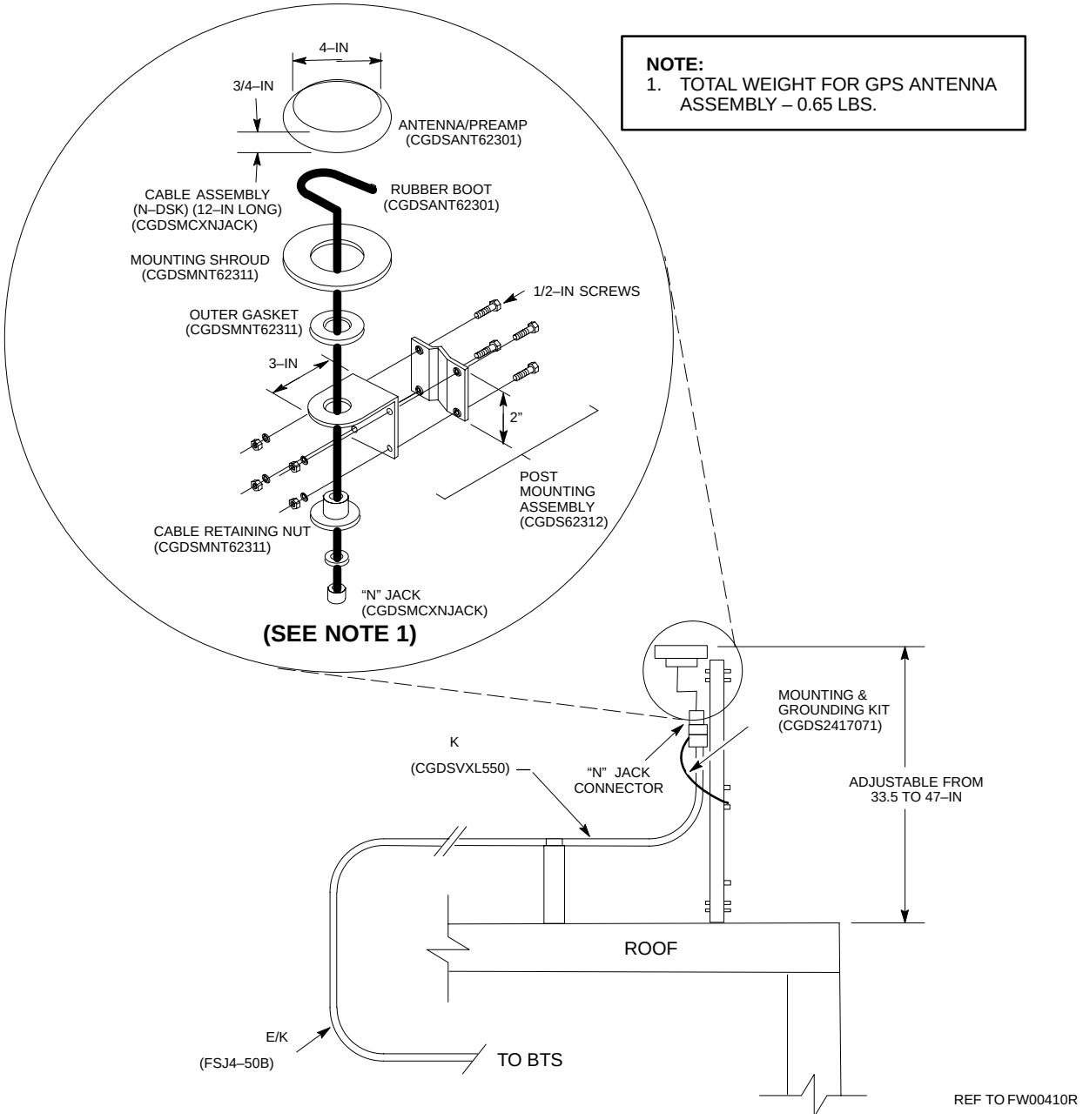
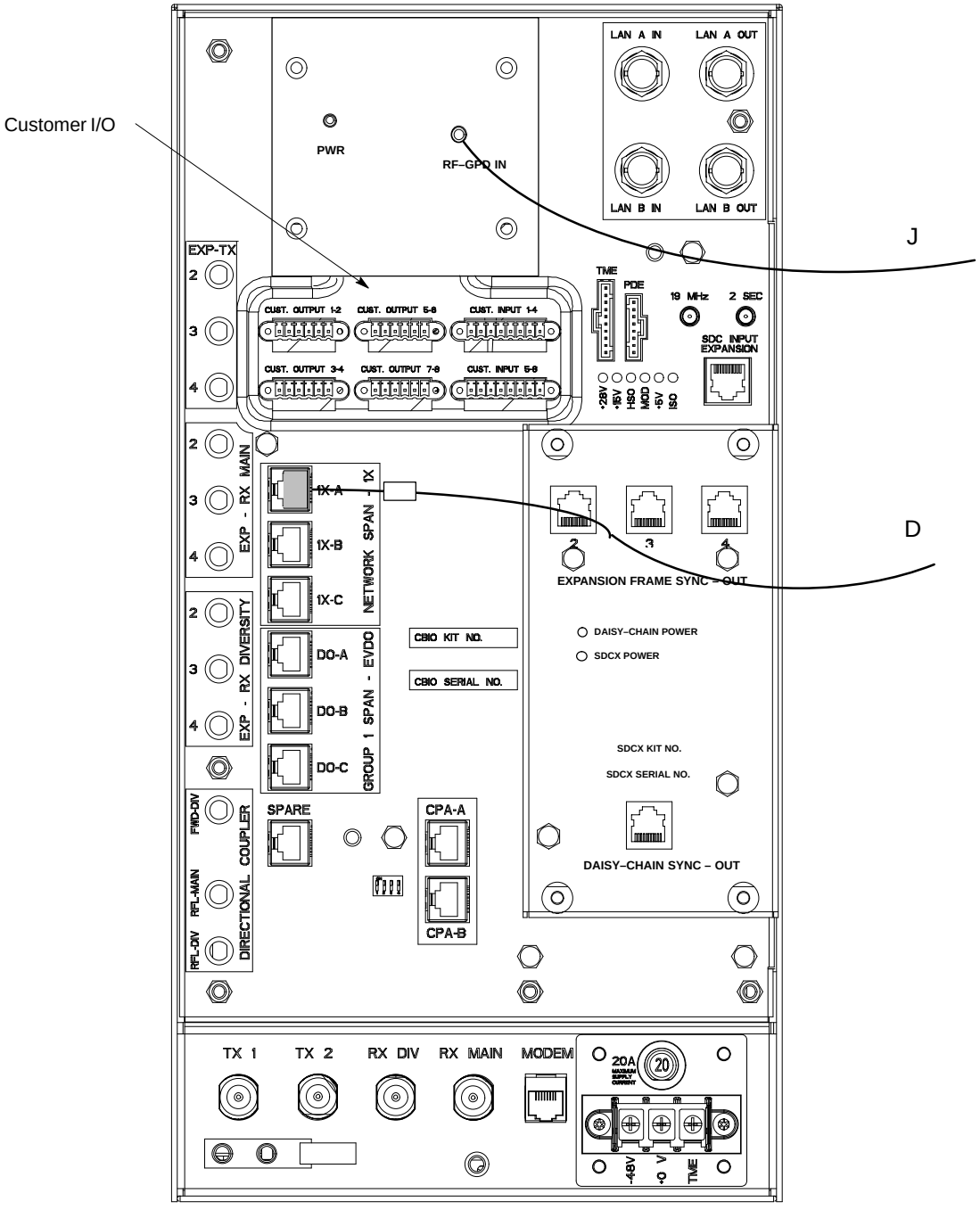


**Figure 4-48:** Span and RF–GPS Cabling Details

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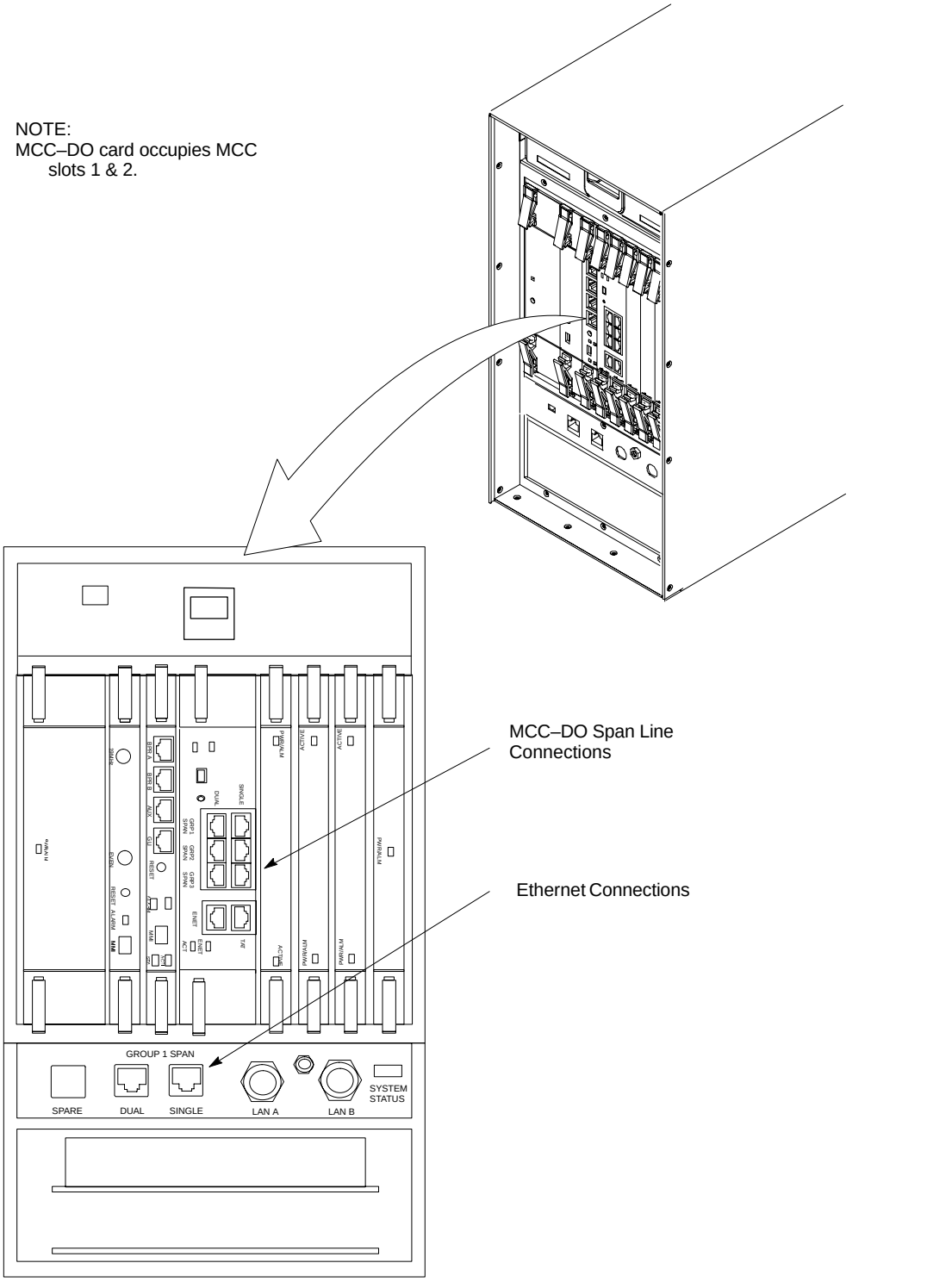
### Connecting MCC–DO

At the front of the BTS under the CCP2 Shelf, there are two ethernet connectors for MCC–DO use: Single and Dual. The connections can be made with standard ethernet cables. The MCC–DO card provides for three MCC–DO span lines (See Figure 4-49). Refer to *1X EV–DO Hardware Installation manual – 68P09257A95* for further information.

**Figure 4-49:** EV–DO Connections

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## Introduction

The objective of this procedure is to attach the ferrite core onto the customer input and output cables.

## Cable Descriptions and Part Numbers

Table 4-38 gives the cable descriptions and part numbers used to install the Customer I/O connectors.

**Table 4-38:** Cable Descriptions and Part Numbers

| Cable | Qty. | Part Number | Description |
|---|---|---|---|
| E | 1 | Customer Supplied | Customer Input/Output cable, 0–8 conductor, 18–24 AWG, stranded wire |
| | 4 | Molex, terminal plugs, P/N 39352–0106 | Connector, 6 pin |
| | 2 | Molex, terminal plugs, P/N 39352–0108 | Connector, 8 pin |
| | 3 | Motorola P/N 7687717T02 | Core, Ferrite |
| | 1–3 | Customer Supplied | Tie–wrap |

## Customer Input and Output Connector Pinouts

### Input Pinouts

Table 4-39 lists the pinouts for the Customer Input connectors.

**Table 4-39:** Customer Input Connector Pinouts

| Pin Number | Description |
|---|---|
| 1 | Customer Input 1/5 |
| 2 | Customer Input 1/5 Return |
| 3 | Customer Input 2/6 |
| 4 | Customer Input 2/6 Return |
| 5 | Customer Input 3/7 |
| 6 | Customer Input 3/7 Return |

table continued on next page

| **Table 4-39:** Customer Input Connector Pinouts | |
|---|---|
| **Pin Number** | **Description** |
| 7 | Customer Input 4/8 |
| 8 | Customer Input 4/8 Return |

### Output Pinouts

Table 4-40 lists the pinouts for the Customer Output connectors.

| **Table 4-40:** Customer Input Connector Pinouts | |
|---|---|
| **Pin Number** | **Description** |
| 1 | Customer Output 1/3/5/7 NC |
| 2 | Customer Output 1/3/5/7 C |
| 3 | Customer Output 1/3/5/7 NO |
| 4 | Customer Output 2/4/6/8 NC |
| 5 | Customer Output 2/4/6/8 C |
| 6 | Customer Output 2/4/6/8 NO |



### Procedure

Follow the procedure in Table 4-41 to attach a ferrite core.

| **Table 4-41:** Procedure for Using Ferrite Core on Customer Input and Output Wires | |
|---|---|
| **Step** | **Action** |
| 1 | Route Customer I/O cables from termination equipment to rear of BTS and connect. |
| 2 | At the rear of the BTS, just below the top, are three pairs of connectors for customer defined inputs and outputs. See Figure 4-48. |
| 3 | Connect the cable for Customer Outputs 1 and 2 to BTS connector **CUST. OUTPUT 1–2**.<br>Perform the same for the remaining connectors. |
| 4 | After connections are made, bundle the wires of **CUST. OUTPUT 1–2** and **CUST. OUTPUT 3–4** together and place a ferrite core around them. Ensure that the wires will not be pinched prior to closing and latching the ferrite core. |
| 5 | Slide ferrite core as close to the BTS connectors as possible without causing stress. Use a tie–wrap on the ferrite core side away from the BTS connectors to hold the ferrite core in place. |
| 6 | Perform step 4 and step 5 for **CUST. OUTPUT 5–6** and **CUST. OUTPUT 7–8** and **CUST. INPUT 1–4** and **CUST. INPUT 5–8**. |

# Site Cleanup

### Remove Protective Covering

Remove any anti–static plastic or cloth sheeting that was used to cover the equipment.

### Lighting Fixtures

Remove the masking tape from the fluorescent light fixtures.

### Tools

Place all hand and power tools in the installation tool kit or other appropriate place. Note any tools that need replacement, cleaning, or adjustment.



### Materials

Place any leftover materials in a location specified by the site manager.

### Remove Debris

Remove any packing material.

Ensure that all scrap materials have been removed from any tables or stands.

Clean/sweep the area. Ensure that all alignment marks have been removed.

### Environment

Remove any temporary weather protection used for installation.

Check that the power connections are tight.

Organize any items (manuals, materials, etc.) left on site and place them in a location specified by the site manager.

Check that the unit lock is secure and key is removed.

Verify that cabling is properly secured between unit and enclosures.

# Installation Completion Checklist

## Directions

Fill out the installation completion checklist and make any necessary copies. You may copy this check sheet as needed.

## Indoor Installation Completion Checklist

Date Hardware Installation Completed: _____

Site:_____

Serial Number(s):_____

_____

Checklist Completed By:_____

Checklist Reviewed By:_____



**Table 4-42:** Indoor Installation Completion Checklist

| Status | No. | Item | Notes |
|---|---|---|---|
| | 1 | Equipment is not damaged. | |
| | 2 | Air flow clearance requirements are met. | |
| | 3 | Mounting plate is level and secure. (Indoor) | |
| | 4 | BTS is securely mounted to plate and rack. (Indoor) | |
| | 5 | TME is securely mounted to wall or pole. (Outdoor) | |
| | 6 | PDM is installed and cabled within TME. (Outdoor) | |
| | 7 | BTS is securely mounted within the TME. (Outdoor) | |
| | 8 | BTS is correctly cabled to TME. | |
| | 9 | 1U Module is installed and cabled to TME (If used). | |
| | 10 | HMS is securely mounted to TME. (Outdoor) | |
| | 11 | HMS is cabled to TME. (Outdoor) | |
| | 12 | PDE is securely mounted to wall or pole. (outdoor) | |
| | 13 | HX is securely mounted to PDE. (Outdoor) | |
| | 14 | HX is cabled to PDE. (Outdoor) | |
| | 15 | TME, PDE, and cCLPA are grounded. (Outdoor) | |

table continued next page

| **Table 4-42:** Indoor Installation Completion Checklist | | | |
|---|---|---|---|
| **Status** | **No.** | **Item** | **Notes** |
| | 16 | TME is cabled to PDE and cCLPA through conduit and conduit hubs on TME are tight. | |
| | 17 | PDE is cabled to TME through conduit and conduit hubs on PDE are tight. | |
| | 18 | cCLPA is cable to TME through conduit and and conduit hubs on cCLPA are tight. | |
| | 19 | Conduit is sufficiently grounded. | |
| | 20 | 200–240 VAC is connected to PDE. | |
| | 21 | Battery backups (if used) are connected to the PDE. | |
| | 22 | TME DC power cable is connected (through conduit) to PDE (Outdoor) | |
| | 23 | cCLPA DC power cable is connected through conduit) to PDE | |
| | 24 | RGPS head and mast are secure. | |
| | 25 | RGPS head has a clear view of the sky and is not in a location which accumulates debris. Make sure the RGPS is located away from the BTS transmit antenna. | |
| | 26 | Local GPS antenna is secure. (If used) | |
| | 27 | Local GPS cabling is installed (If used). | |
| | 28 | Mounting rack is isolated from the Master ground. (Indoor) | |
| | 29 | cCLPA is securely mounted to rack (if in use). (Indoor) | |
| | 30 | Compact BTS connection to the DC source is secure. (Indoor) | |
| | 31 | cCLPA connection to its DC source is secure. (Indoor) | |
| | 32 | The antenna connections are secure. | |
| | 33 | The antenna cables are protected by lightning arrestors (if applicable). | |
| | 34 | Span and RGPS connections are protected by lightning arrestors (if applicable). | |
| | 35 | The RGPS ground lead is connected to the BTS digital ground reference. | |

table continued next page

| **Table 4-42:** Indoor Installation Completion Checklist | | | |
|---|---|---|---|
| **Status** | **No.** | **Item** | **Notes** |
| | 36 | Installation hardware is removed. | |
| | 37 | The earth ground connections are secure between the earth ground and the Compact BTS. (Indoor) | |
| | 38 | The DC input cable is securely attached to the DC input connector. (Indoor) | |
| | 39 | The BTS–to–cCLPA cabling is secure (if applicable) (Indoor) | |
| | 40 | cCLPA connection to earth ground is secure (if cCLPA in use). (Indoor) | |
| | 41 | The antenna N–type connectors are securely attached to the antenna A and B connectors (if applicable). (Indoor) | |
| | 42 | All unused ports on BTS and/or cCLPA are properly terminated. (Indoor) | |
| | 43 | All cables are dressed and tied. (Indoor) | |
| | 44 | Power, Span, Customer I/O, PA, RGPS, and DO cables to the BTS have a ferrite core attached and tie–wrapped in place. | |
| | 45 | The external power source (DC) is active. (Indoor) | |
| | 46 | AC power source is active. (Outdoor) | |
| | 47 | The circuit breaker on the BTS is disengaged (Pulled out). | |
| | 48 | Circuit breakers are disengaged (Pulled out) on TME PDM. (Outdoor) | |
| | 49 | Circuit breakers are disengaged (Pulled out) on PDE. (Outdoor) | |
| | 50 | Circuit breaker is disengaged (Pulled out) on cCLPA. | |
| | 51 | The site is cleaned, swept and trash removed. | |
| | 52 | The site specific documentation is present at the site. | |

**Notes**

# Chapter 5: Power Installation

## Table of Contents

**Notes**

# Frame Configuration DIP Switch

## Introduction

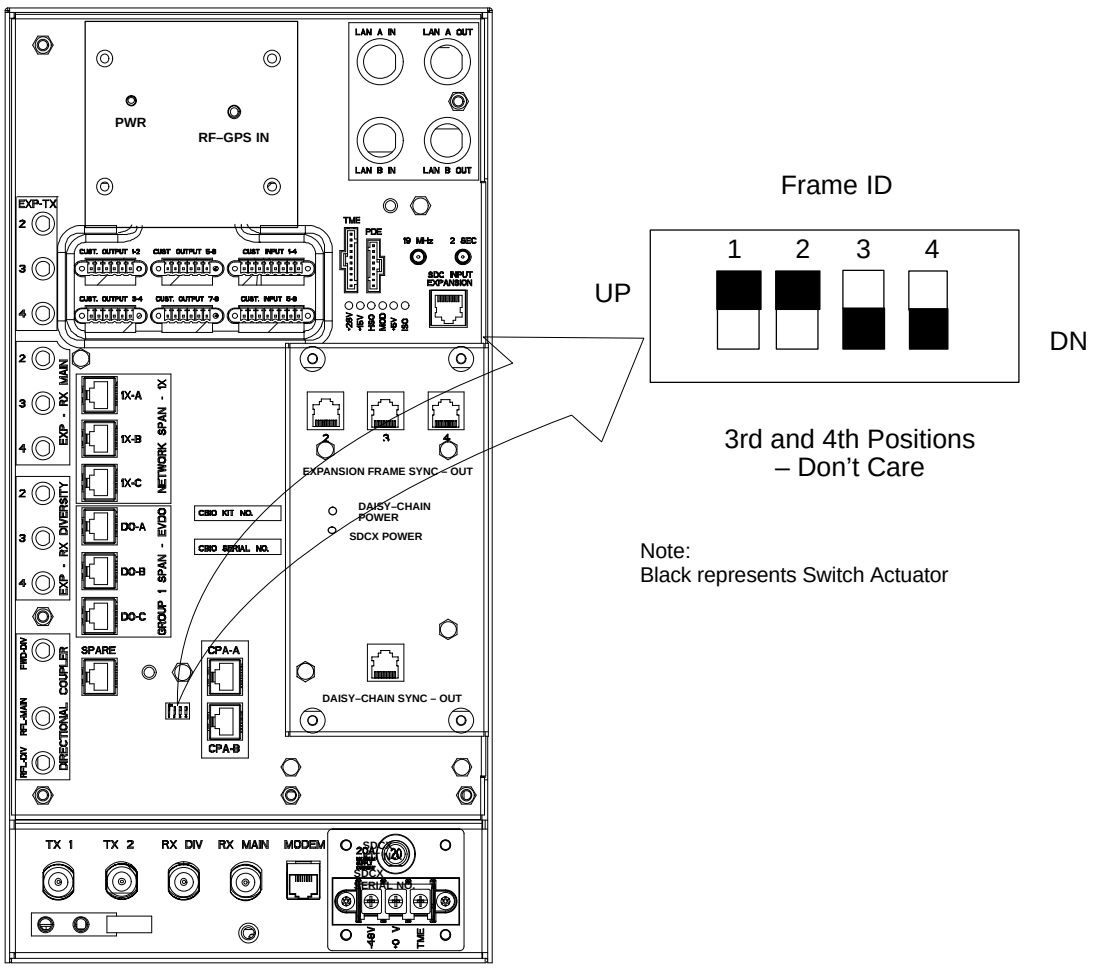
This section describes setting the DIP switch positions for starter/single frame and exapansion frames. The following sections describe BTS preparation before applying DC power.

## Setting Frame Configuration DIP Switch

The frame configuration switch is located on the Compact BTS Input/Output (CBIO) Card of the BTS. Figure 5-1 shows the switch position for a starter /single frame configuration. If there are expansion frames, then each would have the DIP switch positions set to reflect that frames identification. See Figure 5-2.

The switch settings must be verified and set before power is applied to the BTS. Refer to Figure 5-1 or Table 5-1 for a starter or single frame.

**Figure 5-1:** DIP Switch Configuration

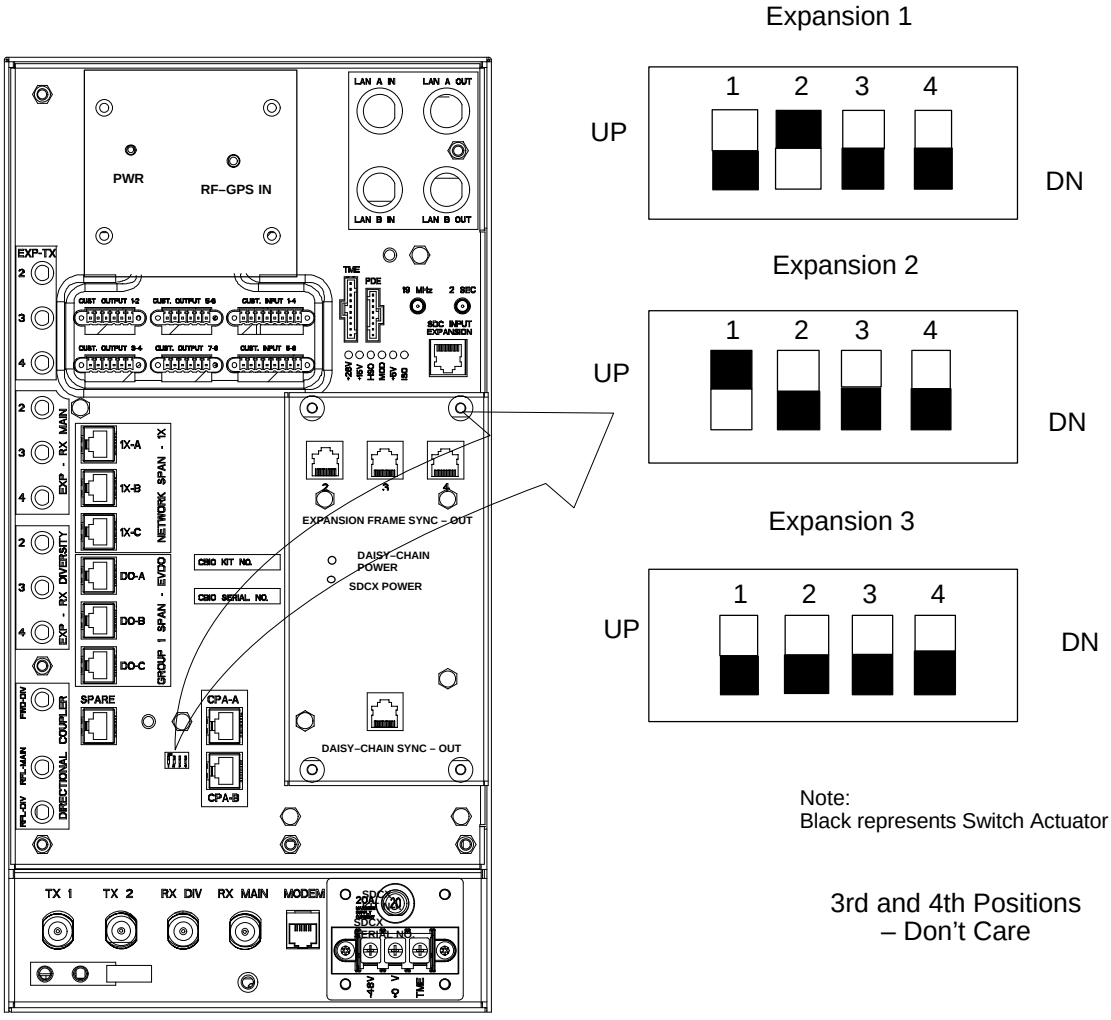


| Table 5-1: Frame ID Switch Position – Single/Starter Frame | | | |
|---|---|---|---|
| **1** | **2** | **3** | **4** |
| UP | UP | — | — |
| — = Don't Care. These switch positions do not affect the BTS. | | | |

### Expansion Frame DIP Switch Settings

Figure 5-2 shows the switch position for the expansion frames.

**Figure 5-2:** Expansion Frames DIP Switch Configuration



### Expansion 1 Frame DIP Switch

The switch settings must be verified and set before power is applied to the BTS. Refer to Figure 5-2 or Table 5-2 for the expansion 1 frame.

| **Table 5-2:** Frame ID Switch Position – Expansion 1 Frame | | | |
|---|---|---|---|
| **1** | **2** | **3** | **4** |
| DN | UP | — | — |
| — = Don't Care. These switch positions do not affect the BTS. | | | |

### Expansion 2 Frame DIP Switch

The switch settings must be verified and set before power is applied to the BTS. Refer to Figure 5-2 or Table 5-3 for Expansion 2 frame.

| **Table 5-3:** Frame ID Switch Position – Expansion 2 Frame | | | |
|---|---|---|---|
| **1** | **2** | **3** | **4** |
| UP | DN | — | — |
| — = Don't Care. These switch positions do not affect the BTS. | | | |



### Expansion 3 Frame DIP Switch

The switch settings must be verified and set before power is applied to the BTS. Refer to Figure 5-2 or Table 5-4 for Expansion 3 frame.

| **Table 5-4:** Frame ID Switch Position – Expansion 3 Frame | | | |
|---|---|---|---|
| **1** | **2** | **3** | **4** |
| DN | DN | — | — |
| — = Don't Care. These switch positions do not affect the BTS. | | | |

# Pre–Power Up Test (Indoor)

## Objective

This procedure check for any electrical problems and verifies the operation and tolerances of the cell site BTS power supply prior to applying power for the first time.

## Power for EV–DO

Information for applying power to a BTS equipped with EV–DO (MCC–DO) can be found in *1xEV–DO Hardware Installation manual – 68P09257A95*

## Test Equipment

The following test equipment is required to perform the Pre–Power Up test:

- Digital Multimeter (DMM)

**CAUTION**

Before handling any circuit cards or modules, be sure to wear a grounding strap to prevent damage from ESD.

5

## Cabling Inspection

Using the site specific documentation generated by Motorola Systems Engineering, verify that the following cable systems are properly connected:

- DC Power cabling
- Receive RF cabling
- Transmit RF cabling
- GPS

## DC Power Pre–Test

Perform the procedure Table 5-5 in before applying any power to the BTS.

**Table 5-5:** BTS DC Pre–Power Test

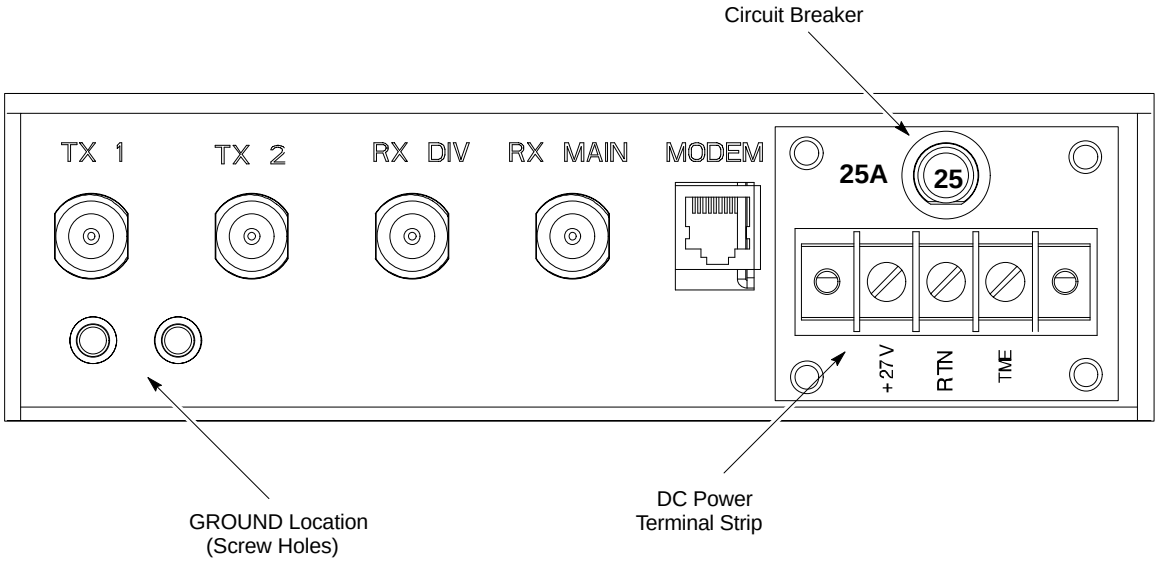
| Step | Action |
|---|---|
| | *** IMPORTANT**<br>When handling circuit boards and modules, be sure to wear a grounding strap to prevent damages caused by ESD. |
| 1 | Remove front panel cover. |
| 2 | Unseat all circuit boards and modules, but do not remove them from their slots. |

table continued on next page

| **Table 5-5:** BTS DC Pre–Power Test | |
|---|---|
| **Step** | **Action** |
| 3 | At the rear of the BTS, verify that 20 or 25 A circuit breaker is OFF (pulled out). See Figure 5-3 or Figure 1-8. |
| 4 | Use a DMM (set to ohms) and verify the resistance on the +27V bus.<br>– Remove the Power Supply Module from the CCP2 Shelf<br>– Verify that the resistance from the power (+) feed terminal with respect to ground measures > **500 Ω**<br>See Figure 5-3<br>– Verify that the resistance from the power (–) feed terminal with respect to ground measures > **500 Ω**<br>See Figure 5-3<br>– The resistance measurement should not read 0 (zero). |
| 5 | Re–seat all circuit boards into their slots |
| 6 | Install the Power Supply Module into its slot. |
| 7 | Install front panel cover. |



**Figure 5-3:** Location of Circuit Breaker



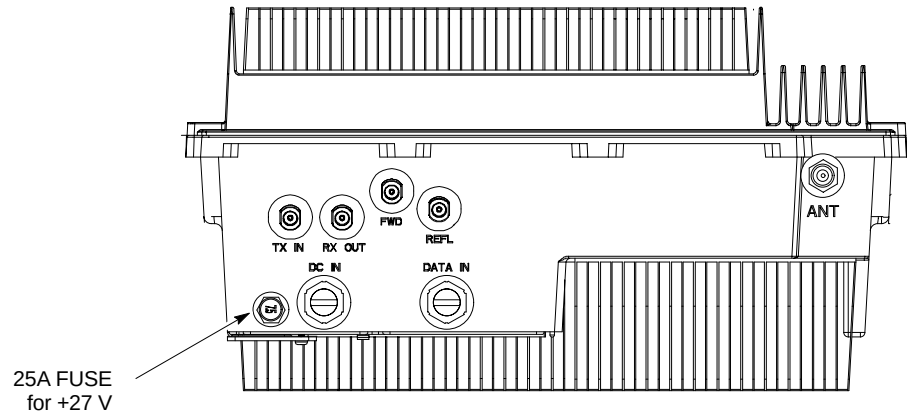

### cCLPA DC Power Pre–Test

Perform the procedure Table 5-6 in before applying any power to the cCLPA.

| Table 5-6: cCLPA DC Pre–Power Test | |
|---|---|
| **Step** | **Action** |
| 1 | Ensure that DC power is disengaged at the source. Verify that the DC power cable has been connected using the procedure in Table 4-8. |
| 2 | Remove I/O panel cover. |
| 3 | At the bottom of the cCLPA, verify that 25 A circuit breaker to OFF (pulled out). See Figure 5-4. |
| 4 | Us a DMM (set to ohms) and verify the resistance on the +27 V bus.<br>– Verify that the resistance from the power (+) feed terminal with respect to ground measures > **500 Ω**<br>– Verify that the resistance from the power (–) feed terminal with respect to ground measures > **500 Ω**<br>The resistance measurement should not read 0 (zero). |
| 5 | Proceed to Initial Power up procedure in Table 5-11. |



**Figure 5-4:** Bottom View of cCLPA

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# AC Power Input (Outdoor Configuration)

## Objective

The objective of this procedure is to verify the AC power for the Compact BTS outdoor configuration.

## Test Equipment

The following test equipment is required to perform the Pre–Power Up test:

- Digital Multimeter (DMM) or equivalent

## Cabling Inspection

Using the site specific documentation generated by Motorola Systems Engineering, verify that the following cable systems are properly connected:

- AC Power cabling
- DC Power Cabling

AC power was installed per manufacturer's installation procedure.

Perform the procedure Table 5-7 in before applying any power to the TME and cCLPA.



**Table 5-7:** PDE Initial Power –Up Test

| Step | Action |
|---|---|
| | *** IMPORTANT**<br>To avoid extensive re–work of the PDE and BTS connections, this procedure should be performed after the PDE and TME are mounted in place. |
| | **△ WARNING**<br>This equipment uses dangerous voltages and is capable of causing death. Failure to observe this Warning could result in electrical shock to personnel and damage to equipment. The AC voltage source should be isolated and locked, and a clearly visible, Warning label attached. |
| 1 | Verify that AC power from the source is OFF. |
| 2 | *If not already done,* remove safety shield covering AC terminal block. |
| 3 | Connect AC power cable to AC power source. |
| 4 | Verify that PDE DC circuit breakers are set to "O" or pulled out (disengaged). |
| 5 | Verify that AC power cable is securely connected to PDE AC terminal block. |
| 6 | Turn on AC power source. |
| | **△ WARNING**<br>This equipment uses dangerous voltages and is capable of causing death. Failure to observe this Warning could result in electrical shock to personnel and damage to equipment. Do not wear jewelry on hands/fingers when making electrical measurements. |

table continued on next page

| Table 5-7: PDE Initial Power –Up Test | |
|---|---|
| **Step** | **Action** |
| 7 | Using a DMM set toVAC, measure the voltage at the AC terminal block. DMM should indicate 200–240 VAC. Adjust AC voltage as necessary. |
| 8 | Remove DMM. |
| 9 | If there is nothing further to do, replace safety shield. Secure to cabinet with 2 nuts and washers. Use an adjustable wrench to tighten nuts. Torque nuts to 3.4 N–M (20 in–lbs). |

# Battery Backup DC Power Input (Outdoor Configuration)

## Objective

The objective of this procedure is to verify the Battery Backup DC power for the Compact BTS outdoor configuration.

## Cable Descriptions and Part Numbers

Table 5-8 gives the cable description and part number for the recommended cable. Consult manufacturer's installation guide for further information.

**Table 5-8:** Cable Descriptions and Part Numbers

| Cable | Qty. | Part Number | Description |
|---|---|---|---|
| †L | 1 | Customer Supplied | DC power cables, 10 AWG, stranded, designed for +20 to +34 VDC power input |

† Length of cables are dependent upon BTS equipment layout.

## Test Equipment

The following test equipment is required to perform the Pre–Power Up test:

- Digital Multimeter (DMM) or equivalent

## Tools Required

Relatively small, flat head, screwdriver or equivalent.

## Cabling Inspection

Using the site specific documentation generated by Motorola Systems Engineering, verify that the following cable systems are properly connected:

- AC Power cabling
- DC Power Cabling

Battery Backup has been installed per the manufacturer's installation procedure.

Following the procedure in Table 5-9 to verify Battery Backup DC power is present.

**Table 5-9:** Procedure to Verify Battery Backup DC Power Test

| Step | Action |
|---|---|
| | △ **WARNING**<br>Do not wear a grounding device or metal of any kind on hands/fingers when working with voltage. injury to personnel and damage to equipment could occur. |
| 1 | Verify that Battery Backup DC Power is disengaged. |

table continued on next page

| **Table 5-9:** Procedure to Verify Battery Backup DC Power Test | |
|---|---|
| **Step** | **Action** |
| 2 | *If not already done*, connect Battery Backup DC power cable to batteries. |
| 3 | *If not already done*, remove safety shield covering DC terminal block. |
| 4 | Verify that Battery Backup DC power cable is securely connected to DC terminal block of PDE. |
| 5 | Verify that circuit breakers on PDE front panel are disengaged (pulled out or set to “O” (OFF)). |
| 6 | Turn on Battery Backup source. |
| 7 | Using a DMM set to VDC, measure the voltage at the DC terminal block. DMM indicates VDC in the range +20 to +34 VDC. |
| 8 | Remove DMM. |
| 9 | If there is nothing further to do, replace safety shield. Secure to cabinet with 2 nuts and washers. Use an adjustable wrench to tighten nuts. Torque nuts to 3.4 N–M (20 in–lbs). |

## Initial Power–Up Tests

**WARNING**

Potentially lethal voltage and current levels are present in the Compact BTS. This test must **NOT** be performed without a second person present capable of administering emergency medical treatment. Remove all decorative metal before beginning this test. Do **NOT** wear a grounding strap when performing voltage measurements.

### BTS Initial Power–Up

Perform the procedure in Table 5-10 to verify input power. Once power has been applied the cards and modules within the BTS should begin operating within specifications.

**Table 5-10:** Procedure for BTS Initial Power–Up

| Step | Action |
|---|---|
| | **NOTE**<br>If the BTS is being utilized in an outdoor configuration, perform this procedure after the TME has been verified as operational. |
| 1 | Ensure that DC power source is OFF. |
| 2 | Connect DC power to BTS DC Power input. |
| 3 | Turn on DC power source. |
| 4 | Use a DMM (set to VDC) to verify the +27 V power output is within +20 to +34 VDC) |
| 5 | On the BTS, set the 25 A circuit breaker to ON (push in). See Figure 5-3. |
| 6 | *If not already done*, install the fan module, note that the fan module begins operating. Feel for air movement at the exhaust vent on top of the BTS. |
| 7 | Ensure that all circuit boards and modules are seated and locked into their associated slots. |

### cCLPA Initial Power –Up

Perform the procedure in Table 5-11 to perform the initial power–up.

**Table 5-11:** Procedure cCLPA Initial Power–Up

| Step | Action |
|---|---|
| | **NOTE**<br>If the cCLPA is being utilized in an outdoor configuration, perform this procedure after the PDE has been verified as operational. |
| 1 | Ensure that DC power source is OFF. |

table continued on next page

| Table 5-11: Procedure cCLPA Initial Power–Up | |
|---|---|
| **Step** | **Action** |
| 2 | *If not already done*, remove cCLPA I/O panel cover. |
| 3 | Connect DC power to cCLPA I/O board DC terminal block. |
| 4 | Turn on DC power source. |
| 5 | Using a DMM (set to VDC), measure the voltage at the cCLPA I/O board terminal block. DC voltage should measure in the range of +20 to +34 VDC. Adjust DC power source as necessary. |
| 6 | Remove DMM and install I/O panel cover. |
| 7 | On the cCLPA, push in 20 A circuit breaker. |

## Outdoor Configuration Initial Power Test



### TME Initial Power–Up

Perform the procedure Table 5-12 in before applying any power to the BTS and HMS.

| Table 5-12: TME DC Initial Power–Up Test | |
|---|---|
| **Step** | **Action** |
| | *** IMPORTANT**<br>To avoid extensive re–work of the TME and BTS connections, this procedure should be performed after the TME with BTS is mounted in place. |
| | **NOTE**<br>Perform this procedure after the PDE has been verified as operational. |
| 1 | Verify that DC power from the PDE is OFF. |
| 2 | *If not already done*, route DC power cable from PDE through conduit to TME. |
| 3 | *If not already done*, remove protective cover from voltage connection on PDA. |
| 4 | Use a Phillips screw driver to remove screws from DC power connector on PDA. |
| 5 | Set lug of "–" wire in the RTN location and secure with screw. |
| 6 | Set lug of "+" wire in the +27 VDC location and secure with screw. |
| 7 | Verify that 1U and TME circuit breakers on PDA are disengaged (pulled out). |
| 8 | Turn on PDE supplying the TME. |
| 9 | Using a DMM set to VDC, measure the voltage at the PDA connector. DMM should indicate +20 to +34 VDC. |
| 10 | *If not already done*, connect PDA to HMS Controller (D–connector) |

table continued on next page

| **Table 5-12:** TME DC Initial Power–Up Test | |
|---|---|
| **Step** | **Action** |
| 11 | *If not already done*, connect PDA to BTS. (Three appropriately marked cables .) |
| 12 | Engage (push in) TME circuit breaker on PDA.<br>**NOTE**<br>Fans on HMS and BTS begin to operate. With TME cable connected the controller for the HMS and BTS is bypassed, and DC power is supplied as long as the TME circuit breaker is engaged. |
| 13 | Using a DMM set to VDC, measure the voltage at the BTS DC Input connector. DMM should indicate +20 to +34 VDC. |
| 14 | Using a DMM set to VDC, measure the voltage at the HMS Controller connector. DMM should indicate +20 to +34 VDC. |
| 15 | If the 1U connector is being used, engage 1U circuit breaker (push in), use a DMM set to VDC to measure the voltage at the 1U unit connector. DMM should indicate +20 to +34 VDC.<br>**NOTE**<br>If 1U connector is not in use, **do not** measure at this time. |

# Remove Power

### Removing BTS Power

Perform the procedure in Table 5-13, if power must be removed from the BTS.

**Table 5-13:** Procedure to Remove Power to BTS

| Step | Action |
|---|---|
| 1 | For indoor configuration, set the 25 A circuit breaker to OFF (pulled out). See Figure 5-3.<br>For outdoor configuration, open TME and set circuit breaker on PDA to “O”.<br>Set TME circuit breaker on PDE to OFF. |
| 2 | Confirm all LEDs are OFF. |
| 3 | If possible, for added safety, locate circuit breaker of DC power source (PDE or Battery Backup) and set it to OFF. |



### Removing cCLPA Power

Perform the procedure in Table 5-14, if power must be removed from the cCLPA.

**Table 5-14:** Procedure to Remove Power to cCLPA

| Step | Action |
|---|---|
| 1 | Set the 20A circuit breaker to OFF (pulled out). See Figure 5-4. |
| 2 | For indoor configuration, turn off DC power source.<br>For outdoor configuration, pull cCLPA circuit breaker on PDE out. |
| 3 | Turn off Battery backup DC power (if used). |

### Removing PDE Power

Perform the procedure in Table 5-15, if power must be removed from the PDE.

**Table 5-15:** Procedure to Remove Power to PDE

| Step | Action |
|---|---|
| 1 | Turn off AC power source. |
| 2 | Turn off Battery Backup DC power (if used). |

# Chapter 6: Optimization and Calibration

## Table of Contents

**Notes**

# Preliminary Operations: Overview

## Introduction

This section first verifies proper frame equipage against the site-specific documentation supplied for each BTS application.

## Cicruit Backhaul Operation

If circuit backhaul operation is being used, perform the procedures described in this chapter. Refer to the *LMF Help*, if further information is needed.

## Packet Backhaul Operation

If packet backhaul configuration is being used, perform the procedures described in Appendix I.

Peform the IBR procedures described in Appendix G and Appendix H if GLI3 data load and span parameters need to be verified.

## Cell–site Types

The site is configured as Omni with one carrier. The BTS can handle two carriers.

## CDF/NECF

The Configuration Data File (CDF) or Network Element Configuration File (NECF) contains information that defines the BTS and data used to download files to the devices. The BTS CDF (`bts-#.cdf`) and CBSC CDF (`cbsc-#.cdf`) files are used by circuit BTSs. The NEC Base (NECB – `NECB*bts#.xml`) and NEC Journaling (NECJ– `NECJ*bts#.xml`) files are used by packet BTSs. CDF or NEC files must be placed in the applicable BTS folder before the LMF can be used to log into that BTS. CDF and NEC files are normally obtained from the CBSC using a floppy disk. A file transfer protocol (ftp) method can be used if the LMF computer has that capability.

The CDF and NEC files include the following information:

- Download instructions and protocol
- Site specific equipage information
- CCP2 Shelf allocation plan
  - BBX equipage
  - CSA equipage
  - MCC–1X (16, 24,32, 64) channel element allocation plan. This plan indicates how the CCP2 shelf is configured, and how paging, synchronization, traffic, and access channel elements (and associated gain values) are assigned among the (up to 3) MCC–1Xs in the shelf.
- CSA equipage

- Effective Rate Power (ERP) table for all TX channels to antennas respectively. Motorola System Engineering specifies the ERP of a transmit antenna based on the site geography, antenna placement, and government regulations. Working from this ERP requirement, the antenna gain, (dependent on the units of measurement specified) and antenna feed line loss can be combined to determine the required power of the BTS. The corresponding BBX–1X output level required to achieve that power level on any channel/sector can also be determined.

**NOTE**

Refer to the *LMF Help function on–line documentation* for additional information on the layout of the LMF directory structure (including CDF or NEC file locations and formats).

### Site Equipage Verification

Review the site documentation. Match the site engineering equipage data to the actual boards and modules shipped to the site. Physically inspect and verify the equipment provided for the frame.

**CAUTION**

Always wear an approved anti–static wrist strap while handling any circuit card/module to prevent damage by ESD. After removal, the card/module should be placed on a conductive surface or back into the anti–static packaging in which it was shipped.



### Initial Installation of Boards/Modules

**Table 6-1:** Initial Installation of Boards/Modules

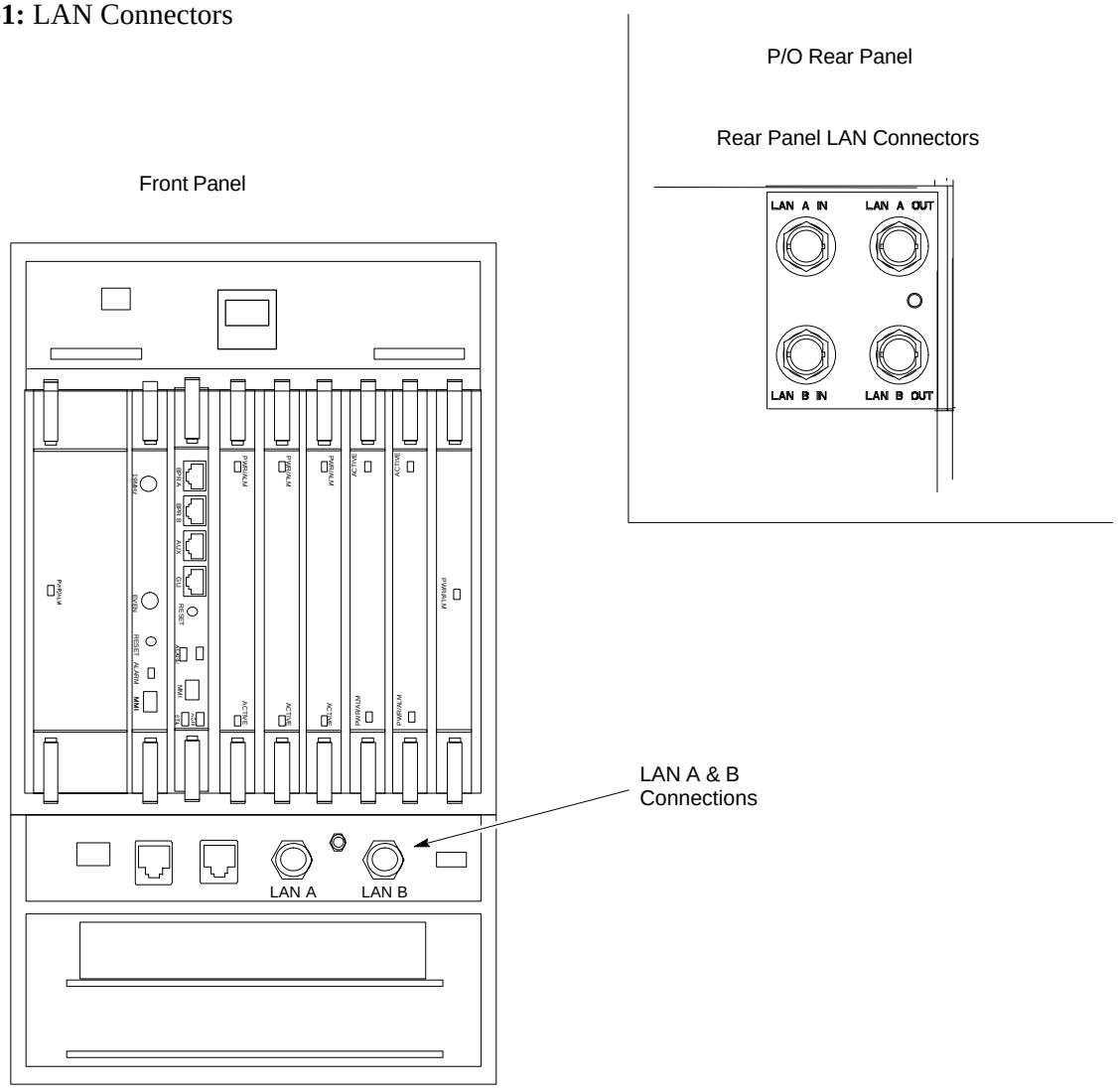
| Step | Action |
|---|---|
| 1 | Refer to the site documentation and, if it was not previously done, slide all boards and modules into the appropriate shelves as required. **DO NOT SEAT the boards and modules at this time.** |
| 2 | As the actual site hardware is installed, record the serial number of each module on a “Serial Number Checklist” in the site logbook. |

### Ethernet LAN Termination

For proper operation, the BTS Ethernet Local Area Network (LAN) connections must be terminated with a 50–ohm loads. This is done by placing four (4) 50–ohm BNC terminations on the LAN A and B external IN and OUT connectors located on the rear of the BTS. This is only done on stand–alone BTSs. The front panel LAN connections are not terminated with loads.

Verify that the LAN A and B external IN and OUT connectors at the rear of the BTS have terminations installed. See Figure 6-1 for locations.

**Figure 6-1:** LAN Connectors



## Overview

This section describes procedures for isolating the BTS from the span lines, preparing and using the WinLMF, downloading system operating software, CSA reference verification/optimization, set up and calibration of the supported test equipment, and transmit/receive paths are functioning properly.

**NOTE**

Before using the WinLMF, use an editor to view the "CAVEATS" section in the "readme.txt" file in the c:\wlmf folder for any applicable information.

## Optimization Process Summary

After a BTS is physically installed and the preliminary operations, such as power up, have been completed, the WinLMF is used to optimize the BTS. The basic optimization process consists of the following:

1. Download GLI3 (GLI–*bts#*–1) with application code and data and then enable GLI3.
2. Use the WinLMF status function and verify that all of the installed devices of the following types respond with status information: CSA, BBX, GLI3, and MCC. If a device is installed and powered up but is not responding and is colored gray in the BTS display, the device is not listed in the CDF file. The CDF/NECF file must be corrected before the device can be accessed by the WinLMF.
3. Download device application code and data to all devices of the following types:
   - CSA
   - BBX–1X
   - MCC–1X
4. Verify the operation of the GPS and HSO/MSO signals.
5. Using the WinLMF test equipment selection function, select the test equipment to be used for the calibration.
6. Calibrate the TX and RX test cables if they have not previously been calibrated with the WinLMF computer and software build which will be used for the optimization/calibration. Cable calibration values can be entered manually, if required.
7. Connect the required test equipment for a full optimization.
8. Select all of the BBXs and all of the MCCs and use the full optimization function. The full optimization function performs TX calibration, BLO download, TX audit, all TX tests, and all RX tests for all selected devices.
9. If the TX calibration fails, repeat the full optimization for any failed paths.

10. If the TX calibration fails again, troubleshoot and correct the problem causing the failure, and repeat the full optimization for the failed path.
11. If the TX calibration and audit portion of the full optimization passes for a path but some of the TX or RX tests fail, troubleshoot and correct the problem causing the failure, and run the individual tests as required until all TX and RX tests have passed for all paths.

### Cell-site Types

The site is configured as Omni/Omni. Each cell site type has unique characteristics and must be optimized accordingly.

### CDF/NECF

The CDF/NECF (Configuration Data File/Network Element Configuration File) contains information that defines the BTS and data used to download files to the devices. A CDF/NECF file must be placed in the applicable BTS folder before the WinLMF can be used to log into that BTS. CDF/NECF files are normally obtained from the CBSC using a floppy disk. A file transfer protocol (ftp) method can be used if the WinLMF computer has that capability. Refer to the *WinLMF Help function on–line documentation* for more information.

The CDF/NECF includes the following information:

- Download instructions and protocol
- Site specific equipage information
- CCP2 Shelf allocation plan
  - BBX equipage (based on cell–site type) including IS–95A/B or CDMA2000 1X capability and redundancy
  - CSA equipage including redundancy
  - Multi–Channel CDMA Card 1X channel element allocation plan. This plan indicates how the CCP2 Shelf is configured, and how the paging, synchronization, traffic, and access channel elements (and associated gain values) are assigned among the (up to 3) MCC–1Xs in the shelf.
- Effective Rated Power (ERP) table for all TX channels to antennas respectively. Motorola System Engineering specifies the ERP of a transmit antenna based on site geography, antenna placement, and government regulations. Working from this ERP requirement, antenna gain and antenna feed line loss can be combined to calculate the required transmit power at the frame antenna connections. The corresponding BBX output power required to achieve that power level on any channel/sector can then be determined based on Bay Level Offset (BLO) data established during the optimization process.

**NOTE**

Refer to Figure 6-2 and the *WinLMF Help function on–line documentation* for additional information on the layout of the WinLMF directory structure (including CDF/NECF file locations and formats).

### BTS System Software Download

BTS system software must be successfully downloaded to the BTS processor boards before optimization can be performed. BTS operating code is loaded from the WinLMF computer terminal.

The BTS is configured for Circuit Backhaul and uses bts.cdf files. BTSs configured for Packet Backhaul use bts.necf files (bts–xxx.xml) located on the OMC–R.

**NOTE**

Before using the WinLMF for optimization/ATP, the correct **bts–#.cdf** (or **bts–#.necf**) and **cbsc–#.cdf** files for the BTS must be obtained from the CBSC and put in a **bts–#** folder in the WinLMF. Failure to use the correct CDF/NECF files can cause wrong results. **Failure to use the correct CDF/NECF files to log into a live (traffic carrying) site can shut down the site**.



The CDF/NECF is normally obtained from the CBSC on a DOS formatted diskette, or through a file transfer protocol (ftp) if the WinLMF computer has ftp capability. Refer to the *WinLMF Help function on–line documentation* for the procedure.

### Site Equipage Verification

If you have not already done so, use an editor to view the CDF/NECF, and review the site documentation. Verify the site engineering equipage data in the CDF/NECF matches the actual site hardware using a CDF/NECF conversion table.

**CAUTION**

Use extreme care not to make any changes to the CDF/NECF content while viewing the file. Changes to the CDF/NECF can cause the site to operate unreliably or render it incapable of operation.
Always wear a conductive, high impedance wrist strap while handling any circuit card/module to prevent damage by ESD. Extreme care should be taken during the removal and installation of any card/module. After removal, the card/module should be placed on a conductive surface or back into the anti–static bag in which it was shipped.

### Overview of Packet BTS files

R16.0 and earlier releases had the configuration file called CDF for each BTS and CBSC used by WinLMF. In 16.1 Packet BTS, BTS with GLI3 booting in packet binary, the CDF is replaced by two new configuration files called Network Element Configuration Base (NECB) and Network Element Change Journal (NECJ). The NECB contains the baseline configuration and is analogous to the CDF, while the NECJ contains all the changes made to the configuration since the last time the NECB was re–generated. Once the NECJ gets to 80% of its maximum size, the NECB is re–generated and all the updates are rolled into it.

These files play much broader and vital role than previous CDF files. GLI3 booting in circuit binaries works similar to R16.0.

A few WinLMF related important facts about these files are listed below.

- Both files (NECB and NECJ) are in XML format.
- NECB contains all the up-to-date static configuration information and NECJ contains all the recent changes (including operations) which are not updated in the NECB.
- Both files can be viewed in any XML viewer (most easily available is Internet Explorer V5.0 and higher). They can be also viewed by any other word processor, but the XML tags will also be seen with them.
- These files will be created by OMC–R from MIB as per the BTS provisioning.
- These files will be regenerated for each software release upgrade on the system for each BTS.
- These files will reside on both OMC–R and Packet–GLI3 (unlike CDF) and will be synchronized periodically between them.
- Both NECB and NECJ file contain a “SoftwareVersion” field in their header section indicating the system release version of these files.
- Instead of the bts#.cdf file, the packet WinLMF uses a bts#.XML file, which is a copy of the NECB.XML file.
- Packet–GLI3 will need these files for site initialization.
- The scope of NECB has grown much broader than CDF and has much more BTS centric information. The use of generic version of these files should be strictly avoided for the correct site initialization.

## WinLMF Features and Installation Requirements

Before optimization can be performed, the WinLMF application software must be installed and configured on a computer platform meeting Motorola–specified requirements.

**NOTE**

For the WinLMF graphics to display properly, the computer platform must be configured to display more than 256 colors. See the operating system software instructions for verifying and configuring the display settings.

Software and files for installing and updating the WinLMF are provided on CD ROM disks. The following items must be available:

- WinLMF application program on CD ROM
- CDF/NECF for each supported BTS (on diskette or available from the CBSC)
- CBSC File for each supported BTS (on floppy disk or CD ROM)

### FTP Server

To be able to download files to the GLI3, the WinLMF now runs FTP server on the WinLMF laptop. The WinLMF FTP server runs from the LMFs home directory. All the files necessary to run the WinLMF FTP server are installed from the WinLMF CD. The FTP server is automatically started by the WinLMF upon successful Login to a Packet BTS.

In addition, the WinLMF provides a new option in the Tools menu called FTP Server. The option starts the LMFs FTP server if **Start** is selected, and stops the server if **Stop** is selected. The LMFs FTP server runs on port 21. If any other process is using that port, the error message is displayed to the user stating that the port is occupied. There is another option under FTP Server menu called FTP Monitor, which allows the user to watch FTP activity b/w the WinLMF and GLI.

#### Firewalls

Firewalls will block the FTP requests from the Packet GLI to the WinLMF laptop. You must disable your firewall before attempting the BTS Synch command. Some common firewall programs to look for include Network ICE, BlackICE, Norton’s Desktop Firewall, Enterprise Firewall, and Personal Firewall.

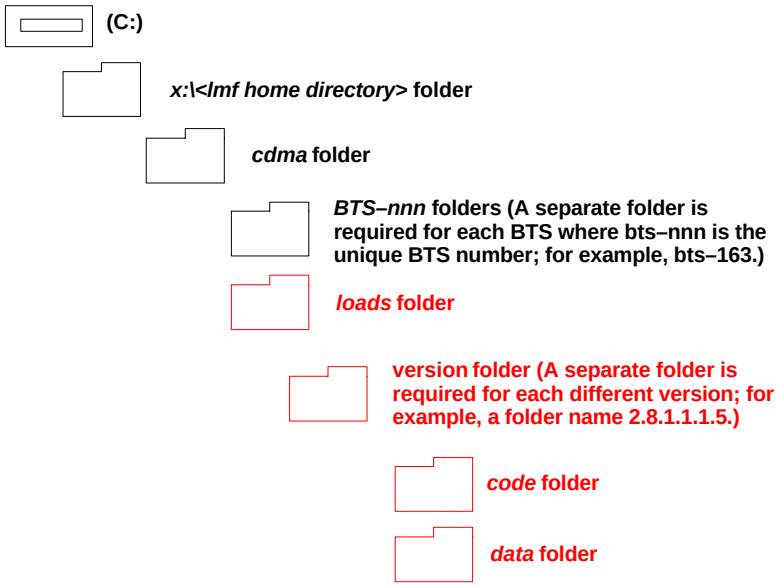
### FTP Server Port in use

On some Windows 2000 installations, a process called “inetd.exe” makes the FTP server port 21 unusable by the WinLMF. If the WinLMF reports that the FTP server could not start because the port is in use, make sure the inetd.exe is not running by using the Task Manager’s process list. If inetd.exe is running, end the process by selecting it and clicking the “End Process” button. Inetd32.exe is NOT the same and ending it will not resolve this problem.

## WinLMF File Structure Overview

The WinLMF uses a <***x***>**:\<*lmf home directory*>** folder that contains all of the essential data for installing and maintaining the BTS. The following list outlines the folder structure for WinLMF. Except for the *bts-nnn* folders, these folders are created as part of the WinLMF installation. Refer to the *CDMA WinLMF Operator’s Guide* for a complete description of the folder structure.

**Figure 6-2:** WinLMF Folder Structure




**NOTE**

The “loads” folder and all the folders below it are not available from the WinLMF for Software Release 2.16.3.x. These folders may be present as as a legacy from previous software versions or downloaded from the OMC–R/CBSC.

## WinLMF Home Directory

The WinLMF installation program creates the default home directory, **`c:\wlmf`**, and installs the application files and subdirectories (folders) in it. Because this can be changed at installation, the CDMA WinLMF home directory will be referred to with the generic convention of:

**<x>:\<lmf home directory>**

Where:

<x> = the WinLMF computer drive letter where the CDMA WinLMF home directory is located.

<lmf home directory> = the directory path or name where the CDMA WinLMF is installed.

## NECF Filename Conventions and Directory Location

### NECF

The NECF actually consists of two files: the NECB and NECJ. The naming convention for the NECB and NECJ is:

**NECB*bts#.xml**

**NECJ*bts#.xml**

Where:

* = any characters can be substituted there

# = the actual integer BTS number

The NECB and its corresponding NECJ must have the exact same name, except for the “B” and “J” difference after the initial NEC characters.

The NECB and the NECJ must reside in the <WinLMF_HOME>\cdma\bts–# directory corresponding to the BTS frame they are for.

### Load Information File (LIF)

The LIF contains all the devices binaries available for the specified System Software Release. It is the functional equivalent of the OLF file that was used pre–Packet.

The naming convention for the LIF is:

**NE_LIF.xml**

The LIF must reside in the <WinLMF_HOME>\cdma\loads\<Software Release Number> directory, where <WinLMF_HOME> = the home directory in which the WinLMF is installed, usually C:\wlmf <Software Release Number> = the System Software Release Number (e.g. 2.16.1.0.10).

### Cal File

The Cal File still resides in the <WinLMF_HOME>\cdma\bts–# directory and is named bts–#.cal, where # is the actual integer number of the BTS.

## WinLMF Operating System Installation

This section provides information and instructions for installing and updating the WinLMF software and files.

### First Time Installation Sequence

- Install Java Runtime Environment (JRE)
- Install U/WIN K–shell emulator
- Install WinLMF application programs
- Install/create BTS folders

**NOTE**

Any time you install U/WIN, you must install the WinLMF software because the installation of the WinLMF modifies some of the files that are installed during the U/Win installation. Installing U/Win over–writes these modifications.
There are multiple binary image packages for installation on the CD–ROM. When prompted, choose the load that corresponds to the switch release that you currently have installed. Perform the Device Images install after the WinLMF installation.
If applicable, a separate CD ROM of BTS Binaries may be available for binary updates.



Follow the procedure in Table 6-2 to install the WinLMF application program using the WinLMF CD ROM.

**Table 6-2:** Install WinLMF using CD ROM

| ✓ | Step | Action |
|---|---|---|
| | 1 | Insert the WinLMF CD ROM disk into your disk drive and perform the following as required: |
| | 1a | – If the Setup screen appears, follow the instructions displayed on the screen. |
| | 1b | – If the Setup screen is not displayed, proceed to Step 2. |
| | 2 | Click on the **Start** button |
| | 3 | Select **Run.** |
| | 4 | Enter **d:\autorun** in the Open box and click **OK.** |
| | | **NOTE**<br>If applicable, replace the letter **d** with the correct CD ROM drive letter. |

### Copy BTS CDF (or NECF) and CBSC CDF Files to the WinLMF Computer

Before logging on to a BTS with the WinLMF computer to execute optimization/ATP procedures, the correct **bts-#.cdf** (or **bts–#.necf**) and **cbsc-#.cdf** files must be obtained from the CBSC and put in a **bts-#** folder in the WinLMF computer. This requires creating versions of the CBSC CDF files on a DOS–formatted floppy diskette and using the diskette to install the CDF files on the WinLMF computer.

**NOTE**

If the WinLMF has ftp capability, the ftp method can be used to copy the CDF or NECF files from the CBSC.
On Sun OS workstations, the **unix2dos** command can be used in place of the **cp** command (e.g., unix2dos bts–248.cdf bts–248.cdf). This should be done using a copy of the CBSC CDF file so the original CBSC CDF file is not changed to DOS format.
When copying CDF or NECF files, comply with the following to prevent BTS login problems with the Windows WinLMF:

- The numbers used in the **bts-#.cdf** (or **bts–#.necf**) and **cbsc-#.cdf** filenames must correspond to the locally-assigned numbers for each BTS and its controlling CBSC.
- The generic **cbsc–1.cdf** file supplied with the Windows WinLMF will work with locally numbered BTS CDF files. Using this file *will not provide a valid optimization* unless the generic file is edited to replace default parameters (e.g., channel numbers) with the operational parameters used locally.

The procedure in Table 6-3 lists the steps required to transfer the CDF files from the CBSC to the WinLMF computer. For further information, refer to the *WinLMF Help function on–line documentation*.

**Table 6-3:** Copying CDF or NECF Files to the WinLMF Computer

| ✓ | Step | Action |
|---|---|---|
| **AT THE CBSC:** | | |
| | 1 | Login to the CBSC workstation. |
| | 2 | Insert a DOS–formatted floppy diskette in the workstation drive. |
| | 3 | Type **eject –q** and press the **Enter** key. |

. . . continued on next page

| **Table 6-3:** Copying CDF or NECF Files to the WinLMF Computer | | |
|---|---|---|
| ✓ | **Step** | **Action** |
| | 4 | Type **mount** and press the **Enter** key.<br>**NOTE**<br>• Look for the *"floppy/no_name"* message on the last line displayed.<br>• If the **eject** command was previously entered, *floppy/no_name* will be appended with a number. Use the explicit *floppy/no_name* reference displayed when performing step 7. |
| | 5 | Change to the directory, where the files to be copied reside, by typing **cd <directoryname>** (e.g., **cd bts–248**) and pressing the **Enter** key. |
| | 6 | Type **ls** and press the **Enter** key to display the list of files in the directory. |
| | 7 | With *Solaris versions of Unix, create DOS–formatted versions* of the **bts-#.cdf** (or **bts–#.necf**) and **cbsc-#.cdf** files on the diskette by entering the following command:<br>**unix2dos <source filename> /floppy/no_name/<target filename>**<br>(e.g., **unix2dos bts–248.cdf /floppy/no_name/bts–248.cdf**). |
| | | **NOTE**<br>• Other versions of Unix do not support the unix2dos and dos2unix commands. In these cases, use the Unix **cp** (copy) command. The *copied* files will be difficult to read with a DOS or Windows text editor because Unix files do not contain line feed characters. Editing *copied* CDF files on the WinLMF computer is, therefore, not recommended.<br>• Using **cp**, multiple files can be *copied* in one operation by separating each filename to be copied with a space and ensuring the destination directory (*floppy/no_name*) is listed at the end of the command string following a space (e.g., **cp bts–248.cdf cbsc–6.cdf /floppy/no_name**). |
| | 8 | Repeat Steps 5 through 7 for each bts–# that must be supported by the WinLMF computer. |
| | 9 | When all required files have been copied to the diskette type **eject** and press the **Enter** key. |
| | 10 | Remove the diskette from the CBSC drive. |
| **AT THE WinLMF:** | | |
| | 11 | If it is not running, start the *Windows* operating system on the WinLMF computer. |
| | 12 | Insert the diskette containing the **bts-#.cdf** (or **bts–#.necf**) and **cbsc-#.cdf** files into the WinLMF computer. |
| | 13 | Using *MS Windows* Explorer, create a corresponding bts–# folder in the **<*x*>:\<*lmf home directory*>\cdma** directory for each **bts–#.cdf**/**cbsc–#.cdf** (or **bts–#.necf**/**cbsc–#.cdf**) file pair copied from the CBSC. |
| | 14 | Use *MS Windows* Explorer to transfer the **bts-#.cdf** (or **bts–#.necf**) and **cbsc-#.cdf** files from the diskette to the corresponding **<*x*>:\<*lmf home directory*>\cdma\bts–#** folders created in Step 13. |

### Creating a Named HyperTerminal Connection for MMI Communication

Confirming or changing the configuration data of certain BTS Field Replaceable Units (FRU) requires establishing an MMI communication session between the WinLMF and the FRU. Using features of the *Windows* operating system, the connection properties for an MMI session can be saved on the WinLMF computer as a named *Windows* HyperTerminal connection. This eliminates the need for setting up connection parameters each time an MMI session is required to support optimization.

Once the named connection is saved, a shortcut for it can be created on the *Windows* desktop. Double–clicking the shortcut icon will start the connection without the need to negotiate multiple menu levels.

Follow the procedures in Table 6-4 to establish a named HyperTerminal connection and create a *Windows* desktop shortcut for it.

**Table 6-4:** Create HyperTerminal Connection

| Step | Action |
|---|---|
| 1 | From the Windows Start menu, select:<br>**Programs>Accessories>** |
| 2 | Perform one of the following:<br>• For *Win NT,* select **Hyperterminal a**nd then click on **HyperTerminal** or<br>• For *Win 98,* select **Communications,** double click the **Hyperterminal** folder, and then double click on the **Hyperterm.exe** icon in the window that opens.<br>**NOTE**<br>• If a **Location Information Window** appears, enter the required information, then click on the **Close** button. (This is required the first time, even if a modem is not to be used.)<br>• If a **You need to install a modem.....** message appears, click on **NO**. |
| 3 | When the **Connection Description** box opens:<br>– Type a name for the connection being defined (e.g., MMI Session) in the **Name:** window,<br>– Highlight any icon preferred for the named connection in the **Icon:** chooser window, and<br>– Click **OK**. |
| 4 | From the **Connect using**: pick list in the **Connect To** box displayed, select **COM1** or **COM2** (*Win NT)* – or **Direct to Com 1** or **Direct to Com 2** (*Win 98*) for the RS–232 port connection and click **OK.** |
| | **NOTE**<br>For WinLMF computer configurations where COM1 is used by another interface such as test equipment and a physical port is available for COM2, select COM2 in the following step to prevent conflicts. |

. . . continued on next page

| **Table 6-4:** Create HyperTerminal Connection | |
|---|---|
| **Step** | **Action** |
| 5 | In the **Port Settings** tab of the **COM# Properties** window displayed, configure the RS–232 port settings as follows:<br>• Bits per second: 9600<br>• Data bits: 8<br>• Parity: None<br>• Stop bits: 1<br>• Flow control: None |
| 6 | Click **OK**. |
| 7 | Save the defined connection by selecting:<br>**File > Save** |
| 8 | Close the HyperTerminal window by selecting:<br>**File > Exit** |
| 9 | Click the **Yes** button to disconnect when prompted. |
| 10 | Perform one of the following:<br>• If the **Hyperterminal** folder window is still open (*Win 98)* proceed to step 12<br>• From the Windows Start menu, select **Programs > Accessories**. |
| 11 | Perform one of the following:<br>• For *Win NT*, select **Hyperterminal** and release any pressed mouse buttons.<br>• For *Win 98*, select **Communications** and double click the **Hyperterminal** folder.<br>• For *Win–XP*, select **Communications** and double click the **Hyperterminal** folder. |
| 12 | Highlight the newly–created connection icon by clicking on it. |
| 13 | *Right click and drag* the highlighted connection icon to the Windows desktop and release the right mouse button. |
| 14 | From the popup menu which appears, select **Create Shortcut(s) Here**. |
| 15 | If desired, reposition the shortcut icon for the new connection by dragging it to another location on the Windows desktop. |
| 16 | Close the **Hyperterminal** *folder* window by selecting:<br>**File > Close** |

### T1/E1 Span Interface

**NOTE**

**At active sites,** the OMC–R/CBSC must disable the BTS and place it out–of–service (OOS). **DO NOT** remove the span line cable connectors until the OMC–R/CBSC has disabled the BTS.

Before connecting the WinLMF computer to the BTS LAN, the OMC–R/CBSC must disable the BTS and place it OOS. This will allow the WinLMF to control the BTS, and prevent the CBSC from inadvertently sending control information to the BTS during WinLMF–based tests.

### Isolate BTS from T1/E1 Spans

Once the OMC–R/CBSC has disabled the BTS, the spans must be disabled to ensure the WinLMF will maintain control of the BTS.

### T1/E1 Span Isolation

Table 6-5 describes the action required for span isolation.

**Table 6-5:** T1/E1 Span Isolation

| Step | Action |
|---|---|
| 1 | Have the OMC–R/CBSC operator place the BTS OOS. |
| 2 | To disable the span lines, disconnect the span or spans from the CBIO Network Span–1X or Group 1 Span–EVDO sockets.<br>If in an outdoor configuration, then unlock and open TME left side door to gain access to rear of BTS. |

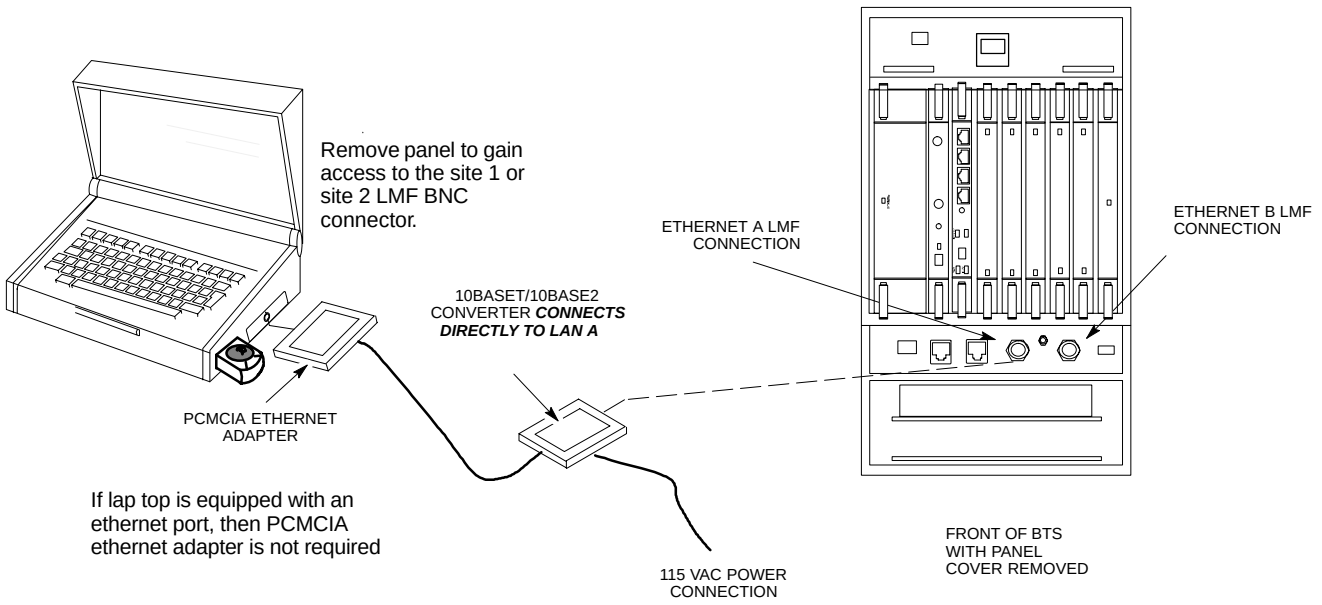
### Connect the WinLMF to the BTS

The WinLMF computer may be connected to the LAN A or B connector located on the front panel or at the rear of the BTS. Figure 6-3 below shows the general location of these connectors. LAN A is considered the primary LAN.

**Table 6-6:** Connecting the WinLMF to the BTS

| ✓ | Step | Action |
|---|---|---|
| | 1 | For indoor configuration, remove BTS front panel cover.<br>For outdoor configuration, unlock and open TME right side door and remove BTS front panel cover.<br>**NOTE**<br>Xircom Model PE3–10B2 or equivalent can also be used to interface the WinLMF Ethernet connection to the BTS frame connected to the PC parallel port, powered by an external AC/DC transformer. In this case, ***the BNC cable must not exceed 91 cm (3 ft) in length***. |
| | 2 | Connect the WinLMF computer to the LAN A (left–hand) BNC connector . (See Figure 6-3) |
| | | *** IMPORTANT**<br>The LAN shield is isolated from chassis ground. The LAN shield (exposed portion of BNC connector) **must not touch the chassis** during optimization. |

**Figure 6-3:** WinLMF Connection Detail



## Basic LMF Operation

**LMF Coverage in This Publication –** The LMF application program supports maintenance of both CDMA and SAS BTSs. All references to the LMF in this publication are to the CDMA portion of the program.

**Operating Environments –** The LMF application program allows the user to work in the two following operating environments which are accessed using the specified desktop icons:

- Graphical User Interface (GUI) using the **WinLMF** icon
- Command Line Interface (CLI) using the **WinLMF CDMA CLI** icon

The GUI is the *primary* optimization and acceptance testing operating environment. The CLI environment provides additional capability to the user to perform manually controlled acceptance tests and audit the results of optimization and calibration actions.

**Basic Operation –** Basic operation of the LMF in either environment includes performing the following:

- Selecting and deselecting BTS devices
- Enabling devices
- Disabling devices
- Resetting devices
- Obtaining device status

The following additional basic operation can be performed in a GUI environment:

- Sorting a status report window

For detailed information on performing these and other LMF operations, refer to the *LMF Help function on–line documentation*.

**NOTE**

*Unless otherwise noted*, LMF procedures in this manual are performed using the GUI environment.

### The LMF Display and the BTS

**BTS Display –** When the LMF is logged into a BTS, a frame tab is displayed for each BTS frames. The frame tab will be labeled with "CDMA" and the BTS number, a dash, and the frame number (for example, **BTS–812–1** for BTS 812, RFMF 1). If there is only one frame for the BTS, there will only be one tab.

**CDF/NECF Requirements –** For the LMF to recognize the devices installed in the BTS, a BTS CDF/NECF file which includes equipage information for all the devices in the BTS must be located in the applicable **<*x*>:\<*lmf home directory*>\cdma\bts–#** folder. To provide the necessary channel assignment data for BTS operation, a CBSC CDF file which includes channel data for all BTS RFMFs is also required in the folder.

### Graphical User Interface Overview

The LMF uses a GUI, which works in the following way:

- Select the device or devices.
- Select the action to apply to the selected device(s).
- While action is in progress, a status report window displays the action taking place and other status information.
- The status report window indicates when the the action is complete and displays other pertinent information.
- Clicking the **OK** button closes the status report window.

### Understanding GUI Operation

The following screen captures are provided to help understand how the GUI operates:

– Figure 6-4 depicts the differences between packet and circuit CDMA "cdf" file identification. Note that if there is a packet version "bts" file, the "(P)" is added as a suffix. There is a corresponding "(C)" for the circuit mode version.

– Figure 6-5 depicts the Self-Managed Network Elements (NEs) state of a packet mode. Note that an "X" is on the front of each card that is under Self–Managed Network Elements (NEs) control by the GLI3 card.

– Figure 6-6 depicts three of the available packet mode commands. Normally the GLI3 has Self-Managed Network Elements (NEs) control of all cards as shown in Figure 6-5 by an "(X)". In that state the LMF may only status a card. In order to download code or test a card, the LMF must request Self-Managed Network Elements (NEs) control of the card by using the shown dropdown menu. It also uses this menu to release control of the card back to the GLI3. The GLI3 will also assume control of the cards after the LMF logs out of the BTS. The packet mode GLI3 normally is loaded with a tape release

and NECB and NECJ files which point to a tape release stored on the GLI3. When the GLI3 has control of a card it will maintain that card with the code on that tape release.

– Figure 6-7 depicts a packet mode site that has the MCC–1 and the BBX–1 cards under LMF control. Notice that the "X" is missing from the front of these two cards.

For detailed information on performing these and other LMF operations, refer to the *LMF Help function on–line documentation*.

**Figure 6-4:** BTS Login Screen – Identifying Circuit and Packet BTS Files

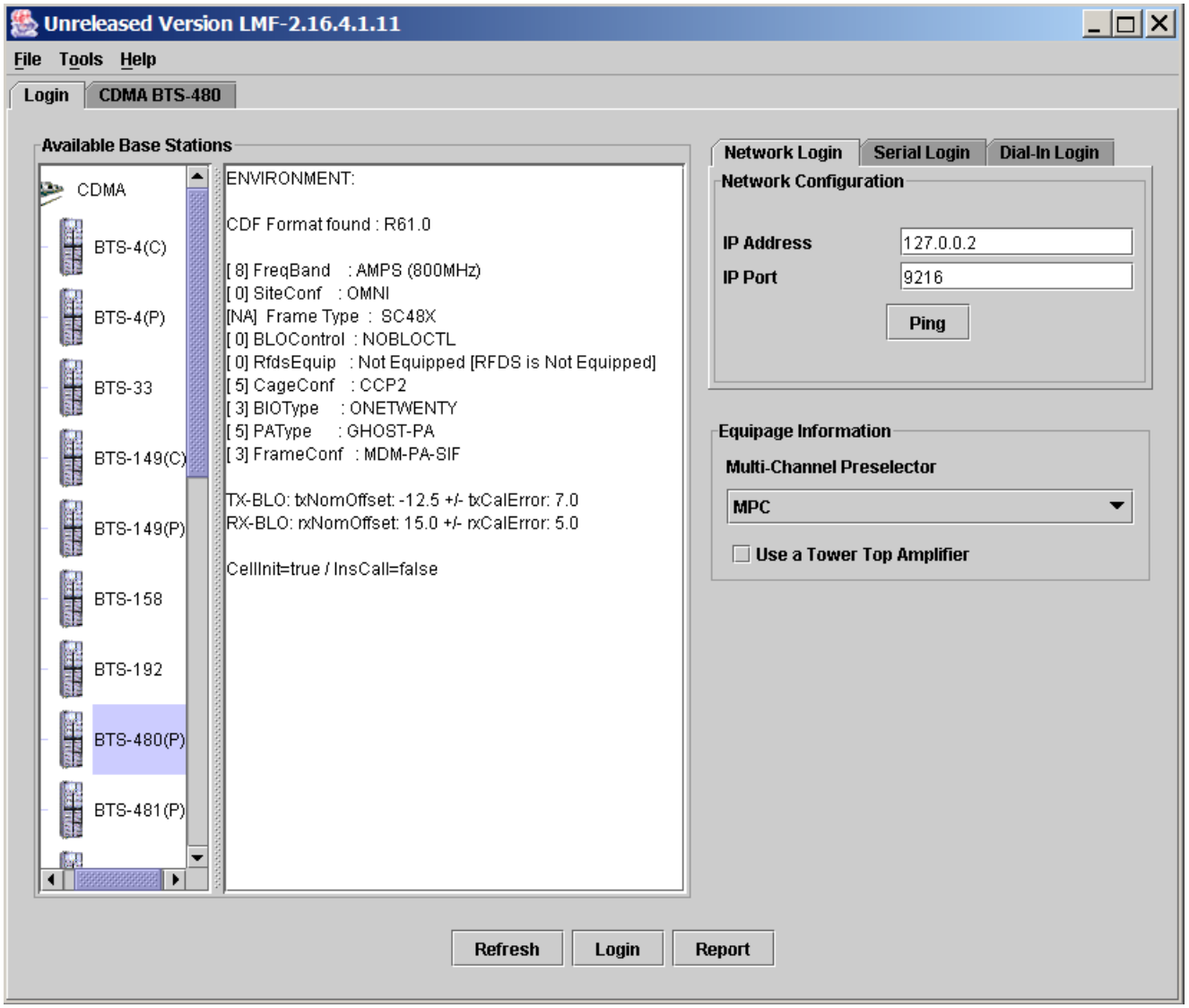


**Figure 6-5:** Self–Managed Network Elements (NEs) State of a Packet Mode

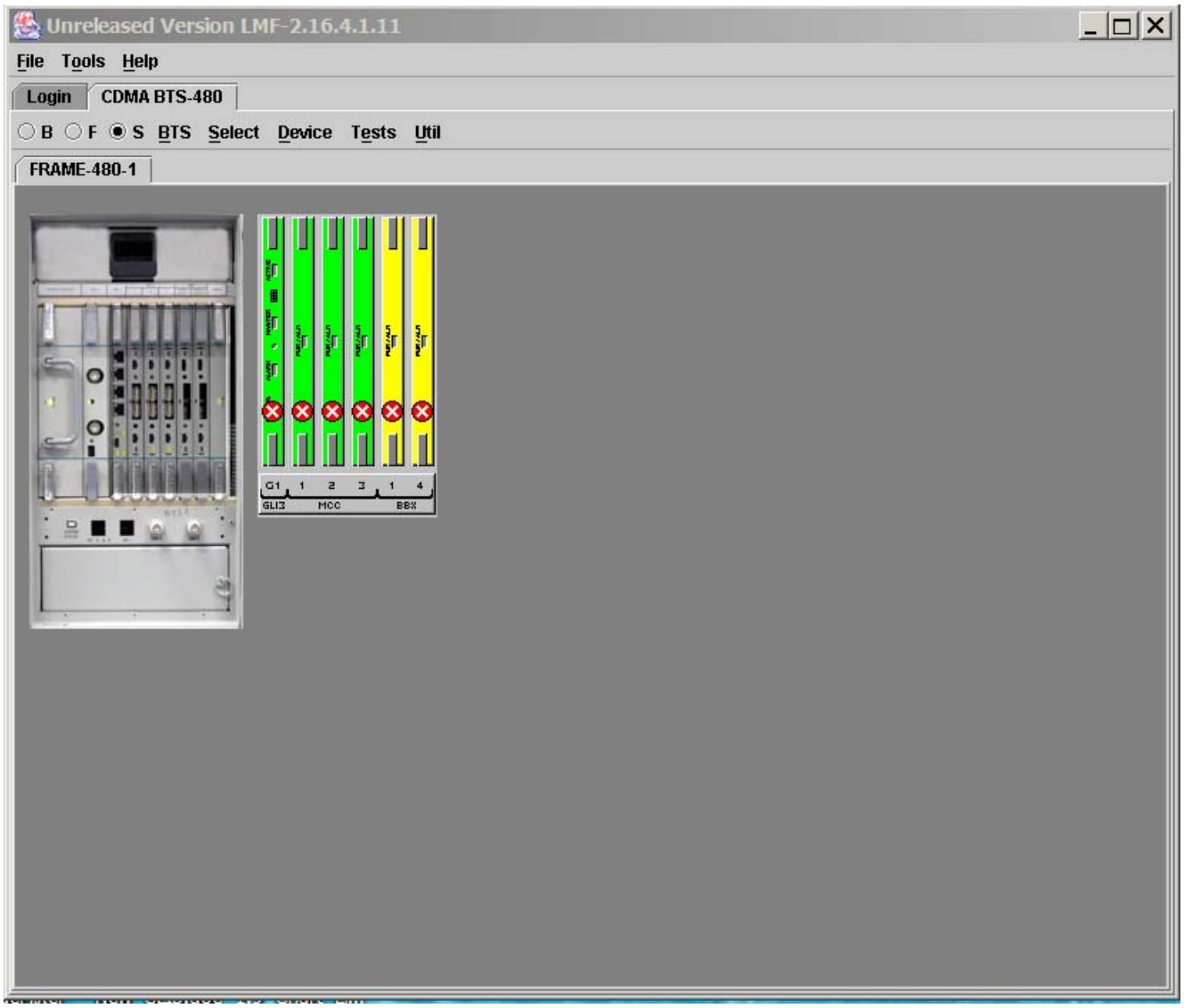
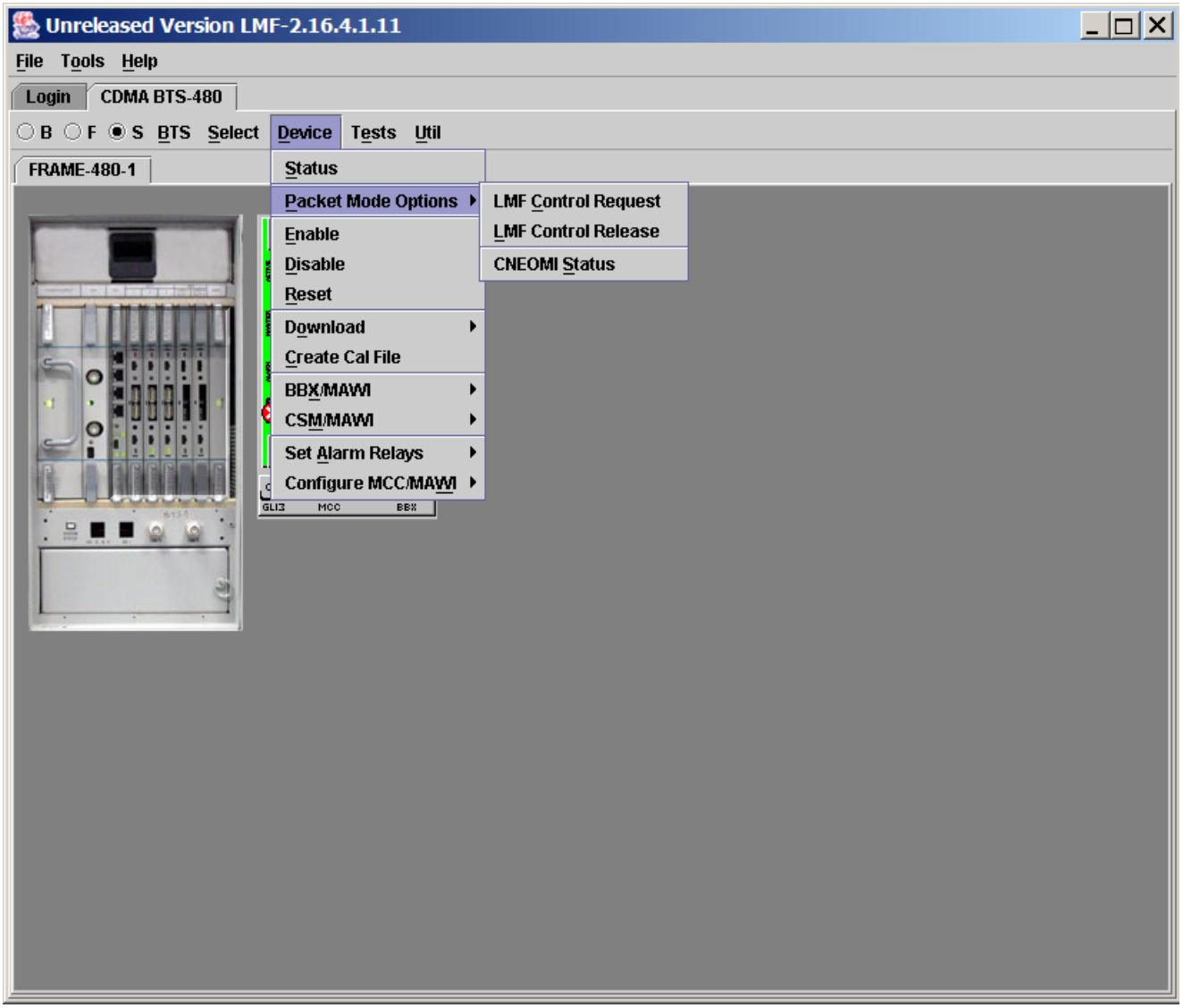
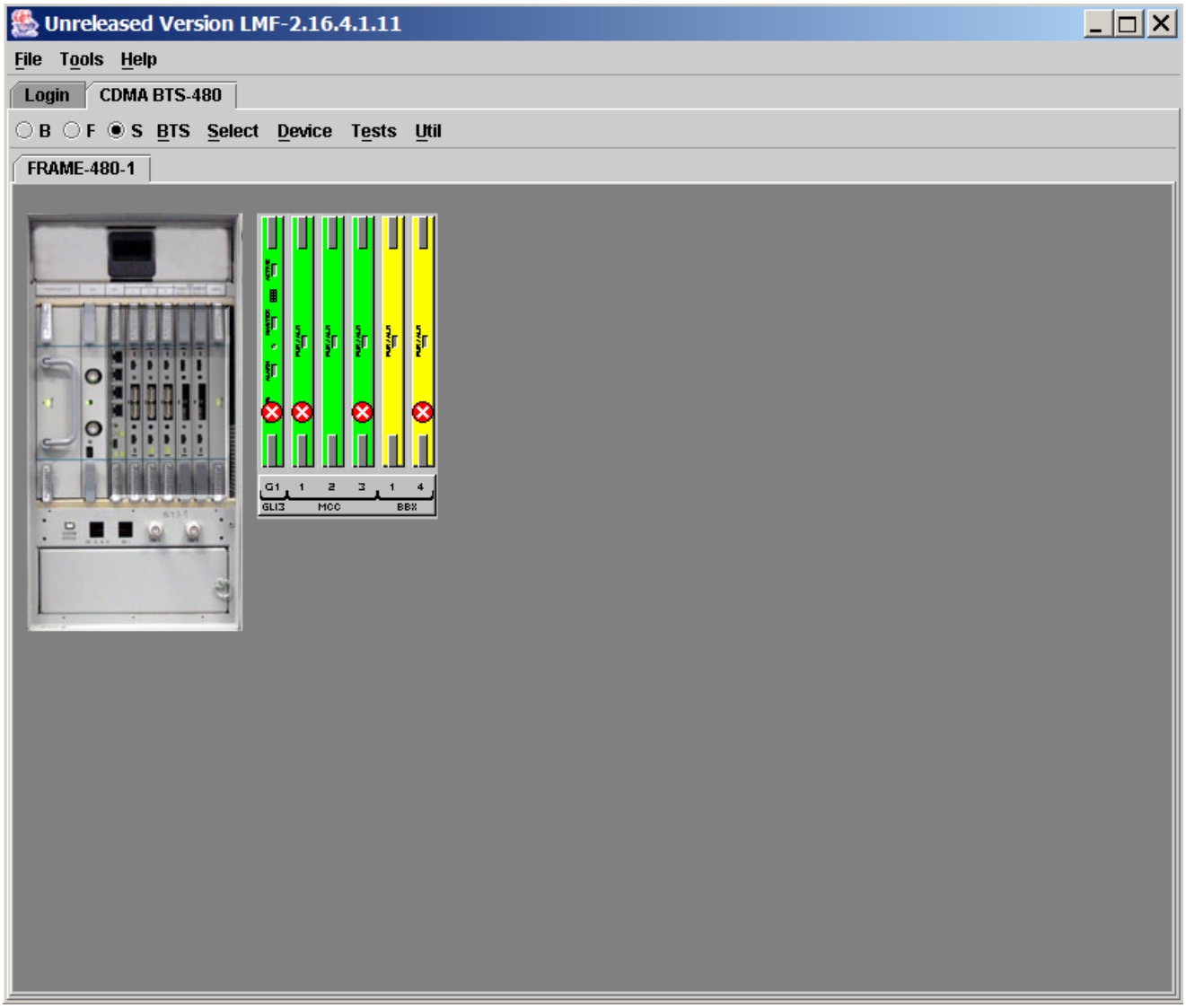


**Figure 6-6:** Available Packet Mode Commands




6

**Figure 6-7:** Packet Mode Site with MCC–1 and BBX–1 under LMF Control



## Command Line Interface Overview

The LMF also provides Command Line Interface (CLI) capability. Activate the CLI by clicking on a shortcut icon on the desktop. The CLI can not be launched from the GUI, only from the desktop icon.

Both the GUI and the CLI use a program known as the handler. Only one handler can be running at one time. The architectural design is such that the GUI must be started before the CLI if you want the GUI and CLI to use the same handler.

When the CLI is launched after the GUI, the CLI automatically finds and uses an in–progress login session with a BTS initiated under the GUI. This allows the use of the GUI and the CLI in the same BTS login session.

If a CLI handler is already running when the GUI is launched (this happens if the CLI window is already running when the user starts the GUI, or if another copy of the GUI is already running when the user starts the GUI), a dialog window displays the following warning message:

> The CLI handler is already running.
> This may cause conflicts with the LMF.
> Are you sure that you want to start the application?

This window also contains **yes** and **no** buttons. Selecting **yes** starts the application. Selecting **no** terminates the application.



### CLI Format Conventions

The CLI command can be broken down in the following way:

- Verb
- Device including device identifier parameters
- Switch
- Option parameters consisting of:
  - Keywords
  - Equals sign (=) between the keyword and the parameter value
  - Parameter values

Spaces are required between the verb, device, switch, and option parameters. A hyphen is required between the device and its identifiers. Following is an example of a CLI command.

**measure bbx–**<bts_id>**–**<bbx_id> **rssi** channel=6 sector=5

Refer to the *LMF CLI Commands* for a complete explanation of the CLI commands and their usage.

## Logging Into a BTS

Logging into a BTS establishes a communication link between the BTS and the LMF. An LMF session can be logged into only one BTS at a time.

### Prerequisites

*Before attempting to log into a BTS,* ensure the following have been completed:

- The LMF is correctly installed on the LMF computer.
- A ***bts-nnn*** folder with the correct CDF/NECF and CBSC files exists.
- The LMF computer was connected to the BTS before starting the *Windows* operating system and the LMF software. If necessary, restart the computer after connecting it to the BTS in accordance with Table 6-6 and Figure 6-3.

**CAUTION**

Be sure that the correct **bts–#.cdf/necf** and **cbsc–#.cdf** file are used for the BTS. These should be the CDF/NECF files that are provided for the BTS by the CBSC. Failure to use the correct CDF/NECF files can result in invalid optimization. **Failure to use the correct CDF/NECF files to log into a live (traffic–carrying) site can shut down the site.**

### BTS Login from the GUI Environment

Follow the procedures in Table 6-7 to log into a BTS when using the GUI environment.

**Table 6-7:** BTS GUI Login Procedure

| ✓ | Step | Action |
|---|---|---|
| | 1 | Start the LMF GUI environment by double–clicking on the WinLMF desktop icon (if the LMF is not running).<br>– An LMF window will open and display the LMF build number in the title bar. |
| | | **NOTE**<br>If a warning similar to the following is displayed, select **No**, shut down other LMF sessions which may be running, and start the LMF GUI environment again:<br>`The CLI handler is already running.`<br>`This may cause conflicts with the LMF.`<br>`Are you sure you want to start the application?`<br>`Yes No` |
| | 2 | Click on **Login** tab (if not displayed). |
| | 3 | Double click on **CDMA** (in the **Available Base Stations** pick list). |

. . . continued on next page

| **Table 6-7:** BTS GUI Login Procedure | | |
|---|---|---|
| ✓ | **Step** | **Action** |
| | 4 | Click on the desired BTS number. |
| | 5 | Click on the **Network Login** tab (if not already in the forefront). |
| | 6 | Enter correct IP address (normally **128.0.0.2**) for a field BTS, if not correctly displayed in the **IP Address** box. |
| | 7 | Type in the correct IP Port number (normally **9216**) if not correctly displayed in the **IP Port** box. |
| | 8 | Click on **Ping**.<br>– If the connection is successful, the **Ping Display** window shows text similar to the following:<br>`Reply from 128 128.0.0.2: bytes=32 time=3ms TTL=255`<br>– If there is no response the following is displayed:<br>`128.0.0.2:9216:Timed out`<br>If the GLI fails to respond, reset and perform the ping process again. If the GLI still fails to respond, typical problems are shorted BNC to inter–frame cabling, open cables, crossed A and B link cables, missing 50–Ohm terminators, or the GLI itself. |
| | 9 | If required, match the device corresponding to the BTS configuration by selecting **Multi-channel Preselector** type from the **Multi-channel Preselector** drop–down list (default is **MPC**). |
| | 10 | Click on **Login**. (A BTS tab with the BTS and frame numbers is displayed.) |
| | | **NOTE**<br>• If an attempt is made to log into a BTS that is already logged on, all devices will be gray.<br>• There may be instances where the BTS initiates a log out due to a system error (i.e., a device failure).<br>• If the GLI is OOS–ROM (blue), it must be downloaded with RAM code before other devices can be seen.<br>• If the GLI is OOS–RAM (yellow), it must be enabled before other installed devices can be seen. |

### BTS Login from the CLI Environment

Follow the procedures in Table 6-8 to log into a BTS when using the CLI environment.

**NOTE**

If the CLI and GUI environments are to be used at the same time, the *GUI must be started first and BTS login must be performed from the GUI*. Refer to Table 6-7 to start the GUI environment and log into a BTS.

**Table 6-8:** BTS CLI Login Procedure

| ✓ | Step | Action |
|---|---|---|
| | 1 | Double–click the WinLMF CLI desktop icon (if the LMF CLI environment is not already running). |
| | | **NOTE**<br>If a BTS was logged into under a GUI session before the CLI environment was started, the CLI session will be logged into the same BTS, and step 2 is not required. |
| | 2 | At the `/wlmf` prompt, enter the following command:<br>**login bts–***<bts#>* **host=***<host>* **port=***<port>*<br>where:<br>host = GLI card IP address (defaults to address last logged into for this BTS or 128.0.0.2 if this is first login to this BTS)<br>port = IP port of the BTS (defaults to port last logged into for this BTS or 9216 if this is first login to this BTS)<br>A response similar to the following will be displayed:<br>`LMF>`<br>`13:08:18.882 Command Received and Accepted`<br>`COMMAND=login bts-33`<br>`13:08:18.882 Command In Progress`<br>`13:08:21.275 Command Successfully Completed`<br>`REASON_CODE="No Reason"` |

6

### Logging Out

Logging out of a BTS is accomplished differently for the GUI and CLI operating environments.

**NOTE**

The GUI and CLI environments use the same connection to a BTS. If a GUI and the CLI session are running for the same BTS at the same time, logging out of the BTS in either environment will log out of it for both. When either a login or logout is performed in the CLI window, there is no GUI indication that the login or logout has occurred.

#### Logging Out of a BTS from the GUI Environment

Follow the procedure in Table 6-9 to logout of a BTS when using the GUI environment.

**Table 6-9:** BTS GUI Logout Procedure

| ✓ | Step | Action |
|---|---|---|
| | 1 | Click on **BTS** in the BTS menu bar. |
| | 2 | Click the **Logout** item in the pull–down menu (a **Confirm Logout** pop-up message will appear). |
| | 3 | Click on **Yes** (or press the **Enter** key) to confirm logout. The **Login** tab will appear.<br>**NOTE**<br>If a logout was previously performed on the BTS from a CLI window running at the same time as the GUI, a **Logout Error** pop–up message will appear stating the system could not log out of the BTS. When this occurs, the GUI must be exited and restarted before it can be used for further operations. |
| | 4 | If a **Logout Error** pop–up message appears stating that the system could not log out of the Base Station because the given BTS is not logged in, click **OK** and proceed to Step 5. |
| | 5 | Select **File > Exit** in the window menu bar, click **Yes** in the **Confirm Logout** pop–up, and click **OK** in the **Logout Error** pop–up which appears again. |
| | 6 | If further work is to be done in the GUI, restart it. |
| | | **NOTE**<br>• The **Logout** item on the BTS menu bar will only log you out of the displayed BTS.<br>• You can also log out of all BTS sessions and exit LMF by clicking on the **File** selection in the menu bar and selecting **Exit** from the **File** menu list. A **Confirm Logout** pop–up message will appear. |

### Logging Out of a BTS from the CLI Environment

Follow the procedure in Table 6-10 to logout of a BTS when using the CLI environment.

**Table 6-10:** BTS CLI Logout Procedure

| ✓ | Step | Action |
|---|---|---|
| | | **NOTE**<br>If the BTS is also logged into from a GUI running at the same time and further work must be done with it in the GUI, proceed to Step 2. |
| | 1 | Log out of a BTS by entering the following command:<br>**logout bts–<bts#>**<br>A response similar to the following will be displayed:<br>`LMF>`<br>`13:24:51.028 Command Received and Accepted`<br>`COMMAND=logout bts-33`<br>`13:24:51.028 Command In Progress`<br>`13:24:52.04 Command Successfully Completed`<br>`REASON_CODE="No Reason"` |
| | 2 | If desired, close the CLI interface by entering the following command:<br>**exit**<br>A response similar to the following will be displayed before the window closes:<br>`Killing background processes....` |

### Establishing an MMI Communication Session

**Equipment Connection –** Figure 6-8 illustrates common equipment connections for the LMF computer. For specific connection locations on FRUs, refer to the illustration accompanying the procedures which require the MMI communication session.

If the Motorola SLN2006A MMI Interface Kit is not available, an MMI cable can be made, refer to Appendix D for more information.

**Initiate MMI Communication –** For those procedures which require MMI communication between the LMF and BTS FRUs, follow the procedures in Table 6-11 to initiate the communication session.

**Table 6-11:** Establishing MMI Communication

| Step | Action |
|---|---|
| 1 | Connect the LMF computer to the equipment as detailed in the applicable procedure which requires the MMI communication session. Refer to Figure 6-8 or Figure 6-9 using the GLI3 as an example. |
| 2 | If the LMF computer has only one serial port (COM1) and the LMF is running, disconnect the LMF from COM1 by performing the following: |
| 2a | – Click on **Tools** in the LMF window menu bar, and select **Options** from the pull–down menu list.<br>— An **LMF Options** dialog box will appear. |
| 2b | – In the **LMF Options** dialog box, click the **Disconnect Port** button on the **Serial Connection** tab. |
| 3 | Start the named HyperTerminal connection for MMI sessions by double clicking on its *Windows* desktop shortcut.<br>**NOTE**<br>If a *Windows* desktop shortcut was not created for the MMI connection, access the connection from the *Windows* Start menu by selecting:<br>**Programs > Accessories > Hyperterminal > HyperTerminal > <*Named HyperTerminal Connection (e.g., MMI Session)*>** |
| 4 | Once the connection window opens, establish MMI communication with the BTS FRU by pressing the LMF computer **<Enter>**key until the prompt identified in the applicable procedure is obtained. |

**Figure 6-8:** LMF Computer Common MMI Connections – Motorola MMI Interface Kit, SLN2006A

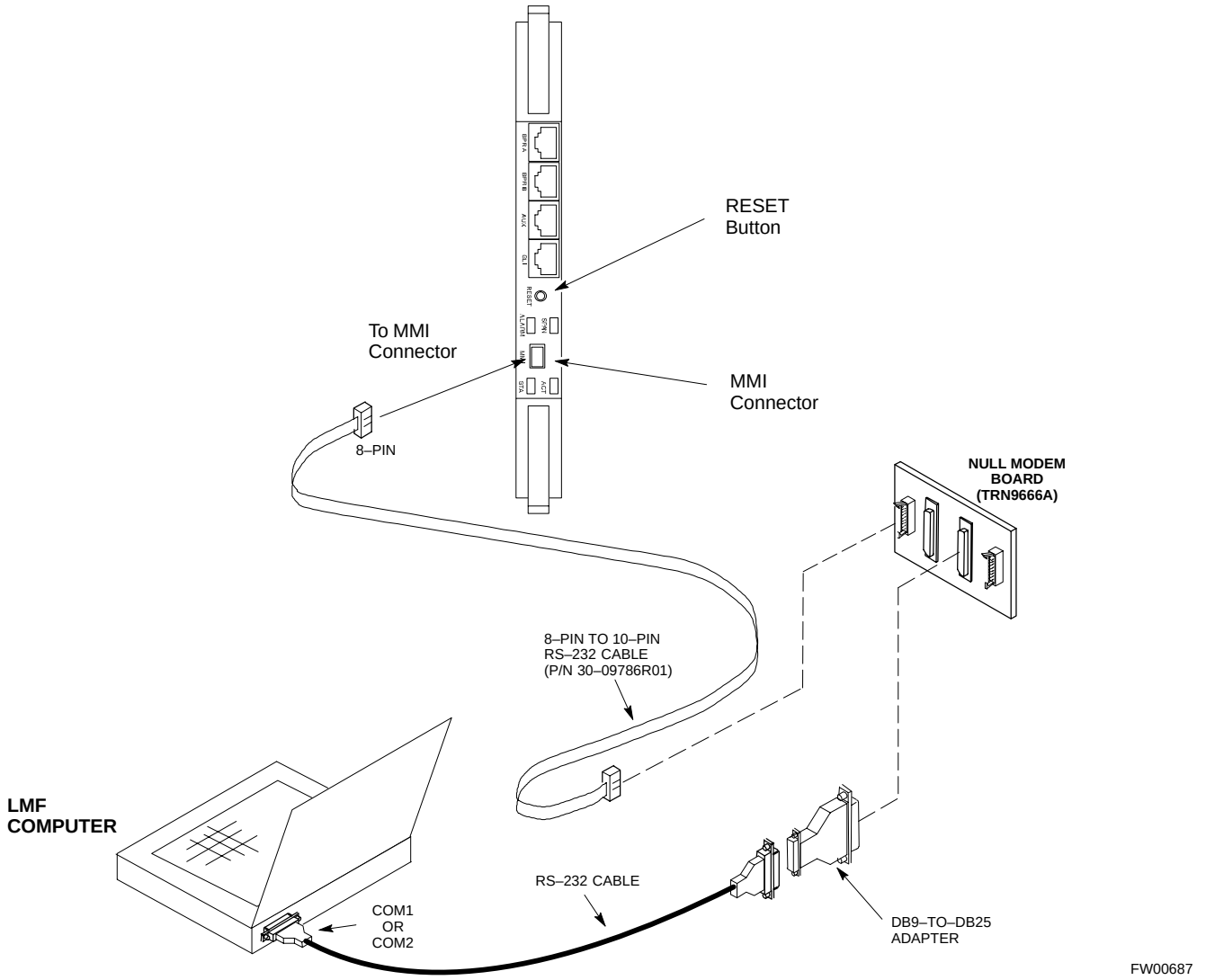
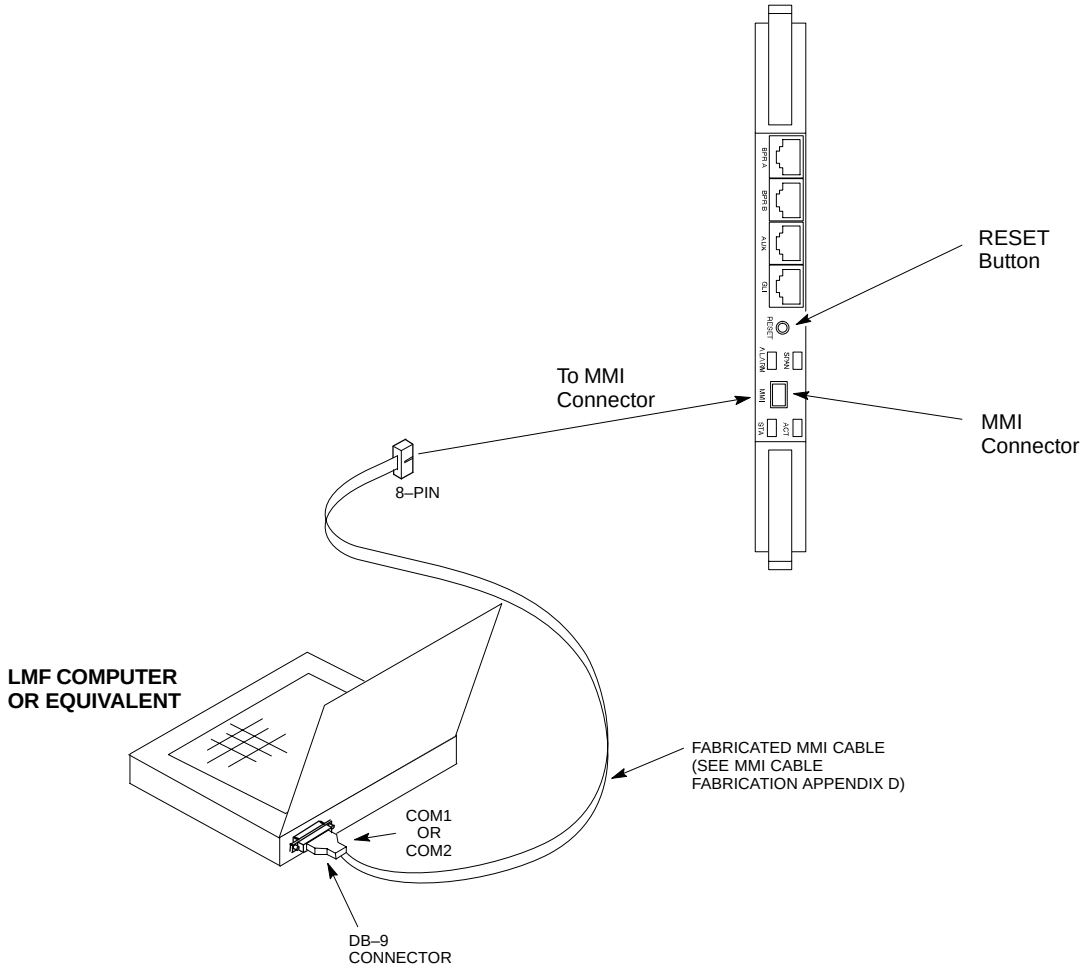


**Figure 6-9:** MMI Connection Detail – Fabricated MMI Cable




### Online Help

Task oriented online help is available in the LMF by clicking on **Help** in the window menu bar, and selecting **LMF Help** from the pull–down menu.

### Pinging the BTS

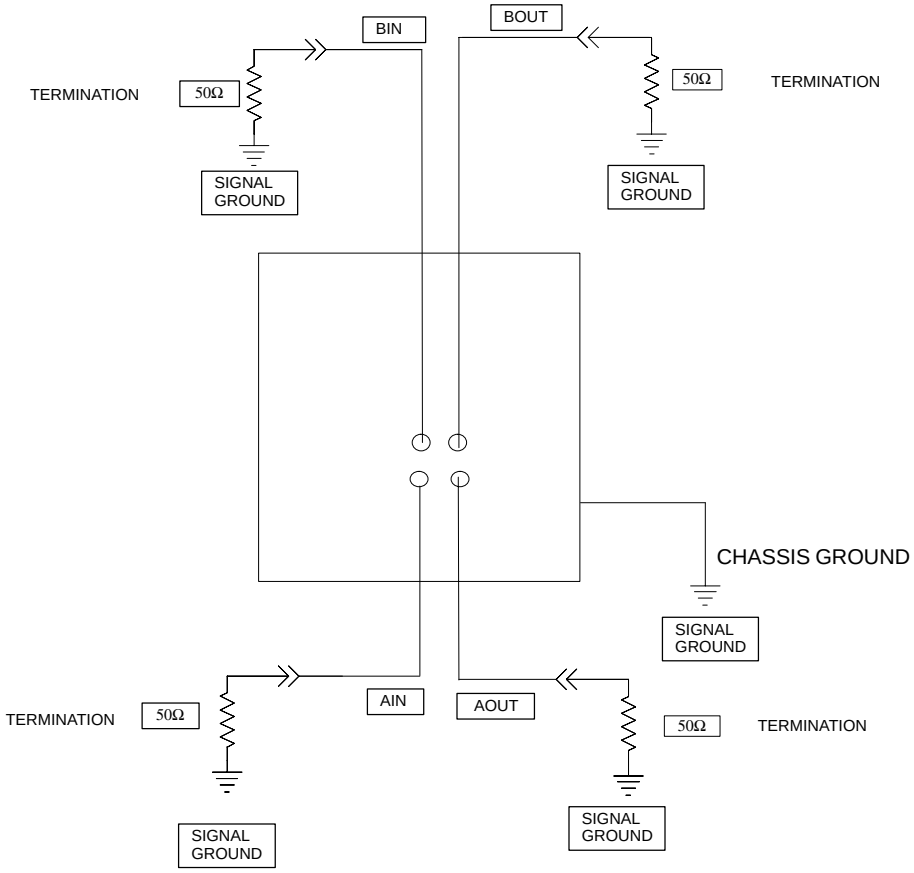
For proper operation, the integrity of the Ethernet LAN A and B links must be verified. Figure 6-10 represents a typical BTS Ethernet configuration. The drawing depicts cabling and termination for both the A and B LANs.

Ping is a program that sends request data packets to hosts on a network, in this case GLI modules on the BTS LAN, to obtain a response from the "target" host specified by an IP address.

Follow the steps in Table 6-12 to ping each processor (on both LAN A and LAN B) and verify LAN redundancy is working properly.

| **CAUTION** | Always wear an approved anti–static wrist strap while handling any circuit card/module to prevent damage by ESD. |
|---|---|

**Figure 6-10:** BTS Ethernet LAN Termination Diagram

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| NOTE | The Ethernet LAN A and B cables and/or terminations must be installed on each frame/enclosure external LAN connector before performing this test. All other processor board LAN connections are made through the backplanes. |
|---|---|

**Table 6-12:** Pinging the Processors

| Step | Action |
|---|---|
| 1 | If this is a *first–time communication* with a newly–installed frame *or* a GLI card which has been replaced, *perform the procedure in* Table 11-3 and then return to step 2. |
| 2 | Be sure any uncabled LAN A and B IN and OUT connectors at the rear of BTS are terminated with 50 Ω loads. |
| 3 | *If it has not already been done*, connect the LMF computer to the BTS. |
| 4 | *If it has not already been done*, start a *GUI* LMF session and log into the BTS ( refer to Table 6-7). |
| 5 | Remove the 50Ω termination on the BTS LAN B IN connector.<br>– The LMF session should remain active. |
| 6 | Replace the 50Ω termination on the BTS LAN B IN connector. |
| 7 | From the *Windows* desktop, click the **Start** button and select **Run**. |
| 8 | In the **Open** box, type **`ping`** and the **GLI IP address** (for example, **`ping 128.0.0.2)`**.<br>**NOTE**<br>128.0.0.2 is the default IP address for the GLI card in slot GLI–1 in field BTS units. |
| 9 | Click on **OK**. |
| 10 | If the targeted module responds, a DOS window will appear with a display similar to the following:<br>`Reply from 128.0.0.2: bytes=32 time=3ms TTL=255`<br>– If the device responds, *proceed to step 18*.<br>If there is no response, the following is displayed:<br>`Request timed out`<br>– If the GLI fails to respond, it should be reset and re–pinged. If it still fails to respond, typical problems would be: failure of the LMF to login, shorted BNC–to–inter-frame cabling, open cables, crossed A and B link cables, or the GLI itself. |
| 11 | Logout of the BTS as described in Table 6-9, exit from the LMF program, and restart the *Windows* operating system on the LMF computer. |
| 12 | Restart the LMF *GUI* program as described in *LMF Help function on–line documentation*, and log into the BTS as described in Table 6-7. |
| 13 | Perform steps 7 through 10 again.<br>– If the device responds, *proceed to step 18*.<br>If there is still no response, *proceed to step 14*. |

. . . continued on next page

| Table 6-12: Pinging the Processors | |
|---|---|
| **Step** | **Action** |
| 14 | If ping was unsuccessful after restarting the LMF computer, press the GLI front panel reset pushbutton and perform steps 7 through 10 again. |
| 15 | After the BTS has been successfully pinged, be sure the 50Ω termination was replaced on the BTS LAN B IN connector at the rear of the BTS. Disconnect the LMF cable from the front LAN A connector, and connect it to front LAN B (right–hand connector). |
| 16 | Remove the 50Ω termination on the BTS LAN A IN connector. |
| 17 | Repeat steps 5 through 9 using LAN B. |
| 18 | After the BTS has been successfully pinged on the secondary LAN, replace the 50Ω termination on the BTS LAN A IN connector. |
| 19 | Disconnect the LMF cable from the LAN B and connect it to LAN A. |
| 20 | Remove and replace the 50Ω termination on the LAN B IN connector to force the GLI to switch to primary LAN A. |
| 21 | Repeat steps 5 through 9 to ensure proper primary LAN operation. |

### Overview

Before a BTS can operate, each equipped device must contain device initialization (ROM) code. ROM code is loaded in all devices during manufacture, factory repair, or, for software upgrades, from the CBSC using the DownLoad Manager (DLM). Device application (RAM) code and data must be downloaded to each equipped device by the user before the BTS can be made fully functional for the site where it is installed.

### ROM Code

Downloading ROM code to BTS devices from the LMF is *NOT routine maintenance or a normal part of the optimization process.* It is only done in unusual situations where the resident ROM code release level in the device is not compatible with the required release level of the site operating software *and* the CBSC can not communicate with the BTS to perform the download.

If you must download ROM code, the procedures are located in **Appendix C.**

Before ROM code can be downloaded from the LMF, the correct ROM code file for each device to be loaded must exist on the LMF computer. ROM code *must be manually selected* for download.

**NOTE**

The ROM code file is not available for GLI3s. GLI3s are ROM code loaded at the factory.

ROM code can be downloaded to a device that is in any state. After the download is started, the device being downloaded will change to OOS_ROM (blue). The device will remain OOS_ROM (blue) when the download is completed. A *compatible revision–level* RAM code must then be downloaded to the device. Compatible code loads for ROM and RAM must be used for the device type to ensure proper performance. The compatible device code release levels for the Base Station System (BSS) software release being used are listed in the Version Matrix section of the SC™ CDMA Release Notes (supplied on the tape or CD–ROM containing the BSS software).

### RAM Code

Before RAM code can be downloaded from the LMF, the correct RAM code file for each device must exist on the LMF computer. RAM code can be automatically or manually selected depending on the **Device** menu item chosen and where the RAM code file for the device is stored in the LMF file structure. The RAM code file will be selected automatically if the file is in the ***<x>*:\<*lmf home directory*>***cdma**loads**n.n.n.n**code* folder (where *n.n.n.n* is the download code version number that matches the “NextLoad” parameter of the CDF file). The RAM code file in the code folder must have the correct hardware bin number for the device to be loaded.

RAM code can be downloaded to a device that is in any state. After the download is started, the device being loaded will change to OOS_ROM (blue). When the download is completed successfully, the device will change to OOS_RAM (yellow).

When code is downloaded to a GLI, the LMF automatically also downloads data and then enables the GLI. When enabled, the GLI will change to INS_ACT (bright green).

For non–GLI devices, data must be downloaded after RAM code is downloaded. To download data, the device state must be OOS_RAM (yellow).

If an MCC–DO card is in use, it can only be loaded using the Local Maintenance Tool (LMT). LMT is software designed specifically for the MCC–DO card. To avoid confusion and duplication of effort, refer to Motorola Lifecycles website at http://www.motorola.com/networkoperators/CDMA–1xEV–DO.htm for further information on LMT or MCC–DO.

The devices to be loaded with RAM code and data are:

- Group Line Interface III (GLI3)
- Clock Synchronization and Alarm card (CSA) (*Only if new revision code must be loaded*)
- Multi–Channel CDMA (MCC–1X) cards
- Broad Band Transceiver (BBX–1X) cards

**NOTE**

The GLI *must* be successfully downloaded with RAM code and data, and in INS_ACT (bright green) status *before* downloading any other device. The RAM code download process for an GLI automatically downloads data and then enables the GLI.

### Verify GLI ROM Code Loads

Devices should not be loaded with a RAM code version which is not compatible with the ROM code with which they are loaded. Before downloading RAM code and data to the processor cards, follow the procedure in Table 6-13 to verify the GLI devices are loaded with the correct ROM code for the software release used by the Base Station System.

#### Prerequisite

Identify the correct GLI ROM code load for the software release being used on the BSS by referring to the Version Matrix section of the SC™ CDMA Release Notes (supplied on the tapes or CD–ROMs containing the BSS software).

**Table 6-13:** Verify GLI ROM Code Loads

| Step | Action |
|---|---|
| 1 | ***If it has not already been done***, start a *GUI* LMF session and log into the BTS ( refer to Table 6-7). |
| 2 | Select all GLI devices by clicking on them, and select **Device > Status** from the BTS menu bar. |
| 3 | In the status report window which opens, note the number in the **ROM Ver** column for each GLI2. |
| 4 | If the ROM code loaded in the GLIs is *not* the correct one for the software release being used on the BSS, perform the following: |
| 4a | – Log out of the BTS as described in Table 6-9 or Table 6-10, as applicable. |
| 4b | – Disconnect the LMF computer. |
| 4c | – Reconnect the span lines as described in Table 8-6. |
| 4d | – Have the CBSC download the correct ROM code version to the BTS devices. |
| 5 | When the GLIs have the correct ROM load for the software release being used, be sure the span lines are disabled as outlined in Table 6-5 and proceed to downloading RAM code and data. |

## Download RAM Code and Data to GLI

### Prerequisites

- Prior to performing these procedures, ensure a code file exists for each of the devices to be loaded.
- The LMF computer is connected to the BTS (refer to Table 6-6), and is logged in using the *GUI* environment (refer to Table 6-7).

### Procedure

Follow the procedure in Table 6-14 to download the firmware application code for GLI. The download code action downloads data and also enables the GLI.

**Table 6-14:** Download and Enable GLI Device

| ✓ | Step | Action |
|---|---|---|
| | 1 | Note the active LAN to which the LMF computer is connected. |
| | 2 | At the rear of the BTS, remove the 50–ohm termination from the LAN OUT connector of the LAN to which the LMF is *not* connected. |
| | 3 | Select **Tools > Update Next Load > CDMA** function to ensure the Next Load parameter is set to the correct code version level. |
| | 4 | Note the LAN IP address in the Network Login section of the LMF Login tab, and verify the Win LMF is logged into the following IP address:<br>– GLI : 128.0.0.2 |
| | 5 | Down load code to the GLI by clicking on the GLI.<br>– From the **Device** pull down menu, select **Download > Code/Data**<br>A status report confirms change in the device status.<br>– Click **OK** to close the status window. (*The GLI should automatically be downloaded with data and enabled.*) |
| | 6 | If the card accepts the download and enables, proceed to step 8. |
| | 7 | If the BTS connection is lost during or after the download process, repeat step 4 and step 5 again. |
| | 8 | Re–install the 50 ohm termination removed from the LAN connector in step 2. |

## Download RAM Code and Data to Non–GLI Devices

Downloads to non–GLI devices can be performed individually for each device or all installed devices can be downloaded with one action.

**NOTE**

CSA devices are RAM code–loaded at the factory. RAM code is downloaded to CSA *only if a newer software version needs to be loaded*.
When downloading to multiple devices, the download may fail for some of the devices (a time–out occurs). These devices can be loaded individually after completing the multiple download.

Follow the steps in Table 6-15 to download RAM code and data to non–GLI devices.

**Table 6-15:** Download RAM Code and Data to Non–GLI Devices

| ✓ | Step | Action |
|---|---|---|
| | 1 | Select the target CSA, MCC, and/or BBX device(s) by clicking on them. |
| | 2 | Click **Device** in the BTS menu bar, and select **Download > Code/Data** in the pull–down menus.<br>– A status report is displayed that shows the results of the download for each selected device. |
| | 3 | Click **OK** to close the status report window when downloading is completed. |
| | | **NOTE**<br>After a BBX, CSA, or MCC device is successfully loaded with RAM code and data have changed to the OOS_RAM state (yellow), the status LED should be rapidly flashing GREEN. |
| | | **NOTE**<br>The command in Step 2 loads both code and data. Data can be downloaded without doing a code download anytime a device is OOS–RAM using the command in Step 4. |
| | 4 | To download just the firmware application data to each device, select the target device and select: **Device>Download>Data** |

## Selecting CSA Clock Source and Enabling CSAs

CSA must be enabled prior to enabling the MCCs. Procedures in the following two sub-sections cover the actions to accomplish this. For additional information on the CSA sub–system, see “Clock Synchronization and Alarm (CSA) in the CSA System Time – GPS & HSO/MSO Verification section of this chapter.

### Select CSA Clock Source

A CSA can have three different clock sources. The CSA Source function can be used to select the clock source for each of the three inputs. This function is only used if the clock source for a CSA needs to be changed. The Clock Source function provides the following clock source options.

- Local GPS
- Remote GPS
- HSO/MSO

### Prerequisites

- GLI is INS_ACT (bright green)
- CSA is OOS_RAM (yellow) or INS_ACT (bright green)

Follow the procedure in Table 6-16 to select a CSA Clock Source.

**Table 6-16:** Select CSA Clock Source

| ✓ | Step | Action |
|---|---|---|
| | 1 | Select the CSA for which the clock source is to be selected. |
| | 2 | Click on **Device** in the BTS menu bar, and select **CSA > Select Clock Source...** in the pull–down menu list.<br>– A CSA clock reference source selection window will appear. |
| | 3 | Select the applicable clock source in the **Clock Reference Source** pick lists. Uncheck the related check boxes for Clock Reference Sources 2 and 3 if you do not want the displayed pick list item to be used. |
| | 4 | Click on the **OK** button.<br>– A status report is displayed showing the results of the operation. |
| | 5 | Click on the **OK** button to close the status report window. |

**NOTE**

For Local GPS (RF–GPS), verify the CSA configured with the GPS receiver "daughter board" is installed in the BTS's CSA slot before continuing.



### Enable CSA

Follow the steps outlined in Table 6-17 to enable the CSA.

**Table 6-17:** Enable CSA

| ✓ | Step | Action |
|---|---|---|
| | 1 | Click on **Device** in the BTS menu bar, and select **Enable** in the pull–down menu list.<br>– A status report is displayed showing the results of the enable operation.<br>– Click **OK** to close the status report window. |
| | | *** IMPORTANT**<br>– The GPS satellite system satellites are not in a geosynchronous orbit and are maintained and operated by the United States Department of Defense (DOD). The DOD periodically alters satellite orbits; therefore, satellite trajectories are subject to change. A GPS receiver that is INS contains an "almanac" that is updated periodically to take these changes into account.<br>– If a GPS receiver has not been updated for a number of weeks, it may take up to an hour for the GPS receiver "almanac" to be updated.<br>– Once updated, the GPS receiver must track at least four satellites and obtain (hold) a 3–D position fix for a minimum of 45 seconds before the CSA will come in service. (In some cases, the GPS receiver needs to track only one satellite, depending on accuracy mode set during the data load). |

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| Table 6-17: Enable CSA | | |
|---|---|---|
| ✓ | **Step** | **Action** |
| | | **NOTE**<br>– After CSA have been successfully enabled, be sure the STA/ALM LED is steady green (alternating green/red indicates the card is in an alarm state). |
| | 2 | If more than an hour has passed without the CSA enabling, refer to the CSA System Time – GPS & HSO/MSO Verification section of this chapter (see Table 6-19, Figure 6-11, and Table 6-20) to determine the cause. |

### Enable MCCs

This procedure configures the MCC and sets the "tx fine adjust" parameter. The "tx fine adjust" parameter is not a transmit gain setting, but a timing adjustment that compensates for the processing delay in the BTS (approximately 3 μS).

Follow the steps in Table 6-18 to enable the MCCs installed in the CCP2 shelf.

**NOTE**

The GLI and primary CSA must be downloaded and enabled (IN–SERVICE ACTIVE), prior to downloading and enabling an MCC.



| Table 6-18: Enable MCCs | | |
|---|---|---|
| ✓ | **Step** | **Action** |
| | 1 | If the GLI/MCC/BBX view is not displayed in the LMF window, click on the GLI/MCC/BBX area of the CCP2 shelf. |
| | 2 | Click on the target MCC(s), or click on **Select** in the BTS menu bar, and select **MCCs** in the pull–down menu list. |
| | 3 | Click on **Device** in the BTS menu bar, and select **Enable** in the pull–down menu list.<br>– A status report is displayed showing the results of the enable operation. |
| | 4 | Click **OK** to close the status report window. |

## Clock Synchronization and Alarm (CSA) Sub–system Description

### Overview

The primary function of the CSA card is to maintain CDMA system time. A GPS receiver provides the primary timing reference for all CDMA BTS's During normal operation, the CSA clocking outputs are phase locked to the GPS receiver timing reference. The CSA supports either an on–board GPS receiver module (RF GPS) or Remote GPS (RGPS) receiver. The RGPS receiver consists of a combined GPS receiver and antenna witha digital interface to the CSA.

### Backup Timing References

Timing signals from the High Stability Oscillator (HSO) or Medium Stability Oscillator (MSO) are used in the event that the primary (GPS) reference should become unavailable. The HSO or MSO clock is calibrated against the GPS timing signal when a valid GPS timing signal is available to provide the longest possible backup timing performance. The CSA continuously monitors each available timing reference and utilizes the most suited reference to maintain system synchronization.

### Timing Source Fault Management

Fault management has the capability of switching between the GPS synchronization source and the HSO/MSO backup source in the event of a GPS receiver failure. During normal operation, the CSA selects GPS as the primary timing source (Table 6-20). The source selection can also be overridden via the WinLMF or by the system software.



## Front Panel LEDs

The status of the LEDs on the CSA boards are as follows:

- Steady Green – CSA locked to GPS.
- Rapidly Flashing Green – Standby CSA locked to GPS.
- Flashing Green/Rapidly Flashing Red – CSA OOS–RAM attempting to lock on GPS signal.
- Rapidly Flashing Green and Red – Alarm condition exists. Trouble Notifications (TNs) are currently being reported to the GLI.

## High Stability Oscillator / Medium Stability Oscillator (HSO/MSO)

### General

#### CSA and HSO/MSO

The CSA utilizes timing signals provided by either an HSO or MSO to maintain BTS synchronization during the absence of valid GPS timing information. WHen a GPS timing signal is available the CSA is responsible for calibration of the HSO or MSO clock to maximize the backup timing interval. A minimum period of 24 hours of operation with a valid GPS reference is required to fully calibrate the HSO backup reference such that a 24 hour backup interval may be provided.

#### HSO

The HSO is a free–running backup oscillator that is capable of providing a minimum backup interval of 24 hours.

#### MSO

The MSO is a free–running backup oscillator that is capable of providing a minimum backup interval of 8 hours.

| NOTE | Allow the **base site and test equipment to warm up for 60 minutes** after any interruption in oscillator power. CSA card warm-up allows the oscillator oven temperature and oscillator frequency to stabilize prior to test. Test equipment warm-up allows the Rubidium standard time base to stabilize in frequency before any measurements are made. |
|---|---|

### CSA Frequency Verification

The objective of this procedure is the initial verification of the Clock Synchronization Alarms (CSA) Module before performing the RF path verification tests.

### Test Equipment Setup (GPS & HSO/MSO Verification)

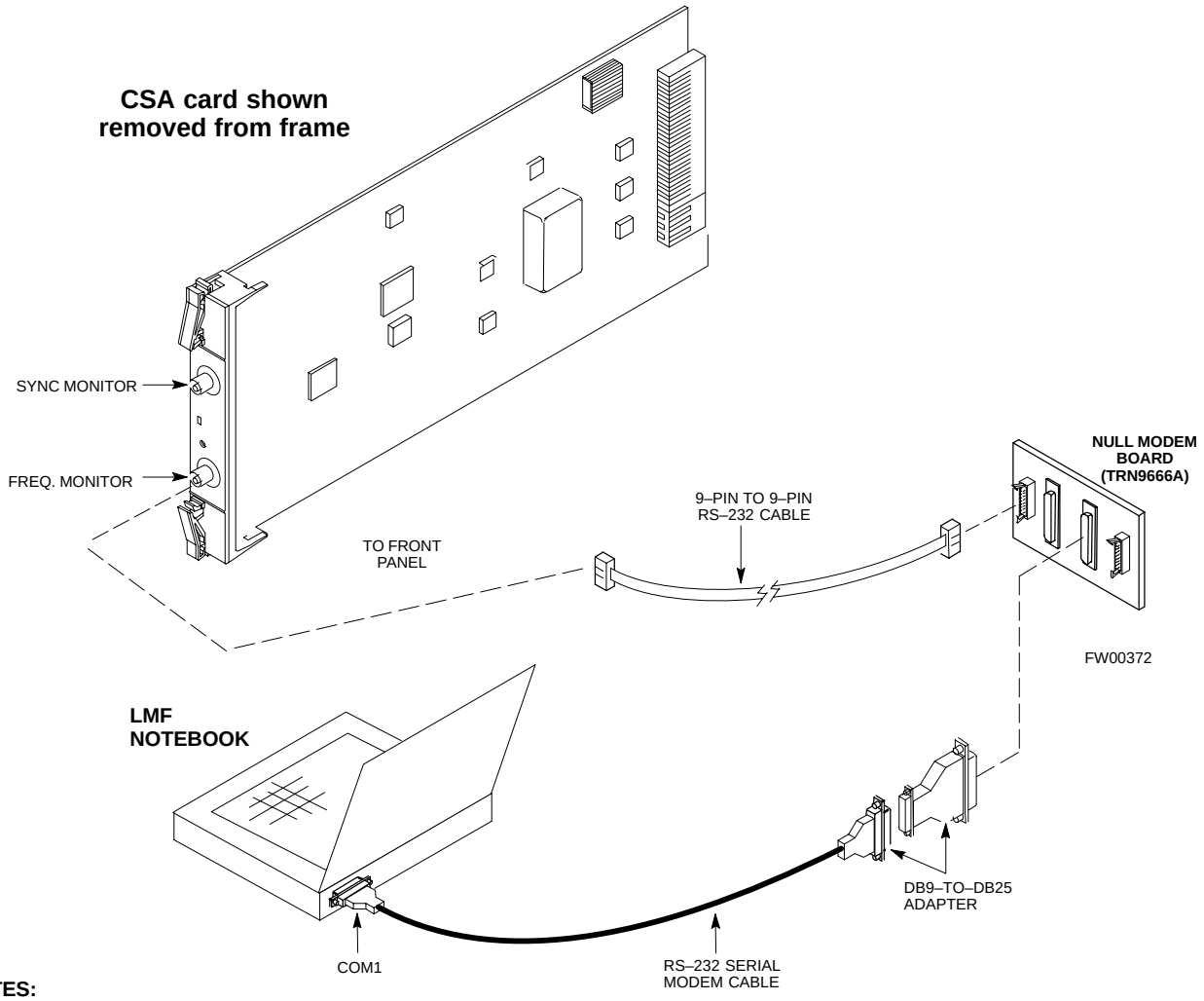
Follow the steps outlined in Table 6-19 to set up test equipment.

**Table 6-19:** Test Equipment Setup (GPS & HSO/MSO Verification)

| Step | Action |
|---|---|
| 1 | Perform one of the following as required by installed equipment: |
| 1a | – Verify a CSA card is installed in the CSA slot, and that the card is INS_ACT (bright green). |
| 2 | Connect a serial cable from the LMF COM 1 port (via null modem card) to the MMI port on the CSA (see Figure 6-11). |
| 3 | Start an MMI communication session with the CSA by using the *Windows* desktop shortcut icon (see Table 6-11) . |
| 4 | When the terminal screen appears press the **Enter** key until the `CSA>` prompt appears. |

**CAUTION** If the RF GPS module is uesd to take care to ensure that the GPS antenna is properly connected to the GPS antenna connector within the power entry compartment only. Damage to the GPS antenna and/or GPS receiver can result if the GPS antenna is inadvertently connected to any other RF connector.

**Figure 6-11:** CSA MMI Terminal Connection




**NOTES:**
1. One LED on each CSA:
   Green = IN–SERVICE ACTIVE
   Fast Flashing Green = OOS–RAM
   Red = Fault Condition
   Flashing Green & Red = Fault

## GPS Initialization/Verification

### Prerequisites

Ensure the following prerequisites have been met before proceeding:

- The CSA and HSO/MSO (if equipped) has been warmed up for at least 15 minutes.
- The LMF computer is connected to the MMI port of the CSA as shown in Figure 6-11.
- An MMI communication session has been started (Table 6-11), and the `CSA>` prompt is present in the HyperTerminal window (Table 6-19).

Follow the steps outlined in Table 6-20 to initialize and verify proper GPS receiver functioning.

**Table 6-20:** GPS Initialization/Verification

| Step | Action |
|---|---|
| 1 | To verify that `Clock alarms (0000), Dpll is locked and has a reference source`, and `GPS self test passed` messages are displayed within the report, issue the following MMI command<br>**bstatus**<br>– The system will display a response similar to the following:<br>`Clock Alarms (0000):`<br>`DPLL is locked and has a reference source.`<br>`GPS receiver self test result: passed`<br>`Time since reset 0:33:11, time since power on: 0:33:11` |
| 2 | Enter the following command at the `CSA>` prompt to display the current status of the GPS receiver and HSO or MSO backup reference:<br>**sources**<br>– When equipped with HSO, the system will generate a response similar to the following:<br>`N Source Name Type TO Good Status Last Phase Target Phase Valid`<br>`0 LocalGPS Primary 4 YES Good 0 0 Yes`<br>`1 HSO Backup 4 YES Good -2013177 -2013177 Yes`<br>`2 Not Used`<br>***NOTE** "Timed–out" should only be displayed while the HSO is warming up. If the HSO does not appear as one of the sources, then configure the HSO as a back–up source by entering the following command at the CSA> prompt:<br>**ss 1 12**<br>The HSO or MSO must complete an initial warmup and calibration cycle before being usable as a backup reference source. The intial warmup cycle should be completed in less than 15 minutes. During the warmup cycle, the HSO clock output is disabled and indicated as being "timed out" in the following response to the "sources command:<br>43:26:15 CSA>sources<br>43:26:35<br>43:26:35 N Source Name Type TO Good Status Last Phase Target Phase Valid<br>43:26:35<br>43:26:35 0 Local GPS Primary 59 Yes Good 0 0 Yes<br>43:26:35 1 HSO Backup –25 No Bad timed out unknown No<br>43:26:35 2 Not Used<br>43:26:35 Current reference source number: 0<br>See 2–Cont. |

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**Table 6-20:** GPS Initialization/Verification

| Step | Action |
|---|---|
| 2–Cont | At the completion of the HSO warmup cycle, the HSO clcok output is enabled allowing califd clock pulses to be detected by the CSA. An integer value should then be displayed in the HSO "Last Phase" entry of the "sources" command as show below. If the HSO or MSO calibration cycle is not completed within 2 hours it will be necessary to inspect the HSO or MSO hardware.<br>43:29:33 CSA>sources<br>43:29:43<br>43:29:43 N Source Name Type TO Good Status Last Phase Target Phase Valid<br>43:29:43 ———————————————————————————————<br>43:29:43 0 Local GPS Primary 59 Yes Good 0 0 Yes<br>43:29:43 1 HSO Backup 3 Yes Bad –xxxxxx –xxxxxx No<br>43:29:43 2 Not Used<br>43:29:43 Current reference source number: 0<br>The HSO or MSO calibration cycle can take as long as 2 hours to complete. The completion of the HSO or MSO calibration is indicated by a "yes" value in the valid column of the "sources" command response as shown below. If the HSO or MSO calibration cycle is not complete within 2 hours it will be necessary to inspect the HSO or MSO hardware.<br>26:09:33 CSA>sources<br>26:09:35<br>26:09:35 N Source Name Type TO Good Status Last Phase Target Phase Valid<br>26:09:35 ———————————————————————————————<br>26:09:35 0 Local GPS Primary 59 Yes Good 0 0 Yes<br>26:09:35 1 HSO Backup 3 Yes Bad 8683466 8683466 Yes<br>26:09:35 2 Not Used<br>26:09:35 Current reference source number: 0 |
| 3 | HSO information (underlined text above, verified from left to right) is usually the #1 reference source. If this is not the case, have the *OMC–R* determine the correct BTS timing source has been identified in the database by entering the **display bts csmgen** command and correct as required using the **edit csm csmgen refsrc** command.<br>**NOTE**<br>If any of the above areas fail, verify:<br>– Verify that HSO had been powered up for at least 15 minutes.<br>– If "timed out" is displayed in the Last Phase column, suspect the HSO output buffer or oscillator is defective<br>– Verify the HSO is FULLY SEATED and LOCKED. |
| 4 | Verify the following GPS information (underlined text above):<br>– GPS information is usually the 0 reference source.<br>– At least one Primary source must indicate "Status = good" and "Valid = yes" to bring site up. |

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**Table 6-20:** GPS Initialization/Verification

| Step | Action |
|---|---|
| 5 | Enter the following command at the CSA> prompt to verify that the GPS receiver is in tracking mode.<br>**gstatus**<br>– Observe the following typical response:<br>27:27:11 CSA>gstatus<br>27:27:14 GPS Receiver Control Task State: tracking satellites.<br>27:27:14 Time since last valid fix: 0 seconds<br>27:27:14 Frame type (0): master<br>27:27:14<br>27:27:14 Recent Change Data:<br>27:27:14 GPS time offset 0 ns.<br>27:27:14 Initial position: lat 151679000 msec, lon: –316798000 msec, height 0 cm (GPS)<br>27:27:14 Initial position accuracy (0): estimated.<br>27:27:14<br>27:27:14 GPS Receiver Status<br>27:27:14 Position hold: lat 151679326 msec, lon: –316798498 msec, hgt 21955 cm<br>27:27:14 Current position: lat 151679326 msec, lon: –316798498 msec, hgt 21955 cm (GPS)<br>27:27:14 8 satellites tracked, receiving 8 satellites, 8 satellites visible.<br>27:27:14 Current Dilution of Precision (PDOP or HDOP): 0<br>27:27:14 Date & Time: 2004:03:16:21:37:48 LS:13<br>27:27:14 GPS Receiver Status Byte:0x8400<br>27:27:14 Chan:0, SVID: 24, Mode: 8, RSSI: 42, Status: 0x08a1<br>27:27:14 Chan:1, SVID: 10, Mode: 8, RSSI: 49, Status: 0x08a0<br>27:27:14 Chan:2, SVID: --, Mode: –, RSSI: ---, Status: 0x0000<br>27:27:14 Chan:3, SVID: 21, Mode: 8, RSSI: 48, Status: 0x08a1<br>27:27:14 Chan:4, SVID: 26, Mode: 8, RSSI: 50, Status: 0x08a0<br>27:27:14 Chan:5, SVID: 29, Mode: 8, RSSI: 48, Status: 0x08a0<br>27:27:14 Chan:6, SVID: 18, Mode: 8, RSSI: 42, Status: 0x08a0<br>27:27:14 Chan:7, SVID: 17, Mode: 8, RSSI: 50, Status: 0x08a0<br>27:27:14 Chan:8, SVID: 6, Mode: 8, RSSI: 49, Status: 0x08a0<br>27:27:14 Chan:9, SVID: --, Mode: –, RSSI: ---, Status: 0x0000<br>27:27:14 Chan:10, SVID: --, Mode: –, RSSI: ---, Status: 0x0000<br>27:27:14 Chan:11, SVID: --, Mode: –, RSSI: ---, Status: 0x0000<br>27:27:14 |
| 6 | **Verify** the following GPS information (shown above in underlined text):<br>– At least 4 satellites are tracked, and 4 satellites are visible.<br>– GPS Receiver Control Task State is “tracking satellites”. ***Do not continue until this occurs!***<br>– Dilution of Precision indication is not more that 30.<br>**Record** the current position base site latitude, longitude, height and height reference (height reference to Mean Sea Level (MSL) or GPS height (GPS). (GPS = 0 MSL = 1). |

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**Table 6-20:** GPS Initialization/Verification

| Step | Action |
|---|---|
| 7 | **If steps 1 through 6 pass, the GPS is good.** |
| | **NOTE**<br>If any of the above mentioned areas fail, verify that:<br>– If *Initial position accuracy* is "estimated" (typical), at least 4 satellites must be tracked and visible (1 satellite must be tracked and visible if actual lat, log, and height data for this site has been entered into CDF file).<br>– If *Initial position accuracy* is "surveyed," position data must be of sufficient accuracy or improper GPS receiver timing may occur.<br>– The GPS antenna is not obstructed or misaligned.<br>– GPS antenna connector center conductor measureS approximately +5 Vdc with respect to the shield.<br>– There is no more than 15 dB of loss between the GPS antenna OSX connector and the BTS frame GPS input.<br>– Any lightning protection installed between GPS antenna and BTS frame is installed correctly. |
| 8 | Enter the following commands at the CSA> prompt to verify that the CSA is warmed up and that GPS acquisition has taken place.<br>**debug dpllp**<br>Observe the following typical response if the CSA is not warmed up (15 minutes from application of power) ***(If warmed–up proceed to step 9)***<br>`CSA>DPLL Task Wait. 884 seconds left.`<br>`DPLL Task Wait. 882 seconds left.`<br>`DPLL Task Wait. 880 seconds left. ..........etc.` |
| | **NOTE**<br>The **warm** command can be issued at the MMI port used to force the CSA into warm–up, but the reference oscillator will be unstable. |
| 9 | Observe the following typical response if the CSA is warmed up.<br>`c:17486 off: -11, 3, 6 TK SRC:0 S0: 3 S1:-2013175,-2013175`<br>`c:17486 off: -11, 3, 6 TK SRC:0 S0: 3 S1:-2013175,-2013175`<br>`c:17470 off: -11, 1, 6 TK SRC:0 S0: 1 S1:-2013175,-2013175`<br>`c:17486 off: -11, 3, 6 TK SRC:0 S0: 3 S1:-2013175,-2013175`<br>`c:17470 off: -11, 1, 6 TK SRC:0 S0: 1 S1:-2013175,-2013175`<br>`c:17470 off: -11, 1, 6 TK SRC:0 S0: 1 S1:-2013175,-2013175` |
| 10 | Verify the following GPS information (underlined text above, from left to right):<br>– Lower limit offset from tracked source variable is not less than –60 (equates to 3µs limit).<br>– Upper limit offset from tracked source variable is not more than +60 (equates to 3µs limit).<br>– TK SRC: 0 is selected, where SRC 0 = GPS. |
| 11 | Enter the following commands at the CSA> prompt to exit the debug mode display.<br>**debug dpllp** |

## Connecting Test Equipment to the BTS

The following types of test equipment are required to perform calibration and ATP tests:

- WinLMF
- Communications system analyzer model supported by the WinLMF
- Power meter model supported by the WinLMF (required when using the HP 8921A/600 and Advantest R3465 analyzers)
- Non–radiating transmit line termination load
- Directional coupler and in–line attenuator
- RF cables and adapters

Refer to Table 6-21 for an overview of connections for test equipment currently supported by the WinLMF. In addition, see the following figures:

- Figure 6-15, Figure 6-17, and Figure 6-18 show the test set connections for TX calibration
- Figure 6-19 through Figure 6-22 show the test set connections for optimization/ATP tests

## Test Equipment GPIB Address Settings

All test equipment is controlled by the WinLMF through an IEEE–488/GPIB bus. To communicate on the bus, each piece of test equipment must have a GPIB address set which the WinLMF will recognize. The standard address settings used by the WinLMF for the various types of test equipment items are as follows:

- Signal generator address: **1**
- Power meter address: **13**
- Communications system analyzer: **18**

Using the procedures included in the Verifying and Setting GPIB Addresses section of Appendix B, verify and, if necessary, change the GPIB address of each piece of employed test equipment to match the applicable addresses above



## Supported Test Equipment

| | |
|---|---|
| **CAUTION** | To prevent damage to the test equipment in high power configurations, all transmit (TX) test connections must be through a 30 dB directional coupler *plus* a 20 dB in-line attenuator for the 800 MHz BTSs.<br>Attenuators are not required for low power configurations. |

### IS–95A/B Operation

Optimization and ATP testing for IS–95A/B sites or carriers may be performed using the following test equipment:

- CyberTest (High Power Configurations only)
- Advantest R3267 spectrum analyzer with R3562 signal generator
- Advantest R3465 spectrum analyzer with R3561L signal generator and HP–437B or Gigatronics Power Meter
- Agilent E4406A transmitter test set with E4432B signal generator
- Agilent 8935 series E6380A communications test set (formerly HP 8935)
- Hewlett–Packard HP 8921 (with CDMA interface and, for 1.9 GHz, PCS Interface) and HP–437B or Gigatronics Power Meter
- Spectrum Analyzer (HP8594E) – *optional*
- Rubidium Standard Timebase – *optional*

### CDMA2000 1X Operation

Optimization and ATP testing for CDMA2000 1X sites or carriers may be performed using the following test equipment:

- Advantest R3267 spectrum analyzer with R3562 signal generator
- Agilent E4406A transmitter test set with E4432B signal generator
- Agilent 8935 series E6380A communications test set (formerly HP 8935) with option 200 or R2K and with E4432B signal generator for 1X FER
- Agilent E7495A communications test set

## Test Equipment Preparation



See Appendix B for specific steps to prepare each type of test set and power meter to perform calibration and ATP.

Agilent E7495A communications test set requires additional setup and preparation. This is described in detail in Appendix B.

## Test Equipment Connection Charts

To use the following charts to identify necessary test equipment connections, locate the communications system analyzer being used in the **COMMUNICATIONS SYSTEM ANALYZER** columns, and read down the column. Where a dot appears in the column, connect one end of the test cable to that connector. Follow the horizontal line to locate the end connection(s), reading up the column to identify the appropriate equipment and/or BTS connector.

### IS–95A/B–only Test Equipment Connections

Table 6-21 depicts the interconnection requirements for currently available test equipment *supporting IS–95A/B only* which meets Motorola standards and is supported by the WinLMF.

**Table 6-21:** IS–95A/B–only Test Equipment Interconnection

| | COMMUNICATIONS SYSTEM ANALYZER | | | | ADDITIONAL TEST EQUIPMENT | | | | |
|---|---|---|---|---|---|---|---|---|---|
| *SIGNAL* | Cyber–Test | Advantest R3465 | HP 8921A | HP 8921 W/PCS | Power Meter | GPIB Interface | WinLMF | Attenuator & Directional Coupler | BTS |
| EVEN SECOND SYNCHRONIZATION | EVEN SEC REF | EVEN SEC SYNC IN | EVEN SECOND SYNC IN | EVEN SECOND SYNC IN | | | | | SYNC MON-ITOR |
| 19.6608 MHZ CLOCK | TIME BASE IN | CDMA TIME BASE IN | CDMA TIME BASE IN | CDMA TIME BASE IN | | | | | FREQ MON-ITOR |
| CONTROL IEEE 488 BUS | IEEE 488 | GPIB | HP–IB | HP–IB | HP–IB | GPIB | SERIAL PORT | | |
| TX TEST CABLES | RF IN/OUT | INPUT 50Ω | RF IN/OUT | RF IN/OUT | | | | 20 DB ATTEN. BTS PORT | TX1–6 |
| RX TEST CABLES | RF GEN OUT | RF OUT 50Ω | DUPLEX OUT | RF OUT ONLY | | | | | RX1–6 |

### CDMA2000 1X/IS–95A/B–capable Test Equipment Connections

Table 6-22 depicts the interconnection requirements for currently available test equipment supporting *both* CDMA 2000 1X *and* IS–95A/B which meets Motorola standards and is supported by the WinLMF.

**Table 6-22:** CDMA2000 1X/IS–95A/B Test Equipment Interconnection

| | COMMUNICATIONS SYSTEM ANALYZER | | | | ADDITIONAL TEST EQUIPMENT | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| *SIGNAL* | Agilent 8935 (Option 200 or R2K) | Agilent E7495A | Advantest R3267 | Agilent E4406A | Agilent E4432B Signal Generator | Advantest R3562 Signal Generator | Power Meter | GPIB Interface | WinLMF | 30 dB Directional Coupler & 20 dB Pad* | BTS |
| EVEN SECOND SYNCHRONIZATION | EXT TRIG IN | EVEN SECOND SYNC IN | EXT TRIG | TRIGGER IN | PATTERN TRIG IN | EVEN SECOND SYNC IN | | | | | SYNC MONITOR |
| 19.6608 MHZ CLOCK | MOD TIME BASE IN | | | EXT REF IN | | EXT REF IN | | | | | FREQ MONITOR |
| CONTROL IEEE 488 BUS | IEEE 488 | | GPIB | HP–IB | GPIB | HP–IB | HP–IB | GPIB | SERIAL PORT | | |
| 10 MHZ | 10 MHZ IN | | 10 MHZ OUT | 10 MHZ OUT (SWITCHED) | 10 MHZ IN | SYNTHE REF IN | | | | | |
| SIGNAL SOURCE CONTROLLED SERIAL I/O | | | SERIAL I/O | | | SERIAL I/O | | | | | |
| TX TEST CABLES | RF IN/OUT | PORT 2 RF IN | RF IN | RF INPUT 50 OHM | RF OUTPUT 50 OHM | RF IN/OUT | | | | 30 DB COUPLER AND 20 DB PAD | TX1–6 |
| RX TEST CABLES | DUPLEX OUT * | PORT 1 RF OUT | RF OUT 50–OHM | RF OUT ONLY | RF OUTPUT 50–OHM | RF OUT 50 OHM | | | | | RX1–6 |

* WHEN USED ALONE, THE AGILENT 8935 WITH OPTION 200 OR R2K SUPPORTS IS–95A/B RX TESTING BUT NOT CDMA2000 1X RX TESTING.

### Equipment Warm-up

**IMPORTANT**

Warm-up *BTS equipment for a minimum of 60 minutes* prior to performing the BTS optimization procedure. This assures BTS stability and contributes to optimization accuracy.

- Agilent E7495A for a minimum of 30 minutes
- All other test sets for a minimum of 60 minutes
- Time spent running initial or normal power-up, hardware/firmware audit, and BTS download counts as warm-up time.

**WARNING**

Before installing any test equipment directly to any BTS **TX OUT** connector, verify there are *no* CDMA channels keyed.

- At active sites, have the OMC-R/CBSC place the antenna (sector) assigned to the BBX under test OOS. Failure to do so can result in serious personal injury and/or equipment damage.

### Automatic Cable Calibration Set–up

Figure 6-21 and Figure 6-22 show the cable calibration setup for the test sets supported by the WinLMF. The left side of the diagram depicts the location of the input and output connectors of each test equipment item, and the right side details the connections for each test. Table 6-24 provides a procedure for performing automatic cable calibration.

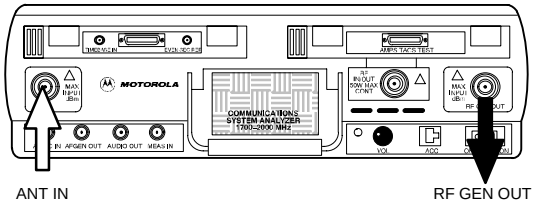
### Manual Cable Calibration

If manual cable calibration is required, refer to the procedures in Appendix B.

**Figure 6-12:** IS–95A/B and CDMA 2000 1X Cable Calibration Test Setup – Agilent E4406A/E4432B and Advantest R3267/R3562

**SUPPORTED TEST SETS**

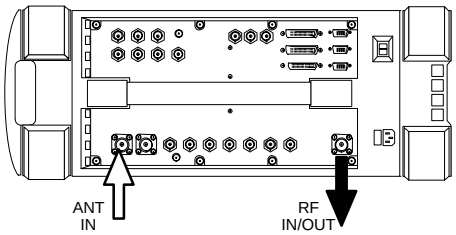
**Motorola CyberTest**



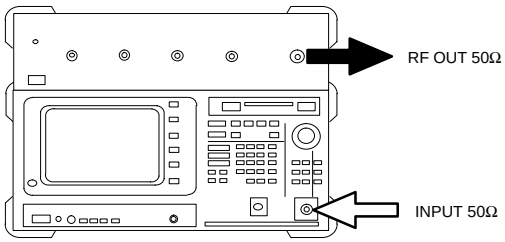

**Note:** The 30 dB directional coupler is not used with the Cybertest test set. The TX cable is connected directly to the Cybertest test set.

A 10dB attenuator must be used with the short test cable for cable calibration with the CyberTest test set. The 10dB attenuator is used only for the cable calibration procedure, not with the test cables for TX calibration and ATP tests.

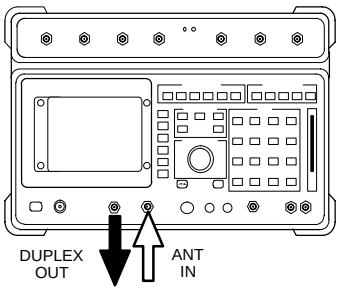
**Agilent 8935 Series E6380A (formerly HP 8935)**




**Advantest Model R3465**



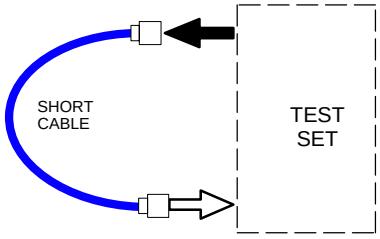

**Hewlett Packard Model HP 8921A**



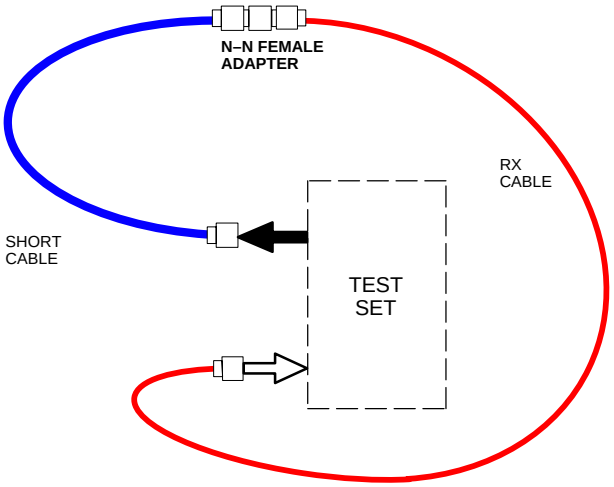

**Note:** For 800 MHZ only. The HP8921A cannot be used to calibrate cables for PCS frequencies.

**CALIBRATION SET UP**

**A. SHORT CABLE CAL**




**B. RX TEST CAL SETUP**




**C. TX TEST AND RX TEST CAL SETUP**

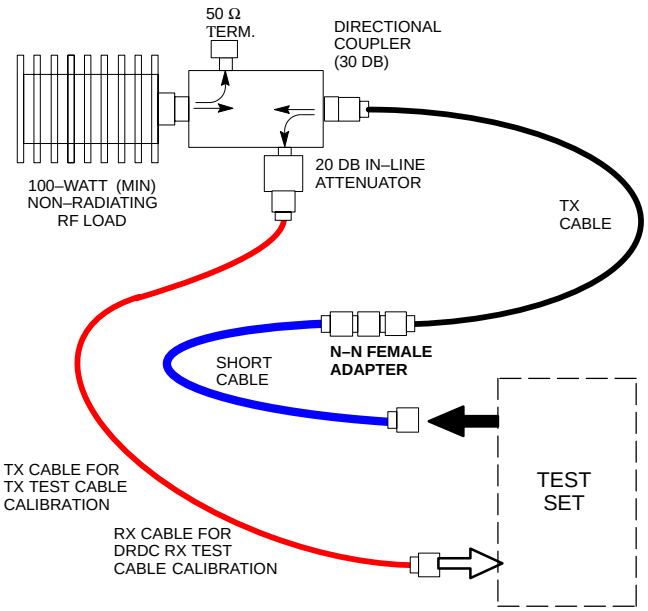



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**Figure 6-13:** CDMA2000 1X Cable Calibration Test Setup – Agilent E7495A

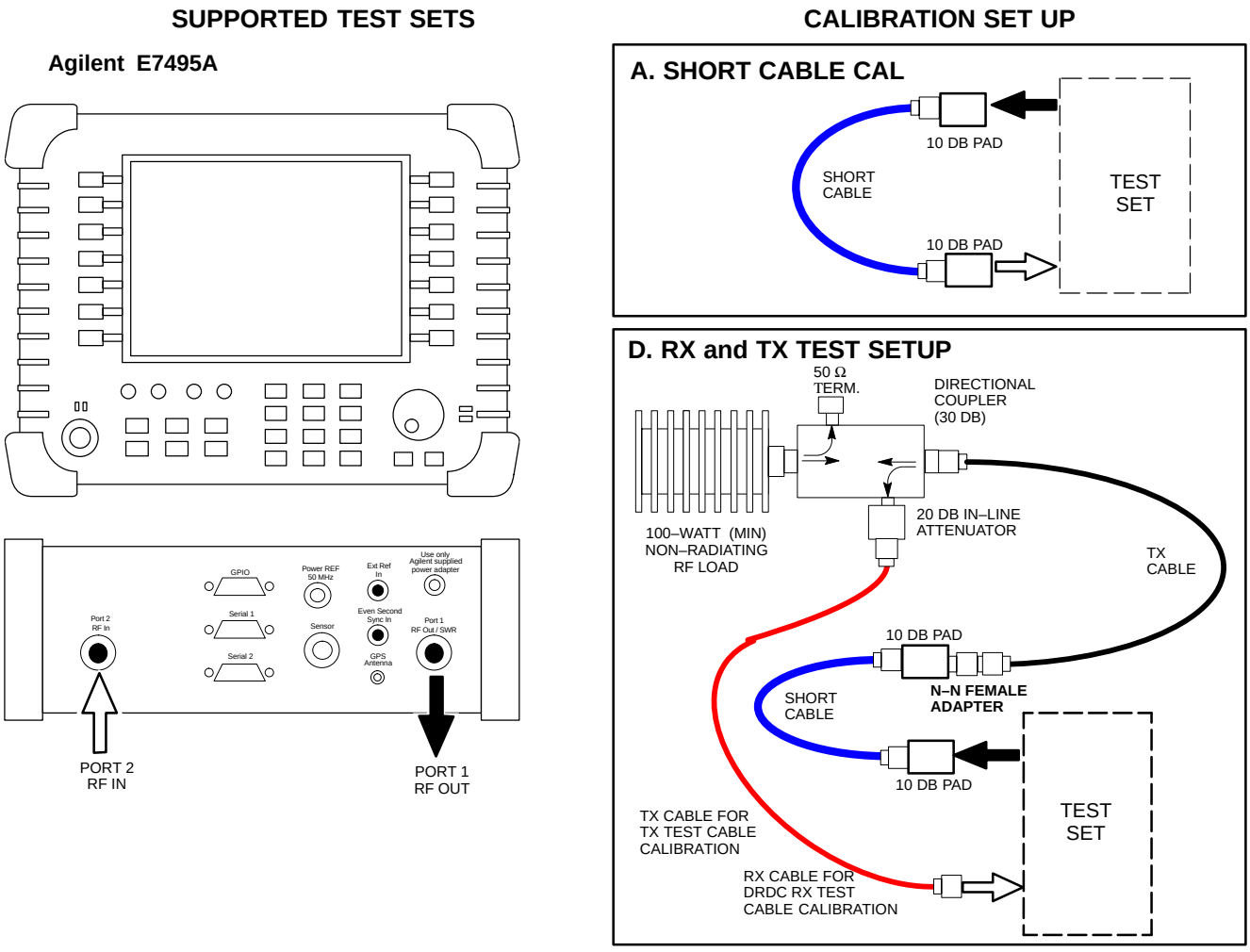
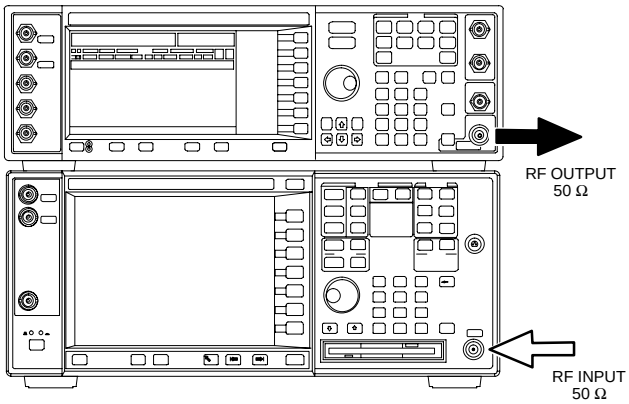


**Figure 6-14:** IS–95A/B and CDMA 2000 1X Cable Calibration Test Setup – Agilent E4406A/E4432B and Advantest R3267/R3562

## SUPPORTED TEST SETS

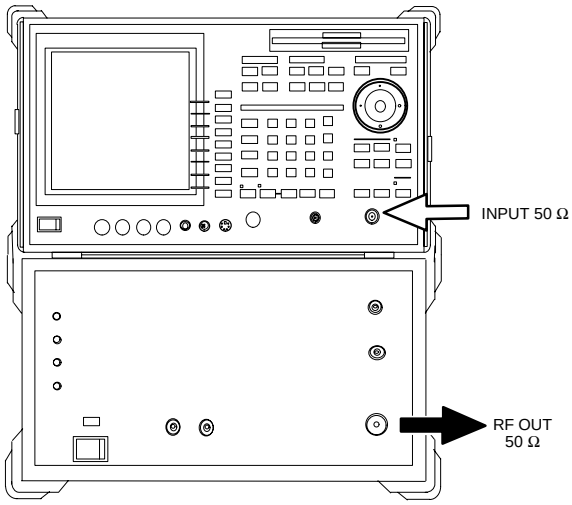
**Agilent E4432B (Top) and E4406A (Bottom)**




**NOTE:**

**10 MHZ IN** ON REAR OF SIGNAL GENERATOR IS CONNECTED TO **10 MHZ OUT (SWITCHED)** ON REAR OF TRANSMITTER TESTER (FIGURE B-18).

**Advantest R3267 (Top) and R3562 (Bottom)**

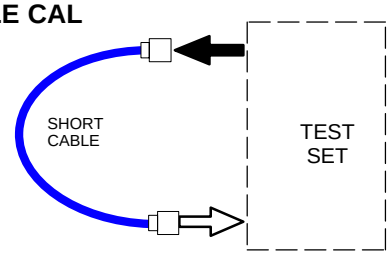



**NOTE:**

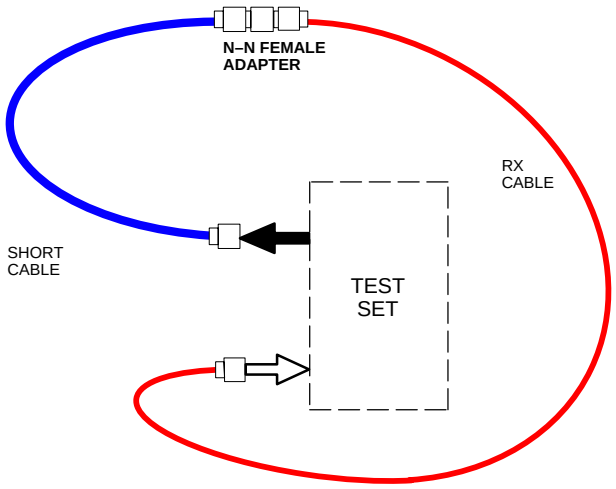
**SYNTHE REF IN** ON REAR OF SIGNAL GENERATOR IS CONNECTED TO **10 MHZ OUT** ON REAR OF SPECTRUM ANALYZER

## CALIBRATION SET UP

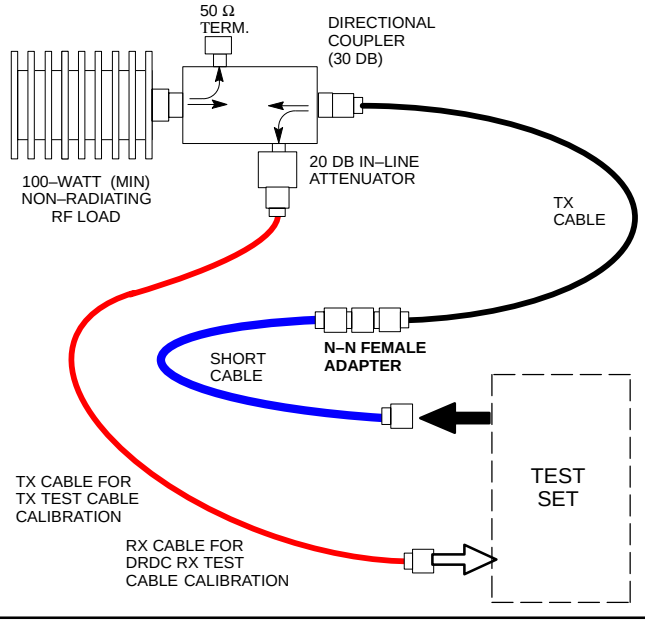
### A. SHORT CABLE CAL




### B. RX TEST SETUP




### D. TX TEST SETUP AND RX TEST SETUP



### Set-up for TX Calibration

Figure 6-15 and Figure 6-17 show the test set connections for TX calibration.

**Figure 6-15:** TX Calibration Test Setup – CyberTest (IS–95A/B) and Agilent 8935 (IS–95A/B and CDMA2000 1X)

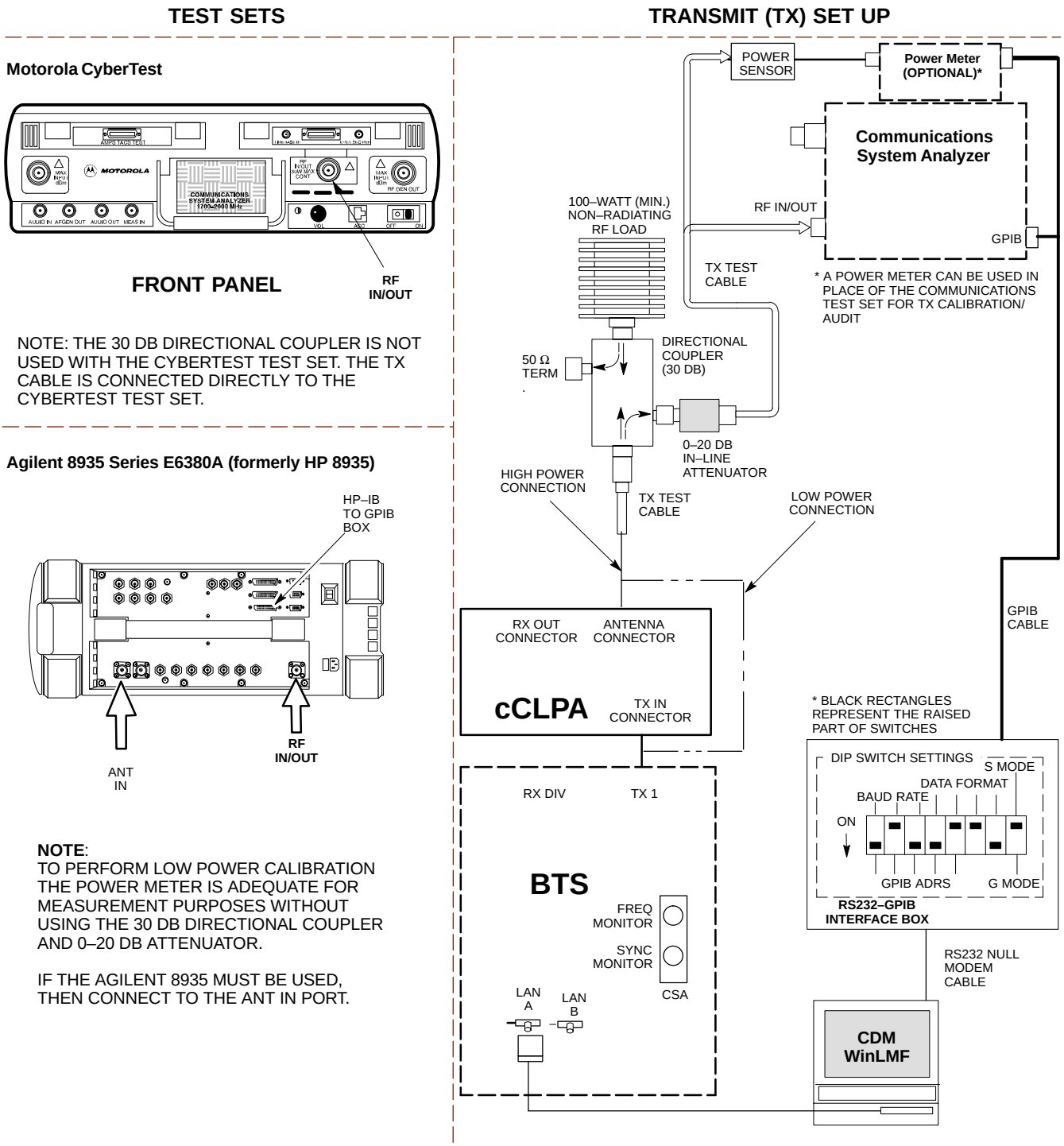


**Figure 6-16:** TX Calibration Test Setup – Agilent E7495A (IS–95A/B and CDMA2000 1X)

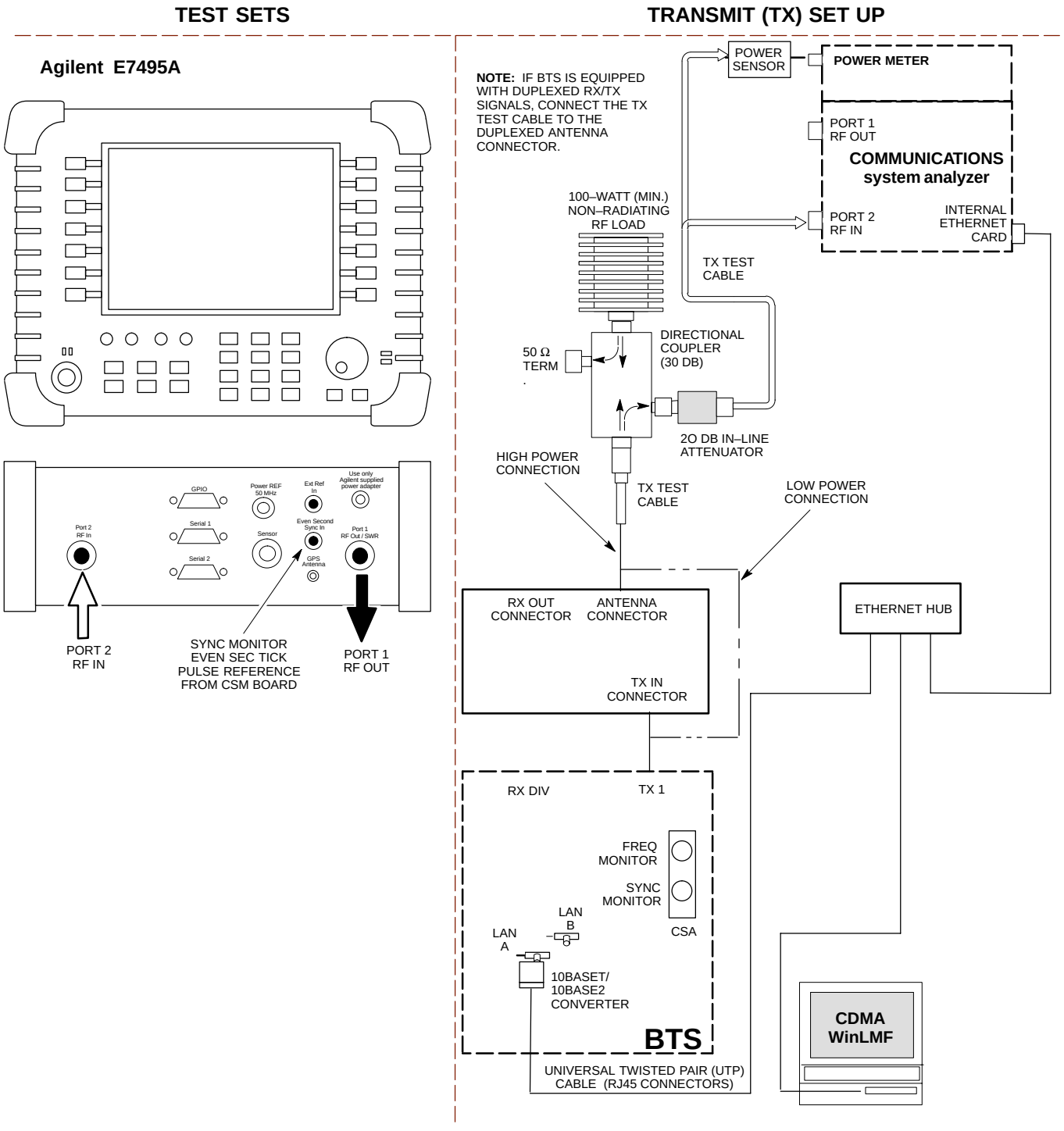


**Figure 6-17:** TX Calibration Test Setup – Using Power Meter

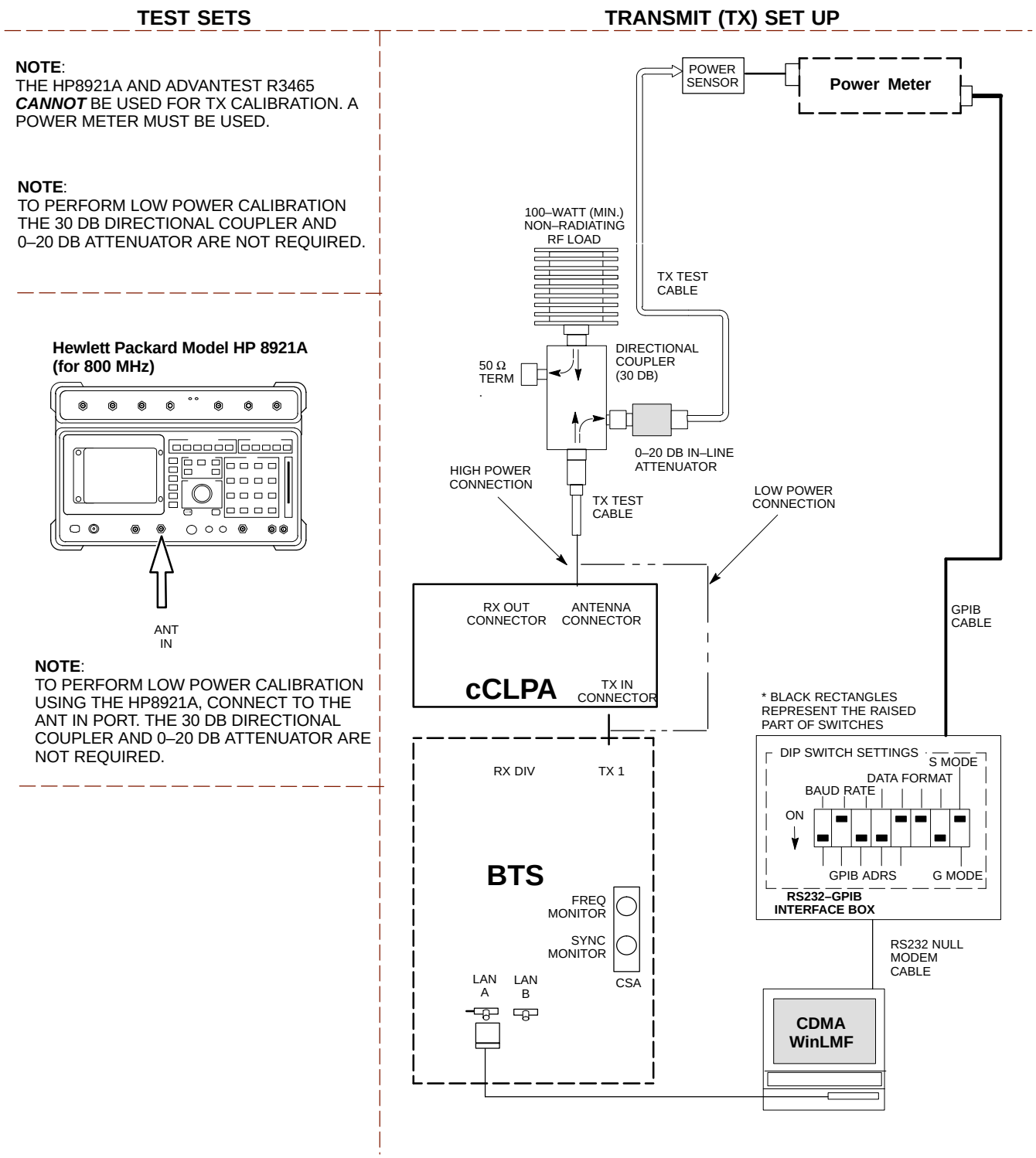
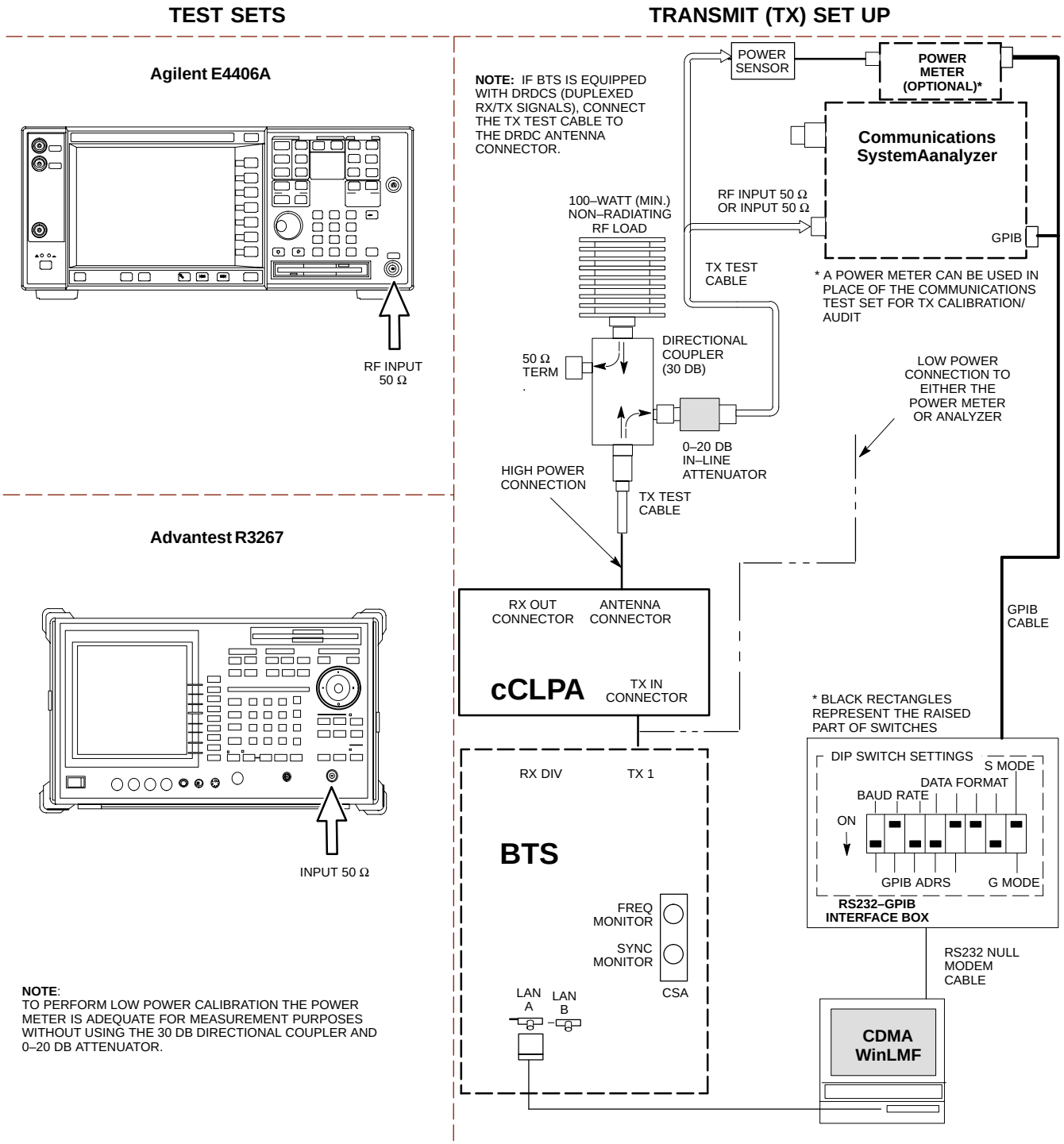


**Figure 6-18:** TX Calibration Test Setup –
Agilent E4406A and Advantest R3567 (IS–95A/B and CDMA2000 1X)



### Set–up for ATP

Figure 6-19 and Figure 6-20 show the test set connections for ATP tests.

**Figure 6-19:** IS–95A/B ATP Test Set–up– CyberTest, Advantest R3465, and Agilent 8935

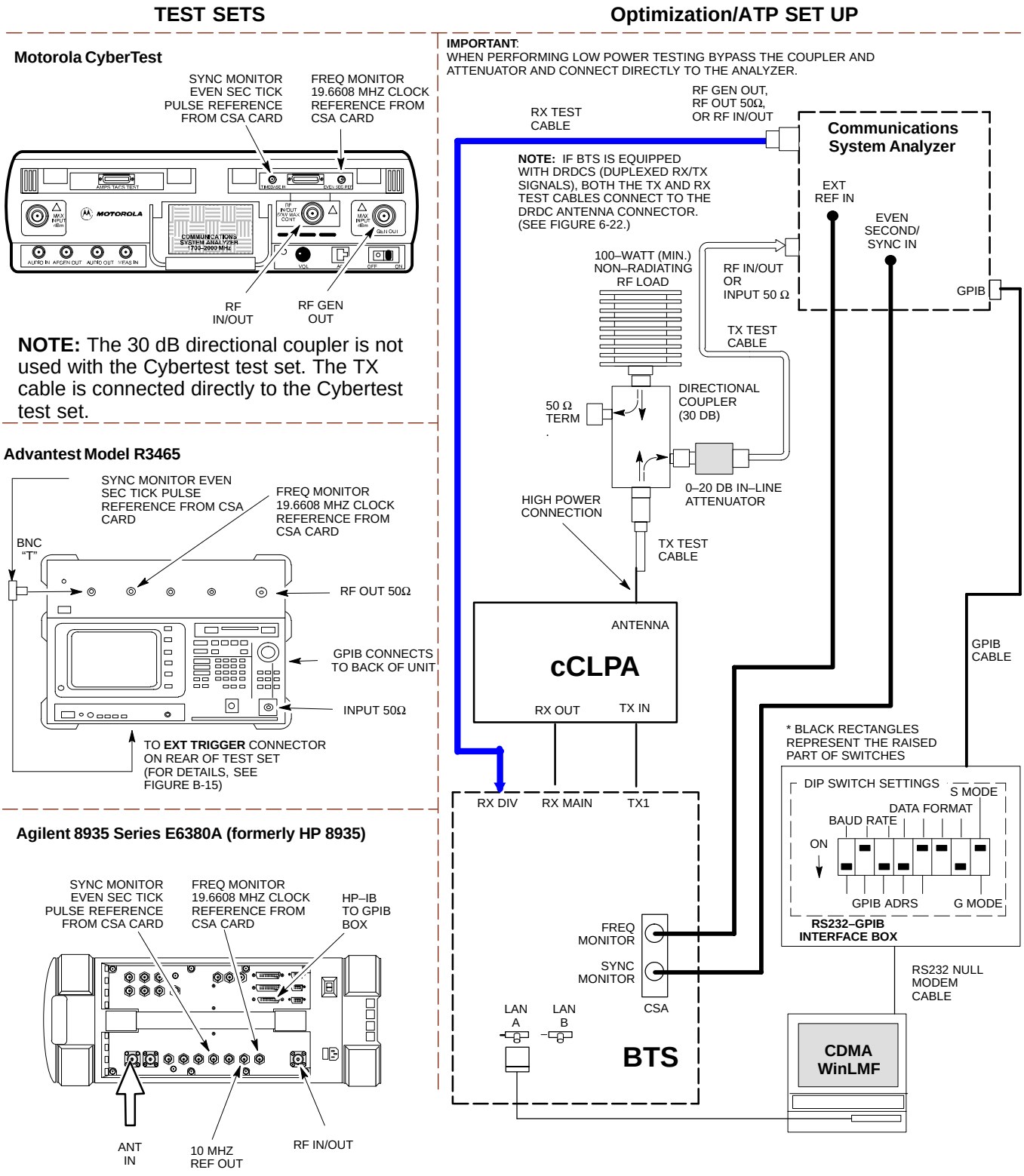


**Figure 6-20:** IS–95A/B ATP Test Setup – HP 8921A

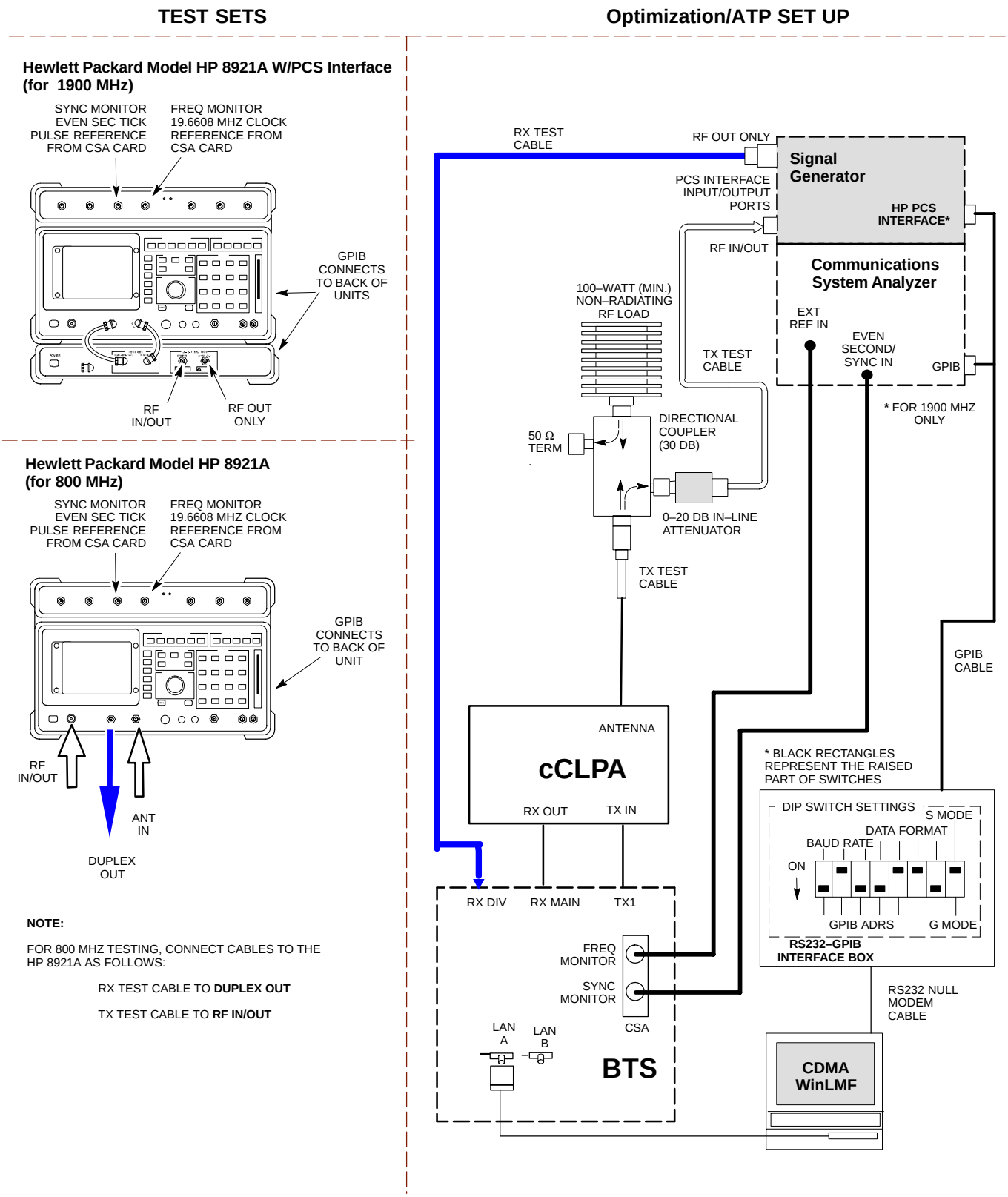


**Figure 6-21:** IS–95A/B and CDMA2000 1X ATP Test Setup Agilent Test Equipment

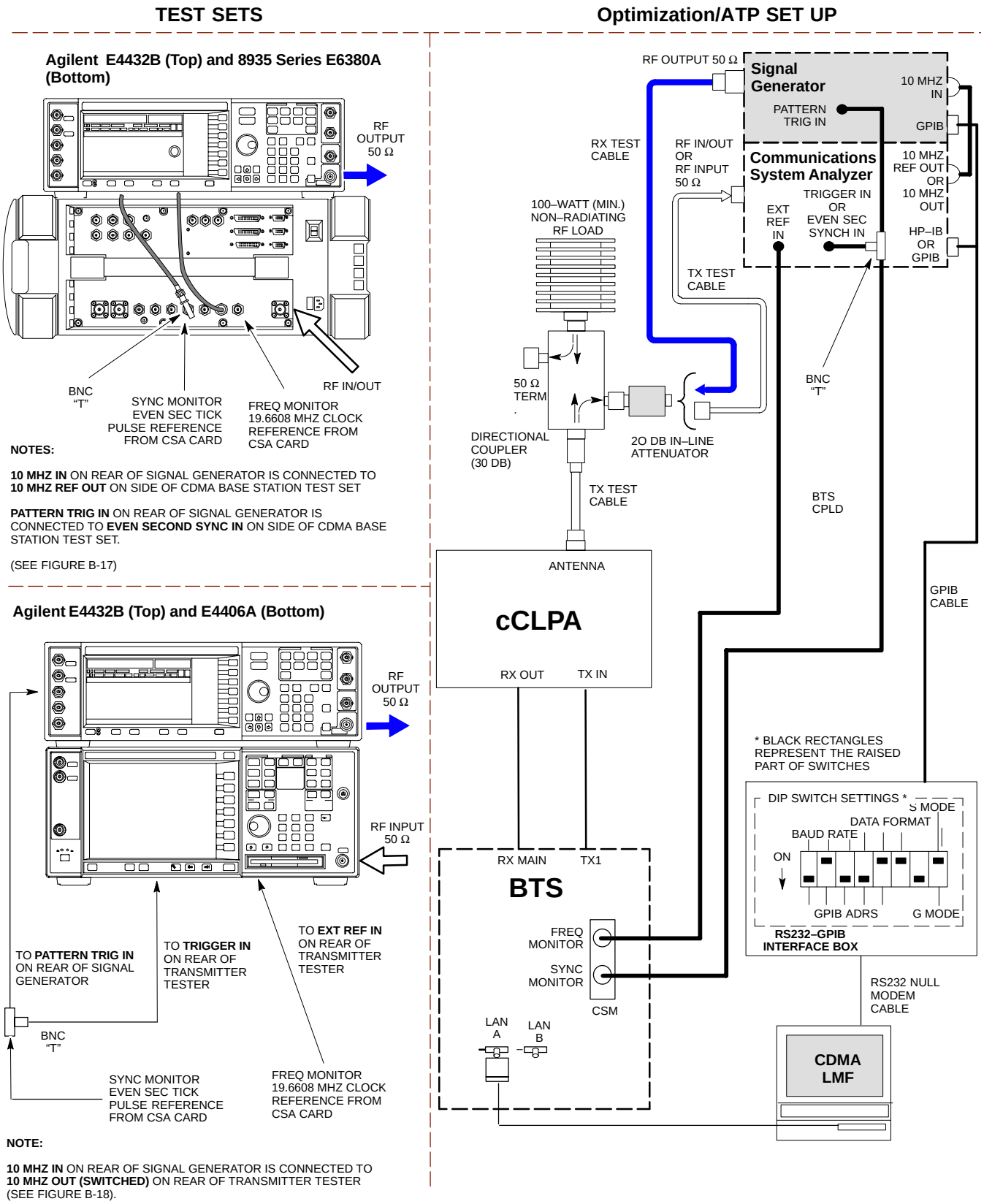


**Figure 6-22:** *IS–95A/B and CDMA2000 1X* Optimization/ATP Test Setup – Agilent E4432B/8935 Series E6380A and E4432B/E4406A Test Equipment

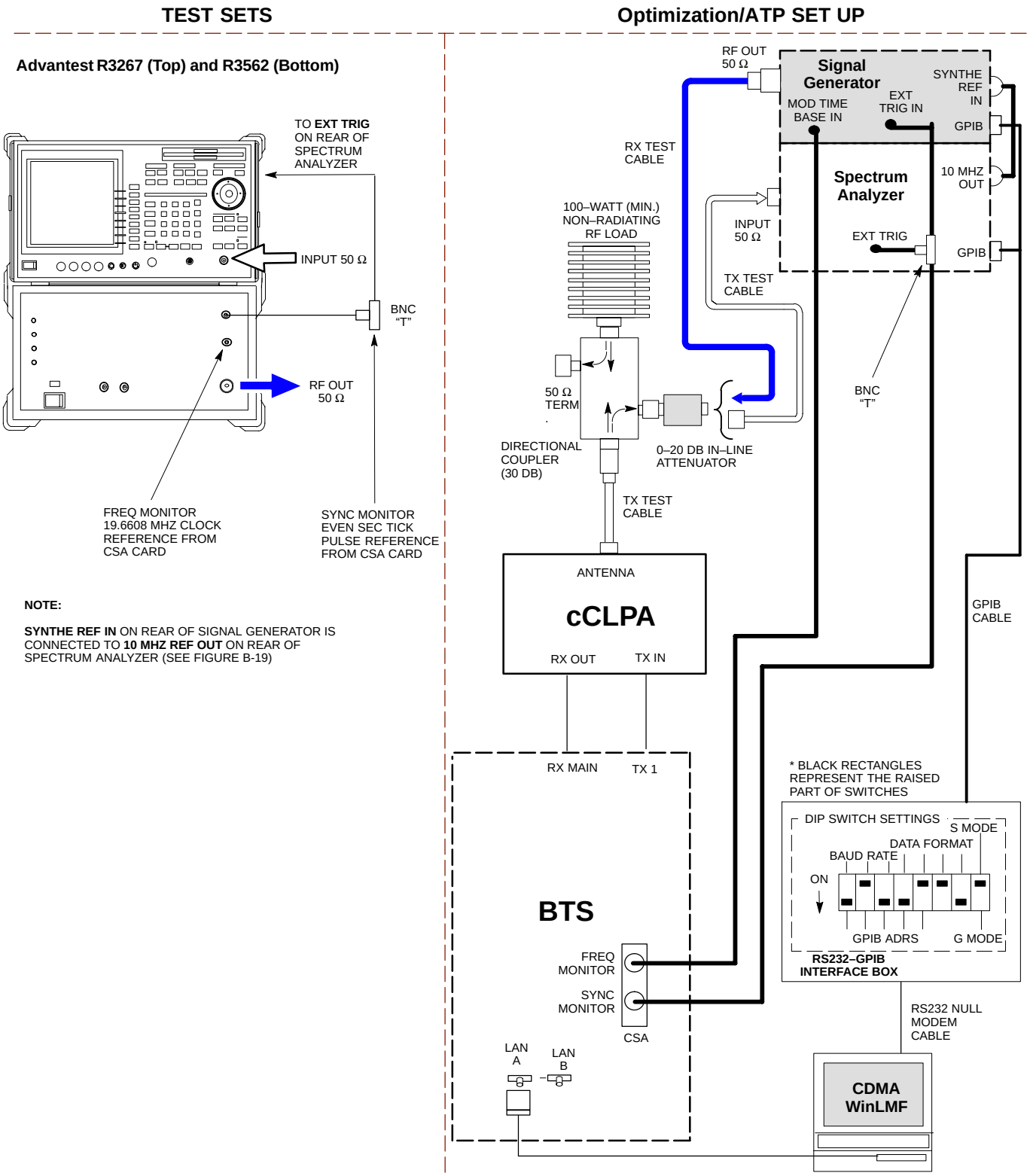
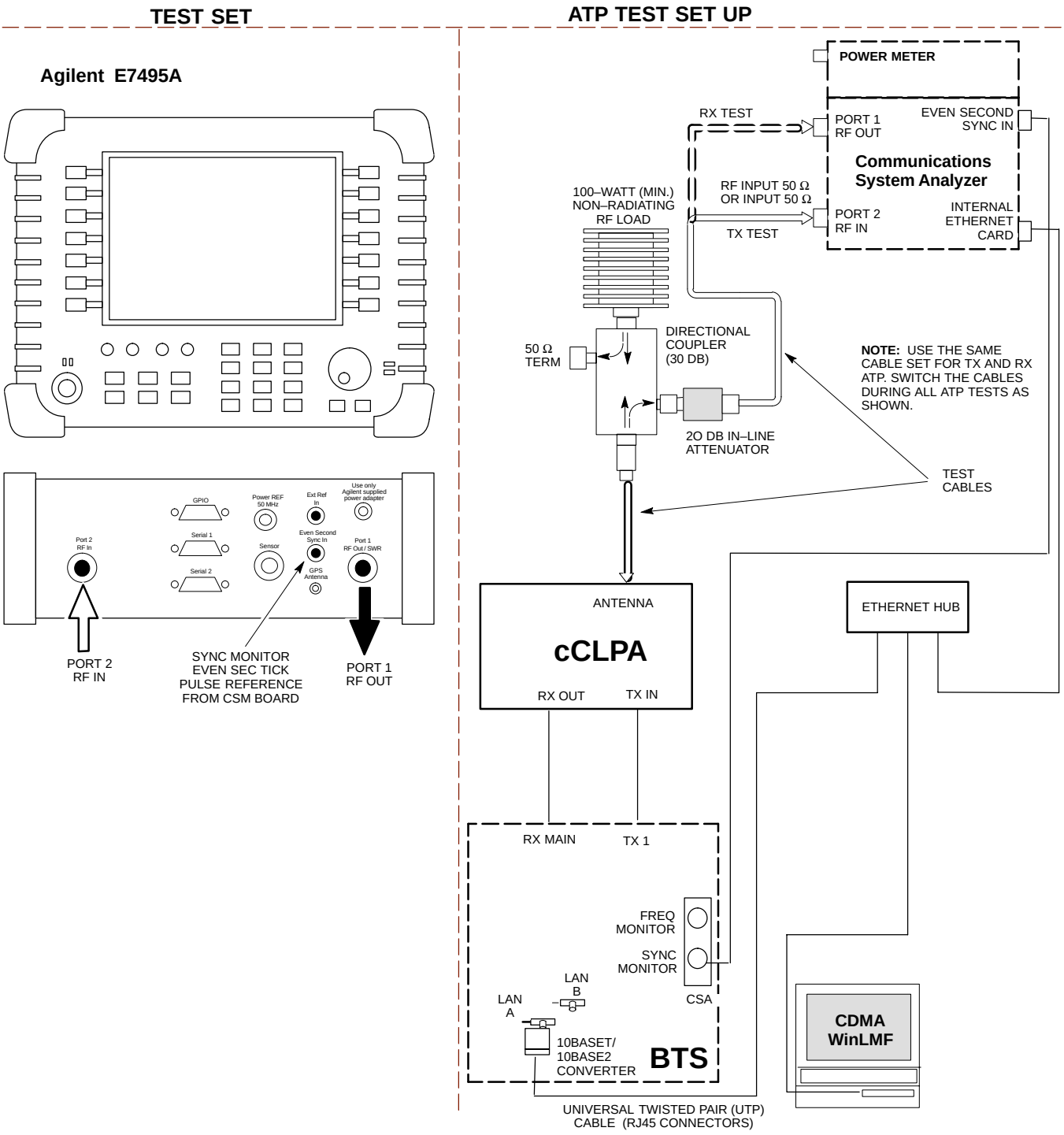


**Figure 6-23:** *IS–95A/B and CDMA2000 1X* Optimization/ATP Test Setup – Agilent E7495A



## Background

Proper test equipment calibration helps to ensure accurate BTS optimization and acceptance testing by assuring that the test equipment and associated cables do not introduce measurement errors.

**NOTE**

If the *test equipment set* being used to optimize or test the BTS has been calibrated and maintained as a set, this procedure does not need to be performed.

This procedure must be performed *prior to* beginning the optimization. Verify all test equipment (including all associated cables and adapters actually used to interconnect test equipment items and the BTS) has been calibrated and maintained as a set.

**CAUTION**

If any piece of test equipment, test cable, or RF adapter that makes up the calibrated *test equipment set* has been replaced, the *set* must be re-calibrated. Failure to do so can introduce measurement errors, resulting in incorrect measurements and degradation to system performance. Motorola recommends repeating cable calibration before testing at each BTS site.

**NOTE**

Calibration of the communications system analyzer (or equivalent test equipment) must be performed at the site before calibrating the overall *test equipment set*. Calibrate the test equipment *after* it has been allowed to warm–up and stabilize for a *a minimum of 60 minutes*.

## Calibration Procedures Included

### Automatic

Procedures included in this section use the WinLMF automated calibration routine to determine path losses of the supported communications analyzer, power meter, associated test cables, adapters, and (if used) antenna switch that make up the overall calibrated *test equipment set*. After calibration, the gain/loss offset values are stored in a test measurement offset file on the WinLMF computer.

### Manual

**Agilent E4406A Transmitter Tester –** The E4406A does not support the power level zeroing calibration performed by the WinLMF. If this instrument is to be used for Bay Level Offset calibration and calibration is attempted with the WinLMF **Calibrate Test Equipment** function, the WinLMF will return a status window failure message stating that zeroing power is not supported by the E4406A. Refer to the Equipment Calibration section of Appendix B for instructions on using the instrument's self–alignment (calibration) function prior to performing Bay Level Offset calibration.

**Power Meters –** Manual power meter calibration procedures to be performed prior to automated calibration are included in the Equipment Calibration section of Appendix B **.**

**Cable Calibration –** Manual cable calibration procedures using the HP 8921A and Advantest R3465 communications system analyzers are provided in the Manual Cable Calibration section of Appendix B, if needed.

## GPIB Addresses

GPIB addresses can range from 1 through 30. The WinLMF will accept any address in that range, but the numbers entered in the WinLMF Options window GPIB address boxes (Table 6-23 and Table 6-24) must match the addresses set in the test equipment. Motorola recommends using **1** for a CDMA signal generator, **13** for a power meter, and **18** for a communications system analyzer. To verify and, if necessary, change the GPIB addresses of the test equipment, refer to the Setting GPIB Addresses section of Appendix B.



## Selecting Test Equipment

**Serial Connection** and **Network Connection** tabs are provided in the **WinLMF Options** window to specify the test equipment connection method. The **Serial Connection** tab is used when the test equipment items are connected directly to the WinLMF computer through a GPIB box (normal setup). The **Network Connection** tab is used when the test equipment is to be connected remotely via a network connection or the Agilent E7495A Communications Test Set is used.

### Prerequisites

Be sure the following have been completed before selecting test equipment:

- Test equipment is correctly connected and turned on.
- GPIB addresses set in the test equipment have been verified as correct using the applicable procedures in Appendix B.
- WinLMF computer serial port and test equipment are connected to the GPIB box.

### Selecting Test Equipment

Test equipment may be selected either manually with operator input or automatically using the WinLMF autodetect feature.

### Manually Selecting Test Equipment in a Serial Connection Tab

Test equipment can be manually specified before or after the test equipment is connected. The WinLMF does not attempt to verify the test equipment is actually detected when manual selection is specified. Follow the procedure in Table 6-23 to manually select test equipment.

**Table 6-23:** Procedure for Selecting Test Equipment Manually in the Serial Connection Tab

| Step | Action |
|---|---|
| 1 | In the WinLMF window menu bar, click **Tools** and select **Options...** from the pull–down menu.<br>The **WinLMF Options** window appears. |
| 2 | If it is not in the forefront, click on the **Serial Connection** tab. |
| 3 | Select the correct serial port in the **COMM Port:** pick list (normally **COM1**). |
| 4 | *If it is not selected (black dot showing),* click on the **Manual Specification** button. |
| 5 | Click on the check box(es) corresponding to the test equipment item(s) to be used. |
| 6 | Type the GPIB address in the corresponding **GPIB address** box (refer to the Setting GPIB Addresses section of Appendix B for directions on verifying and/or changing test equipment GPIB addresses).<br>***Motorola–recommended addresses are:***<br>**1** = signal generator<br>**13** = power meter<br>**18** = communications system analyzer<br>*** IMPORTANT**<br>When test equipment items are manually selected by the operator, the WinLMF defaults to using a power meter for RF power measurements. The WinLMF will use a communications system analyzer for RF power measurements only if a power meter is not selected (power meter checkbox *not* checked). |
| 7 | Click on **Apply**. (The button will darken until the selection has been committed.)<br>**NOTE**<br>With manual selection, the WinLMF does not attempt to detect the test equipment to verify it is connected and communicating with the WinLMF.<br>To verify and, if necessary, change the GPIB address of the test equipment, refer to Appendix B. |
| 8 | Click on **Dismiss** to close the **WinLMF Options** window. |

### Automatically Selecting Test Equipment in the Serial Connection Tab

When using the auto-detection feature to select test equipment, the WinLMF determines which test equipment items are actually communicating with WinLMF. Follow the procedure in Table 6-24 to use the auto-detection feature.

**Table 6-24:** Procedure for Selecting Test Equipment Using Auto-Detect

| Step | Action |
|---|---|
| 1 | In the WinLMF window menu bar, click **Tools** and select **Options...** from the pull–down menu. The **WinLMF Options** window appears. |
| 2 | If it is not in the forefront, click on the **Serial Connection** tab. |
| 3 | Select the correct serial port in the **COMM Port:** pick list (normally **COM1**). |
| 4 | *If it is not selected (no black dot showing),* click on the **Auto–Detection** button. |
| 5 | *If they are not already displayed* in the box labeled **GPIB address to search**, click in the box and type in the GPIB addresses for the test equipment to be used, separating each address *with commas and no spaces*. (Refer to the Setting GPIB Addresses section of Appendix B for instructions on verifying and/or changing test equipment GPIB addresses.)<br>**NOTE**<br>During the GPIB address search for a test equipment item to perform RF power measurements (that is, for TX calibration), the WinLMF will select the first item it finds with the capability to perform the measurement. If, for example, the address sequence **13,18,1** is included in the **GPIB addresses to search** box, the power meter (GPIB address 13) will be used for RF power measurements. If the address sequence **18,13,1** is included, the WinLMF will use the communications system analyzer (GPIB address 18) for power measurements. |
| 6 | Click **Apply.** The button will darken until the selection has been committed. A check mark will appear in the applicable **Manual Configuration** section check boxes for detected test equipment items. |
| 7 | Click **Dismiss** to close the **WinLMF Options** window. |

### Calibrating Test Equipment

The WinLMF **Calibrate Test Equipment** function zeros the power measurement level of the test equipment item that is to be used for TX calibration and audit. If both a power meter and an analyzer are connected (for example, an HP 437 and an HP8921A/600), only the power meter is zeroed.

**NOTE**

The Agilent E4406A transmitter tester does not support power measurement level zeroing. Refer to the Equipment Calibration section of Appendix B for E4406A calibration.

### Prerequisites

- WinLMF computer serial port and test equipment are connected to the GPIB box.
- Test equipment is turned on and has warmed up for at least 60 minutes.
- Test equipment has been selected in the WinLMF (Table 6-23 or Table 6-24)

Follow the procedure in Table 6-25 to calibrate the test equipment.

**Table 6-25:** Procedure for Test Equipment Calibration

| Step | Action |
|---|---|
| 1 | From the **Util** menu, select **Calibrate Test Equipment** from the pull–down menu. A **Directions** window is displayed. |
| 2 | Follow the directions provided. |
| 3 | Click on **Continue** to close the **Directions** window and start the calibration process. A status report window is displayed. |
| 4 | Click on **OK** to close the status report window. |

## Calibrating Cables Overview



The WinLMF Cable Calibration function is used to measure the path loss (in dB) for the TX and RX cables, adapters, directional couplers, and attenuators that make up the cable configurations used for testing. A communications system analyzer is used to measure the loss of both the TX test cable and the RX test cable configurations. WinLMF cable calibration consists of the following processes:

1. Measure the loss of a short cable. This is done to compensate for any measurement error of the communications system analyzer. The short cable, which is used only for the calibration process, is connected in series with both the TX and RX test cable configurations when they are measured. The measured loss of the short cable is deducted from the measured loss of the TX and RX test cable configurations to determine the actual loss of the configurations. This deduction is done so any error in the analyzer measurement will be adjusted out of both the TX and RX measurements.
2. Measure the loss of the short cable plus the RX test cable configuration. The RX test cable configuration normally consists only of a coax cable with type–N connectors that is long enough to reach from the BTS RX connector to the test equipment. When the BTS antenna connectors carry *duplexed TX and RX* signals, a directional coupler and, if required by BTS type, an additional attenuator are also required for the RX test cable configuration. These additional items must be included in the path loss measurement.

3. Measure the loss of the short cable plus the TX test cable configuration. The TX test cable configuration normally consists of two coax cables with type–N connectors, a directional coupler, a termination load with sufficient rating to dissipate the BTS output power, and an additional attenuator, if required by the BTS type. The total path loss of the TX test configuration must be as required for the BTS (normally 30 or 50 dB). The Motorola Cybertest analyzer is different from other communications system analyzers because the required attenuation/load is built into the test set. Because of this, the Cybertest TX test configuration consists only of the required length coax cable.

## Calibrating Test Cable Configurations with a Communications System Analyzer

Cable Calibration is used to calibrate both TX and RX test cables.

**NOTE**

WinLMF cable calibration cannot be accomplished with an HP8921A analyzer for 1.9 GHz. A different analyzer type or the signal generator and spectrum analyzer method (Table 6-27 and Table 6-28) must be used. Cable calibration values must be manually entered into the WinLMF cable loss file if the signal generator and spectrum analyzer method is used. To use the HP8921A for *manual* test cable configuration calibration for 800 MHz BTSs, refer to the Manual Cable Calibration section of Appendix B.



### Prerequisites

- Test equipment is turned on and has warmed up for at least 60 minutes. Agilent E7495A requires only 30 minute warmup.
- Test equipment has been selected in the WinLMF (Table 6-23 or Table 6-24).
- Test equipment has been calibrated and correctly connected for the type of test cable configuration to be calibrated.

### Calibrating cables

Refer to Figure 6-21 or Figure 6-22 and follow the procedure in Table 6-26 to calibrate the test cable configurations.

**Table 6-26:** Procedure to Test Cabling Calibration using Communication System Analyzer

| ✓ | Step | Action |
|---|---|---|
| | 1 | Click **Util** in the BTS menu bar, and select **Cable Calibration...** in the pull–down menu. A **Cable Calibration** window is displayed. |

. . . continued on next page

| **Table 6-26:** Procedure to Test Cabling Calibration using Communication System Analyzer | | |
|---|---|---|
| ✓ | **Step** | **Action** |
| | 2 | Enter one or more channel numbers in the **Channels** box.<br>**NOTE**<br>Multiple channel numbers must be separated by a comma with no spaces (for example: 200,800). When two or more channel numbers are entered, the cables will be calibrated for each channel. Interpolation will be accomplished for other channels, as required, for TX calibration. |
| | 3 | Select **TX and RX CABLE CAL**, **TX CABLE CAL** or **RX CABLE CAL** in the **Cable Calibration** picklist. |
| | 4 | Click **OK**, and follow the directions displayed for each step. A status report window will be displayed with the results of the cable calibration. |

### Calibrate Test Cabling Using Signal Generator & Spectrum Analyzer

Refer to Figure 6-24 and follow the procedure in Table 6-27 to calibrate the TX test cable configuration for all BTSs or the RX ATP test cable configuration for BTSs with *duplexed TX/RX* using the signal generator and spectrum analyzer. Refer to Figure 6-25 and follow the procedure in Table 6-28 to calibrate the test cable configuration for *non*–duplexed RX using the signal generator and spectrum analyzer.



| **Table 6-27:** Procedure to Calibrate **TX/Duplexed RX** Test Cabling Using Signal Generator & Spectrum Analyzer | |
|---|---|
| **Step** | **Action** |
| 1 | Connect a short test cable between the spectrum analyzer and the signal generator as shown in Figure 6-24, detail “A” (top portion of figure). |
| 2 | Set signal generator to 0 dBm at the customer frequency of:<br>869–894 MHz or 1930–1990 MHz |
| 3 | Use spectrum analyzer to measure signal generator output (see Figure 6-24, **A**) and record the value. |
| 4 | Connect the spectrum analyzer’s short cable to point **B**, (as shown in the lower right portion of the diagram) to measure cable output at customer frequency of:<br>869–894 MHz or 1930–1990 MHz<br>Record the value at point **B**. |
| 5 | Calibration factor = (value measured with detail “A” setup) – (value measured with detail “B” setup)<br>Example: Cal factor = –1 dBm – (–53.5 dBm) = 52.5 dB<br>**NOTE**<br>The short cable is used for *calibration only.* It is *not* part of the final test setup. After calibration is completed, *do not* re-arrange any cables. Use the test cable configuration as is to ensure test procedures use the correct calibration factor. |

**Figure 6-24:** Cal Setup for TX/Duplexed RX Test Cabling Using Signal Generator & Spectrum Analyzer

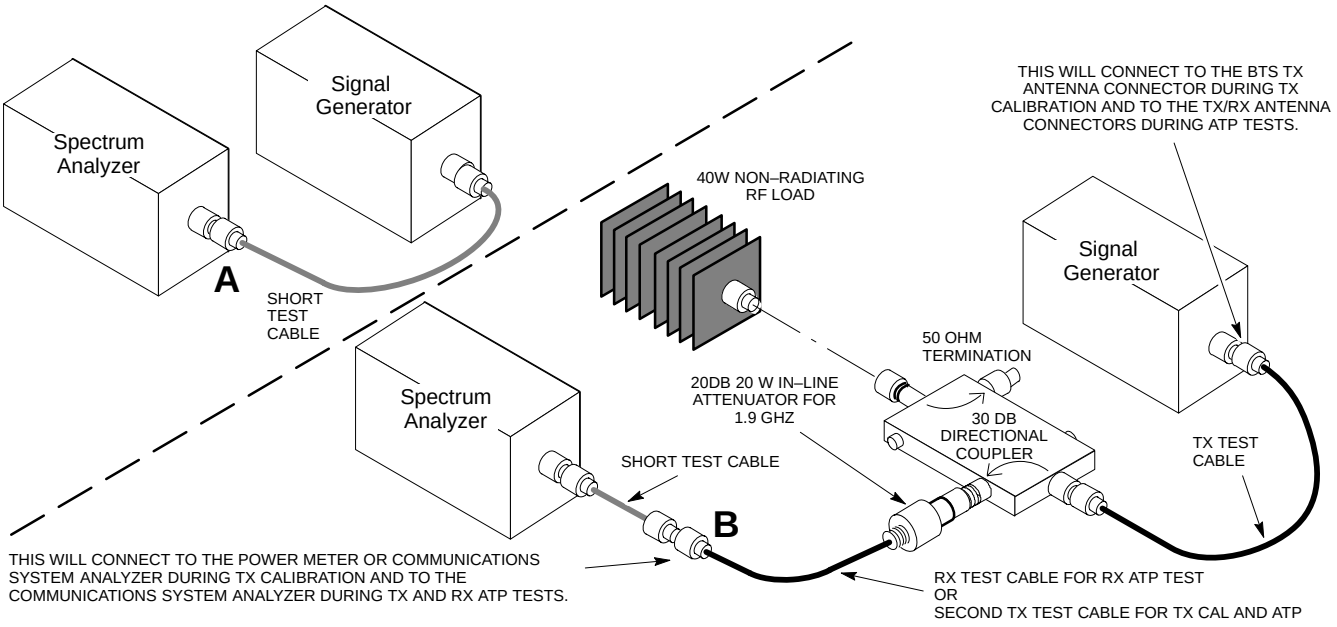
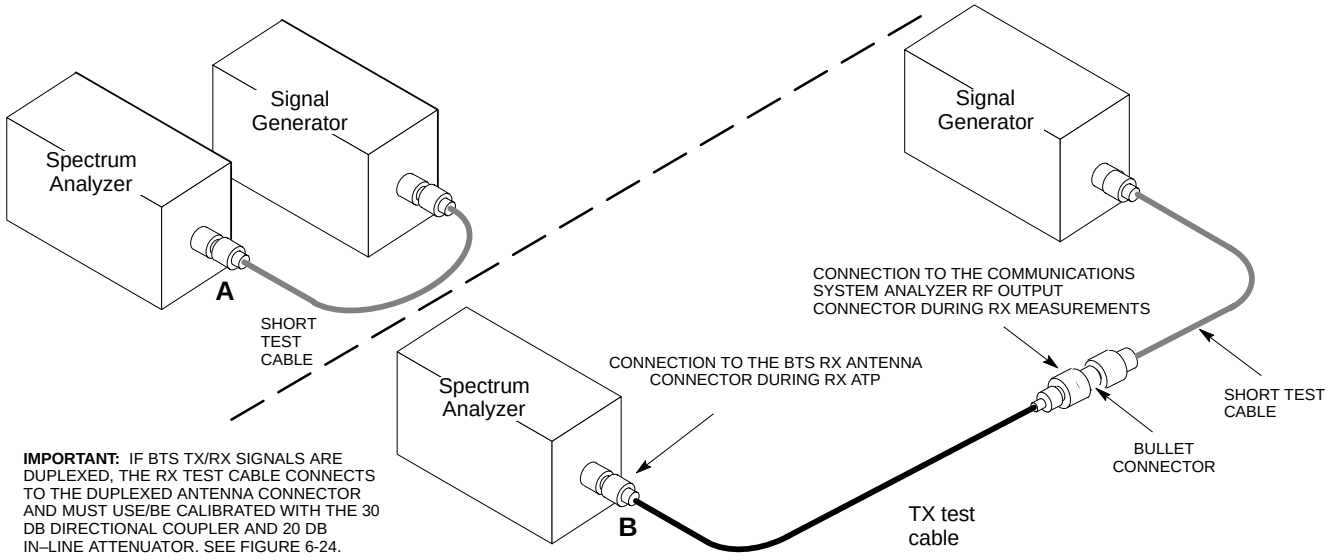



**Table 6-28:** Procedure for Calibrating **Non–Duplexed RX** Test Cabling Using Signal Generator & Spectrum Analyzer

| Step | Action |
|---|---|
| | **NOTE**<br>When preparing to calibrate a BTS with **Duplexed TX and RX** the RX cable calibration must be done using calibration setup in Figure 6-24 and the procedure in Table 6-27. |
| 1 | Connect a short test cable between the spectrum analyzer and the signal generator as shown in Figure 6-25, detail "A" (top portion of figure). |
| 2 | Set signal generator to –10 dBm at the customer's RX frequency of:<br>824–849 for North American Cellular or 1850–1910 MHz band for North American PCS |
| 3 | Use spectrum analyzer to measure signal generator output (see Figure 6-25, **A**) and record the value. |
| 4 | Connect the test setup, as shown in the lower portion of the diagram (see Figure 6-25, **B**) to measure the output at the customer's RX frequency of:<br>824–849 for North American Cellular or 1850–1910 MHz band for North American PCS<br>Record the value at point **B**. |
| 5 | Calibration factor = (value measured with detail "A" setup) – (value measured with detail "B" setup)<br>Example: Cal factor = –12 dBm – (–14 dBm) = 2 dB<br>**NOTE**<br>The short test cable is used for test equipment setup calibration *only.* It is not part of the final test setup. After calibration is completed, *do not* re-arrange any cables. Use the test cable configuration as–is to ensure test procedures use the correct calibration factor. |

**Figure 6-25:** Cal Setup for Non–Duplexed RX Test Cabling Using Signal Generator & Spectrum Analyzer




### Setting Cable Loss Values

Cable loss values for TX and RX test cable configurations are normally set by accomplishing automatic cable calibration using the WinLMF and the applicable test equipment. The WinLMF stores the measured loss values in the cable loss files. The cable loss values can also be set or changed manually. Follow the procedure in Table 6-29 to set cable loss values.

| | |
|---|---|
| **CAUTION** | If cable calibration was performed without using the WinLMF, cable loss values *must* be manually entered in the WinLMF database. Failure to do this will result in inaccurate BTS calibration and reduced site performance. |

#### Prerequisites

- WinLMF is logged into the BTS

**Table 6-29:** Procedure for Setting Cable Loss Values

| Step | Action |
|---|---|
| 1 | Click **Util** in the BTS menu bar, and select **Edit > Cable Loss** in the pull–down menus.<br>– A *tabbed* data entry pop–up window will appear. |
| 2 | Click on the **TX Cable Loss** tab or the **RX Cable Loss** tab, as required. |
| 3 | To add a new channel number, perform the following: |
| 3a | – Click on the **Add Row** button. |
| 3b | – Click in the **Channel #** or **Loss (dBm)** column, as required. |
| 3c | – Enter the desired value. |

. . . continued on next page

| Table 6-29: Procedure for Setting Cable Loss Values | |
|---|---|
| **Step** | **Action** |
| 4 | To edit existing values, click in the data box to be changed and change the value. |
| 5 | To delete a row, click on the row and then click on the **Delete Row** button. |
| 6 | *For each tab with changes*, click on the **Save** button to save displayed values. |
| 7 | Click on the **Dismiss** button to close the window.<br>**NOTE**<br>• Values entered or changed after the **Save** button was used will be lost when the window is dismissed.<br>• If cable loss values exist for two different channels the WinLMF will interpolate for all other channels.<br>• Entered values will be used by the WinLMF as soon as they are saved. It is not necessary to log out and log back into the WinLMF for changes to take effect. |

### Setting TX and RX Directional Coupler Loss Value

If an in–service TX or RX directional coupler is installed in the RF path, the loss due to the added coupler (e.g., 30 dB) must be manually entered so it will be included in the WinLMF TX calibration and audit calculations and the RX FER test. Follow the procedure in Table 6-30 to enter directional coupler loss values.



#### Prerequisites

- WinLMF is logged into the BTS
- Path loss, in dB, of the TX coupler must be known.

| Table 6-30: Procedure for Setting TX and RX Directional Coupler Loss Values | |
|---|---|
| **Step** | **Action** |
| 1 | Click **Util** in the BTS menu bar, and select **Edit > Coupler Loss...** in the pull–down menus.<br>– A *tabbed* data entry pop–up window will appear. |
| 2 | Click on the **TX Coupler Loss** tab or the **RX Coupler Loss** tab, as required |
| 3 | Click in the **Loss (dBm)** column for each carrier that has a coupler and enter the appropriate value. |
| 4 | To edit existing values, click in the data box to be changed and change the value. |
| 5 | *For each tab with changes*, click on the **Save** button to save displayed values. |

. . . continued on next page

| **Table 6-30:** Procedure for Setting TX and RX Directional Coupler Loss Values | |
|---|---|
| **Step** | **Action** |
| 6 | Click on the **Dismiss** button to close the window.<br><br>**NOTE**<br>• Values entered or changed after the **Save** button is used will be lost when the window is dismissed.<br>• The **In–Service Calibration** check box in the **Tools > Options > BTS Options** tab must be checked before entered TX coupler loss values will be used by the TX calibration and audit functions.<br>• New or changed values will be used by the LMF as soon as they are saved. Logging out and logging in again *are not required* to cause saved changes to take effect. |

## Purpose of Bay Level Offset Calibration

Bay Level Offset (BLO) calibration is the central activity of the optimization process. BLO calibration compensates for normal equipment variations within the BTS RF paths and assures the correct transmit power is available at the BTS antenna connectors to meet site performance requirements.

## What is BLO Calibration?

### Description

BLO calibration is the complete title of what is normally referred to as "calibration." Calibration identifies the accumulated gain in every *transmit* path at the BTS site. The transmit path BLO values determined during calibration are stored in the LMF calibration data file, and are subsequently downloaded to each BBX. When transmit path calibration is performed, *receive* path BLO values will automatically be set to the default value in the LMF calibration file and downloaded.

## Component Verification During Calibration

### TX Path Calibration

TX path calibration supports verification of correct BTS installation, RF cabling installation and performance, functionality of all equipment installed in the transmit RF chain, and the proper functioning of each transmit RF path. External test equipment is used to calibrate and audit the TX paths of the BTS.

### RX Path Calibration

RX path calibration is not required or supported on CDMA BTS systems. Default RX calibration values are written to the RX calibration data files during the TX calibration process. RX functionality is verified during Frame Erasure Rate (FER) testing.

## When to Calibrate BLOs

Calibration to determine BLO:

1. Is required after initial BTS installation.
2. Must be done once each year for an operational BTS site.
3. Is recommended by Motorola for all associated RF paths after replacing any of the following components:
   - BBX card
   - CCP2 shelf
   - cCLPA

### BLO Calibration Data File

During the calibration process, the LMF creates a calibration (CAL) data file where BLO values are stored. After calibration has been completed, these offset values must be downloaded to the BBXs using the LMF BLO download function. A detailed description of the file organization and content is provided in the following paragraphs

| NOTE | Due to the size of the file, Motorola recommends printing out a copy of a **bts–#.cal** file and referring to it for the following descriptions. |
|---|---|

- When referring to the CAL file print–out it can be seen that there is one BBX slot with 20 "calibration *entries*" per BBX (sector) for each branch. *Two* calibration *entries* define a single "calibration *point*;" therefore there are *ten* calibration *points* in each branch for each BBX.
  - The first entry for a calibration point (all odd entries) identifies the CDMA channel (frequency) where the BLO is measured. The second calibration entry (all even entries) is the power set level (PwrLvlAdj) for that frequency. The valid range for PwrLvlAdj is from 2500 to 27500 (2500 corresponds to –125 dBm and 27500 corresponds to +125 dBm).
  - The ten calibration points for each slot–branch combination must be stored in order of increasing frequency. If less than ten points (frequencies) are calibrated, the BLO data for the highest frequency calibrated is written into the remainder of the ten points for that slot–branch.

  Example:

  *C[1]=384* (odd cal entry)
  *C[2]=19102* (even cal entry) } = *1 "calibration point"*

  *C[3]=777* (odd cal entry)
  *C[4]=19086* (even cal entry) } = *1 "calibration point"*

  .
  .
  .

  *C[19]=777* (odd cal entry)
  *C[20]=19086* (even cal entry) } = *1 "calibration point"*

  In the example above, BLO was measured at only two frequencies (channels 384 and 777) for CCP2 slot BBX–1 transmit. The BLO data for the highest frequency measured (channel 777) will be written to the remaining eight transmit calibration points (defined by entries C[5] through C[20]) for BBX–1.

**Slot Block Temperature Compensation –** Each BBX slot Block also has a temperature compensation data section (TempLevelCal) where power level compensation factors for temperature variations are stored.

### CAL File and BLO Data Download

When BLO data is downloaded to the BBXs after calibration, the data is downloaded to the devices in the order it is stored in the CAL file. TX calibration data (entries C[1] – C[60]) are sent first. Data for the ten BBX slot 1 calibration points (entries C[1] – C[20]) are sent initially, followed by data for the ten BBX slot 2 calibration points (entries C[21] – C[40]), and so on. The RX calibration data is sent next in BBX slot sequence, followed by RX Diversity calibration data.

## BLO for Expansion BTS

The BLO Ranges for expansion BTS configurations are listed below:

### Low Power

- 1.9 GHz: 1 to 4 carriers: –15 ± 7 dB
- 1.9 GHz: 5 to 8 carriers: –19 ± 7dB

### High Power (1 or 2 cCLPAs)

- 1.9 GHz: 1 to 2 carriers: 46± 7 dB
- 1.9 GHz: 3 to 4 carriers: 42± 7 dB
- 1.9 GHz: 5 to 8 carriers: 40 ± 7dB



## Test Equipment Setup for RF Path Calibration

Follow the procedure in Table 6-31 and refer as needed to Figure 6-15 or Figure 6-17 to set up test equipment.

**Table 6-31:** Procedure to Set Up Test Equipment for RF Path Calibration

| Step | Action |
|---|---|
| 1 | *If it has not already been done*, refer to the procedure in Table 6-6 (on page 6-17) to interface the LMF computer terminal to the frame LAN A connector. |
| 2 | *If it has not already been done*, refer to Table 6-7 (on page 6-25) to start a *GUI* LMF session. |
| 3 | *If not already done*, select test equipment per the procedure in Table 6-23 or Table 6-24. |
| 4 | If required, calibrate the test equipment per the procedure in Table 6-25. |
| | **! CAUTION**<br>To prevent damage to the test equipment in high power configurations, all transmit (TX) test connections must be via the 30 dB directional coupler for 1.9 GHz.<br>Attenuators are not required for low power configuration. |
| 5 | *For TX path calibration*, connect the test equipment as shown in Figure 6-15, Figure 6-17, or Figure 6-18, depending on the communications analyzer being used. |

### Transmit (TX) Path Calibration Description

The assigned channel frequency and desired power level at the frame TX ports for transmit calibration are derived from the BTS CDF file. Each BBX at the site is assigned to a carrier. These are specified respectively in the carrier *field* of the `ParentCARRIER` parameter in each BBXs CDF file block. The channel frequency for the assigned *sector* is specified in the `ChannelList` parameter of the CDF block for the CARRIER to which the BBX is assigned.

For Low Power optimization of the SC480, the following adjustments must be made to the CDF.

- In the *Carrier section* of the CDF, verify that the **SifPilotPwr** is set to **–200**.
- In the *BTS section* of the CDF, verify that the **CageConf** is set to **5** (CCP2), and that **BIOType** is set to **3**.

**NOTE**

Be sure the **bts–#.cdf** and **cbsc–#.cdf** files loaded on the LMF computer are current. The LMF will obtain carrier and channel information from these files and insert it into the appropriate CDMA Test Parameter screen. Failure to have the most current files from the CBSC can result in incorrect channel information being used to calibrate the BTS and unfavorable affects on BTS performance. Carrier and channel numbers should only be entered manually for special test cases or as a last resort.



The calibration process attempts to adjust the measured power to within ±0.5 dB of the desired power. The calibration will pass if the error is less than ±1.5 dB.

Table 6-32 lists the maximum and minimum power with and without the cCLPA. The numbers presented may change at a later date.

**Table 6-32:** Maximum and Minimum Power

| TX Configuration | Max Power | Min Power |
|---|---|---|
| Indoor / Low Power | –6.0 dBm | –16.0 dBm |
| Outdoor / Low Power | –6.0 dBm | –16.0 dBm |
| Indoor / High Power | 43.0 dBm / 41.76 dBm* | 33.0 dBm |
| Outdoor / High Power | 43.0 dBm / 41.76 dBm* | 33.0 dBm |
| * Non–domestic maximum high power is 41.76 due to TX GSM Elimination filter. | | |

### TX Calibration and the LMF

The LMF **Tests > TX > TX Calibration...** and **Tests > All Cal/Audit...** selections perform TX BLO calibration testing for installed BBX(s). The **All Cal/Audit...** selection initiates a series of actions to perform TX calibration, and if calibration is successful, download BLO and perform TX audit. The **TX Calibration...** selection performs only TX calibration. When **TX Calibration...** is used, BLO download and TX audit *must be performed as separate activities*. The CDMA Test Parameters window which opens when **TX Calibration...** or **All Cal/Audit...** is selected contains several user–selectable features which are described in the following subsections.

#### Rate Set Drop–down Pick List

The Rate Set Drop–down Box is enabled if at least one MCC card is selected for the test. The available options for TX tests are 1 = 9600, and 3 = 9600 1X. Option 3 is only available if 1X cards are selected for the test. The available transfer rate options for RX tests are 1 = 9600 and 2 = 14400. Option 2 is only available if no 1X cards are selected.

#### Verify BLO Check Box

In both the TX Calibration and All Cal/Audit dialog boxes, a **Verify BLO** check box is provided and checked by default. After the actual TX calibration is completed during either the TX Calibration or All Cal/Audit process, the BLO derived from the calibration is compared to a standard, acceptable BLO tolerance for the BTS. In some installations, additional items may be installed in the transmit path. The additional change in gain from these items could cause BLO verification failure and, therefore, failure of the entire calibration. In these cases, either the **Verify BLO** check box should be unchecked or the additional path losses should be added.

#### Single–Sided BLO Check Box

An acceptable range of BLO values for each type of BTS is established to allow for tolerance variations in all the components of the RF chain. This acceptable range, 42±5 dB for example, is a much wider tolerance than necessary for the BBXs. Single–Sided BLO calibration restricts the allowable BLO variations to the lower half of the range (i.e., 37 to 42 dB). Because this is a much more stringent tolerance, calibrations run with **Single–Sided BLO** are more likely to fail and should only be attempted by an experienced CFE.

The **Tests > TX > TX Calibration...** menu window has a **Test Pattern** pull–down menu. This menu has the following choices:

- **Standard** – performs calibration or audit using pilot, paging, synch, and six traffic channels with IS–97–specified gain. This pattern setting should be used for all *non*–in–service calibrations and audits. Using this pattern setting requires the selection of both a BBX *and* at least one MCC.
- **Pilot** (default) – performs calibration using only the pilot channel. This pattern setting should be used for in–service calibrations, and requires selection of only a BBX.

- **CDFPilot** – This pattern setting is for advanced users. It performs calibration or audit using the CDF value for pilot gain and IS–97 gain values for all the other channels included in the **Standard** pattern setting (paging, synch, and six traffic). Using this pattern setting requires the selection of both a BBX *and* at least one MCC.
- **CDF** – This pattern setting is for advanced users who need to use CDF gain settings for *all* channels included in the **Standard** pattern setting (pilot, paging, synch, and six traffic). Using this pattern setting requires the selection of both a BBX *and* at least one MCC.

**Test Pattern Channels and Gain Settings –** The CDMA channels and their respective digital gain settings used for each test pattern are listed in Table 6-33.

**Table 6-33:** Test Patterns with Channels and Gain Settings Used

| Test Pattern | Channel(s) | Gain Setting |
|---|---|---|
| Pilot | Pilot channel only | 262 |
| Standard | Pilot | 117 |
| | Synch channel (SCH) | 57 |
| | Paging (PCH) | 114 |
| | Traffic (TCH) | 80 for each of 6 Walsh codes used (6*80) |
| CDF Pilot | Pilot | Uses CDF–specified pilot gain |
| | SCH | 57 |
| | PCH | 114 |
| | TCH | 6*80 |
| CDF | Pilot | All channels use CDF–specified gains |
| | SCH | |
| | PCH | |
| | TCH (6) | |



### Set-up for TX Calibration

The work–around in Table 6-34 allows the user to manually set the BLO limits .

| Table 6-34: Procedure for Initial Set-up for TX Calibration | | |
|---|---|---|
| ✓ | **Step** | **Action** |
| | 1 | Delete the existing calibration file (if any) from the BTS folder on LMF laptop from the location **C:\wlmf\cdma\bts–#**, where # is the BTS number. |
| | 2 | To edit the nominal TX BLO, from the **Util** menu, select **Edit > TX Nominal Offset**. In the TX Cal Parameter window, make any necessary changes to ensure the TX BLO Nominal Offset (in dB) is set to the following:<br>– For 1.9 GHz, TX Nominal Offset value is 44.0 (dB), and the Allowed error range, plus or minus (in dB) is 1.5 |
| | 3 | Download the data, which includes BLO values, to all the BBXs. From the **Device** menu, select **Download > Data** |

### TX Calibration

**WARNING**

***Before*** installing any test equipment directly to any BTS **TX OUT** connector, ***first verify no CDMA channels are keyed***. Failure to do so can result in serious personal injury and/or equipment damage.

**CAUTION**

Always wear an approved anti–static wrist strap while handling any circuit card or module. If this is not done, there is a high probability that the card or module could be damaged by ESD.

**NOTE**

***At new site installations,*** to facilitate the complete test of the CCP2 Shelf empty BBX slots may be populated to ensure that all BBX TX paths are tested.
This procedure can be bypassed on operational sites that are due for periodic optimization.
Prior to testing, view the CDF (or NECF) file to verify the correct BBX slots are equipped. Edit the file as required to include BBX slots not currently equipped (per Systems Engineering documentation).

### All Cal/Audit and TX Calibration Procedure

The LMF All Cal/Audit and TX calibration procedures are essentially identical, except for the step that selects the type of procedure desired (Refer to Step 4 in Table 6-35).

### Prerequisites

Before running this procedure, be sure that the following have been done:

- The card in slot CSA, GLI, MCCs, and BBXs have correct code and data loads.
- All BBXs are OOS_RAM (yellow).
- If running calibration or audit using a test pattern *other than* ***Pilot***, MCCs are INS_ACT (bright green).
- Test equipment and test cables are calibrated and connected for TX calibration.
- LMF is logged into the BTS in the *GUI* environment.

**NOTE**

Verify all BBX cards removed and repositioned have been returned to their assigned shelves/slots. Any BBX cards moved since they were downloaded will have to be downloaded again.

Follow the procedure in Table 6-35 to perform BLO calibration on the TX paths, download BLO values to the BBXs, and perform TX path audit in one operation.

**Table 6-35:** Procedure for All Cal/Audit and TX Calibration

| Step | Action |
|---|---|
| 1 | *If it has not already been done*, configure test equipment for TX calibration by following the procedure in Table 6-31. |
| 2 | Click on the BBX(s) to be calibrated. |
| 3 | If the **Test Pattern** to be used is **Standard**, **CDFPilot**, or **CDF**, select at least one MCC (refer to "Test Pattern Drop–down Pick List" under "TX Calibration and the LMF" in this section). |
| 4 | ***For All Cal Audit...***<br>– Click **Tests** in the BTS menu bar, and select **TX > All Cal/Audit...** from the pull–down menus. A CDMA Test Parameters window will appear.<br>***For TX Calibration***<br>– Click **Tests** in the BTS menu bar, and select **TX > TX Calibration** from the pull–down menus. A CDMA Test Parameters window will appear. |
| 5 | Select the appropriate carrier(s) and sector(s) (carrier-bts#-sector#-carrier#) from those displayed in the **Channels/Carrier** pick list.<br>**NOTE**<br>To select multiple items, hold down the **Shift** or **Ctrl** key while clicking on pick list items to select multiple carrier(s)–sector(s). |
| 6 | Verify that the correct channel number for the selected carrier is shown in the **Carrier # Channels** box. If it is not, obtain the latest **bts–#.cdf** (or **bts–#.necf**) and **cbsc–#.cdf** files from the CBSC. |

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| Table 6-35: Procedure for All Cal/Audit and TX Calibration | |
|---|---|
| **Step** | **Action** |
| | **NOTE**<br>If necessary, the correct channel number may be manually entered into the **Carrier # Channels** box. |
| 7 | If at least one MCC was selected in Step 3, select the appropriate transfer rate (**1** = 9600, **3** = 9600 1X) from the drop–down list in the **Rate Set** box.<br>**NOTE**<br>The rate selection of **3** is only available if 1X cards are selected for the test. |
| 8 | If **Verify BLO** is to be used during the calibration, leave the checkbox checked (default). |
| 9 | If **Single–Sided BLO** is to be used during the calibration, click on the checkbox. |
| 10 | In the **Test Pattern** box, select the test pattern to use for the calibration from the drop–down list (refer to "Test Pattern Drop–down Pick List" under "TX Calibration and the LMF" in this section). |
| 11 | Click **OK** to display the status report window followed by a **Directions** pop-up window. |
| 12 | Follow cable connection directions as they are displayed.<br>– When the calibration process is completed, results will be displayed in the status report window. |
| 13 | Click **OK** to close the status report window. |

### Exception Handling

In the event of a failure, the calibration procedure displays a **FAIL** message in the status report window and provides information in the **Description** field.

Re–check the test setup and connection and re–run the calibration. If the calibration fails again, note specifics about the failure.

## Download BLO Procedure

After a successful TX path calibration, download the BLO calibration file data to the BBXs. BLO data is extracted from the CAL file for the BTS and downloaded to the selected BBX devices.

**NOTE**

If a successful **All Cal/Audit** was completed, this procedure does not need to be performed, as BLO is downloaded as part of the **All Cal/Audit**.

### Prerequisites

Ensure the following prerequisites have been met before proceeding.

- BBXs to receive the download are OOS_RAM (yellow).
- TX calibration was successfully completed

Follow the steps in Table 6-36 to download the BLO data to the BBXs.

**Table 6-36:** Procedure to Download BLO

| ✓ | Step | Action |
|---|---|---|
| | 1 | Select the BBX(s) to be downloaded. |
| | 2 | Click **Device** in the BTS menu bar, and select **Download > BLO** from the pull–down menus. A status report window displays the result of the download.<br>**NOTE**<br>Selected device(s) do not change color when BLO is downloaded. |
| | 3 | Click **OK** to close the status report window. |

### Calibration Audit Introduction

The BLO calibration audit procedure confirms the successful generation and storage of the BLO calibration values. The calibration audit procedure measures the path gain or loss of every BBX transmit path at the site. In this test, actual system tolerances are used to determine the success or failure of a test. The same external test equipment set–up required for TX calibration is used for TX audit.

**NOTE**

RF path verification, BLO calibration, and BLO data download to BBXs must have been successfully completed prior to performing the calibration audit.

6

### TX Path Audit

Perform the calibration audit of the TX paths of all equipped BBX slots, per the steps in Table 6-37.

**WARNING**

***Before*** installing any test equipment directly to any **TX OUT** connector, ***first verify there are no CDMA BBX channels keyed***. Failure to do so can result in serious personal injury and/or equipment damage.

**NOTE**

If a successful **All Cal/Audit** was completed, this procedure does not need to be performed, as BLO is downloaded as part of the **All Cal/Audit**.

### TX Audit Test

The **Tests** menu item, **TX Audit**, performs the TX BLO Audit test for BBXs. All measurements are made through the appropriate TX output connector using the TX calibration setup.

### Prerequisites

Before running this test, the following should be done:

- The CSA, GLIs, BBXs have correct code load.
- The CSA and GLI are INS_ACT (bright green).
- All BBXs are OOS_RAM (yellow).
- Test equipment and test cables are calibrated and connected for TX BLO calibration.
- LMF is logged into the BTS.

### TX Path Audit procedure

After a TX calibration has been performed, or if verification of BLO data in the CAL file is required, follow the procedure in Table 6-37 to perform a BTS TX path audit.

**Table 6-37:** Procedure for BTS TX Path Audit

| ✓ | Step | Action |
|---|---|---|
| | 1 | ***If it has not already been done***, configure test equipment for TX path audit by following the procedure in Table 6-31 (TX audit uses the same configuration as TX calibration). |
| | 2 | Select the BBX(s) to be audited. |
| | 3 | If the **Test Pattern** to be used is **Standard**, **CDFPilot**, or **CDF**, select at least one MCC (refer to "Test Pattern Drop–down Pick List" under "TX Calibraton and the LMF" in this section). |
| | 4 | Click **Tests** in the BTS menu bar, and select **TX > TX Audit...** from the pull–down menus. A CDMA Test Parameters window will appear. |
| | 5 | Select the appropriate carrier(s) (carrier-bts#-sector#-carrier#) from those displayed in the **Channels/Carrier** pick list.<br>**NOTE**<br>To select multiple items, hold down the **Shift** or **Ctrl** key while clicking on pick list items to select multiple carrier(s)–sector(s). |
| | 6 | Verify that the correct channel number for the selected carrier is shown in the **Carrier # Channels** box. If it is not, obtain the latest **bts–#.cdf** (or **bts–#.necf**) and **cbsc–#.cdf** files from the CBSC.<br>**NOTE**<br>If necessary, the correct channel number may be manually entered into the **Carrier # Channels** box. |
| | 7 | If at least one MCC was selected in Step 3, select the appropriate transfer rate (**1** = 9600, **3** = 9600 1X) from the drop–down list in the **Rate Set** box.<br>**NOTE**<br>The rate selection of **3** is only available if 1X cards are selected for the test. |

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| Table 6-37: Procedure for BTS TX Path Audit | | |
|---|---|---|
| ✓ | **Step** | **Action** |
| | 8 | From the **Test Pattern** pick list, select a test pattern.<br>– Selecting **Pilot** (default) performs tests using a pilot signal only.<br>– Selecting **Standard** performs tests using pilot, synch, paging and six traffic channels. This requires an MCC to be selected.<br>– Selecting **CDFPilot** performs tests using the CDF value for pilot gain and IS–97 gain values for all the other channels included in the Standard pattern setting (paging, synch, and six traffic). Using this pattern setting requires the selection of both a BBX and at least one MCC.<br>– Selecting **CDF** performs tests using pilot, synch, paging and six traffic channels, however, the gain for the channel elements is specified in the CDF file. |
| | 9 | Click **OK** to display the status report window followed by a **Directions** pop-up window. |
| | 10 | Follow the cable connection directions as they are displayed. When the calibration process is completed, results will be displayed in the status report window. |
| | 11 | Click on the **Save Results** or **Dismiss** button, as desired, to close the status report window. |

### Exception Handling

In the event of a failure, the calibration procedure displays a **FAIL** message in the status report window and provides information in the **Description** field.

## Create CAL File

The LMF Create CAL File function gets the BLO data from BBXs and creates or updates the CAL file for the BTS. After a BTS has been fully optimized a copy of the CAL file must exist so it can be transferred to the CBSC. If TX calibration has been successfully performed for all BBXs and BLO data has been downloaded, the BLO data must be saved to the CAL file in the BTS folder. If this is a first time calibration and no CAL file is stored in the BTS folder, the procedure in Table 6-38 will create the file and store the BLO data in it. If the CAl file already exists, this procedure will update it with the new BLO data. Note the following:

- The Create Cal File function only applies to selected (highlighted) BBXs.

**CAUTION**

Editing the CAL file is not encouraged as this action can cause interface problems between the BTS and the LMF. To manually edit the CAL file you must first logout of the BTS. If you manually edit the CAL file and then use the Create Cal File function the edited information will be lost.

### Prerequisites

Before running the procedure in Table 6-38, the following should be done:

- LMF is logged into the BTS
- BBXs are OOS_RAM (yellow)
- BLO has been downloaded to the BBXs

**Table 6-38:** Create CAL File

| Step | Action |
|---|---|
| 1 | Select the applicable BBXs.<br>– The CAL file will be updated for the selected BBXs *only.* |
| 2 | Click on **Device** in the BTS menu bar, and select **Create Cal File** from the pull–down menu.<br>– A status report window will appear and display the results of the action. |
| 3 | Click the **OK** button to close the status report window. |

**Notes**

# Chapter 7: Automated Acceptance Test Procedure (ATP)

## Table of Contents

**Notes**

# Automated Acceptance Test Procedure – Introduction

## Introduction

### General

The Acceptance Test Procedures (ATP) allow Cellular Field Engineers (CFEs) to run automated acceptance tests on all BTS subsystem devices equipped in the CDF using the LMF and the test equipment it supports.

### Test Reports

The CFE can choose to save the results of ATP tests to a report file from which *ATP reports* are generated for later printing. See the Generating an ATP Report section in this chapter.

### Test Equipment Selection

Because test equipment functions during acceptance testing are controlled by the LMF through the GPIB, only the test equipment models supported by the LMF can be used.

**IMPORTANT**

1. Before using the LMF, read the Developer Release Notes section in the *LMF Help function on–line documentation* for any applicable information.
2. The ATP test is to be performed on out-of-service sectors *only.*
3. DO NOT substitute test equipment with other models not supported by the LMF.

### Test Equipment Set Calibration

Refer to Chapter 3 for detailed interconnection information needed for calibrating equipment, cables, and other test equipment set components.

## Reduced ATP

**NOTE**

Equipment has been factory–tested for FCC compliance. If license–governing bodies require documentation supporting *BTS site* compliance with regulations, a full ATP may be necessary. Perform the Reduced ATP only if reports for the specific BTS site are NOT required.

After downloading the proper operational software to the BTS, the CFE must perform these procedures (minimum recommendation):

1. Verify the TX/RX paths by performing TX Calibration, TX Audit, and FER tests.

2. Retrieve Calibration Data required for normal site operation.

In the unlikely event that the BTS passes these tests but has a forward link problem during normal operation, the CFE should then perform the additional TX tests for troubleshooting: TX spectral mask, TX rho, and TX code domain.

### ATP Test Options

ATP tests can be run individually or as one of the following groups:

- **All TX:** TX tests verify the performance of the BTS transmit elements. These include the GLI, MCC, BBX, trunking modules, the LPAs, and passive components including splitters, combiners, bandpass filter(s), and RF cables.
- **All RX:** The RX test verifies the performance of the BTS receive elements. These include the MPC, EMPC (for companion frames), BBX, MCC, GLI modules, and the passive components including RX filters and RF cables.
- **All TX/RX:** Executes all TX and RX tests.
- **Full Optimization:** Executes the TX calibration, downloads BLO, and executes the TX audit before running all TX and RX tests.

### ATP Prerequisites

Before attempting to run *any* ATP tests, be sure the following have been completed:

- BTS has been optimized (BBXs calibrated and BLOs downloaded) (Chapter 3)
- The carrier(s) and/or sector(s) to be tested have been taken out of service at the CBSC.
- LMF is logged into the BTS
- CSA, GLI, BBXs, and MCC have correct code and data loads
- The CSA and GLI are INS_ACT (bright green)
- MCCs are INS_ACT (bright green)
- BBXs are OOS_RAM (yellow)
- Test cables are calibrated
- Test equipment has been selected, warmed up 60 minutes, and calibrated
- GPIB is on
- No BBXs are keyed (transmitting)
- BTS transmit connectors are properly terminated for the test(s) to be performed

**WARNING**

1. All transmit connectors must be properly terminated for all ATP tests.

2. Before the FER is run, be sure that one of the following is done:
   - All transmitter connectors are properly terminated
     OR
   - The Compact PA is turned OFF (circuit breakers pulled)

Failure to observe these warnings may result in bodily injury or equipment damage.

### EV–DO Optimization and ATP

Appendix A contains procedures for testing the DO card using the LMF. The procedures are unproven at this time. To load the DO card, the Local Maintenance Tool (LMT) must be used. For further information on the LMT refer to the following manuals:

- *LMT Command References – 68P09258A03*
- *LMT Operator's Guide – 68P09258A04*

There are ATP tests available specifically for DO. For further information refer to the following manual:

- *1xEV–DO System ATP – 68P09258A02*

## Required Test Equipment

The following test equipment is required:

- LMF
- Power meter (used with HP438 and Agilent 8935)
- Communications system analyzer
- Signal generator for FER testing (required for *all* communications system analyzers for 1X FER)

**WARNING**

***Before*** installing any test equipment directly to any BTS **TX OUT** connector, ***verify that there are no CDMA channels keyed***.

At active sites, have the OMCR/CBSC place the carrier assigned to the cCLPAs under test OOS. Failure to do so can result in serious personal injury and/or equipment damage.

**NOTE**

The test equipment must be re–calibrated before using it to perform the TX Acceptance Tests.

## Acceptance Test Equipment Set Up

**All ATP testing –** Follow the steps in Table 7-1 to set up test equipment for all tests.



**Table 7-1:** Set Up Test Equipment – TX Output Verify/Control Tests

| Step | Action |
|---|---|
| 1 | ***If it has not already been done***, interface the LMF computer to the BTS (refer to Table 6-6 and Figure 6-3). |
| 2 | ***If it has not already been done***, refer to Table 6-7 to start a *GUI* LMF session and log into the BTS. |
| 3 | ***If it has not already been done***, refer to Figure 6-19, Figure 6-20, Figure 6-21, or Figure 6-22, applicable, for the test equipment and antennas being used, to connect test equipment for acceptance testing.<br>*** IMPORTANT**<br>LMF–based measurements factor in TX test cable loss between the BTS and test equipment. If additional attenuation, such as external TX combiners, is inserted in the path, it must be identified to the LMF by including it in the TX test cable calibration. If this is not possible, include the attenuation in the TX path by editing cable loss values (refer to Table 6-29). Failure to do this will result in test inaccuracies and potential for erroneous ATP failures *because the additional losses would not be compensated for in the test measurements*. |

## All–inclusive Tests

**General –** The all–inclusive acceptance tests are performed from the LMF *GUI* environment. These all–inclusive tests are called *abbreviated ATPs* because they execute various combinations of individual acceptance tests *with a single command*. This allows verification of multiple aspects of BTS performance while minimizing time needed for individual test set up and initiation.

**Abbreviated ATP Options –** There are three abbreviated acceptance tests which evaluate different performance aspects of the BTS. This allows the CFE to select testing to meet the specific requirements for individual maintenance and performance verification situations. The following summarizes the coverage of each abbreviated test:

- **All TX/RX**. Performs all transmit and receive ATPs on the selected MCCs and BBXs.
- **All TX**. Performs complete set of transmit ATPs on the selected MCCs and BBXs. Testing is the equivalent of performing all of the following individual tests:
  - **TX Mask** Test
  - **Rho** Test
  - **Pilot Time Offset** Test
  - **Code Domain Power** Test
- **All RX**. Performs complete receive ATP on the selected MCCs and BBXs. Testing is the equivalent of performing the following:
  - **FER** Test

**Abbreviated ATP Procedures –** Procedures to accomplish each type of abbreviated ATP are included in the following subsections.

### All TX/RX ATP Test

Follow the procedures in Table 7-2 to perform the abbreviated, all–inclusive **transmit and receive** test.

**Table 7-2:** All TX/RX ATP Test Procedure

| Step | Action |
|---|---|
| 1 | Set up the test equipment initially for abbreviated tests as described in Table 7-1. |
| | *** IMPORTANT**<br>If the LMF has been logged into the BTS with a different **Multi–Channel Preselector** setting than the one to be used for this test, the LMF *must be logged out of the BTS and logged in again* with the *new* **Multi–Channel Preselector** setting. Using the wrong MPC setting can cause a false test failure. |
| 2 | Select the BBXs and MCCs to be tested. |
| 3 | Click on **Tests** in the BTS menu bar, and select **All TX/RX ATP...** from the pull–down menu. |
| 4 | Select the appropriate carrier(s) and sector(s) (carrier-bts#-sector#-carrier#) from those displayed in the **Channels/Carrier** pick list.<br>**NOTE**<br>To select multiple items, hold down the **Shift** or **Ctrl** key while clicking on pick list items to select multiple carrier(s)–sector(s). |
| 5 | Verify that the correct channel number for the selected carrier is shown in the **Carrier # Channels** box.<br>– If it is not, obtain the latest **bts–#.cdf** and **cbsc–#.cdf** files from the CBSC.<br>**NOTE**<br>If necessary, the correct channel number may be manually entered into the **Carrier # Channels** box. |
| 6 | *** IMPORTANT**<br>If a companion frame with the inter–frame diversity RX cabling *dis*connected is being tested *do not select* **BOTH** in this step. The RX main and diversity paths must be tested separately for this configuration because each requires a different **Multi–Coupler Preselector** type to provide the proper test signal gain.<br>Select the appropriate **RX branch** (**BOTH**, **MAIN**, or **DIV**ersity) in the drop–down list. |
| 7 | In the **Rate Set** box, select the appropriate data rate (**1**=9600, **2**=14400, **3**=9600 1X) from the drop–down list.<br>**NOTE**<br>The **Rate Set** selection of **3** is only available if 1X cards are selected for the test. |
| 8 | In the **Test Pattern** box, select the test pattern to use for the acceptance tests from the drop–down list (refer to "Test Pattern Drop–down Pick List" under "TX Calibration and the LMF" in the Bay Level Offset Calibration section of Chapter 6. |
| 9 | Click **OK** to display a status bar followed by a **Directions** pop-up window. |
| 10 | Follow cable connection directions as they are displayed, and click the **Continue** button to begin testing.<br>– As the ATP process is completed, results will be displayed in the status report window. |

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| Table 7-2: All TX/RX ATP Test Procedure | |
|---|---|
| **Step** | **Action** |
| 11 | Click the **Save Results** or **Dismiss** button.<br>**NOTE**<br>If **Dismiss** is used, the test results *will not* be saved in the test report file. |

### All TX ATP Test

Follow the procedures in Table 7-3 to perform the abbreviated, all–inclusive **transmit** test.

| Table 7-3: All TX ATP Test Procedure | |
|---|---|
| **Step** | **Action** |
| 1 | Set up the test equipment for abbreviated tests per Table 7-1. |
| 2 | Select the BBXs and MCCs to be tested. |
| 3 | Click on **Tests** in the BTS menu bar, and select **All TX ATP...** from the pull–down menu. |
| 4 | Select the appropriate carrier(s) and sector(s) (carrier-bts#-sector#-carrier#) from those displayed in the **Channels/Carrier** pick list.<br>**NOTE**<br>To select multiple items, hold down the **Shift** or **Ctrl** key while clicking on pick list items to select multiple carrier(s)–sector(s). |
| 5 | Verify that the correct channel number for the selected carrier is shown in the **Carrier # Channels** box.<br>– If it is not, obtain the latest **bts–#.cdf** and **cbsc–#.cdf** files from the CBSC.<br>**NOTE**<br>If necessary, the correct channel number may be manually entered into the **Carrier # Channels** box. |
| 6 | In the **Test Pattern** box, select the test pattern to use for the acceptance test from the drop–down list (refer to "Test Pattern Drop–down Pick List" under "TX Calibration and the LMF" in the Bay Level Offset Calibration section of Chapter 6. |
| 7 | Click **OK** to display a status bar followed by a **Directions** pop-up window. |
| 8 | Follow cable connection directions as they are displayed, and click the **Continue** button to begin testing.<br>– As the ATP process is completed, results will be displayed in the status report window. |
| 9 | Click the **Save Results** or **Dismiss** button.<br>**NOTE**<br>If **Dismiss** is used, the test results *will not* be saved in the test report file. |

### All RX ATP Test

Follow the procedures in Table 7-4 to perform the abbreviated, all–inclusive **receive** test.

| Table 7-4: All RX ATP Test Procedure | |
|---|---|
| **Step** | **Action** |
| 1 | Set up the test equipment for abbreviated tests per Table 7-1. |
| | *** IMPORTANT**<br>If the LMF has been logged into the BTS with a different **Multi–Channel Preselector** setting than the one to be used for this test, the LMF *must be logged out of the BTS and logged in again* with the *new* **Multi–Channel Preselector** setting. Using the wrong MPC setting can cause a false test failure. |
| 2 | Select the BBXs and MCCs to be tested. |
| 3 | Click on **Tests** in the BTS menu bar, and select **All RX ATP...** from the pull–down menu. |
| 4 | Select the appropriate carrier(s) and sector(s) (carrier-bts#-sector#-carrier#) from those displayed in the **Channels/Carrier** pick list.<br>**NOTE**<br>To select multiple items, hold down the **Shift** or **Ctrl** key while clicking on pick list items to select multiple carrier(s)–sector(s). |
| 5 | Verify that the correct channel number for the selected carrier is shown in the **Carrier # Channels** box.<br>– If it is not, obtain the latest **bts–#.cdf** and **cbsc–#.cdf** files from the CBSC.<br>**NOTE**<br>If necessary, the correct channel number may be manually entered into the **Carrier # Channels** box. |
| 6 | *** IMPORTANT**<br>If a companion frame with the inter–frame diversity RX cabling *dis*connected is being tested *do not select* **BOTH** in this step. The RX main and diversity paths must be tested separately for this configuration because each requires a different **Multi–Coupler Preselector** type to provide the proper test signal gain.<br>Select the appropriate **RX branch** (**BOTH**, **MAIN**, or **DIV**ersity) in the drop–down list. |
| 7 | In the **Rate Set** box, select the appropriate data rate (**1**=9600, **2**=14400, **3**=9600 1X) from the drop–down list.<br>**NOTE**<br>The **Rate Set** selection of **3** is only available if 1X cards are selected for the test. |
| 8 | Click **OK** to display a status bar followed by a **Directions** pop-up window. |
| 9 | Follow cable connection directions as they are displayed, and click the **Continue** button to begin testing.<br>– When the ATP process is completed, results will be displayed in the status report window. |
| 10 | Click the **Save Results** or **Dismiss** button.<br>**NOTE**<br>If **Dismiss** is used, the test results *will not* be saved in the test report file. |

## Individual Acceptance Tests

The following individual ATP tests can be used to evaluate specific aspects of BTS operation against individual performance requirements. All testing is performed using the LMF *GUI* environment.

### TX Testing

TX tests verify any given transmit antenna path and output power control. All tests are performed using the external, calibrated test equipment. All measurements are made at the appropriate BTS **TX OUT** connector(s).

TX tests verify TX operation of the entire CDMA forward link using selected BBXs assigned to respective sector antennas. Each BBX is keyed up to generate a CDMA carrier (using both `bbxlevel` and BLO) at the CDF file–specified carrier output power level.

### RX Testing

RX testing verifies receive antenna paths for BBXs selected for the test. All tests are performed using the external, calibrated test equipment to inject a CDMA RF carrier with all zero longcode at the specified RX frequency at the appropriate BTS **RX IN** connector(s).

RX tests verify RX operation of the entire CDMA reverse link using all equipped MCCs assigned to all respective sector/antennas.

## Individual Tests

### Spectral Purity TX Mask

This test verifies that the transmitted CDMA carrier waveform generated on each sector meets the transmit spectral mask specification (as defined in IS–97) with respect to the assigned CDF file values.

### Waveform Quality (Rho)

This test verifies that the transmitted Pilot channel element digital waveform quality (rho) exceeds the minimum specified value in IS–97. *Rho* represents the correlation between the actual and perfect CDMA modulation spectrums. 1.0000 represents 100% (or perfect correlation).

### Pilot Time Offset

The Pilot Time Offset is the difference between the communications system test set measurement interval (based on the BTS system time reference) and the incoming block of transmitted data from the BTS (Pilot only, Walsh code 0).

### Code Domain Power/Noise Floor

This test verifies the code domain power levels, which have been set for all ODD numbered Walsh channels, using the OCNS command. This is done by verifying that the ratio of PILOT divided by OCNS is equal to **10.2 $\pm$ 2 dB**, and, that the noise floor of all EVEN numbered "OFF" Walsh channels measures $\leq$ **–27 dB** for IS–95A/B and CDMA2000 1X with respect to total CDMA channel power.

### BTS FER

This test verifies the BTS receive FER on all traffic channel elements currently configured on all equipped MCCs (fullrate at one percent FER) at an RF input level of –119 dBm on the *main* RX antenna paths using operator–selected, CDF–*equipped* MCCs and BBXs at the site. *Diversity* RX antenna paths are also tested using the lowest equipped MCC channel element ONLY.

**NOTE**

There are no pass/fail criteria associated with FER readings taken at levels below –119 dBm, other than to verify that the FER measurement reflects changes in the RX input signal level.

## Background

**Overview –** This test verifies the spectral purity of each operator–selected BBX carrier keyed up at a specific frequency *specified in the current CDF.* All tests are performed using the external, calibrated test equipment controlled by the same command. All measurements are made at the appropriate BTS TX antenna connector.

**Test Patterns –** There are four operator–selectable test patterns with which this acceptance test can be performed. The patterns, along with the channels tested and gain setting for each, are listed in Table 6-33. Refer to "TX Calibration and the LMF" in the Bay Level Offset Calibration section for more information on the test patterns.

**Equipment Operation During Testing –** At least one MCC must be selected to perform the Standard, CDF Pilot, and CDF test patterns. For these test patterns, forward links will be enabled for synch channel (SCH), paging channel (PCH), and traffic channel (TCH) elements from the selected MCC(s), as shown in Table 6-33. Gain will be set for the applicable channels on each antenna as shown in the table. The operator–selected BBXs will be keyed using a BLO–corrected `bbxlvl` value to generate a CDMA carrier. RF output power, as measured at the appropriate frame TX antenna connector, will be set to one of the following depending on the operating frequency spectrum:

- 800 MHz: 33.5 dBm

**Test Measurements –** The test equipment will measure and return the attenuation level in dB of all spurious and IM products with respect to the mean power of the CDMA channel measured in a 1.23 MHz bandwidth, verifying that results meet system tolerances at the following test points (see also Figure 7-1):

- For 800 MHz:
  - At least **–45 dB** @ **+ 750 kHz** from center frequency
  - At least **–45 dB** @ **– 750 kHz** from center frequency
  - At least **–60 dB** @ **– 1980 kHz** from center frequency
  - At least **–60 dB** @ **+ 1980 kHz** from center frequency



## Spectral Purity TX Mask Acceptance Test

Follow the steps in Table 7-5 to verify the transmit spectral mask specification on the TX antenna paths for the selected BBXs.

**Table 7-5:** Test Spectral Purity Transmit Mask

| Step | Action |
|---|---|
| 1 | Set up the test equipment for TX acceptance tests per Table 7-1. |

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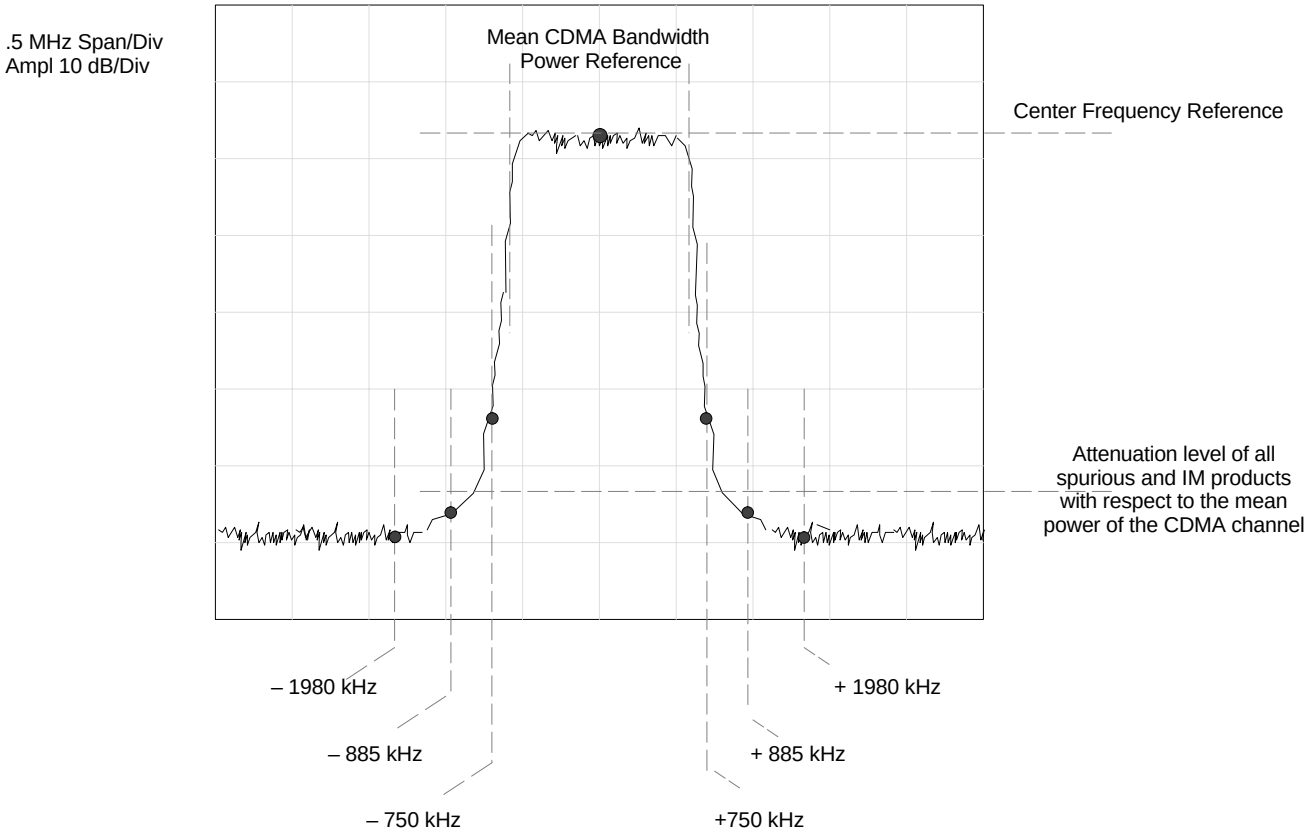
| Table 7-5: Test Spectral Purity Transmit Mask | |
|---|---|
| **Step** | **Action** |
| 2 | Select the BBXs to be tested. |
| 3 | Click on **Tests** in the BTS menu bar, and select **TX > TX Mask...** from the pull–down menus. |
| 4 | Select the appropriate carrier(s) and sector(s) (carrier-bts#-sector#-carrier#) from those displayed in the **Channels/Carrier** pick list.<br>**NOTE**<br>To select multiple items, hold down the **Shift** or **Ctrl** key while clicking on pick list items to select multiple carrier(s)–sector(s). |
| 5 | Verify that the correct channel number for the selected carrier is shown in the **Carrier # Channels** box.<br>– If it is not, obtain the latest **bts–#.cdf** and **cbsc–#.cdf** files from the CBSC.<br>**NOTE**<br>If necessary, the correct channel number may be manually entered into the **Carrier # Channels** box. |
| 6 | In the **Test Pattern** box, select the test pattern to use for the calibration from the drop–down list (refer to “Test Pattern Drop–down Pick List” under “TX Calibration and the LMF” in the Bay Level Offset Calibration section. |
| 7 | Click **OK** to display a status bar followed by a **Directions** pop-up window. |
| 8 | Follow the cable connection directions as they are displayed, and click the **Continue** button to begin testing.<br>– As the ATP process is completed, results will be displayed in a status report window. |
| 9 | Click the **Save Results** or **Dismiss** button.<br>**NOTE**<br>If **Dismiss** is used, the test results *will not* be saved in the test report file. |

**Figure 7-1:** TX Mask Verification Spectrum Analyzer Display



# TX Waveform Quality (Rho) Acceptance Test

## Background

**Overview –** This test verifies the transmitted pilot channel element digital waveform quality of each operator–selected BBX carrier keyed up at a specific frequency *specified in the current CDF.* All tests are performed using the external, calibrated test equipment controlled by the same command. All measurements are made at the appropriate TX antenna connector.

**Equipment Operation During Testing –** Pilot gain will be set to 262 for each antenna, and all TCH elements from the MCCs will be forward–link disabled. The selected BBXs will be keyed up using both `bbxlvl` and BLO to generate a CDMA carrier (with pilot channel element only, Walsh code 0). RF output power is set at 40 dBm as measured at the appropriate BTS TX antenna connector.

**Test Measurements –** The test equipment will measure and return the pilot channel element digital waveform quality (rho) percentage, verifying that the result meets the following specification:

Waveform quality (Rho) should be > **0.98**.

## Waveform Quality (Rho) Acceptance Test

Follow the steps in Table 7-6 to verify the pilot channel element waveform quality (rho) on the TX antenna paths for the selected BBXs.

**Table 7-6:** Test Waveform Quality (Rho)

| Step | Action |
|---|---|
| 1 | Set up the test equipment for TX acceptance tests per Table 7-1. |
| 2 | Select the BBXs to be tested. |
| 3 | Click on **Tests** in the BTS menu bar, and select **TX > Rho...** from the pull–down menus. |
| 4 | Select the appropriate carrier(s) and sector(s) (carrier-bts#-sector#-carrier#) from those displayed in the **Channels/Carrier** pick list.<br>**NOTE**<br>To select multiple items, hold down the **Shift** or **Ctrl** key while clicking on pick list items to select multiple carrier(s)–sector(s). |
| 5 | Verify that the correct channel number for the selected carrier is shown in the **Carrier # Channels** box.<br>– If it is not, obtain the latest **bts–#.cdf** and **cbsc–#.cdf** files from the CBSC.<br>**NOTE**<br>If necessary, the correct channel number may be manually entered into the **Carrier # Channels** box. |
| 6 | Click **OK** to display a status bar followed by a **Directions** pop-up window. |
| 7 | Follow the cable connection directions as they are displayed, and click the **Continue** button to begin testing.<br>– As the ATP process is completed, results will be displayed in a status report window. |

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| Table 7-6: Test Waveform Quality (Rho) | |
|---|---|
| **Step** | **Action** |
| 8 | Click the **Save Results** or **Dismiss** button.<br>**NOTE**<br>If **Dismiss** is used, the test results *will not* be saved in the test report file. |

# TX Pilot Time Offset Acceptance Test

## Background

**Overview –** This test verifies the transmitted pilot channel element Pilot Time Offset of each operator–selected BBX carrier keyed up at a specific frequency *specified in the current CDF.* All tests will be performed using the external, calibrated test equipment controlled by the same command. All measurements will be made at the BTS TX antenna connector.

**Equipment Operation During Testing –** The pilot gain will be set to 262 for each antenna and all TCH elements from the MCCs will be forward–link disabled. The selected BBXs will be keyed using both `bbxlvl` and BLO to generate a CDMA carrier (with pilot channel element only, Walsh code 0). TX power output is set at 40 dBm as measured at the TX output.

**Test Measurements –** The test equipment will measure and return the Pilot Time Offset in μs, verifying that results meet the following specification:

Pilot Time Offset should be within **3 μs** of the target PT Offset (zero μs).

**NOTE**

This test also executes and returns the TX Frequency and TX Waveform Quality (rho) ATP tests, however, only *Pilot Time Offset* results are written to the ATP test report.

## Pilot Time Offset Acceptance Test

Follow the steps in Table 7-7 to verify the Pilot Time Offset on the TX antenna paths for the selected BBXs.

**Table 7-7:** Test Pilot Time Offset

| Step | Action |
|---|---|
| 1 | Set up the test equipment for TX acceptance tests per Table 7-1. |
| 2 | Select the BBXs to be tested. |
| 3 | Click on **Tests** in the BTS menu bar, and select **TX > Pilot Time Offset...** from the pull–down menus. |
| 4 | Select the appropriate carrier(s) and sector(s) (carrier-bts#-sector#-carrier#) from those displayed in the **Channels/Carrier** pick list.<br>**NOTE**<br>To select multiple items, hold down the **Shift** or **Ctrl** key while clicking on pick list items to select multiple carrier(s)–sector(s). |

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| Table 7-7: Test Pilot Time Offset | |
|---|---|
| **Step** | **Action** |
| 5 | Verify that the correct channel number for the selected carrier is shown in the **Carrier # Channels** box.<br>– If it is not, obtain the latest **bts–#.cdf** and **cbsc–#.cdf** files from the CBSC.<br>**NOTE**<br>If necessary, the correct channel number may be manually entered into the **Carrier # Channels** box. |
| 6 | Click **OK** to display a status bar followed by a **Directions** pop-up window. |
| 7 | Follow the cable connection directions as they are displayed, and click the **Continue** button to begin testing.<br>– As the ATP process is completed, results will be displayed in a status report window. |
| 8 | Click the **Save Results** or **Dismiss** button.<br>**NOTE**<br>If **Dismiss** is used, the test results *will not* be saved in the test report file. |

## Background

**Overview –** This test verifies the Code Domain Power and Noise Floor of each operator–selected BBX carrier keyed at a specific frequency *specified in the current CDF.* All tests are performed using the external, calibrated test equipment controlled by the same command. All measurements are made at the appropriate BTS TX antenna connector.

**CDMA Channel Test Set–up –** Pilot gain will be set to 262 for each antenna and the selected MCCs will be configured to supply all odd–numbered Walsh code traffic channel elements by enabling Orthogonal Channel Noise Source (OCNS) on all odd MCC channel elements (maximum 32 full rate channels with an OCNS gain of 81). All even–numbered Walsh code traffic channel elements will not have OCNS enabled, and are considered "OFF". Selected MCCs will be forward–link enabled for the antenna (sector) under test.

**Equipment Operation During Testing –** The BBX will be keyed up using a BLO–corrected `bbxlvl` value to generate a CDMA carrier consisting of pilot and OCNS channels. RF output power, as measured at the appropriate frame TX antenna connector, is set at one of the following values depending on the operating frequency spectrum:

- 800 MHz:  33.5 dBm

**Test Measurements –** The test equipment will measure and return the channel element power in dB of all specified Walsh channels within the CDMA spectrum. Additional calculations will be performed to verify the following parameters are met (refer to Figure 7-2 for graphic representations):

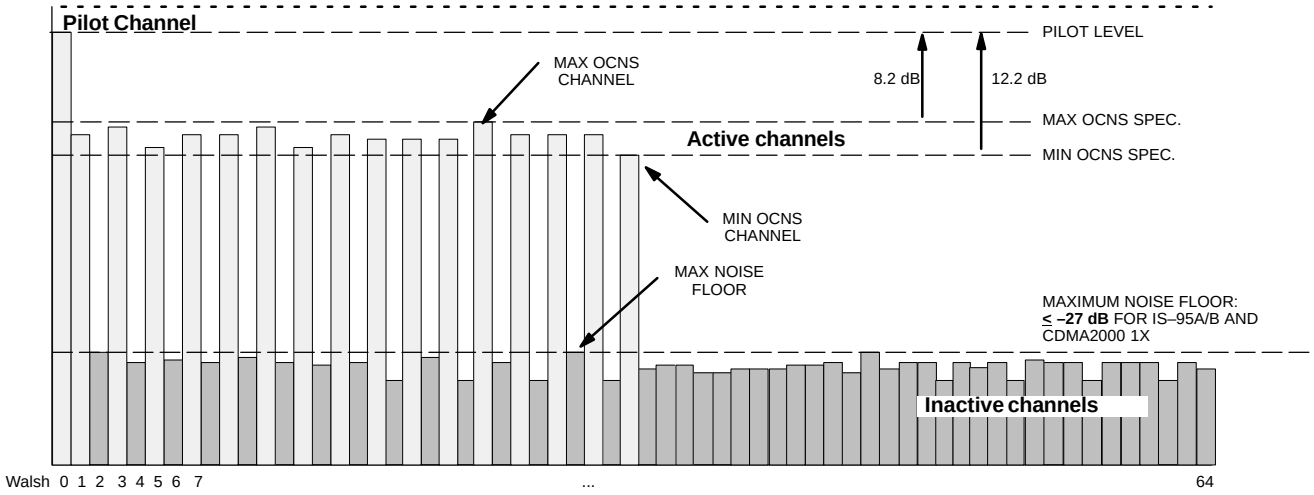
- Traffic channel element power level will be verified by calculating the ratio of Pilot power to OCNS gain of all traffic channels (root sum of the square (RSS) of each OCNS gain divided by the Pilot power). This value should be **10.2 dB ± 2.0 dB**.
- Noise floor (unassigned "OFF" even–numbered Walsh channels) is verified to be **≤ –27 dB** for IS–95A/B and CDMA2000 1X with respect to total CDMA channel power.

## Code Domain Power/Noise Floor Test

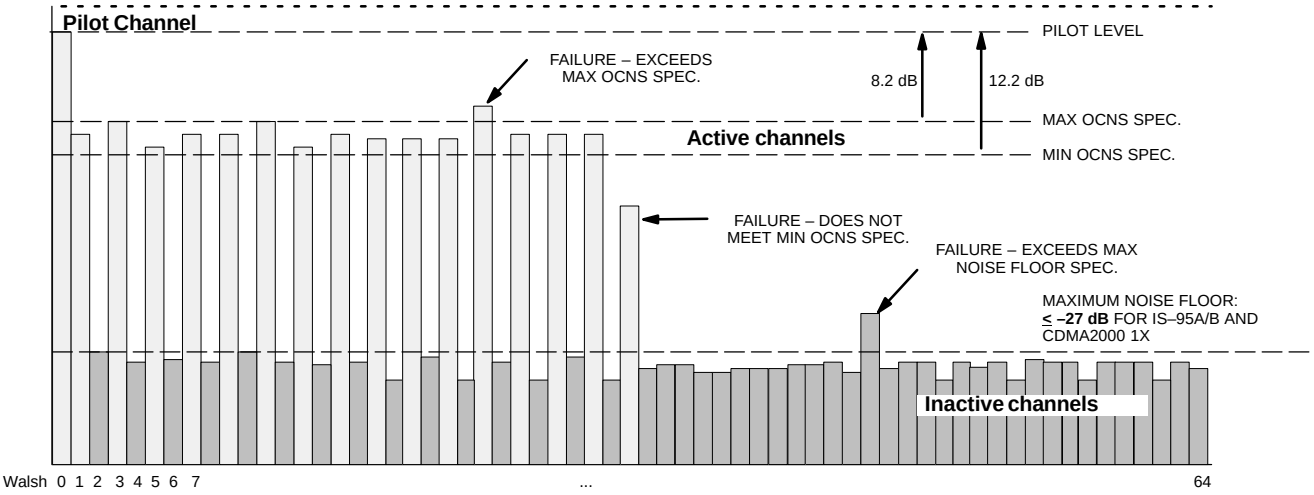
Follow the steps in Table 7-8 to verify the Code Domain Power/Noise floor of each selected BBX carrier keyed up at a specific frequency.

| Table 7-8: Test Code Domain Power/Noise Floor | |
|---|---|
| **Step** | **Action** |
| 1 | Set up the test equipment for TX acceptance tests per Table 7-1. |
| 2 | Select the BBXs and MCCs to be tested. |
| 3 | Click on **Tests** in the BTS menu bar, and select **TX > Code Domain Power...** from the pull–down menus. |
| 4 | Select the appropriate carrier(s) and sector(s) (carrier-bts#-sector#-carrier#) from those displayed in the **Channels/Carrier** pick list.<br>**NOTE**<br>To select multiple items, hold down the **Shift** or **Ctrl** key while clicking on pick list items to select multiple carrier(s)–sector(s). |
| 5 | Verify that the correct channel number for the selected carrier is shown in the **Carrier # Channels** box.<br>– If it is not, obtain the latest **bts–#.cdf** and **cbsc–#.cdf** files from the CBSC.<br>**NOTE**<br>If necessary, the correct channel number may be manually entered into the **Carrier # Channels** box. |
| 6 | Click **OK** to display a status bar followed by a **Directions** pop-up window. |
| 7 | Follow the cable connection directions as they are displayed, and click the **Continue** button to begin testing.<br>– As the ATP process is completed, results will be displayed in a status report window. |
| 8 | Click the **Save Results** or **Dismiss** button.<br>**NOTE**<br>If **Dismiss** is used, the test results *will not* be saved in the test report file. |

**Figure 7-2:** Code Domain Analyzer CD Power/Noise Floor Display Examples




**Code Domain Power/Noise Floor (OCNS Pass) Example**




**Code Domain Power/Noise Floor (OCNS Failure) Example**

## Background

**Overview –** This test verifies the BTS Frame Erasure Rate (FER) on *all* TCHs currently configured on operator–selected MCCs (fullrate at 1% FER) at –119 dBm. All tests are performed using the external, calibrated test equipment as the signal source controlled by the same command. Measurements are made at the specified BTS RX antenna connection.

**Equipment Operation During Testing –** The pilot gain on each MCC will be set to 262 for each TX antenna, and the forward link for all TCH elements from the MCCs will be enabled. Appropriate BBX(s) must be keyed in order to enable the RX receive circuitry. Operator–selected BBXs will be keyed using only `bbxlvl`, to generate a CDMA carrier with pilot channel element only. Transmit power output is set at –40 dBm. Test equipment output power is set so that the received power at the BBX is –119 dBm. The final output power setting of the test equipment takes into account the MPC type, BTS RF path losses, and test cable losses. .

**Test Measurements –** The LMF will prompt the MCC channel element under test to measure all–zero longcode and provide the FER report on the selected active MCC on the reverse link for the main and, if selected, diversity RX antenna paths. Results are evaluated to ensure they meet the following specification:

FER returned less than **1%** and Total Frames measured is **1500**

## FER Acceptance Test

Follow the steps in Table 7-9 to verify the FER on RX antenna paths using selected MCCs and BBXs.

**Table 7-9:** Test FER

| Step | Action |
|---|---|
| 1 | Set up the test equipment for RX acceptance tests per Table 7-1. |
| 2 | *** IMPORTANT**<br>If the LMF has been logged into the BTS with a different **Multi–Channel Preselector** setting than the one to be used for this test, the LMF *must be logged out of the BTS and logged in again* with the *new* **Multi–Channel Preselector** setting. Using the wrong MPC setting can cause a false test failure. |
| 3 | Select the BBXs and MCCs to be tested. |
| 4 | Click on **Tests** in the BTS menu bar, and select **RX > FER...** from the pull–down menu. |
| 5 | Select the appropriate carrier(s) and sector(s) (carrier-bts#-sector#-carrier#) from those displayed in the **Channels/Carrier** pick list. |
| 6 | **NOTE**<br>To select multiple items, hold down the **Shift** or **Ctrl** key while clicking on pick list items to select multiple carrier(s)–sector(s). |

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| **Table 7-9:** Test FER | |
|---|---|
| **Step** | **Action** |
| 7 | Verify that the correct channel number for the selected carrier is shown in the **Carrier # Channels** box.<br>– If it is not, obtain the latest **bts–#.cdf** and **cbsc–#.cdf** files from the CBSC. |
| 8 | **NOTE**<br>If necessary, the correct channel number may be manually entered into the **Carrier # Channels** box. |
| 9 | *** IMPORTANT**<br>If a companion frame with the inter–frame diversity RX cabling *dis*connected is being tested *do not select* **BOTH** in this step. The RX main and diversity paths must be tested separately for this configuration because each requires a different **Multi–Coupler Preselector** type to provide the proper test signal gain. |
| 10 | Select the appropriate **RX branch** (**Both**, **Main**, or **Div**ersity) in the drop–down list. |
| 11 | In the **Rate Set** box, select the appropriate data rate (**1**=9600, **2**=14400, **3**=9600 1X) from the drop–down list. |
| 12 | **NOTE**<br>The **Rate Set** selection of **3** is only available if 1X cards are selected for the test. |
| 13 | Click **OK** to display a status bar followed by a **Directions** pop-up window. |
| 14 | Follow cable connection directions as they are displayed, and click the **Continue** button to begin testing.<br>– As the ATP process is completed, results will be displayed in the status report window. |
| 15 | Click the **Save Results** or **Dismiss** button.<br>**NOTE**<br>If **Dismiss** is used, the test results *will not* be saved in the test report file. |

# Generating an ATP Report

### Background

Each time an ATP test is run, ATP data is updated and must be saved to an ATP report file using the **Save Results** button to close the status report window. The ATP report file *will not* be updated if the status reports window is closed using the **Dismiss** button.

### ATP Report

A separate report is created for each BTS and includes the following for each test:

- Test name
- PASS or FAIL
- Description information (if applicable)
- BBX number
- Channel number
- Carrier number
- Sector number
- Upper test limit
- Lower test limit
- Test result
- Time stamp
- Details/Warning information (if applicable)

Follow the procedures in the Table 7-10 to view and create a printable file for the ATP report.

**Table 7-10:** Generating an ATP Report

| Step | Action |
|---|---|
| 1 | Click on the **Login** tab (if not in the forefront). |
| 2 | Click on the desired BTS in the **Available Base Stations** pick list to select it. |
| 3 | Click on the **Report** button. |
| 4 | If a printable file is not needed, click on the **Dismiss** button. |
| 5 | If a printable file is required, perform the following: |
| 5a | – Select the desired file type (text, comma–delimited, HTML) for the report file from the drop–down list at the bottom of the screen. |
| 5b | – Click the **Save** button to save the file.<br>— The file will be saved in the selected format in the bts–# folder for the BTS selected. |

**Notes**

# Chapter 8: Leave the Site

## Table of Contents

**Notes**

# Updating Calibration Data Files

## Software Release caveats

With Software Release 2.16.1.x, the packet BTS will NOT detect a new calibration file on the OMC–R. A manual workaround is available in bulletin cdma_g_bts_059. This will be corrected in Software Release 2.16.3.

Software Release 2.16.3 will allow the user to load the calibration file from the LMF directly onto the MGLI. The MGLI will then ftp the new calibration file to the OMC–R, thereby eliminating the need for the user to place the calibration file at the OMC–R.

## Copy and Load Cal File to to CBSC

After completing the TX calibration and audit, updated CAL file information must be moved from the LMF *Windows* environment back to the CBSC, a Unix environment. The following procedures detail moving files from one environment to the other.

### Copying CAL files from LMF to a Diskette

Follow the procedures in Table 8-1 to copy the CAL files from an LMF computer to a 3.5 diskette.

**Table 8-1:** Copying CAL Files to a Diskette

| Step | Action |
|---|---|
| 1 | With *Windows* running on the LMF computer, insert a disk into Drive A:\. |
| 2 | Launch the ***Windows* Explorer** application program from the **Start > Programs** menu list. |
| 3 | Select the applicable **<*x*>:\<*lmf home directory*/cdma/bts–#** folder. |
| 4 | Drag the **bts–#.cal** file to Drive A. |
| 5 | Repeat Steps 3 and 4, as required, for other **bts–#** folders. |

### Copying CAL Files from Diskette to the CBSC

Follow the procedures in Table 8-2 to copy CAL files from a diskette to the CBSC.

**Table 8-2:** Copying CAL Files from Diskette to the CBSC

| Step | Action |
|---|---|
| 1 | Log into the CBSC on the OMC–R Unix workstation using your account name and password. |
| 2 | Place the diskette containing calibration files (cal files) in the workstation diskette drive. |
| 3 | Type in **eject –q** and press the **Enter** key. |
| 4 | Enter **mount** and press the **Enter** key. Verify that **floppy/no_name** is displayed.<br>**NOTE**<br>If the **eject** command has been previously entered, **floppy/no_name** will be appended with a number. Use the explicit floppy/no_name reference displayed. |
| 5 | Type in **cd /floppy/no_name** and press the **Enter** key. |
| 6 | Type in **ls –lia** and press the **Enter** key. Verify the **bts–#.cal** file filename appears in the displayed directory listing. |
| 7 | Type in **cd** and press the **Enter** key. |
| 8 | Type in **pwd** and press the **Enter** key. Verify the displayed response shows the correct home directory (**/home/**<*user's name*>). |
| 9 | With *Solaris versions of Unix*, create a Unix–formatted version of the **bts–#.cal** file in the home directory by performing the following: |
| 9a | – Type in **dos2unix /floppy/no_name/bts–#.cal bts–#.cal** and press the **Enter** key.<br>Where: # = BTS number for which the CAL file was created<br>**NOTE**<br>Other versions of Unix do not support the `dos2unix` command. In these cases, use the Unix **cp** (copy) command. The *copied* files will contain DOS line feed characters which must be edited out with a Unix text editor. |
| 10 | Type in **ls –l *.cal** and press the **Enter** key. Verify the CAL files have been copied. Verify all CAL files to be transferred appear in the displayed listing. |
| 11 | Type **eject** and press the **Enter** key. |
| 12 | Remove the diskette from the workstation. |

### External Test Equipment Removal

Perform the procedure in Table 8-3 to disconnect the test equipment and configure the BTS for active service.

**Table 8-3:** Remove External Test Equipment

| Step | Action |
|---|---|
| 1 | **△ WARNING**<br>Be sure no BBXs are keyed before performing this step. Failure to do so can result in personal injury and damage to BTS LPAs.<br>Disconnect all external test equipment from all TX and RX connectors at the rear of the frame. |
| 2 | Reconnect and visually inspect all TX and RX antenna feed lines at the frame RF interface panel.<br>**NOTE**<br>Verify that all sector antenna feed lines are connected to the correct antenna connectors on the frame. Crossed antenna cables will degrade call processing. |

### Bringing Modules into Service with the LMF

**NOTE**

Whenever possible, have the CBSC/MM bring up the site and enable all devices at the BTS.

If there is a reason code and/or data should or could not be loaded remotely from the CBSC, follow the steps outlined in Table 8-4 *as required* to bring BTS processor modules from OOS to INS state.

**Table 8-4:** Bring Modules into Service

| Step | Action |
|---|---|
| 1 | In the WinLMF *GUI* environment, select the device(s) to be enabled by clicking on each one.<br>**NOTE**<br>• The GLI and CSA must be INS_ACT (bright green) before an MCC can be enabled.<br>• Processors which must be enabled and the order of enabling are as follows:<br>1. GLI<br>2. CSA<br>3. MCCs |
| 2 | Click on **Device** in the BTS menu bar, and select **Enable** from the pull–down list.<br>– A status report window is displayed. |
| 3 | **NOTE**<br>If a BBX is selected, a transceiver parameters window is displayed to collect keying information. *Do not enable the BBX*. |

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| Table 8-4: Bring Modules into Service | |
|---|---|
| **Step** | **Action** |
| 4 | Click **Cancel** to close the transceiver parameters window, if applicable. |
| 5 | Click **OK** to close the status report window.<br>– The color of devices which successfully change to INS will change bright green. |

### WinLMF Removal

Perform the procedure in Table 8-5 as required to terminate the WinLMF *GUI* session and remove the WinLMF computer.

| Table 8-5: Terminate the WinLMF Session and Remove the WinLMF | |
|---|---|
| **Step** | **Action** |
| 1 | **! CAUTION**<br>Do not power down the WinLMF terminal without performing the procedure below. Corrupted/lost data files may result.<br>Log out of all BTS sessions and exit WinLMF by clicking on **File** in the WinLMF window menu bar and selecting **Logout and Exit** from the pull–down list. |
| 2 | In the *Windows* Task Bar, click **Start** and select **Shutdown**. Click **Yes** when the Shut Down Windows message appears. |
| 3 | Wait for the system to shut down and the screen to go blank. |
| 4 | Disconnect the WinLMF terminal Ethernet port from the BTS frame. |
| 5 | Disconnect the WinLMF terminal serial port, the RS–232–to–GPIB interface box, and the GPIB cables as required for equipment transport. |

### Connecting BTS T1/E1 Spans

Perform the procedure in Table 8-6 to connect any T1 or E1 span connectors removed previously to allow the WinLMF to control the BTS.

| Table 8-6: Connect T1 or E1 Spans | |
|---|---|
| **Step** | **Action** |
| 1 | Re–connect any disconnected span lines. |
| 2 | Verify span status, ensuring the OMC–R/CBSC can communicate with the BTS. |

### Final Checks before leaving site

Be sure all requirements listed in Table 8-7 are completed before leaving the site.

**Table 8-7:** Check Before Leaving the Site

| Step | Action |
|---|---|
| 1 | When backup batteries are installed, *all* battery circuit breakers are **ON** (pushed in). |
| 2 | BTS circuit breaker is ON (pushed in). |
| 3 | No alarm conditions are being reported to the OMC–R. |

### Reset All Devices and Initialize Site Remotely

Devices in the BTS should not be left with data and code loaded from the WinLMF. The configuration data and code loads used for normal operation could be different from those stored in the WinLMF files. Perform the procedure in Table 8-8 to reset all devices and initialize site remotely.

**Table 8-8:** Reset BTS Devices and Remote Site Initialization

| Step | Action |
|---|---|
| 1 | Terminate the WinLMF session by following the procedures in Table 8-5. |
| 2 | Reconnect spans by following the procedure in Table 8-6. |
| 3 | **Circuit BTS Procedure:** |
| 3a | From the BTS site, contact the OMC–R and request the operator to perform a BTS reset.<br>*or*<br>At the BTS site:<br>– unseat the GLI card and wait for 30 seconds; |
| 3b | Have the operator perform the following:<br>• ACTIVATE the GLI to set the Nextload attribute for the GLI to the one for the current BSS software version;<br>• Disable the GLI;<br>• Enable the GLI to allow the MM to load the software version specified by the Nextload attribute;<br>• Once the GLI is INS_ACT, contact the OMC–R and request the operator ACTIVATE the BTS.<br>– Once the GLI card is loaded with the specified code version, the GLI will verify and update, as required, the RAM and, if it is necessary, ROM code loads for the installed CSA, MCC, and BBX cards using the DLM. |
| 4 | After all activities at the site have been completed, contact the OMC–R and confirm that the BTS is under OMC–R control. |

**Notes**

# Chapter 9: Field Replaceable Unit

## Table of Contents

# Introduction

## Scope

The objective of the Field Replaceable Unit (FRU ) section contains OMC–R procedures and information and procedures for disassembling and/or replacing cards, modules, and components of the Compact BTS. The Compact BTS is a single cage, non–redundant configuration.

## Section Organization

The FRU section is organized in the following manner:

- Compact BTS FRU procedures that are performed by a technician at the site
- OMC–R procedures performed by the operator

### BTS FRU Procedures

The BTS FRU procedures are grouped by major functional areas within the BTS and presented as follows:

- Compact BTS Input/Output (CBIO) Board Replacement Procedure
  - Synchronization Daisy–Chaining and eXpansion (SDCX) Module Replacement Procedure
  - RF GPS Module Replacement Procedure
- CCP2 Card and Shelf Replacement Procedures
- RF Component Replacement Procedures
- High Stability Oscillator/Medium Stability Oscillator (HSO/MSO) Replacement Procedure

**External Components –** The following external components are optional

- Compact Combined Linear Power Amplifier (cCLPA) Replacement Procedure

### OMC–R Procedures

Describes procedures that can be performed only by the operator from the OMC–R site.

If the OMC–R operator is unable to resolve the problem, then the user will be directed to the appropriate section of the Troubleshooting manual for further action.

**Figure 9-1:** Compact BTS Front Panel Layout without Front Panel Cover

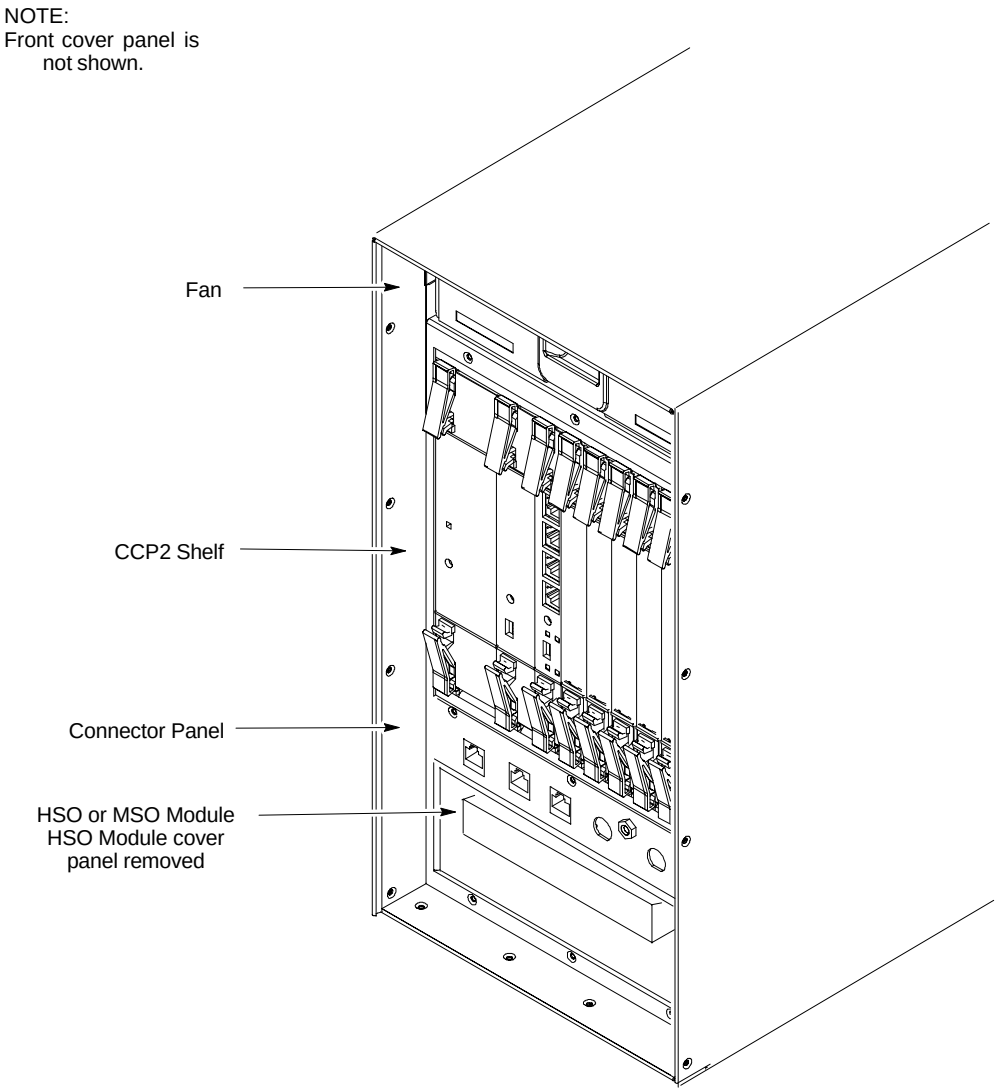
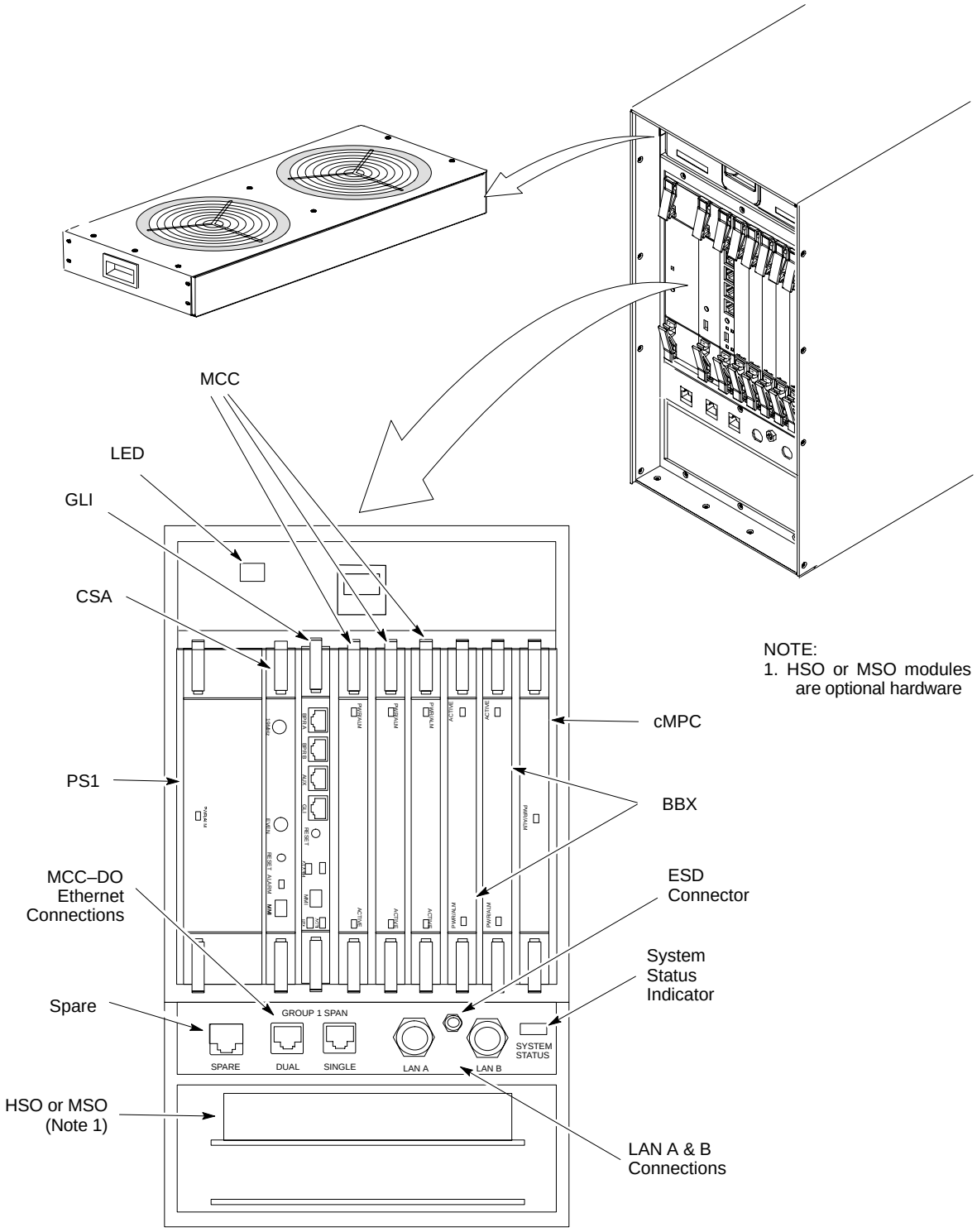


**Figure 9-2:** Compact BTS Fan and CCP2 Shelf Layout



# Fan Module

## Introduction

The fan module is located above the CCP2 Shelf at the front of the Compact BTS.

The fan mdoule is a modular device allowing easy replacement. The electrical connection for DC power is made through a connector at the rear of the module. The connector is automatically engaged when the fan module is inserted and seated.

## System Impact/Considerations

**NOTE**

At room temperature, the fan module is very quiet. Operation can be verified by holding a hand over the exhaust grill on top and feeling for air movement.

**IMPORTANT**

Performing this replacement procedure will not cause downtime or interrupt call processing, but it will trigger alarms.

If a fan begins to degrade or fails, an alarm signal will be sent to the Clock Synchronization Alarms card in the CCP2 Shelf.

## Required Items

### Documents

None.

### Tools

None.

### Replacement Units

One fan module (STLN6210)

## Prerequisite

**IMPORTANT**

Coordinate this repair task with the OMC–R operator.

Contact the OMC–R operator before performing the replacement procedure. Tell the operator that the fan module will be replaced and that alarms can be expected.

Upon completion of the replacement procedure, have the OMC–R operator verify that old alarms are cleared and that no new ones are reported.

## Replacement Procedure

**CAUTION**

This procedure requires working around circuitry that is extremely sensitive to Electrostatic Discharge (ESD). Wear a conductive, high impedance wrist strap during the procedure.
Use appropriate safety measures.

If desired, record the BTS and Fan Module serial number of the failed unit in Table 9-53 at the end of this chapter.

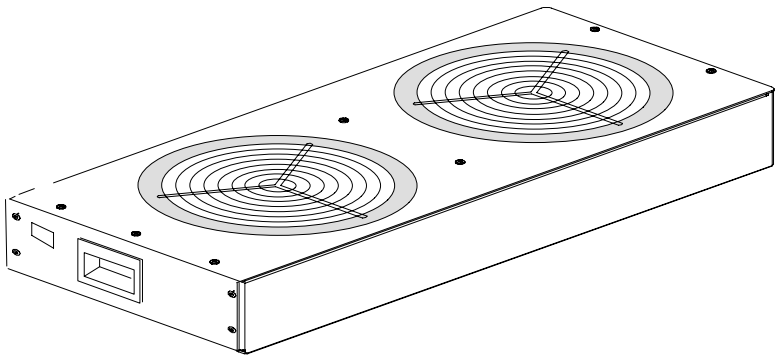
### Remove Fan Module

Use the procedure in Table 9-1 to remove the fan module.

**Table 9-1:** Procedure to Remove Fan Module

| Step | Action |
|---|---|
| 1 | Notify operator that the fan replacement procedure is starting and that alarms can be expected. |
| 2 | Put on the ESD wrist strap or another approved grounding device. |
| 3 | If not already done, remove BTS front panel cover by grasping finger grooves at the top and bottom and pulling simultaneously. |
| 4 | Lower the latch on front of the fan module while gently pulling it forward. |
| 5 | When the fan module is half–way out, support it with the other hand and remove it the rest of the way. |

**Figure 9-3:** Fan Module



### Install Fan Module

Use the procedure in Table 9-2 to install the fan module.

**Table 9-2:** Procedure to Install Fan Module

| Step | Action |
|---|---|
| 1 | Put on the ESD wrist strap or another approved grounding device. |
| 2 | Using both hands, set the fan module in the guide channels, and slide module in. |
| 3 | Ensure that fan module seats and front latch engages. |
| 4 | Notify operator that the fan replacement procedure is completed. Have operator verify that old alarms have cleared and no new alarms are reported. |
| 5 | Install BTS front panel cover by setting it in place and pushing on the top and bottom simultaneously. |

# High and Medium Stability Oscillator Module

## Introduction

The High Stability and Medium Stability Oscillator module provide a backup reference source in the case of Global Positioning System (GPS) failure. The HSO is capable of providing up to 24 hours, the synchronization initially established by the GPS reference signal. The MSO is capable of providing up to 8 hours.

There is only one HSO or MSO equipped in the Compact BTS. The module is located in front, behind a cover, underneath the CCP2 Shelf. The HSO or MSO slides into the top slot of the two that are present.

## System Impact/Considerations

The HSO or MSO produces a 1 pulse per second (1 pps) clock output signal to the CSA.

## Front Panel Indicator

The HSO or MSO have no indicators.

## Required Items

### Documents

None.

### Tools

None.

### Replacement Units

- One HSO module (SGLA4007)
- One MSO module (SGLA4008)

## Prerequisite

**IMPORTANT**

Coordinate this replacement with the OMC–R operator.

Contact the OMC–R operator before performing the replacement procedure. Tell the operator that the HSO or MSO module will be replaced and that alarms can be expected.

Upon completion of the replacement procedure, have the OMC–R operator verify that old alarms are cleared and that no new ones are reported.

## Replacement Procedure

**CAUTION**

This procedure requires working around circuitry that is extremely sensitive to Electrostatic Discharge (ESD). Wear a conductive, high impedance wrist strap during the procedure.
Use appropriate safety measures.

If desired, record the BTS and HSO/MSO serial number of the failed unit in Table 9-54 at the end of this chapter.

### Remove HSO or MSO Module

Follow the procedure in Table 9-3 to remove the HSO or MSO module. See Figure 9-4.

**Table 9-3:** Procedure to Remove HSO or MSO Module

| Step | Action |
|---|---|
| 1 | Notify operator that the HSO or MSO replacement procedure is starting and that alarms can be expected. |
| 2 | Put on an ESD wrist strap or other approved grounding device. |
| 3 | If not already done, remove BTS front panel cover by grasping finger grooves at the top and bottom and pulling simultaneously. |
| 4 | If not already done, remove HSO Module cover panel by turning latch, gently pulling it open, and sliding it out towards the right. The panel has a flange that fits into a slot in the frame. |
| 5 | Use a T20 star bit to remove two M4 screws securing HSO or MSO to frame. |
| 6 | Pull on handle to gently slide HSO or MSO out and disconnect cable from side. See Figure 9-5. |

### Install HSO or MSO

Follow the procedure in Table 9-4 to install the HSO or MSO module.

**Table 9-4:** Procedure to Install HSO or MSO Module

| Step | Action |
|---|---|
| 1 | Put on an ESD wrist strap or other approved grounding device. |
| | *** IMPORTANT**<br>The HSO and MSO will only fit into the top slot. DO NOT force it into the lower slot. |
| 2 | Connect cable to rear of HSO or MSO and slide into top slot. |
| 3 | Secure HSO or MSO to frame using two M4 screws. Torque screws to 2.3 N–M (20 in–lbs). |

table continued on next page

| Table 9-4: Procedure to Install HSO or MSO Module | |
|---|---|
| **Step** | **Action** |
| 4 | Install HSO Module cover panel by sliding its flange into the slot, closing, and latching it in place. |
| 5 | Notify operator that the HSO or MSO replacement procedure is completed. Have operator verify that old alarms have cleared and no new alarms are reported. |
| 6 | Install BTS front panel cover by setting it in place and pushing on the top and bottom simultaneously. |

**Figure 9-4:** HSO or MSO Module

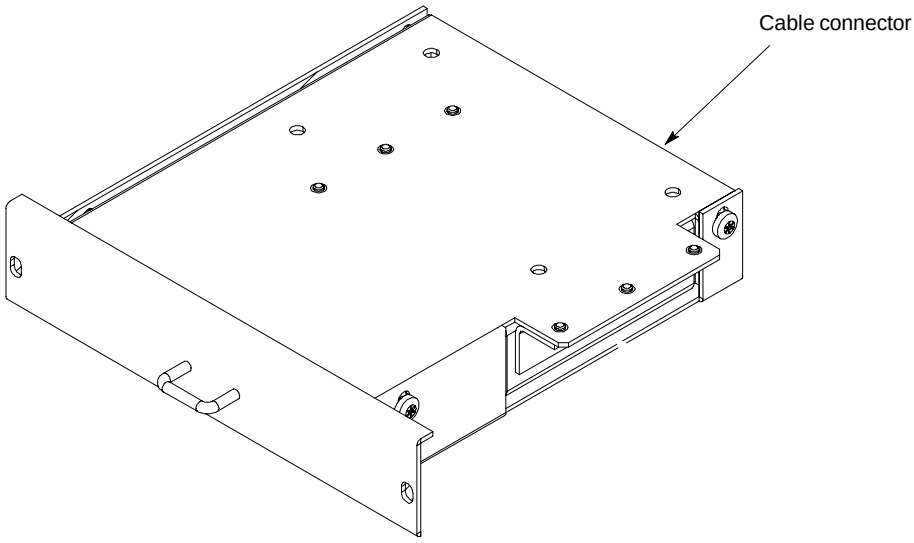
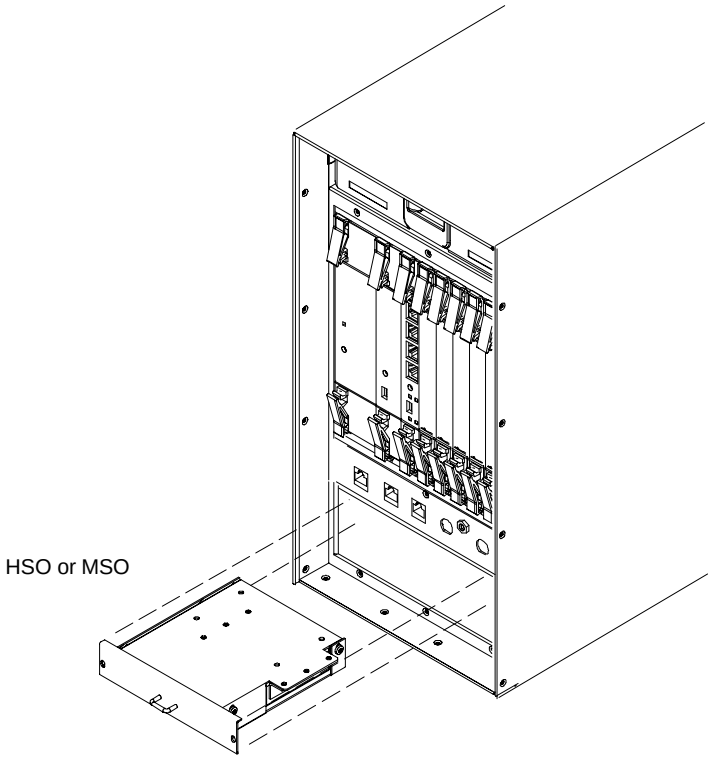


**Figure 9-5:** HSO or MSO Location

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## Introduction

The Compact BTS is configured with either Remote or RF Global Positioning System (GPS) receiver operation.

For Remote GPS operation, the GPS receiver is located in a remotely–located GPS head. This head contains a GPS antenna, GPS receiver, and digital interface. The GPS receiver output signal from the RGPS head is applied to the Compact BTS. The received signal is routed to the CSA card.

## System Impact/Considerations

**IMPORTANT**

If the GPS head has failed, performing the replacement procedure will not cause an downtime or interrupt call processing as long as an HSO or MSO has been installed.

If the HSO or MSO has not been “trained” by the GPS for a minimum of 24 hours, BTS synchronization may not be maintained for the minimum 24 hours when using the HSO or 8 hours when using the MSO backup.

## Required Items

### Documents

Optimization chapter this manual.

### Tools

Appropriate size socket for loosening the pipe/conduit mounting hardware.

### Replacement Unit

One RGPS head (Motorola P/N 0186012H04)

## Prerequisite

**IMPORTANT**

Coordinate this repair task with the OMC–R operator.

## Replacement Procedure

If desired, record the BTS and RGPS head serial number of the failed unit in Table 9-55 at the end of this chapter.

### Remove RGPS Head

Follow the procedure in Table 9-5 to remove the RGPS Head.

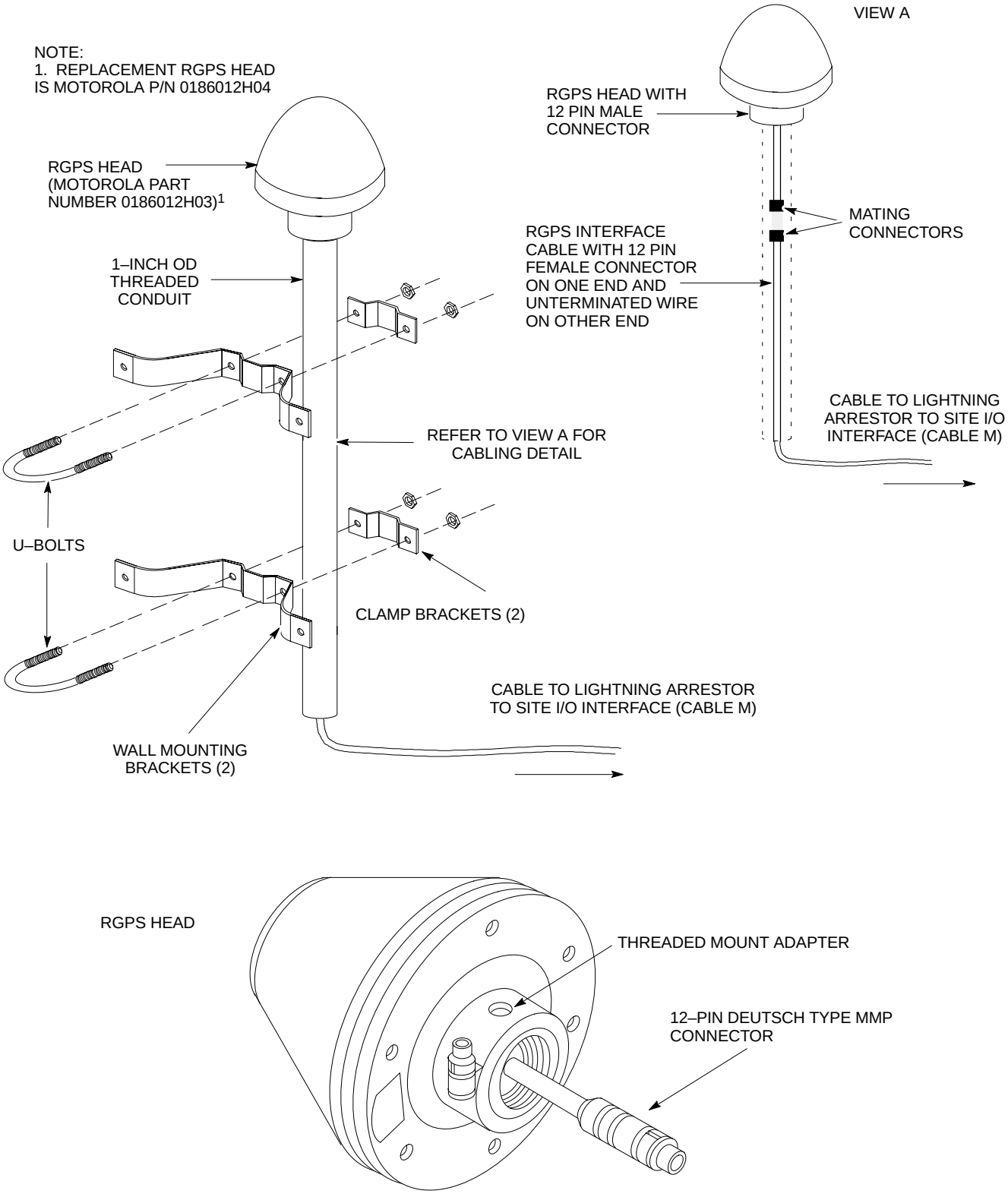
| Table 9-5: Procedure to Remove RGPS Head | |
|---|---|
| **Step** | **Action** |
| 1 | Notify operator that the RGPS Head replacement procedure is starting and that alarms can be expected. |
| 2 | Have the OMC–R operator verify the reference source configuration for the CSA.<br>*** IMPORTANT**<br>Before removing an RGPS Head that has a working RGPS receiver, have the OMC–R operator verify that the reference source for the CSA is configured for an HSO or MSO. |
| 3 | Create slack in the RGPS cable so that 0.70 m (2 ft.) of cable extend out of the RGPS Head end of the mounting pipe/conduit.<br>**NOTE**<br>To prevent twisting of cables, do not unscrew or screw RGPS Head while holding the pipe/conduit. |
| 4 | Loosen the pipe/conduit mounting hardware until the pipe/conduit is free to be unscrewed from the RGPS Head. |
| 5 | Grasp the RGPS Head in one hand and the pipe/conduit in the other.<br>Unscrew the pipe/conduit from the head and separate.<br>Grasp the cable just below the head and pull out about 0.5 m (16–inches) of cable out of the pipe/conduit until the mating cable connectors are exposed.<br>**NOTE**<br>The CSA will automatically switch over to the HSO or MSO approximately 2 seconds after disconnecting a working RGPS Head. Alarms will be triggered at this time. |

### Install RGPS Head

Follow the procedure in Table 9-6 to install the RGPS Head.

| Table 9-6: Procedure to Install RGPS Head | |
|---|---|
| **Step** | **Action** |
| 1 | Connect the cable connector of the replacement RGPS head to the RGPS cable connector. |
| 2 | Feed the cable slack into the RGPS head end of the mounting pipe/conduit. |
| 3 | Grasp the RGPS head in one hand and the pipe/conduit in the other.<br>Being careful not to cross thread the fitting on the RGPS head, screw the pipe/conduit into the head.<br>Hand tighten only! |
| 4 | Tighten the pipe/conduit mounting hardware until the pipe/conduit is securely mounted. |
| 5 | Notify the operator that the replacement procedure has been completed.<br>Have the operator verify that the original alarms have cleared and that no new alarms are reported. |

**Figure 9-6:** RGPS Head and Mounting Pipe/Conduit



# RF–GPS Module

## Introduction

The procedures in this section cover only the removal and installation of the RF–GPS Module.

## System Impact/Considerations

If the RF–GPS is failing or has failed there will be an interruption in call processing. The entire site will be down during the replacement of this component unless an HSO or MSO is in support.

**IMPORTANT**

The maximum loss of the RF cable ***CANNOT*** exceed 15 dB (assuming 25 dB antenna gain).

## Required Items

### Documents

None

### Tools

Star screw driver.

### Replacement Items

One RF–GPS Receiver (SGRG4030)

One RF–GPS Kit (CGDSGPSKITF4NM50)

## Prerequisite

**IMPORTANT**

Coordinate this repair task with the OMC–R operator.

Contact the OMC–R operator before performing the replacement procedure. Tell the operator that the RF–GPS module will be replaced and that alarms can be expected.

Upon completion of the replacement procedure, have the OMC–R operator verify that old alarms are cleared and that no new ones are reported.

## Replacement Procedure

If desired, record the BTS and RF–GPS serial number of the failed unit in Table 9-56 at the end of this chapter.

### Remove RF–GPS

Follow the procedure in Table 9-7 to remove the RF–GPS.

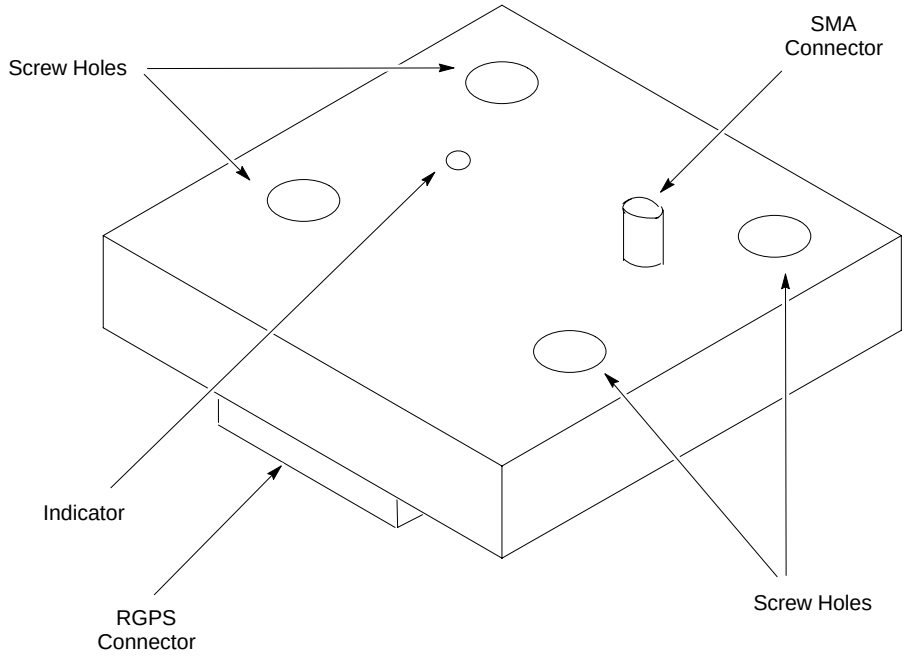
| **Table 9-7:** Procedure to Remove RF–GPS | |
|---|---|
| **Step** | **Action** |
| 1 | Notify operator that the RF–GPS module replacement procedure is starting and that alarms can be expected. |
| 2 | Put on an ESD wrist strap or other approved grounding device. |
| 3 | At the rear of the BTS, disconnect RF–GPS cable from its SMA connector. See Figure 9-7. |
| 4 | Using a T20 bit, remove four M4 screws securing RF–GPS module to the CBIO Board. |
| 5 | Gently remove RF–GPS module (disconnects it from the RGPS D–connector in the CBIO Board) and place in/on an anti–static container or surface. |

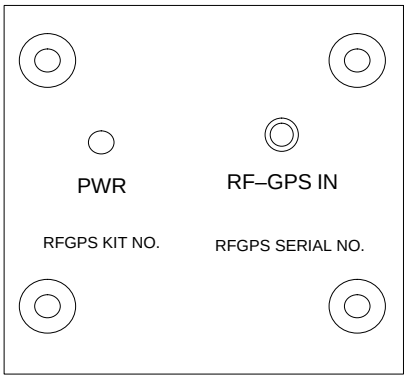
### Install RF–GPS

Follow the procedure in Table 9-8 to install the RF–GPS.

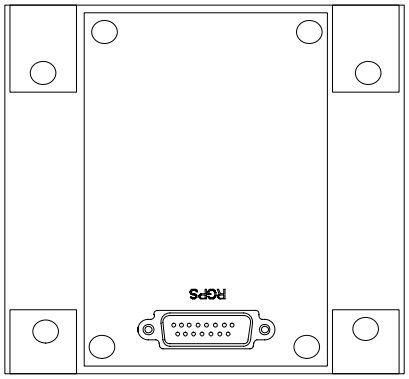
| **Table 9-8:** Procedure to Install RF–GPS | |
|---|---|
| **Step** | **Action** |
| 1 | Put on an ESD wrist strap or other approved grounding device. |
| 2 | If not already done, remove new RF–GPS module from its anti–static container |
| 3 | Remove protective cover from RGPS D–connector. |
| 4 | Install RF–GPS module onto the CBIO Board, by aligning D–connector on bottom of RF–GPS module with RGPS D–connector on CBIO Board and gently push down on module. See Figure 9-8. |
| 5 | Using a T20 bit, secure module to CBIO Board with four M4 screws. Torque screws to 2.3 N–M (20 in–lbs). |
| 6 | Connect RF–GPS cable to the SMA connector. Torque to 1 N–M (9 in–lbs). |
| 7 | Notify the operator that the replacement procedure is complete. |

**Figure 9-7:** RF–GPS Module



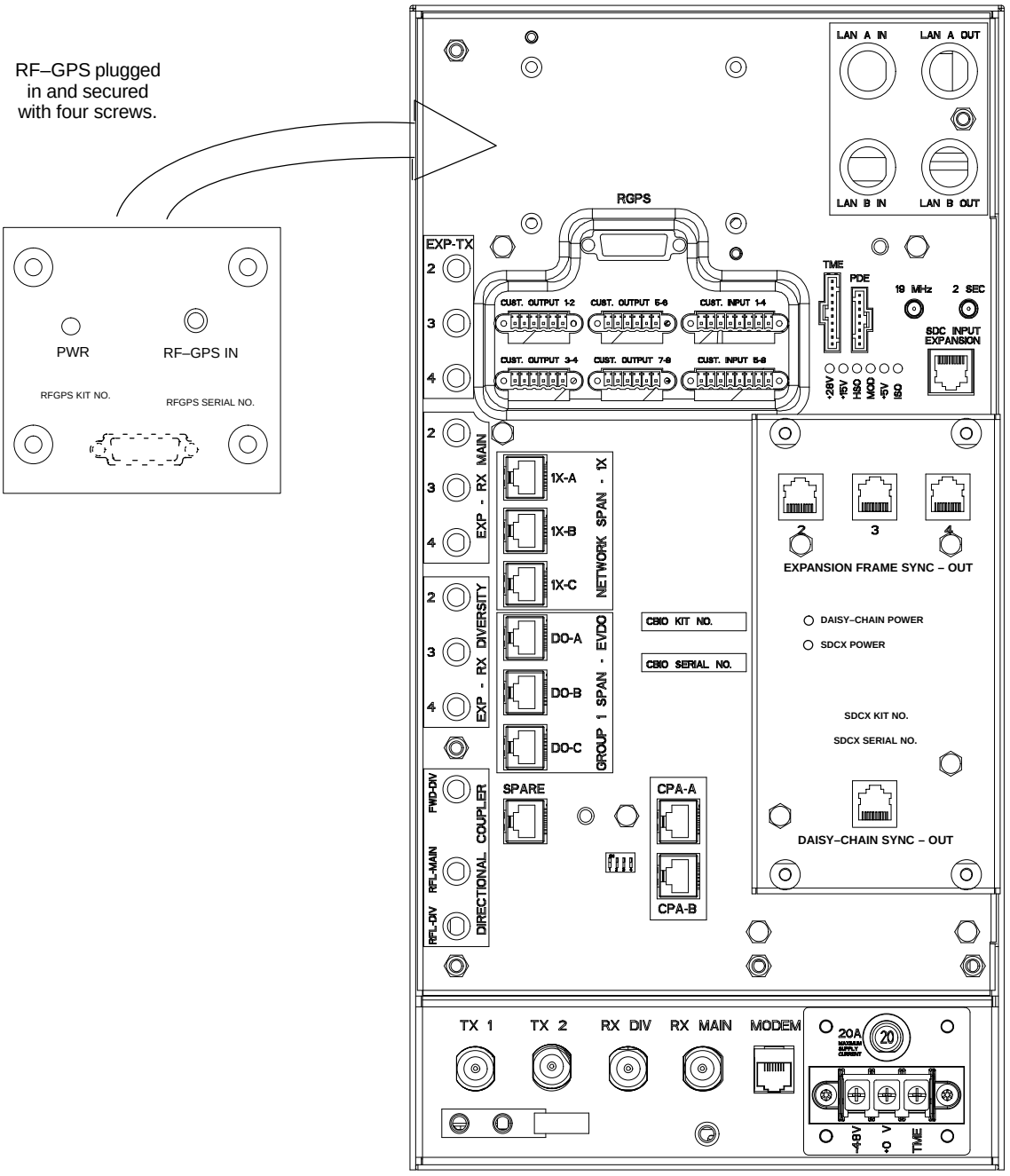




TOP VIEW




BOTTOM VIEW

**Figure 9-8:** RF–GPS Placement on CBIO Board

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# Power Supply Module (PSM)

## Introduction

The procedures in this section cover only the Power Supply Module (PSM). The PSM occupies the first slot in the CCP2 Shelf.

## System Impact/Consideration

The PSM supplies DC power to the cards/modules of the CCP2 Shelf. If the module needed replacing it will cause an interruption in call processing.

## Required Items

### Documents

None.

### Tools

None.

### Replacement Unit

One Power Supply Module (STPN4009)

**NOTE**

The connector keying for the PSM is different for each version to prevent using the wrong module.

## Prerequisite

**IMPORTANT**

Coordinate this repair task with the OMC–R operator.

Contact the OMC–R operator before performing the replacement procedure. Tell the operator that the PSM will be replaced and that alarms can be expected.

Upon completion of the replacement procedure, have the OMC–R operator verify that old alarms are cleared and that no new ones are reported.

**IMPORTANT**

When this module is removed, the BTS will shut down because power to CCP2 Shelf will be interrupted. It is recommended that replacing the PSM be performed during a maintenance window.

### Replacement Procedure

**CAUTION**

This procedure requires working around circuitry that is extremely sensitive to Electrostatic Discharge (ESD). Wear a conductive, high impedance wrist strap during the procedure.
Use appropriate safety measures.

If desired, record the BTS and PSM serial number of the failed unit in Table 9-57 at the end of this chapter.

#### Remove Power Supply Module

Follow the procedure in Table 9-9 to remove the Power Supply Module.

**Table 9-9:** Procedure to Remove Power Supply Module

| Step | Action |
|---|---|
| | △ **WARNING**<br>Disengaging the PSM from the CCP2 Shelf will cause the site to be shutdown due to the disruption in power to the shelf. |
| 1 | Notify operator that the PSM replacement procedure is starting and that alarms can be expected. |
| 2 | At the front of the BTS, remove the front panel cover by grasping finger grooves at the top and bottom and pulling simultaneously. |
| 3 | Put on an ESD wrist strap or other approved grounding device. |
| 4 | Simultaneously press the locking tabs on both the top and bottom module latches |
| 5 | Pull the latches out to disengage the module from the shelf and slide the card out. |
| 6 | Place PSM in/on an anti–static container or surface. |

#### Install Power Supply Module

Follow the procedure in Table 9-10 to install the Power Supply Module.

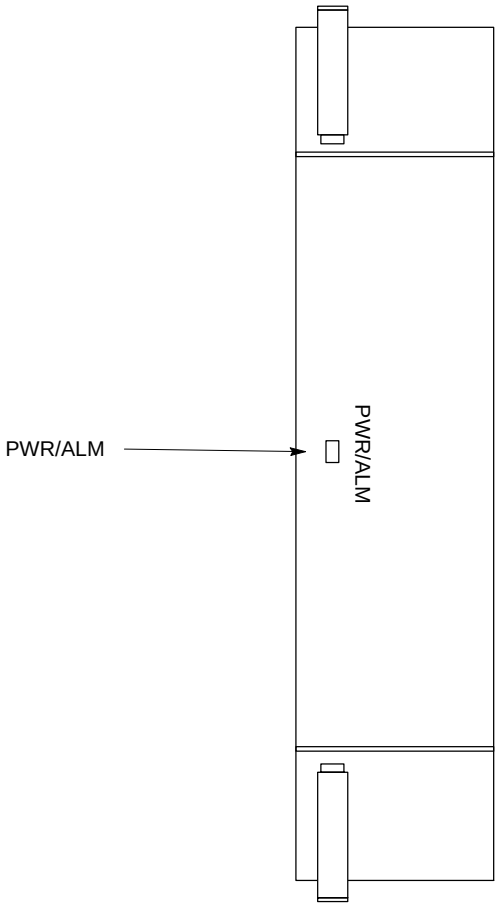
**Table 9-10:** Procedure to Install Power Supply Module

| Step | Action |
|---|---|
| 1 | Put on an ESD wrist strap or other approved grounding device. |
| 2 | If not already done, remove new PSM from its anti–static container. |
| 3 | Insert module and carefully slide into slot and push in until it is seated in the backplane. |
| 4 | Simultaneously pull both latches forward and slip the tips behind the frame. |

table continued on next page

| **Table 9-10:** Procedure to Install Power Supply Module | |
|---|---|
| **Step** | **Action** |
| 5 | Push the latches in to engage the module with the backplane and lock the tabs. |
| 6 | Note that the LED turns red briefly, then green.<br>Green indicates that it has passed all self–tests and is functional. |
| 7 | Notify the operator that the replacement procedure has been completed.<br>Have the operator verify that the original alarms have cleared and that no new alarms are reported. |
| 8 | Install BTS front panel cover by setting it in place and pushing on the top and bottom simultaneously. |

**Figure 9-9:** Power Supply Module (PSM)



# Clock Synchronization Alarms Card

## Introduction

The procedures in this section cover only the Clock Synchronization Alarms (CSA) card. The CSA occupies the second slot in the CCP2 Shelf.

## System Impact/Considerations

This replacement procedure does require some system downtime. Since there is no redundancy, call processing will be interrupted during the time of the replacement.

## Required Items

### Documents

None.

### Tools

None

### Replacement Item

One CSA card.

## Prerequisite

**IMPORTANT**

Coordinate this repair task with the OMC–R operator.

Contact the OMC–R operator before performing the replacement procedure. Tell the operator that the CSA card will be replaced and that alarms can be expected.

Upon completion of the replacement procedure, have the OMC–R operator verify that old alarms are cleared and that no new ones are reported.

## Replacement Procedure

If desired, record the BTS and CSA serial number of the failed unit in Table 9-58 at the end of this chapter.

### Remove CSA Module

Follow the procedure in Table 9-11 to remove the CSA card.

**Table 9-11:** Procedure to Remove CSA Module

| Step | Action |
|---|---|
| | △ **WARNING**<br>Disengaging the CSA from the CCP2 Shelf will cause the site to be shutdown due to the disruption in clock timing to the other cards and modules in the BTS. |
| 1 | Notify operator that the CSA card replacement procedure is starting and that alarms can be expected. |

table continued on next page

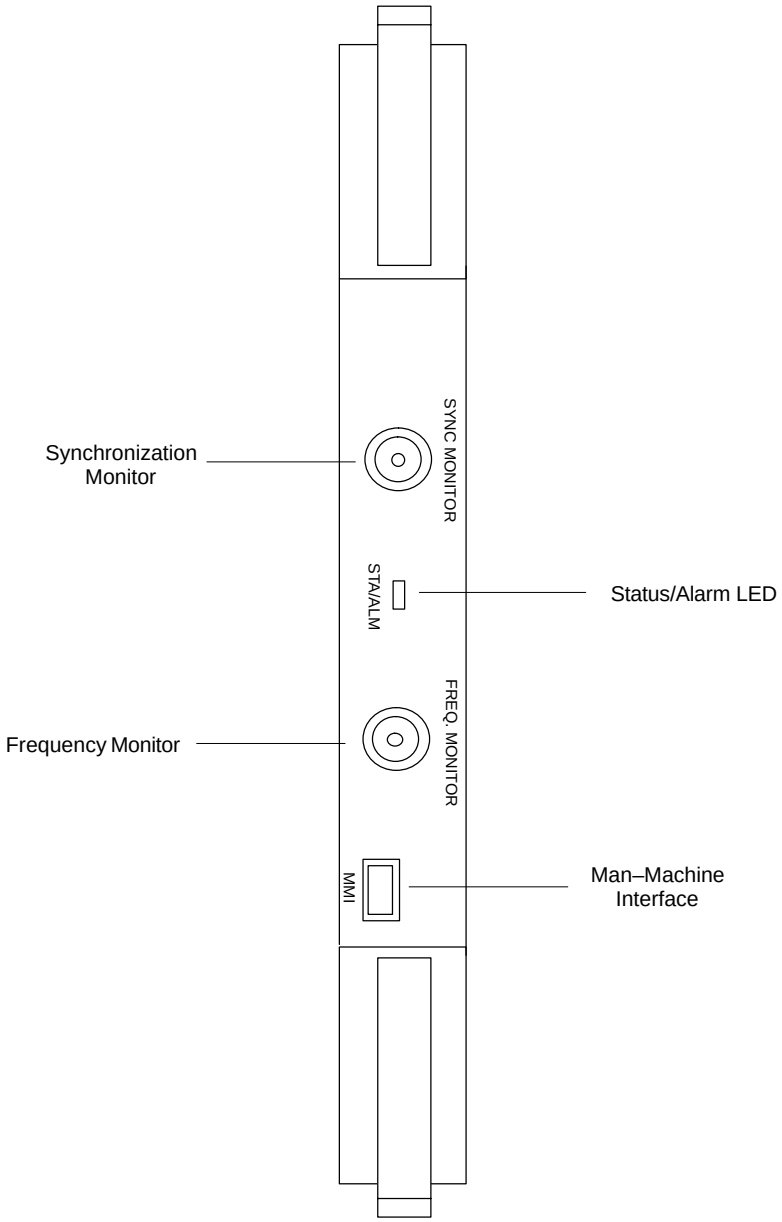
| Table 9-11: Procedure to Remove CSA Module | |
|---|---|
| **Step** | **Action** |
| 2 | Put on the ESD wrist strap or other approved grounding device. |
| 3 | If not already done, remove BTS front panel cover by grasping finger grooves at the top and bottom and pulling simultaneously. |
| 4 | Simultaneously press the locking tabs on both the top and bottom card latches |
| 5 | Pull the latches out to disengage the card from the shelf and slide the card out. |
| 6 | Place card in/on an anti–static container or surface. |

### Install CSA Module

Follow the procedure in Table 9-12 to install the CSA card.

| Table 9-12: Procedure to Install CSA Module | |
|---|---|
| **Step** | **Action** |
| 1 | Put on the ESD wrist strap or other approved grounding device. |
| 2 | If not already done, remove new CSA card from its anti–static container. |
| 3 | Insert card and carefully slide into slot and push in until it is seated in the backplane. |
| 4 | Simultaneously pull both latches forward and slip the tips behind the frame. |
| 5 | Push the latches in to engage the card with the backplane and lock the tabs. |
| 6 | The LED illuminates red briefly, then turns green.<br>Green indicates that the module has passed all self–tests and is functional. |
| 7 | Notify the OMC–R operator that the replacement procedure has been completed, and that old alarms are cleared and no new alarms are reported. |
| 8 | If there are no other actions required, install BTS front panel cover by setting it in place and pushing on the top and bottom simultaneously. |

**Figure 9-10:** Clock Synchronization and Alarm Card



# Group Line Interface Card

## Introduction

The procedures in this section cover only the Group Line Interface (GLI) 3 card. The GLI3 occupies the third slot in the CCP2 Shelf.

## System Impact/Considerations

An interruption in call processing will occur if the GLI3 card is failing or fails.

## Prerequisite

**IMPORTANT**

Coordinate this repair task with the OMC–R operator.

Contact the OMC–R operator before performing the replacement procedure. Tell the operator that the GLI3 card will be replaced and that alarms can be expected.

Upon completion of the replacement procedure, have the OMC–R operator verify that old alarms are cleared and that no new ones are reported.

**IMPORTANT**

When this module is removed, the BTS will shut down because card interface and communication will be interrupted. It is recommended that replacing the GLI3 be performed during a maintenance window.

## Required Items

### Documents

This manual for the optimization and acceptance test procedures.

### Tools

None

### Replacement Item

One GLI3 card (SGLN5975)

## Replacement Procedure

**CAUTION**

This procedure requires working around circuitry that is extremely sensitive to Electrostatic Discharge (ESD). Wear a conductive, high impedance wrist strap during the procedure.
Use appropriate safety measures.

If desired, record the BTS and GLI3 serial number of the failed unit in Table 9-59 at the end of this chapter.

### Remove GLI3 Card

Follow the procedure in Table 9-13 to remove the GLI3 card.

**Table 9-13:** Procedure to Remove GLI3 Card

| Step | Action |
|---|---|
| | **△ WARNING**<br>Disengaging the GLI3 from the CCP2 Shelf will cause the site to be shutdown due to the disruption in commnuication with the BBX and MCC cards. |
| 1 | If not already done, remove BTS front panel cover by grasping finger grooves at the top and bottom and pulling simultaneously. |
| 2 | Put on the ESD wrist strap or other approved grounding device. |
| 3 | Notify operator that the GLI3 card replacement procedure is starting and that alarms can be expected. |
| 4 | Simultaneously press the locking tabs on both the top and bottom card latches |
| 5 | Pull the latches out to disengage the card from the shelf and slide the card out. |
| 6 | Place card in/on an anti–static container or surface. |

### Install GLI3 Card

Follow the procedure in Table 9-14 to install the GLI3 card.

**Table 9-14:** Procedure to Install GLI3 Card

| Step | Action |
|---|---|
| 1 | Put on the ESD wrist strap or other approved grounding device. |
| 2 | If not already done, remove new GLI3 card from its anti–static container. |
| 3 | Insert card and carefully slide into slot and push in until it is seated in the backplane. |
| 4 | Simultaneously pull both latches forward and slip the tips behind the frame. |
| 5 | Push the latches in to engage the card with the backplane and lock the tabs. |
| 6 | Check the STATUS and ALARM LEDs:<br>• The ALARM LED lights for about 10 seconds while it powers up self–diagnostic test.<br>• The STATUS LED lights briefly, indicating that the card has passed self diagnostic tests.<br>• Both LEDs should then remain OFF. |

table continued on next page

| Table 9-14: Procedure to Install GLI3 Card | |
|---|---|
| **Step** | **Action** |
| | **NOTE**<br>If the red ALARM LED remains ON, the card may not be fully seated in the backplane. Pull the card out about halfway, wait about two minutes before reseating. Perform steps 4 and 5.<br>If the red LED turns back ON after the green LED turns OFF, a new failure condition exists and an alarm generated. |
| 7 | Notify operator that the GLI3 replacement procedure is completed. Have operator verify that old alarms have cleared and no new alarms are reported. |
| 8 | Using the LMF connected to the MMI port, verify that new GLI3 card has the proper configuration. |
| 9 | Proceed to Table 9-15. |

### GLI3 Recovery Procedure

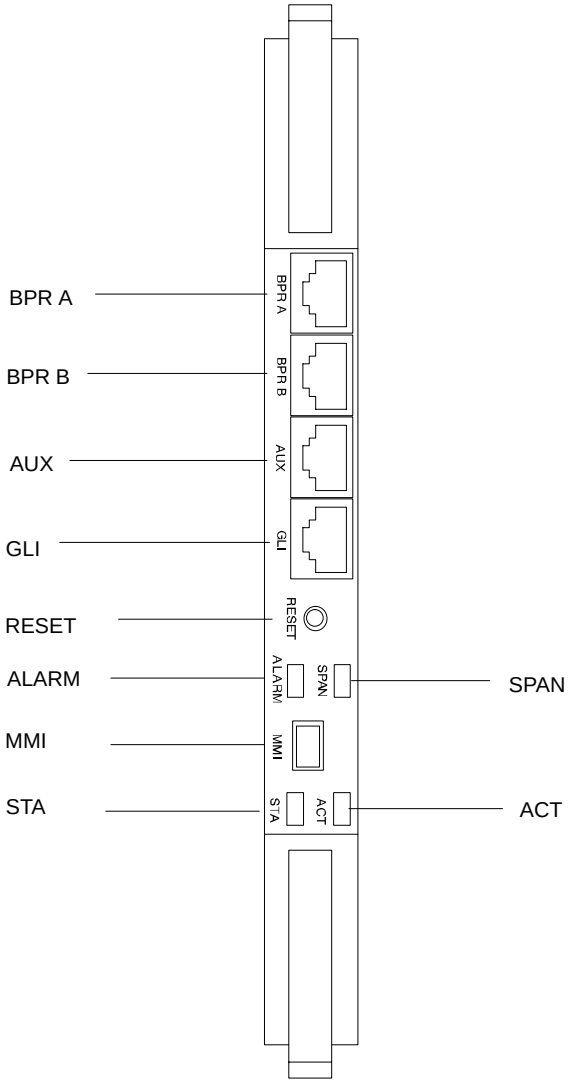
Follow the procedure in Table 9-15 to recover the GLI3 card.

| Table 9-15: Procedure to Recover GLI3 Card | |
|---|---|
| **Step** | **Action** |
| 1 | At the prompt, enter the following command:<br><br>omc–00000>**ENABLE GLI–**<bts#>–<gli#> **UNC** |
| 2 | Display the status of the GLI by entering the following command:<br><br>omc–00000>**DISPLAY BTS–**<bts#> **STATUS** |
| 3 | Verify the status of the new GLI3 is INS_ACTIVE. |
| 4 | If there are no other actions required, install BTS front panel cover by setting it in place and pushing on the top and bottom simultaneously. |

### Optimization Requirement

Refer to the Optimization section of this manual and perform the required procedures.

**Figure 9-11:** Group Line Interface 3 Card



## Introduction

The procedures in this section cover only the Multi–Channel CDMA (MCC) cards. The MCC–1X cards occupy the fourth, fifth, and sixth slots (MCC 1, 2, & 3) in the CCP2 Shelf.

If the MCC–DO card is in use, proceed to that section for more information later in this chapter.

## System Impact/Considerations

If an MCC–1X card fails it will cause some interruption in call processing in the sense that not all calls will be handled. The other MCC–1X cards may not be able to handle the additional calls thus calls on the failing or failed card will be dropped.

If an MCC–1X card must be replaced, it must be ensured that it has the same number of channels as the card being replaced.

## MCC Front Panel

### PWR/ALM LED

The MCC–1X card has its own alarm (fault) detection circuitry that controls the state of the PWR/ALM LED. When the LED is:

- **Green –**
  - OFF – INS_ACT no alarm.
- **Red –** Power-up or fault condition.

### Active LED

The MCC–1X card has circuitry that controls the state of the Active LED. When the LED is:

- **Green –**
  - Solid – INS_ACT no alarm.
  - Rapidly Flashing – OOS_RAM no alarm.
  - Slowly Flashing – OOS_ROM no alarm.
- **Red –**
  - Fault condition or card is in reset.
  - Slow flashing (alternating with green) – CHI bus inactive on power up.

## Required Items

### Documents

None.

### Tools

None.

### Replacement Items

- Up to 3 MCC–1X–16 cards (SGLN6117)
- Up to 3 MCC–1X–32 cards (SGLN6050)
- Up to 3 MCC–1X–48 cards (SGLN6051)
- Up to 3 MCC–1X–64 cards (SGLN6052) (for Packet Backhaul)

## Prerequisite

**IMPORTANT**

Coordinate this repair task with the OMC–R operator.

Contact the OMC–R operator before performing the replacement procedure. Tell the operator that the MCC–1X card will be replaced and that alarms can be expected.

Upon completion of the replacement procedure, have the OMC–R operator verify that old alarms are cleared and that no new ones are reported.

## Replacement Procedure

**CAUTION**

This procedure requires working around circuitry that is extremely sensitive to Electrostatic Discharge (ESD). Wear a conductive, high impedance wrist strap during the procedure.
Use appropriate safety measures.

If desired, record the BTS and MCC serial number of the failed unit in Table 9-60 at the end of this chapter.

### Remove MCC–1X Card

Follow the procedure in Table 9-16 to remove the MCC–1X card.

**Table 9-16:** Procedure to Remove MCC–1X Card

| Step | Action |
|---|---|
| | △ **WARNING**<br>Due to a lack of redundancy, disengaging the MCC cards from the CCP2 Shelf will cause the site to be shutdown due to the disruption in communication with the GLI3. |
| 1 | Notify operator that the MCC replacement procedure is starting and that alarms can be expected. |
| 2 | Put on the ESD wrist strap or other approved grounding device. |
| 3 | If not already done, remove BTS front panel cover by grasping finger grooves at the top and bottom and pulling simultaneously. |

table continued on next page

| **Table 9-16:** Procedure to Remove MCC–1X Card | |
|---|---|
| **Step** | **Action** |
| 4 | Simultaneously press the locking tabs on both the top and bottom card latches |
| 5 | Pull the latches out to disengage the card from the shelf and slide the card out. |
| 6 | Place MCC–1X card on/in an anti–static container or surface. |

### Install MCC–1X Card

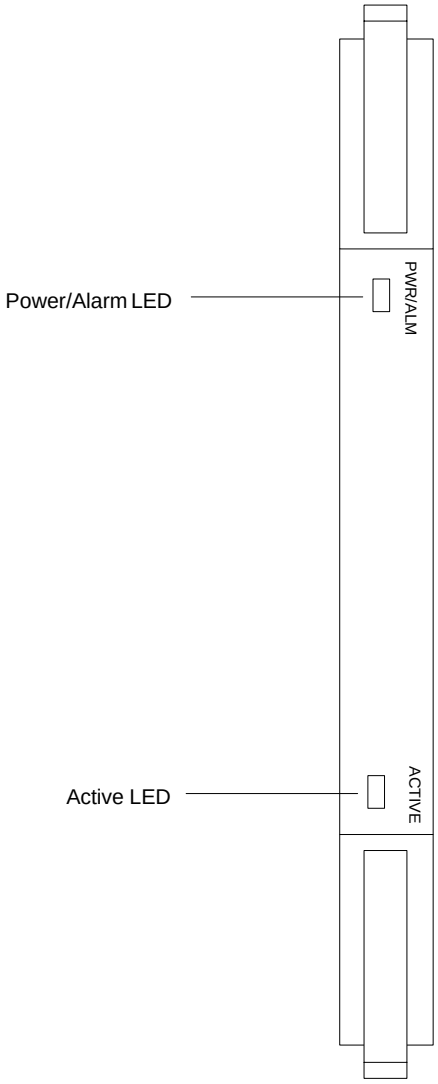
Follow the procedure in Table 9-17 to install the MCC–1X card.

| **Table 9-17:** Procedure to Install MCC–1X Card | |
|---|---|
| **Step** | **Action** |
| 1 | Put on the ESD wrist strap or other approved grounding device. |
| 2 | If not already done, remove new MCC–1X card from anti–static container. |
| 3 | Slide card into slot and simultaneously pull both latches forward and slip the tips behind the frame. |
| 4 | Push the latches in to engage the card with the backplane and lock the tabs. |
| 5 | Notify operator that the MCC replacement procedure is completed. Have operator verify that old alarms have cleared and no new alarms are reported. |
| 6 | If there are no other actions required, install BTS front panel cover by setting it in place and pushing on the top and bottom simultaneously. |

### Optimization Requirement

Refer to the Optimization section of this manual and perform the required procedures.

**Figure 9-12:** MCC 1X Card



## Introduction

The procedures in this section cover only the Broad Band Transceiver 1X (BBX–1X) cards. These cards occupy the seventh and eighth slots (BBX 1 & 4) of the CCP2 Shelf.

## System Impact/ Considerations

The Compact BTS is not configured for redundancy, so a failure of the BBX card will cause an interruption in call processing. It is still "hot–swappable" like its Macrocell counterparts. Once replacement is made, optimization procedures will have to be performed.

## Front Panel

The BBX–1X card contains the PWR/ALM and ACTIVE LED's, reset switch and MMI port connector. A removable lens covers these items and deters access to the reset switch and MMI port. Refer to Figure 9-13.

### PWR/ALM LED

The BBX module has its own alarm (fault) detection circuitry that controls the state of the PWR/ALM LED. When the LED is:

- **Green –**
  - Solid – INS_ACT no alarm.
  - Slowly Flashing – OOS_ROM no alarm.
  - Rapidly Flashing – OOS_RAM no alarm.
- **Red –** initializing or power-up or alarm condition.
- Combinations
  - Long **red**/Short **green**– OOS_ROM alarm.
  - Short **red**/Short **green** – OOS_RAM alarm.
  - Long **green**/Short **red** – INS_ACT alarm.
- OFF
  - No DC power
  - The on–board fuse is open.

### Active LED

The BBX module has circuitry that controls the state of the Active LED. When the LED is:

- **Green –** Operating in INS_ACTIVE state and keyed. No alarm condition present.
- **Red –**
  - Color during initial system power–up.
  - Operating in FAULT (alarm) state. Alarm condition is present.

## Required items

### Documents

This manual for optimization and acceptance test procedures.

### Tools

None

### Replacement Unit

- BBX–1X card (SGLG4044)

## Prerequisite

**IMPORTANT**

Coordinate this repair task with the OMC–R operator.

Contact the OMC–R operator before performing the replacement procedure. Tell the operator that the BBX–1X card will be replaced and that alarms can be expected.

Upon completion of the replacement procedure, have the OMC–R operator verify that old alarms are cleared and that no new ones are reported.

## Replacement Procedure

**CAUTION**

This procedure requires working around circuitry that is extremely sensitive to Electrostatic Discharge (ESD). Wear a conductive, high impedance wrist strap during the procedure.
Use appropriate safety measures.

If desired, record the BTS and BBX–1X serial number of the failed unit in Table 9-61 at the end of this chapter. BBX 1 and 4 will be present if BTS is configured for two carriers; otherwise, only BBX 1 will be present.

### Remove BBX–1X Card

Follow the procedure in Table 9-18 to remove the BBX–1X card.

**Table 9-18:** Procedure to Remove BBX–1X Card

| Step | Action |
|---|---|
| | △ **WARNING**<br>Due to a lack of redundancy, disengaging the BBX card(s) from the CCP2 Shelf will cause the site to be shutdown due to the disruption in communication with the GLI3 and loss of carrier. |
| 1 | Notify operator that the BBX–1X card replacement procedure is starting and that alarms can be expected. |
| 2 | Put on the ESD wrist strap or other approved grounding device. |
| 3 | If not already done, remove BTS front panel cover by grasping finger grooves at the top and bottom and pulling simultaneously. |
| 4 | Simultaneously press the locking tabs on both the top and bottom card latches |
| 5 | Pull the latches out to disengage the card from the shelf and slide the card out. |
| 6 | Place on/in an anti–static container or surface. |

### Install BBX–1X Card

Follow the procedure in Table 9-19 to install the BBX–1X card.

**Table 9-19:** Procedure to Install BBX–1X Card

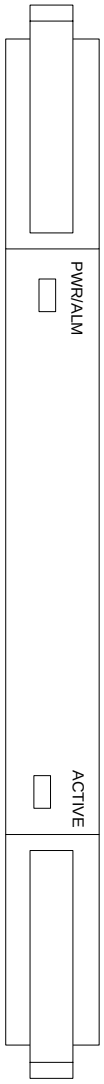
| Step | Action |
|---|---|
| 1 | Put on the ESD wrist strap or other approved grounding device. |
| 2 | If not already done, remove new BBX–1X card from anti–static container. |
| 3 | Slide card into slot and simultaneously pull both latches forward and slip the tips behind the frame. |
| 4 | Push the latches in to engage the card with the backplane and lock the tabs. |
| 5 | Notify operator that the BBX–1X replacement procedure is completed. Have operator verify that old alarms have cleared and no new alarms are reported. |
| 6 | If there are no other actions required, install BTS front panel cover by setting it in place and pushing on the top and bottom simultaneously. |



### Optimization Requirement

Refer to the Optimization section of this manual and perform the required procedures.

**Figure 9-13:** BBX–1X Card



# Compact BTS Multi–Coupler Preselector Card

## Introduction

The procedures in this section cover only the Multi–Coupler Preselector Card (cMPC). The cMPC occupies the ninth slot of the CCP2 Shelf.

### cMPC PWR/ALM LED States

The cMPC has a dual color (green & red) power/alarm (PWR/ALM) status indicator LED located on its front panel. The card has its own alarm (fault) detection circuitry that controls what is displayed on the LED. Table 9-20 lists these states. Refer to Figure 9-14.

**Table 9-20:** cMPC PWR/ALM LED State

| LED State | Device State |
|---|---|
| Steady GREEN | Operating normally |
| Steady RED | 1. Displayed during initial power– up.<br>2. Operating in a Fault condition. |
| OFF | No DC power to card. |

## System Impact/Considerations

An interruption in call processing, due to the RX signal path being broken, will occur if the cMPC must be replaced due to total failure or marginal operation.

## Required items

### Documents

This manual for optimization and acceptance test procedures.

### Tools

None

### Replacement Unit

- cMPC (STLF4110)

## Prerequisite

**IMPORTANT**

Coordinate this repair task with the OMC–R operator.

Contact the OMC–R operator before performing the replacement procedure. Tell the operator that the Compact MPC will be replaced and that alarms can be expected.

Upon completion of the replacement procedure, have the OMC–R operator verify that old alarms are cleared and that no new ones are reported.

## Replacement Procedure

**CAUTION**

This procedure requires working around circuitry that is extremely sensitive to Electrostatic Discharge (ESD). Wear a conductive, high impedance wrist strap during the procedure.
Use appropriate safety measures.

### Before Beginning

If desired, record the BTS and cMPC serial number of the failed unit in Table 9-62 at the end of this chapter.

### Remove cMPC

Follow the procedure in Table 9-21 to remove the cMPC.

**Table 9-21:** Procedure to Remove cMPC

| Step | Action |
|---|---|
| 1 | Notify operator that the cMPC replacement procedure is starting and that alarms can be expected. |
| 2 | Put on an ESD wrist strap or other approved grounding device. |
| 3 | *If not already done*, remove BTS front panel cover by grasping finger grooves at the top and bottom and pulling simultaneously. |
| 4 | Simultaneously press the locking tabs on both the top and bottom card latches<br>Pull the latches out to disengage the card from the shelf and slide the card out far enough to disconnect the RF cabling.<br>*** IMPORTANT**<br>If the BTS is set up for 2 PAs, then there will be 6 RF cables (fitted with QMA connectors) to disconnect.<br>Recommend that the cables be disconnected either from top–to–bottom or bottom–to–top. This will be important when re–connecting the cables.<br>At the rear of the card the jumper will be connected to the upper of the two RF connections |
| 5 | Cables are labeled and color coded, if not, then tag each cable as it is disconnected.<br>Once cables are disconnected, pull out card. |
| 6 | Place in/on an anti–static container or surface. |

### Install cMPC

Follow the procedure in Table 9-22 to install the cMPC.

| Table 9-22: Procedure to Install cMPC | |
|---|---|
| **Step** | **Action** |
| 1 | Put on an ESD wrist strap or other approved grounding device. |
| 2 | If not already done, remove new cMPC from its anti–static container. |
| 3 | Verify that the cMPC is set up for using 1 or 2 Compact PAs. See Figure 9-15.<br>• For 1 PA, the jumper should be connected to the “Default” RF connector.<br>• For 2 PAs, the jumper should be connected to the “Alternate” RF connector. |
| 4 | *** IMPORTANT**<br>To insert the cMPC with minimum of trouble, make sure the RF cabling is held away towards the side of the frame in single file and in order they were disconnected.<br>Insert card and carefully slide into slot far enough to attach cables.<br>Attach RF cables (each cable is labeled and color coded) |
| 5 | Simultaneously pull both latches forward and slip the tips behind the frame. |
| 6 | Push the latches in to engage the card with the backplane and lock the tabs. |
| 7 | Note that the LED turns red briefly, then green.<br>Green indicates that it has passed all self–tests and is functional. |
| 8 | Notify operator that the cMPC replacement procedure is completed. Have operator verify that old alarms have cleared and no new alarms are reported. |
| 9 | If no other action is needed, install BTS front panel cover by setting it in place and pushing on the top and bottom simultaneously. |

**Figure 9-14:** Compact Multi–Coupler Preselector Card

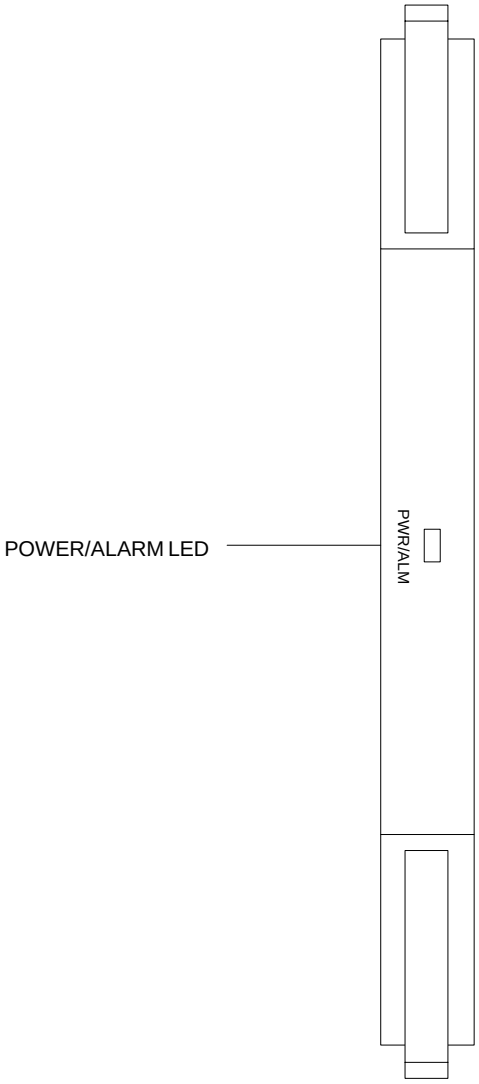
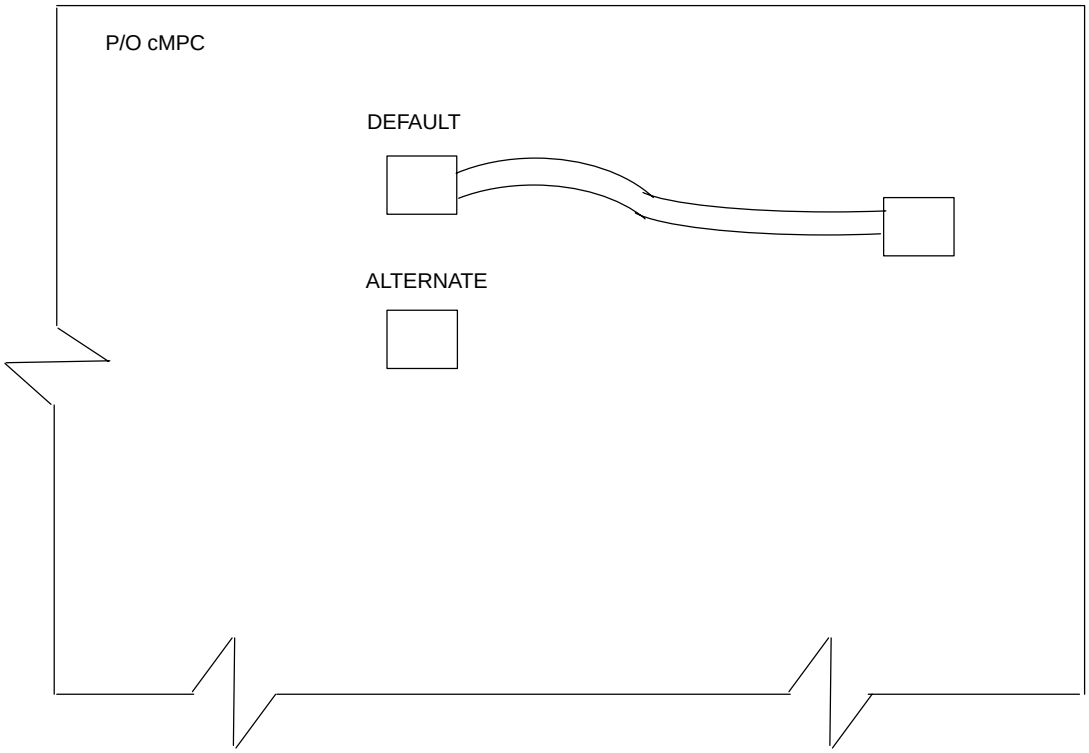


**Figure 9-15:** Compact Multi–Coupler Preselector Card Jumper Connection




Compact MPC shown is set for 1 Power Amplifier

### Introduction

The procedures in this section cover only the MCC Data Only (MCC–DO) card. If in use, this card utilizes MCC slots 1 and 2, with slot 3 containing an MCC–1X card or a filler panel.

### EV–DO FRU Information

If there are conflicts between the procedures presented here and the material presented in *1xEV–DO Field Replaceable Unit (FRU) Procedures – 68P09257A99*, the manual takes precedence.

### System Impact/Considerations

If the Multi–Channel CDMA Data Only card fails or is removed from service, there will be an interruption in call processing.

### LED States

The MCC–DO card uses four front panel LEDs to indicate its status. Table 9-23 lists the states of the MCC–DO LEDs.

**Table 9-23:** MCC–DO LED States

| LED | Color | Status | SPAN |
|---|---|---|---|
| PWR/ALM | Green | ON | INS or INS_SBY or INS_ACT |
| | Red | ON | Not installed or OOS. |
| | | Blinking | Installed in wrong slot. |
| | — | OFF | Off |
| ACT | Green | ON | INS_ACT |
| | | Blinking | OOS or INS_SBY |
| | Red | ON | Not Initialized. |
| | | Blinking | Installed in wrong slot. |
| | Orange | ON | INS |
| | — | OFF | Off |
| SPAN | Red | ON | Major alarms on a provisioned span. |
| | Orange | ON | Minor alarms on a provisioned span. |
| | Green | ON | No alarms on a provisioned span. |
| | — | OFF | No Provisioned span. |
| ENET | Orange | ON | Both ENET and TAT links are up. |
| | Green | ON | Either ENET or TAT link is up. |

table continued on next page

| Table 9-23: MCC–DO LED States | | | |
|---|---|---|---|
| **LED** | **Color** | **Status** | **SPAN** |
| | — | OFF | Both ENET and TAT link are down. |
| **NOTE**: In the case of some spans on a given MCC–DO having Yellow alarms, and other spans having Red alarms, a Red Alarm state should be indicated. | | | |

## Required Items

### Documents

None.

### Tools

None.

### Replacement Items

One MCC–Data Only card (SGLN6146)

## Prerequisite

**IMPORTANT**

Coordinate this repair task with the OMC–R operator.

Contact the OMC–R operator before performing the replacement procedure. Tell the operator that the MCC–DO card will be replaced and that alarms can be expected.

Upon completion of the replacement procedure, have the OMC–R operator verify that old alarms are cleared and that no new ones are reported.

## Replacement Procedure

If desired, record the BTS and MCC–DO serial number of the failed unit in Table 9-63 at the end of this chapter.

### Remove MCC–DO Card

Follow the procedure in Table 9-24 to remove the MCC–DO card.

| Table 9-24: Procedure to Remove MCC–DO Card | |
|---|---|
| **Step** | **Action** |
| | △ **WARNING**<br>Disengaging the MCC–DO card from the CCP2 Shelf will cause the site to be shutdown due to the disruption in signal processing. |
| 1 | Notify operator that the MCC–DO card replacement procedure is starting and that alarms can be expected. |

table continued on next page

| Table 9-24: Procedure to Remove MCC–DO Card | |
|---|---|
| **Step** | **Action** |
| 2 | Put on the ESD wrist strap or other approved grounding device. |
| 3 | If not already done, remove BTS front panel cover by grasping finger grooves at the top and bottom and pulling simultaneously. |
| 4 | If not already done, label cables prior to disconnecting them from front panel connectors. |
| 5 | Simultaneously press the locking tabs on both the top and bottom card latches |
| 6 | Pull the latches out to disengage the card from the shelf and slide the card out. |
| 7 | Place in/on an anti–static container or surface. |

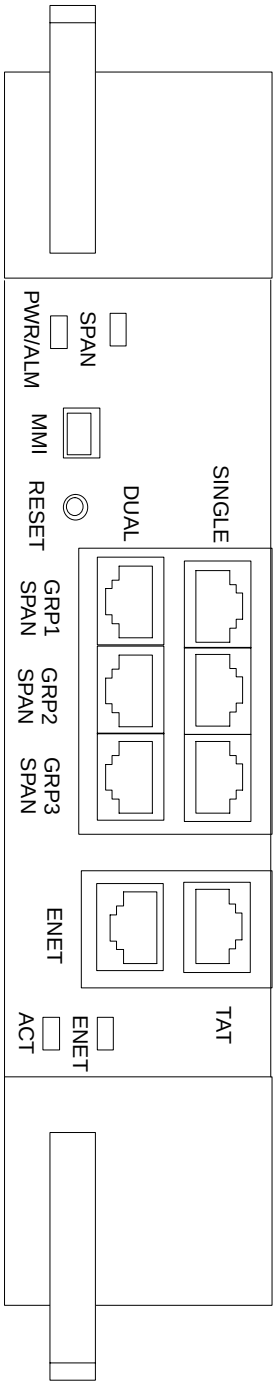
### Install MCC–DO Card

Follow the procedure in Table 9-25 to install the MCC–DO card.

| Table 9-25: Procedure to Install MCC–DO Card | |
|---|---|
| **Step** | **Action** |
| 1 | Put on the ESD wrist strap or other approved grounding device. |
| 2 | If not already done, remove new MCC–DO card from anti–static container. |
| 3 | Slide card into slot and simultaneously pull both latches forward and slip the tips behind the frame. |
| 4 | Push the latches in to engage the card with the backplane and lock the tabs. |
| 5 | Note that the PWR/ALM LED turns red briefly, then green.<br>Green indicates that it has passed all self–tests and is functional. |
| 6 | Connect cabling to front panel connectors. |
| 7 | Notify operator that the MCC–DO replacement procedure is completed. Have operator verify that old alarms have cleared and no new alarms are reported. |
| 8 | If there are no other actions required, install BTS front panel cover by setting it in place and pushing on the top and bottom simultaneously. |

**Figure 9-16:** MCC–DO Card

NOTE:
1. The DO card physically occupies MCC slots 1 & 2, but only plugs into one backplane connector



## Introduction

The procedures in this section cover only the removal and installation of the Compact BTS Input and Output (CBIO) Board.

## System Impact/Considerations

If the CBIO board is failing or has failed there will be an interruption in call processing. The entire site will be down for replacement of this component.

## CBIO Indicators

The CBIO Board has six indicators that provide status of several components of the BTS. The six LEDs are +28V, +15V, HSO, MOD, +5V, and ISO.

### +28V LED

The +28V LED indicates the status of the DC power that is supplied to the Remote GPS or the RF GPS module. This LED will come on after the CSA initializes. When the CSA is trying to determine the cable delay, this LED will go OFF and ON, but it should stay ON once the delay is successfully completed. If the LED remains OFF, it may indicate a problem with either the RGPS or RF GPS, or the CSA FRU.

### +15V LED

The +15V LED indicates the status of the DC power that is coming from the DC–DC converter module to the CBIO Board. This LED should always be ON, unless there is a blown fuse on the CBIO Board.

### HSO LED

The HSO LED indicates the status of the DC power that is supplied to the HSO or MSO module. This LED will be OFF, if the HSO or MSO is not connected; otherwise, it is ON. Faulty operation of the LED may be related to problems with the main +15V supply to the CBIO Board, also indicated by the +15V LED.

### MOD LED

The MOD LED indicates the status of the DC power that is supplied to the modem module. However, this LED is not dependent on whether the modem module is plugged in or not, and should be always ON. If the CBIO +5V supply is okay, then the LED being OFF could indicate a problem with the modem module, the wiring, or a resettable fuse on the CBIO Board.

### +5V LED

The +5V LED indicates the status of the DC power that is coming from the DC–DC converter module to the CBIO Board. This LED should always be ON, unless there is a blown fuse on the CBIO Board.

### ISO LED

The ISO LED indicates the status of the isolated DC voltage that is used for the customer inputs. This LED should always be ON, if the +5V supply to the CBIO Board is okay. If the LED is OFF, it indicates a problem on the CBIO Board.

## Required Items

### Documents

None

### Tools

Screwdriver with T20 star bit

### Replacement Items

One CBIO Board.

## Prerequisite

**IMPORTANT**

Coordinate this repair task with the OMC–R operator.

Contact the OMC–R operator before performing the replacement procedure. Tell the operator that the CBIO will be replaced and that alarms can be expected.

Upon completion of the replacement procedure, have the OMC–R operator verify that old alarms are cleared and that no new ones are reported.

## Replacement Procedure

If desired, record the BTS and CBIO Board serial number of the failed unit in Table 9-64 at the end of this chapter.

### Remove CBIO Board

Follow the procedure in Table 9-26 to remove the CBIO Board.

**NOTE**

To perform the following procedure, the BTS must be removed from the Mounting Plate.

**Table 9-26:** Procedure to Remove CBIO Board

| Step | Action |
|---|---|
| 1 | Notify operator that the CBIO Board replacement procedure is starting and that alarms can be expected. |
| 2 | Perform the Site Shutdown procedure in Table 10-2. |

table continued on next page

| Table 9-26: Procedure to Remove CBIO Board | |
|---|---|
| **Step** | **Action** |
| | **△ WARNING**<br>By pulling out the circuit breaker, power to the BTS will be interrupted, causing the BTS to go off line. |
| 3 | Disengage DC power to the BTS by pulling out the 20 A breaker at the rear of the BTS. |
| 4 | If possible, turn off DC power at the source. Verify that DC power source is OFF. |
| 5 | Disconnect all cabling to the BTS. |
| 6 | Put on the ESD wrist strap. |
| 7 | At the rear of the BTS, remove the four M4 screws securing the SDCX or SDCX cover plate to the CBIO Board. Gently remove SDCX module from the CBIO connector or SDCX cover plate. |
| 8 | Use a driver with a T20 star bit to remove 6 M4 screws securing CBIO to housing. See Figure 9-17. |
| | *** IMPORTANT**<br>DO NOT yank out the CBIO Board, there are cables connected at the bottom rear side of the board. |
| 9 | Grasp holes and gently pull on CBIO Board to disengage it from the backplane. See Figure 9-17.<br>Note that there are internal cables connected at the bottom. |
| 10 | If not already done, label internal cables before disconnecting them. |
| 11 | Remove CBIO Board and place in an anti–static container. |

### Install CBIO Board

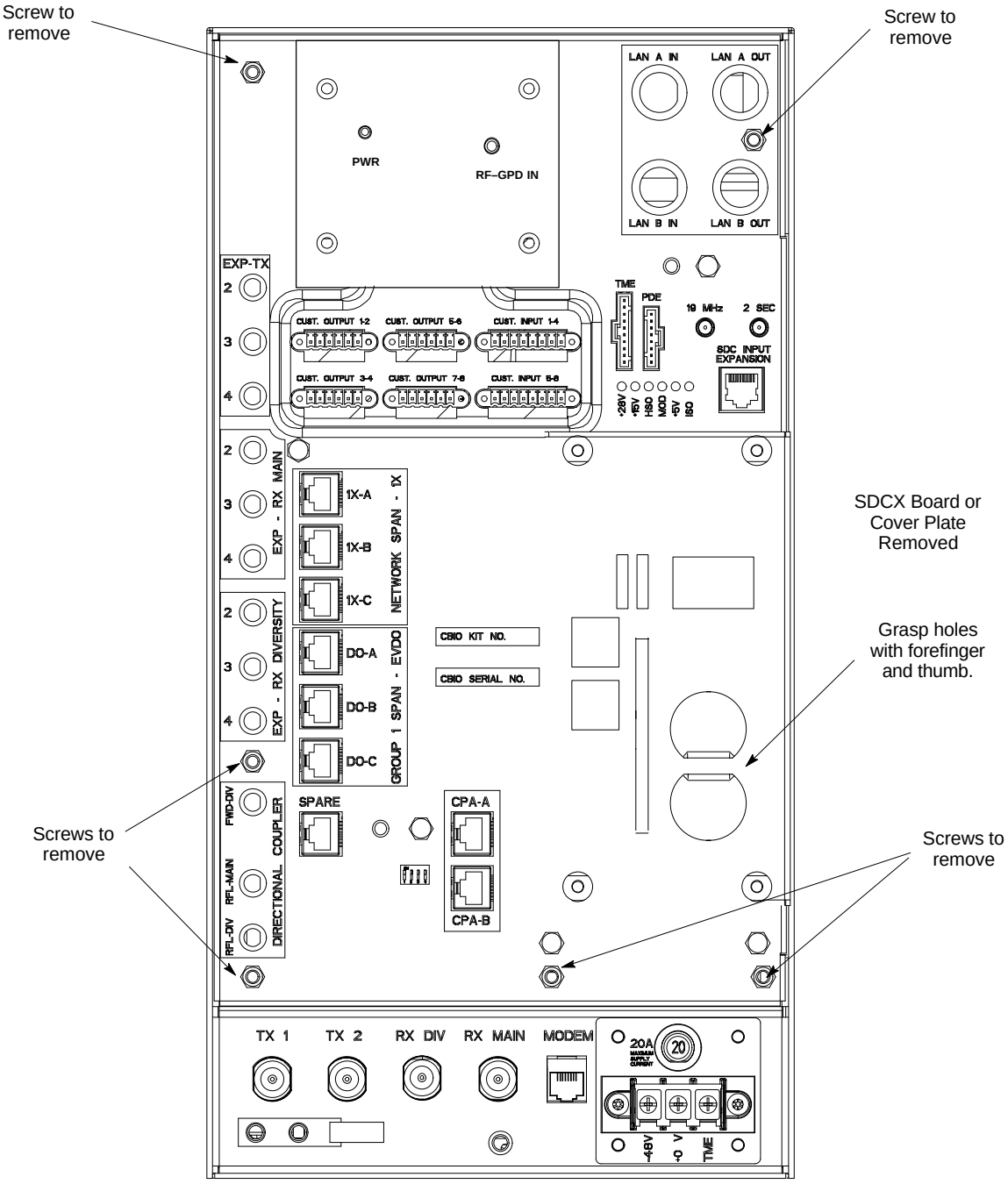
Follow the procedure in Table 9-27 toinstall the CBIO Board.

| Table 9-27: Procedure to Install CBIO Board | |
|---|---|
| **Step** | **Action** |
| 1 | Put on the ESD wrist strap. |
| 2 | If not already done, remove CBIO Board from its anti–static container. |
| 3 | Set CBIO Board onto rear of BTS and connect the internal cables, in the same order as previously connected. |
| 4 | Carefully align the CBIO panel to the frame and gently seat the CBIO connector into the backplane connector. |
| 5 | Once aligned, with one hand grasp BTS and with the other hand gently push the CBIO until it sets up against the housing. |
| 6 | Use a driver with a T20 star bit to secure the CBIO to the frame using 6 M4 screws. Torque screws to 2.3 N–M (20 in–lbs). See Figure 9-17. |
| 7 | Install SDCX or SDCX cover plate and secure to CBIO using 4 M4 screws. Torque screws to 2.3 N–M (20 in–lbs). |

table continued on next page

| Table 9-27: Procedure to Install CBIO Board | |
|---|---|
| **Step** | **Action** |
| 8 | Disengage from the ESD wrist strap. |
| 9 | Connect all external cabling. |
| 10 | Verify that DC power source is OFF before re–connecting to the BTS.<br>Turn on DC power source. |
| 11 | Notify the operator know that the replacement procedure is completed, and that power up will begin shortly. |
| 12 | Allow the BTS to power up by pushing in the 20 A circuit breaker at the rear of the BTS. |
| 13 | Perform the Site Startup procedure in Table 10-5. |
| 14 | Perform an optimization of the cards, using the procedures in the *Optimization/ATP* section of this manual. |
| 15 | After BTS is optimized and is operating within normal parameters, install the BTS front cover panel by setting it in place and pushing on the top and bottom simultaneously. |
| 16 | Notify operator that optimization is complete. |

**Figure 9-17:** CBIO Board with SDCX Removed




ti–cdma–wp–00311–v01–ildoc–ah

# SDCX Module

## Introduction

The procedures in this section cover only the removal and installation of the Synchronization Daisy–Chaining and eXpansion (SDCX) Module.

## System Impact/Considerations

If the SDCX fails it will cause a disruption in call processing by upsetting the timing of the BTSs.

## Required Items

### Documents

None

### Tools

Star screw driver.

### Replacement Items

One SDCX Module (SGLN6153)

## Prerequisite

**IMPORTANT**

Coordinate this repair task with the OMC–R operator.

Contact the OMC–R operator before performing the replacement procedure. Tell the operator that the SDCX module will be replaced and that alarms can be expected.

Upon completion of the replacement procedure, have the OMC–R operator verify that old alarms are cleared and that no new ones are reported.

## Replacement Procedure

If desired, record the BTS and SDCX serial number of the failed unit in Table 9-65 at the end of this chapter.

### Remove SDCX

Follow the procedure in Table 9-28 to remove the SDCX Module.

**Table 9-28:** Procedure to Remove SDCX

| Step | Action |
|---|---|
| 1 | Notify operator that the SDCX Module replacement procedure is starting and that alarms can be expected. |
| 2 | Put on an ESD wrist strap or other approved grounding device. |

table continued on next page

| **Table 9-28:** Procedure to Remove SDCX | |
|---|---|
| **Step** | **Action** |
| 3 | Disconnect all cables from SDCX Module. |
| 4 | At the rear of the BTS, use a T20 screw driver to remove four M4 screws securing SDCX Module to the CBIO Board. See Figure 9-19. |
| 5 | Gently remove SDCX Module (disconnect it from the SDCX connector in the CBIO Board), and place it in/on an anti–static container or surface. |

### Install SDCX

Follow the procedure in Table 9-29 to install the SDCX.

| **Table 9-29:** Procedure to Install SDCX | |
|---|---|
| **Step** | **Action** |
| 1 | Put on an ESD wrist strap or other approved grounding device. |
| 2 | If not already done, remove new SDC Module from its anti–static container |
| 3 | Install SDCX module onto the CBIO Board. |
| 4 | Align connector on bottom of SDCX Module with connector on on CBIO Board and gently push down on module. See Figure 9-20. |
| 5 | Secure module to CBIO Board using four M4 screws. Torque screws to 2.3 N–M (20 in–lbs). |
| 6 | Notify the operator know that the replacement procedure is complete. |

**Figure 9-18:** SDCX Module

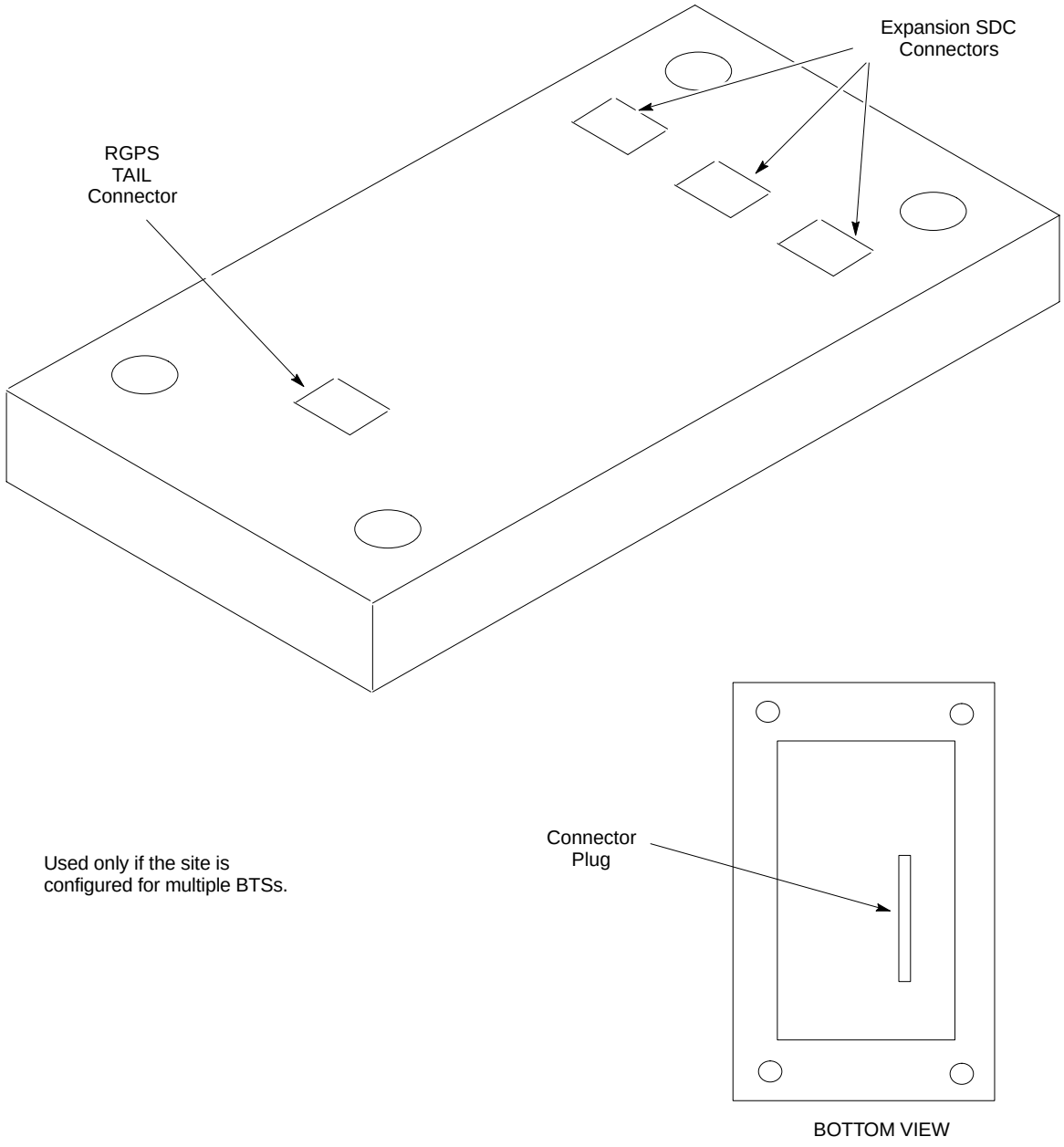
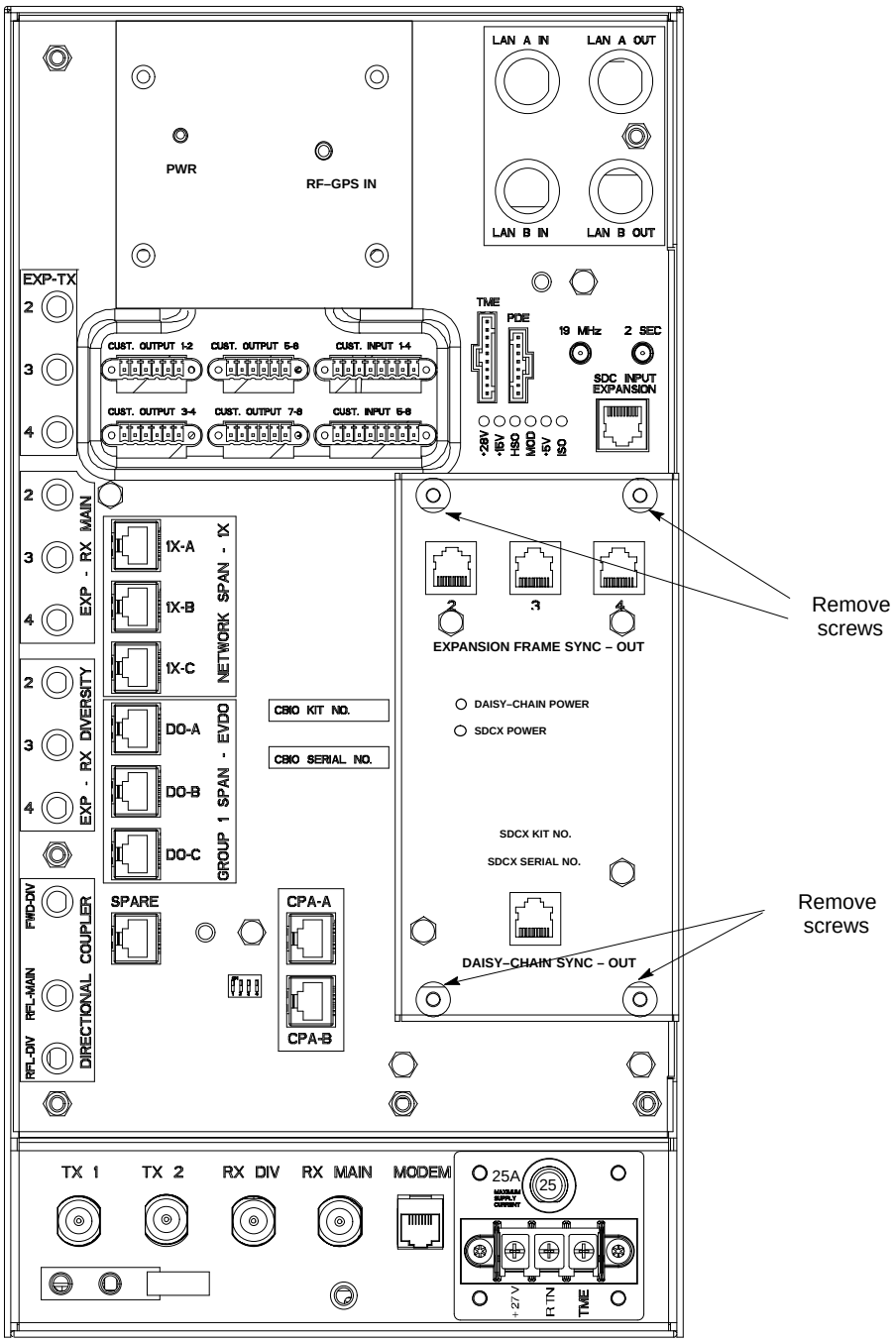
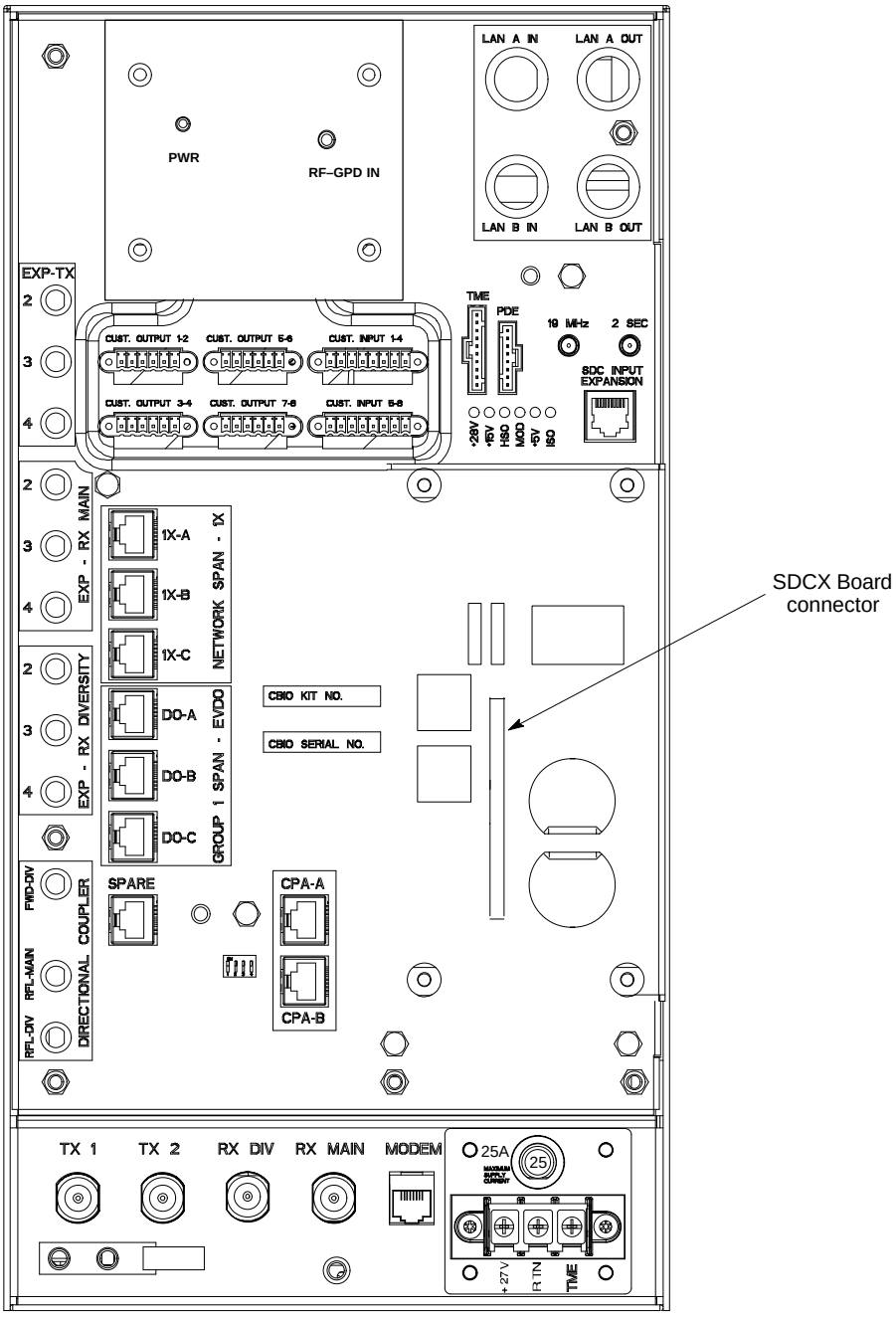


**Figure 9-19:** CBIO Board with SDCX




13003_001C

**Figure 9-20:** CBIO Board with SDCX Removed

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# RF Filter Tray

## Introduction

The procedures in this section cover only the removal and installation of the RF Filter Tray.

## System Impact/Considerations

If either of the filters on the tray is failing or has failed there will be an interruption in call processing. The entire site will be down for replacement of this component.

## Required Items

### Documents

None

### Tools

Screwdriver with T20 star bit

### Replacement Items

- 1.9 GHz Filter Kit – 0 cCLPA (SGLN6221)
- 1.9 GHz Filter Kit – 1 cCLPA (SGLN6220)
- 1.9 GHz Filter Kit – 2 cCLPA (SGLN6219)

## Prerequisite

**IMPORTANT**

Coordinate this repair task with the OMC–R operator.

Contact the OMC–R operator before performing the replacement procedure. Tell the operator that the Filter Tray will be replaced and that alarms can be expected.

Upon completion of the replacement procedure, have the OMC–R operator verify that old alarms are cleared and that no new ones are reported.

## Replacement Procedure

If desired, record the BTS and Filter Tray serial number of the failed unit in Table 9-66 at the end of this chapter.

If the BTS is in an outdoor configuration, perform Table 9-51, Remove TME. The BTS removal is embedded in the procedure.

### Remove Filter Tray

Follow the procedure in Table 9-30 to remove the Filter Tray.

**NOTE**

To perform the following procedure, the BTS must be removed from the Mounting Plate.

| **Table 9-30:** Preparation Procedure for Removing the Filter Tray | |
|---|---|
| **Step** | **Action** |
| 1 | Notify operator that the Filter Kit replacement procedure is starting and that alarms can be expected. |
| 2 | Perform the Site Shutdown procedure in Table 10-2. |
| 3 | Remove 3 M6 screws and washers securing BTS to Mounting Plate. |
| | **△ WARNING**<br>By pulling out the circuit breaker, power to the BTS will be interrupted, causing the BTS to go off line. |
| 4 | Disengage DC power to the BTS by pulling out the 20 A breaker at the rear of the BTS. |
| 5 | If possible, turn off DC power at the source. Verify that DC Power source is OFF. |
| 6 | Disconnect all cabling to the BTS. |
| 7 | Remove BTS from Mounting Plate and place on a stable, flat surface. |
| 8 | Put on an ESD wrist strap or other approved grounding device.Ensure wrist strap is properly grounded. Do not ground to BTS chassis. |
| 9 | *If not already done*, remove BTS front cover panel by grasping finger grooves at the top and bottom and pulling. |
| 10 | Pull out all the circuit cards and modules. |
| 11 | *If not already done,* remove HSO Module cover panel by turning latch, gently pulling it open, and sliding it out towards the right. The panel has a flange that fits into a slot in the chassis. |
| 12 | Reach fingers in along the right side and feel for the clip that holds on the lower front right side vent panel, and pop out the panel. |
| 13 | Using the hole left by the front right side vent panel, reach fingers in along the divider and press on the clip holding the rear right side vent panel and pop it out. |
| 14 | If the BTS is equipped with Filter Tray Kit SGLN6221, proceed to Table 9-31.<br>If the BTS is equipped with Filter Tray Kit SGLN6220, proceed to Table 9-35.<br>If the BTS is equipped with Filter Tray Kit SGLN6219, proceed to Table 9-37. |



### Filter Tray Kit SGLN6221 Removal Procedure

Follow the procedure in Table 9-31 to remove the Filter Tray.

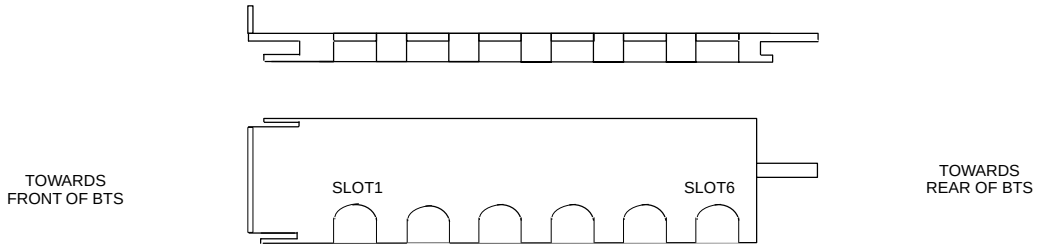
| **Table 9-31:** Procedure to Remove Filter Tray Kit SGLN6221 | |
|---|---|
| **Step** | **Action** |
| 1 | Perform the preparation procedure described in Table 9-30. |
| 2 | Using a screwdriver with T20 star bit, remove two screws securing the Filter Tray Assembly to the chassis. |
| 3 | Disconnect the RF cables (Input) in the following order:<br>– RX MAIN connector (blue)<br>RX DIV connector (green)<br>RX RFL–MAIN connector (blue)<br>RX RFL–DIV connector (green)<br>RX FWD–DIV connector (green) |
| 4 | Hold cables to one side and slide out filter tray to expose cables attached to rear connector (Output) of each filter. |
| 5 | Disconnect RX MAIN cable (blue). |
| 6 | Disconnect RX DIV cable (green). |
| 7 | Remove Filter Tray completely. |

### cMPC Cable Clip Removal Procedure

Follow the procedure in Table 9-32 to remove the cMPC cable clip. The cMPC cable clip is located just inside the front of the BTS, on the CCP2 shelf on the right side (looking into the BTS).

| **Table 9-32:** Procedure to Remove cMPC Cable Clip | |
|---|---|
| **Step** | **Action** |
| | **NOTE**<br>cMPC cable clip only needs to be removed if filter tray is not replaced with the same type. Clip removal is to accommodate other filter tray configurations or cable replacement. |
| 1 | Using a small, flat blade screwdriver, reach in and simultaneously lift tab and push towards the front of the BTS. See Figure 9-21. |
| 2 | Using thumb and forefinger grasp tab (narrow end), and pull up and towards rear to pop out clip. |
| 3 | Remove clip and place a side. |
| 4 | Remove the RX MAIN (blue) and RX DIV (green) cables. |

**Figure 9-21:** cMPC Cable Clip




### cMPC Cable Clip Installation Procedure

Follow the procedure in Table 9-33 to install the cMPC cable clip.

**Table 9-33:** Procedure to Install cMPC Cable Clip

| Step | Action |
|---|---|
| 1 | Properly position cables in clip (order defined in installation procedure). |
| 2 | Insert clip by sliding in wide flange end in first (towards front of BTS) |
| 3 | Using a thumb, press on clip and push towards rear, slipping clip into place. |
| 4 | Route cables inside BTS towards filter tray. |
| 5 | Return to filter tray installation procedure. |

### Install Filter Tray Kit SGLN6221

Follow the procedure in Table 9-34 to install the Filter Tray. Refer to Figure 9-22.

**Table 9-34:** Procedure to Install Filter Tray Kit SGLN6221

| Step | Action |
|---|---|
| 1 | Put on an ESD wrist strap or other approved grounding device. Ensure that wrist strap is properly grounded.<br>**NOTE**<br>***Do not*** attach ESD wrist strap to BTS chassis. |
| 2 | *If not already installed*, the following cables must be installed:<br>– RX RFL–MAIN (blue)<br>– RX RFL–DIV (green)<br>– RX FWD–DIV (green) |
| 3 | Remove the CBIO Board by performing the procedure described in Table 9-26. |

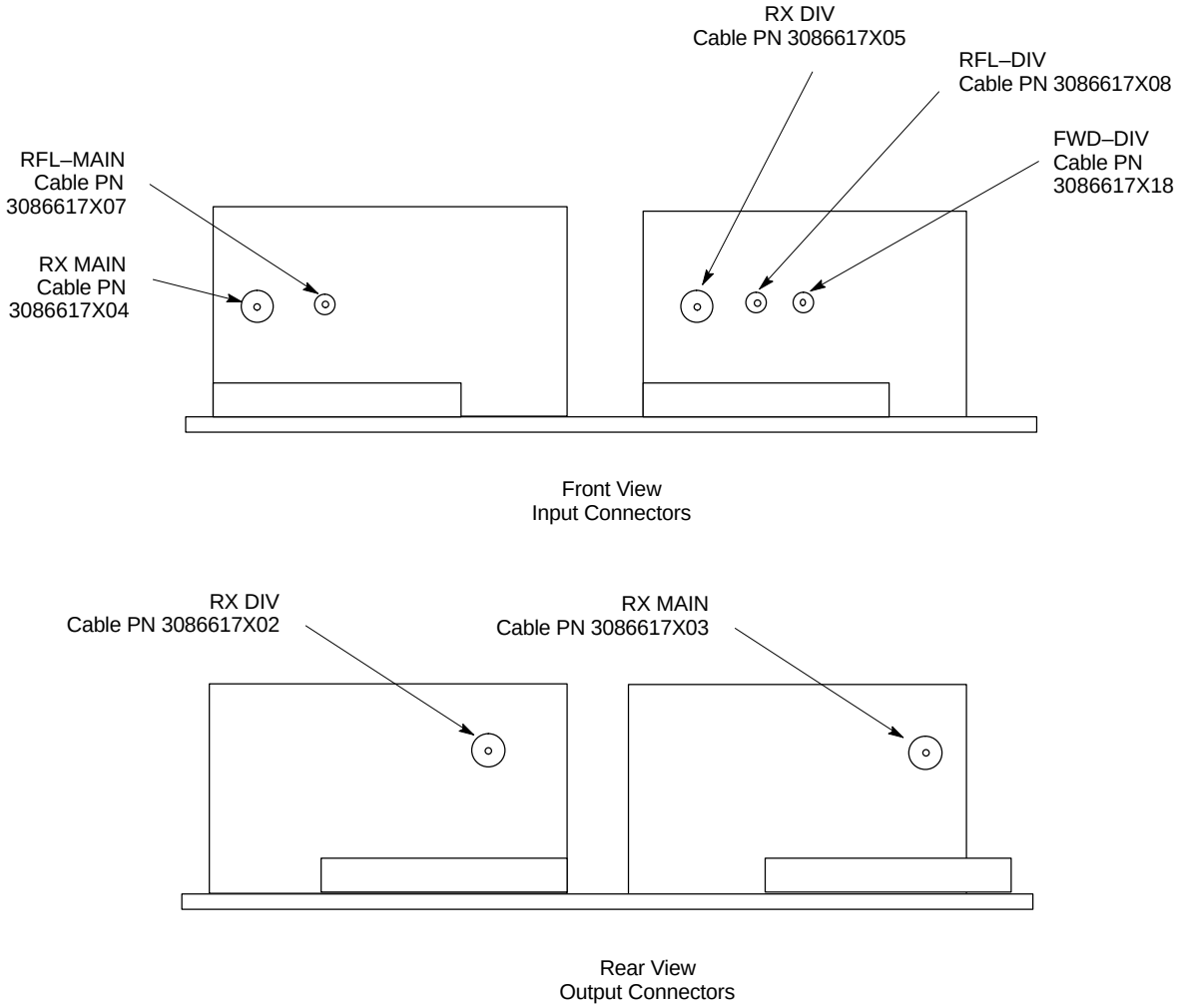
table continued on next page

| **Table 9-34:** Procedure to Install Filter Tray Kit SGLN6221 | |
|---|---|
| **Step** | **Action** |
| 4 | Connect cables to the RFL–MAIN, RFL–DIV, and FWD–DIV connectors at the inside rear of the BTS, respectively. Use a 5/16–in wrench to secure cables to connectors. Torque to 1 N–M. |
| 5 | **NOTE**<br>Cables have two heat shrink sleeves with a slight separation between them. The cMPC cable clip slides into this separation to hold the cables in place.<br><br>Install RX MAIN and RX DIV cables as follows:<br>– Ensuring the cable is on the inside of BTS, place RX DIV (green) cable into slot 1 of cMPC cable clip (Connector labeled RX DIV faces towards the front of BTS)<br>– Place RX MAIN (blue) cable into slot 2 of cMPC cable clip (Connector labeled RX MAIN faces towards the front of BTS).<br>– Place (red) cable into slot 5.<br>– Place (black) cable into slot 6. |
| 6 | Perform Table 9-33 to install the cMPC cable clip. (If it had been removed.) |
| 7 | Set Filter Tray on the edge of its slot and connect the RX MAIN (blue) and RX DIV (green) cables to the output connector at the rear of their respective filters. See Figure 9-22. |
| 8 | Slide Filter Tray into BTS chassis and secure using 2 M4 screws. Torque to 2.3 N–M (20 in–lbs). |
| 9 | Connect the following cables:<br>– RX MAIN (blue) to RX MAIN input<br>– RX DIV (green) to RX DIV input<br>– RX RFL–MAIN (blue) to RFL–MAIN input<br>– RX RFL–DIV (green) to RFL–DIV input<br>– RX FWD–DIV (green) to FWD–DIV input<br>See Figure 9-22. |
| 10 | Use tie–wraps to dress cables as necessary. |
| 11 | Install the rear right side vent panel. Ensure that the clip end faces the front of the BTS or towards the left. |
| 12 | Install the front right side vent panel. Ensure that the clip end faces the front of the BTS or towards the left. |
| 13 | Make sure the vent panels are flush with the side of the BTS. |
| 14 | Install CBIO Board following the procedure in Table 9-27. |
| 15 | Install circuit cards and modules, ensure they are seated properly. |
| 16 | Install HSO Module cover panel by sliding its flange into the slot, closing, and latching it in place. |
| 17 | Disengage from the ESD wrist strap. |
| 18 | Set the BTS on the Mounting Plate and secure using 3 M6 screws and isolation washers. Torque to 5 N–M (44 in–lbs). |

table continued on next page

| **Table 9-34:** Procedure to Install Filter Tray Kit SGLN6221 | |
|---|---|
| **Step** | **Action** |
| 19 | Connect all external cabling. |
| 20 | Verify that DC power source is OFF before re–connecting to the BTS.<br>Turn on DC power source. |
| 21 | Notify the operator know that the replacement procedure is completed, and that power up will begin shortly. |
| 22 | Allow the BTS to power up by pushing in the 20 A circuit breaker at the rear of the BTS. |
| 23 | Perform the Site Startup procedure in Table 10-5. |
| 24 | Perform an optimization of the cards, using the procedures in the *Optimization/ATP* section of this manual. |
| 25 | After BTS is optimized, and it is operating within normal parameters, install the BTS front cover panel by setting it in place and pushing on the top and bottom simultaneously. |
| 26 | Notify operator that optimization is complete. |

**Figure 9-22:** Filter Tray Connectors and Cable Part Numbers (SGLN6221)




### Filter Tray Kit SGLN6220 Removal Procedure

Follow the procedure in Table 9-35 to remove the Filter Tray Kit.

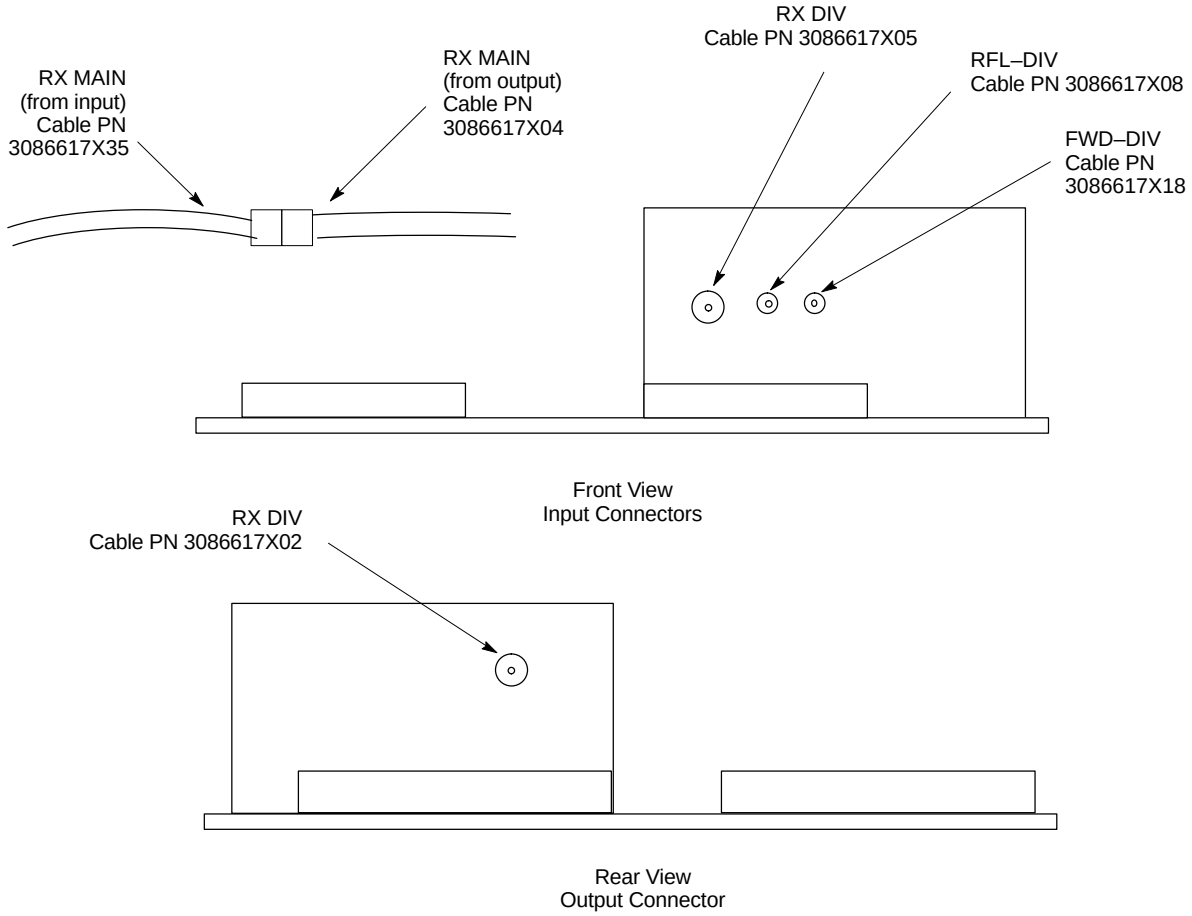
**Table 9-35:** Procedure to Remove Filter Tray Kit SGLN6220

| Step | Action |
|---|---|
| 1 | Perform the preparation procedure described in Table 9-30. |
| 2 | Using a screwdriver with T20 star bit, remove two screws securing the Filter Tray Assembly to the chassis. |

table continued on next page

| **Table 9-35:** Procedure to Remove Filter Tray Kit SGLN6220 | |
|---|---|
| **Step** | **Action** |
| 3 | Disconnect the RF cables (Input) in the following order:<br>– RX MAIN connector (blue) from RX MAIN connector<br>RX DIV connector (green)<br>RX RFL–DIV connector (green)<br>RX FWD–DIV connector (green)<br>See Figure 9-23 |
| 4 | Hold cables to one side and slide out filter tray to expose cable attached to rear connector (Output) of the RX DIV filter. |
| 5 | Disconnect RX DIV (Output) cable (green). |
| 6 | Remove Filter Tray completely. |

**Figure 9-23:** Filter Tray Connectors and Cable Part Numbers (SGLN6220)



### Install Filter Tray Kit SGLN6220

Follow the procedure in Table 9-36 to install the Filter Tray. Refer to Figure 9-22.

**Table 9-36:** Procedure to Install Filter Tray Kit SGLN6220

| Step | Action |
|---|---|
| 1 | Put on an ESD wrist strap or other approved grounding device. Ensure that wrist strap is properly grounded. |
| | **NOTE**<br>***Do not*** attach grounding devices to BTS chassis. |
| 2 | If the filter tray to be installed is different from the one removed, proceed to the appropriate filter tray installation procedure. Otherwise, proceed to step 5. |
| 3 | *If not already installed*, the following cables must be installed:<br>– RX RFL–DIV (green)<br>– RX FWD–DIV (green) |
| 4 | Remove the CBIO Board by performing the procedure described in Table 9-26. |
| 5 | Connect cables to the RFL–DIV and FWD–DIV connectors, respectively. Use a 5/16–in wrench to secure cables to connectors. Torque to 1 N–M. |
| 6 | **NOTE**<br>Cables have two heat shrink sleeves with a slight separation between them. The cMPC cable clip slides into this separation to hold the cables in place.<br>Install RX MAIN and RX DIV cables as follows:<br>– Ensuring the cable is on the inside of BTS, place RX DIV (green) cable into slot 1 of cMPCcable clip (Connector labeled RX DIV faces towards the front of BTS)<br>– Place RX MAIN (blue) cable into slot 2 of cMPC cable clip (Connector labeled RX MAIN faces towards the front of BTS).<br>– Place (red) cable into slot 5.<br>– Place (black) cable into slot 6. |
| 7 | Perform Table 9-33 to install the cMPC cable clip. |
| 8 | Set new Filter Tray into its slot and connect the input RX MAIN (blue) directly to output RX MAIN cable. Connect RX DIV (green) cable to the output connector at the rear of the RX DIV filter. See . |
| 9 | Slide Filter Tray into BTS chassis and secure using 2 M4 screws. Torque to 2.3 N–M (20 in–lbs). |
| 10 | Connect the following cables:<br>– RX DIV (green) to RX DIV input<br>– RX RFL–DIV (green) to RFL–DIV input<br>– RX FWD–DIV (green) to FWD–DIV input<br>See Figure 9-23. |
| 11 | Use tie–wraps to dress cables as necessary. |

table continued on next page

| **Table 9-36:** Procedure to Install Filter Tray Kit SGLN6220 | |
|---|---|
| **Step** | **Action** |
| 12 | Install the rear right side vent panel. Ensure that the clip end faces the front of the BTS or towards the left. |
| 13 | Install the front right side vent panel. Ensure that the clip end faces the front of the BTS or towards the left. |
| 14 | Make sure the vent panels are flush with the side of the BTS. |
| 15 | Install CBIO Board following the procedure in Table 9-27. |
| 16 | Install circuit cards and modules, ensure they are seated properly. |
| 17 | Install HSO Module cover panel by sliding its flange into the slot, closing, and latching it in place. |
| 18 | Disengage from the ESD wrist strap. |
| 19 | Set the BTS on the Mounting Plate and secure using 3 M6 screws and isolation washers. Torque to 5 N–M (44 in–lbs). |
| 20 | Connect all external cabling. |
| 21 | Verify that DC power source is OFF before re–connecting to the BTS.<br>Turn on DC power source. |
| 22 | Notify the operator know that the replacement procedure is completed, and that power up will begin shortly. |
| 23 | Allow the BTS to power up by pushing in the 20 A circuit breaker at the rear of the BTS. |
| 24 | Perform the Site Startup procedure in Table 10-5. |
| 25 | Perform an optimization of the cards, using the procedures in the *Optimization/ATP* section of this manual. |
| 26 | After BTS is optimized, and it is operating within normal parameters, install the BTS front cover panel by setting it in place and pushing on the top and bottom simultaneously. |
| 27 | Notify operator that optimization is complete. |

### Filter Tray Kit SGLN6219 Removal Procedure

Follow the procedure in Table 9-37 to remove the Filter Tray Kit.

| **Table 9-37:** Procedure to Remove Filter Tray Kit SGLN6219 | |
|---|---|
| **Step** | **Action** |
| 1 | Perform the preparation procedure described in Table 9-30. |
| 2 | Disconnect the cables in the following order:<br>– RX MAIN connector (X35, blue) from RX MAIN (X04, blue) connector<br>RX DIV connector (X36, green) from RX DIV (X05, green) connector<br>See Figure 9-24. |
| 3 | Remove cMPC cable clip per Table 9-32, if necessary |

### Install Filter Tray Kit SGLN6219

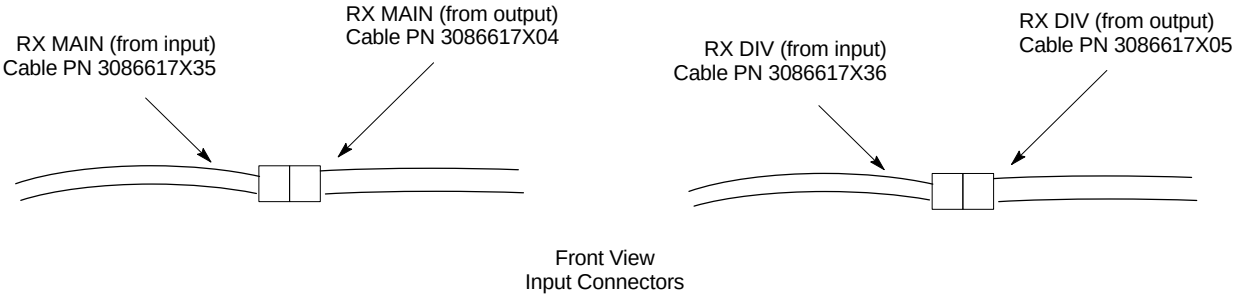
Follow the procedure in Table 9-38 to install the Filter Tray.

| **Table 9-38:** Procedure to Install Filter Tray Kit SGLN6222 or SGLN6219 | |
|---|---|
| **Step** | **Action** |
| 1 | Put on an ESD wrist strap or other approved grounding device. Ensure that wrist strap is properly grounded. |
| | **NOTE**<br>***Do not*** attach ESD wrist strap to BTS chassis. |
| 2 | If the filter tray to be installed is different from the one removed, proceed to the appropriate filter tray installation procedure. Otherwise, proceed to step 5. |
| 3 | **NOTE**<br>Cables have two heat shrink sleeves with a slight separation between them. The cMPC cable clip slides into this separation to hold the cables in place.<br>Install RX MAIN and RX DIV cables as follows:<br>– Ensuring the cable is on the inside of BTS, place RX DIV (green) cable into slot 1 of cMPC cable clip (Connector labeled RX DIV faces towards the front of BTS)<br>– Place RX MAIN (blue) cable into slot 2 of cMPC cable clip (Connector labeled RX MAIN faces towards the front of BTS).<br>– Place (red) cable into slot 5.<br>– Place (black) cable into slot 6.<br>See Figure 9-24. |
| 4 | Perform Table 9-33 to install the cMPC cable clip. (If it had been removed.) |
| 5 | Connect the input RX MAIN (blue) directly to output RX MAIN cable. Connect input RX DIV (green) directly to the output RX DIV cable |
| 6 | Use tie–wraps to dress cables as necessary. |
| 7 | Install the rear right side vent panel. Ensure that the clip end faces the front of the BTS or towards the left. |

table continued on next page

| **Table 9-38:** Procedure to Install Filter Tray Kit SGLN6222 or SGLN6219 | |
|---|---|
| **Step** | **Action** |
| 8 | Install the front right side vent panel. Ensure that the clip end faces the front of the BTS or towards the left. |
| 9 | Make sure the vent panels are flush with the side of the BTS. |
| 10 | Install circuit cards and modules, ensure they are seated properly. |
| 11 | Install HSO Module cover panel by sliding its flange into the slot, closing, and latching it in place. |
| 12 | Disengage from the ESD wrist strap. |
| 13 | Set the BTS on the Mounting Plate and secure using 3 M6 screws and isolation washers. Torque to 5 N–M (44 in–lbs). |
| 14 | Connect all external cabling. |
| 15 | Verify that DC power source is OFF before re–connecting to the BTS.<br>Turn on DC power source. |
| 16 | Notify the operator know that the replacement procedure is completed, and that power up will begin shortly. |
| 17 | Allow the BTS to power up by pushing in the 20 A circuit breaker at the rear of the BTS. |
| 18 | Perform the Site Startup procedure in Table 10-5. |
| 19 | Perform an optimization of the cards, using the procedures in the *Optimization/ATP* section of this manual. |
| 20 | After BTS is optimized, and it is operating within normal parameters, install the BTS front cover panel by setting it in place and pushing on the top and bottom simultaneously. |
| 21 | Notify operator that optimization is complete. |

**Figure 9-24:** Filter Tray Connectors and Cable Part Numbers (SGLN6219)



## Introduction

The procedures in this section cover only the removal and installation of the Compact Combined Linear Power Amplifier (cCLPA).

## System Impact/Considerations

If the cCLPA is failing or has failed there will be an interruption in call processing. While the BTS itself may be operational, there may not be reception or transmission depending on the fault.

## Required Items

### Documents

None

### Tools

Screwdriver with T20 star bit

### Replacement Item

- +27 VDC A Band (STTF4024)
- +27 VDC B Band (STTF4025)
- +27VDC 1.9 GHz (STTG4031)

## Prerequisite

**IMPORTANT**

Coordinate this repair task with the OMC–R operator.

Contact the OMC–R operator before performing the replacement procedure. Tell the operator that the Filter Tray will be replaced and that alarms can be expected.

Upon completion of the replacement procedure, have the OMC–R operator verify that old alarms are cleared and that no new ones are reported.

## Replacement Procedure

If desired, record the BTS and cCLPA serial number of the failed unit in Table 9-67 at the end of this chapter.

### Remove cCLPA

Follow the procedure in Table 9-39 to remove the cCLPA.

**Table 9-39:** Procedure to Remove cCLPA

| Step | Action |
|---|---|
| 1 | Notify operator that the cCLPA replacement procedure is starting and that alarms can be expected. |
| 2 | Have OMC–R operator disable the cCLPA and the associated BBX card(s). |

table continued on next page

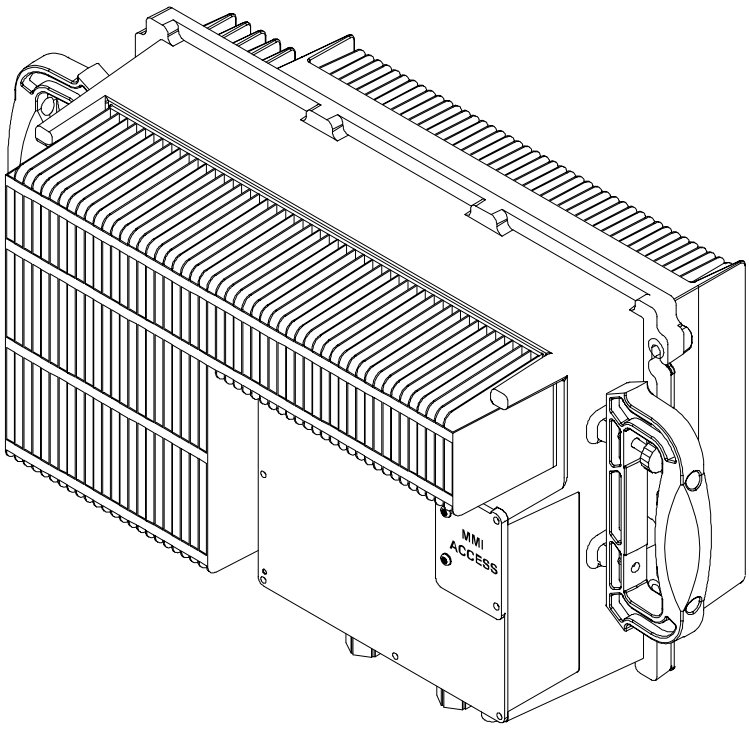
| Table 9-39: Procedure to Remove cCLPA | |
|---|---|
| **Step** | **Action** |
| 3 | Turn off DC power to the cCLPA. For Outdoor configuration disengage the PDE circuit breaker to the cCLPA being removed. |
| 4 | Use a screwdriver with a T20 star bit to remove 8 screws securing I/O Board cover to the cCLPA. |
| 5 | Loosen screws securing DC power to the I/O Board DC connector. |
| 6 | Disconnect BTS Data Cable from the I/O Board. |
| 7 | Disconnect ground cable from the cCLPA. |
| 8 | Remove 4 M6 screws securing cCLPA to the rack. |
| 9 | Loosen 2 M6 screws securing cCLPA flange to the rack enough to safely remove the cCLPA. |
| 10 | Lift cCLPA up and away from the rack. |

### Install cCLPA

Follow the procedure in Table 9-40 to install the cCLPA.

| Table 9-40: Procedure to Install cCLPA | |
|---|---|
| **Step** | **Action** |
| 1 | Lift cCLPA up and hang on two screws. Ensure that all screw holes align, then tighten screws to flange. |
| 2 | Install 4 M6 screws and secure cCLPA to rack. |
| 3 | Connect ground cable to cCLPA. |
| 4 | Route BTS Data Cable through cCLPA DATA opening and connect to RJ45 connector on cCLPA I/O Board. |
| 5 | Route DC power cable through DC IN opening and insert in DC Power terminal board. Ensure that the “–” wire goes to –48V and the “+” wire goes to 0V locations. Tighten the screws to secure the wires in place. |
| 6 | Install I/O Board cover panel and use a screwdriver with a T20 star bit to secure it to cCLPA using 8 M6 screws. |
| 7 | On cCLPA, pull out 20A circut breaker. |
| 8 | Turn on cCLPA DC power source. |
| 9 | Allow the cCLPA to power up by pushing in the 20 A circuit breaker. |
| 10 | Notify OMC–R operator that the cCLPA replacement procedure is completed. |
| 11 | Have OMC–R operator enable cCLPA and associated BBX card(s) that were taken out–of–service and verify that there are no new alarms. |

**Figure 9-25:** Compact Combined Linear Power Amplifier

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# TME Power Distribution Assembly

## Introduction

The procedures in this section cover only the removal and installation of the TME Power Distribution Assembly (PDA)

## System Impact/Considerations

If the PDA is failing or has failed there will be an interruption in call processing. Power to the BTS and 1U unit will be interrupted.

## Required Items

### Documents

None

### Tools

- Screwdriver with T20 star bit
- Torque Driver  Wrench or Torque Ratchet Wrench
- Socket, 8 mm, 3/8–in or 1/4–in
- Flat head or Phillips head screw driver

### Replacement Item

- PDA (STHN4066A)

## Prerequisite

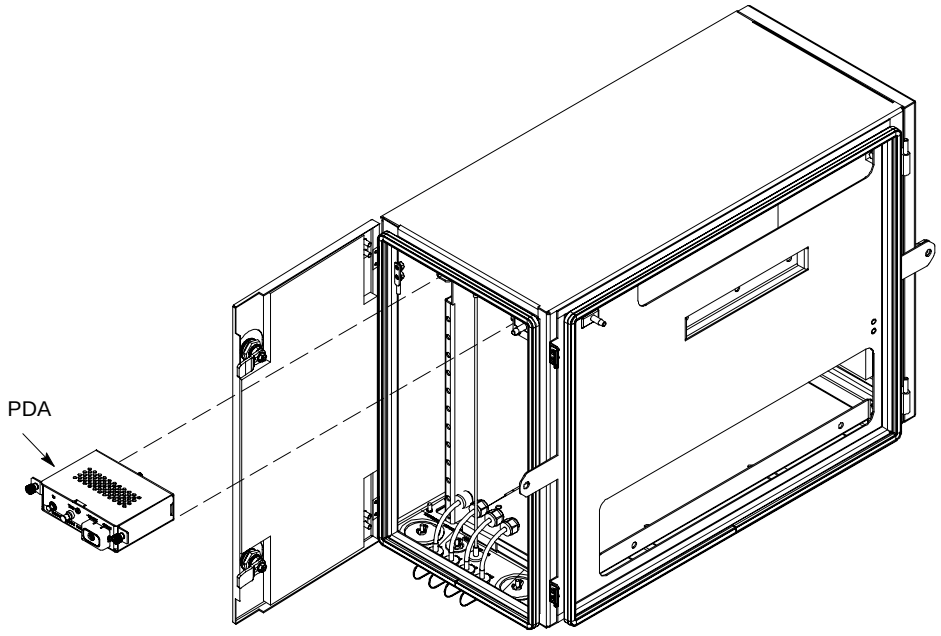
**IMPORTANT**

Coordinate this repair task with the OMC–R operator.

Contact the OMC–R operator before performing the replacement procedure. Tell the operator that the PDA will be replaced and that alarms can be expected.

Upon completion of the replacement procedure, have the OMC–R operator verify that old alarms are cleared and that no new ones are reported.

**Figure 9-26:** PDA Location




### Replacement Procedure

If desired, record the BTS and PDA serial number of the failed unit in Table 9-68 at the end of this chapter.

#### Remove PDA

Follow the procedure in Table 9-41 to remove the PDA. See Figure 9-26 or Figure 9-27.

**Table 9-41:** Procedure to Remove PDA

| Step | Action |
|---|---|
| 1 | Notify operator that the PDA replacement procedure is starting and that alarms can be expected. |
| 2 | Disengage circuit breakers setting to “O” position. |
| 3 | Turn off DC power to the PDA. |
| 4 | On PDA disconnect power plug from connector. Proceed to step 6. |
| 5 | Use a screwdriver to loosen screws securing DC power wires to PDA. |
| 6 | Use a wrench to remove two nuts and washers securing ground lug to the PDA. |
| 7 | Loosen captive screws securing PDA to TME chassis. |

table continued on next page

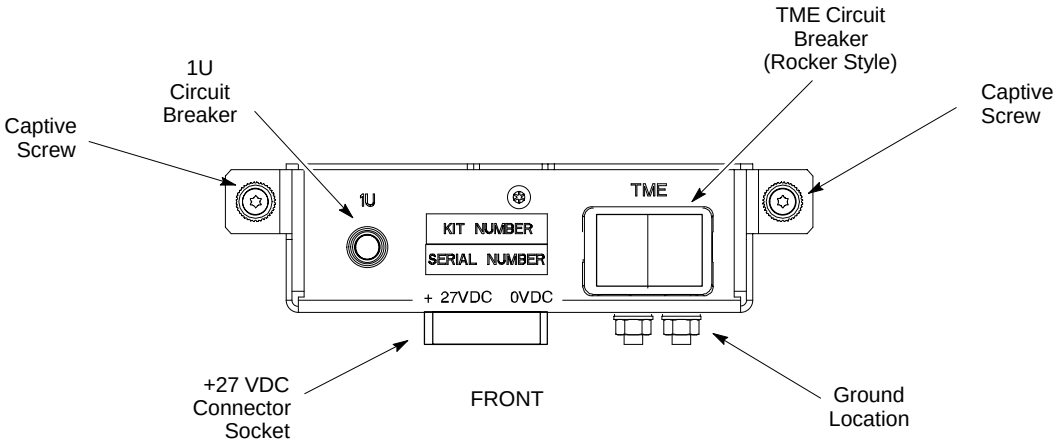
| Table 9-41: Procedure to Remove PDA | |
|---|---|
| **Step** | **Action** |
| 8 | Gently pull out PDA far enough to disconnect cables at the rear. |
| 9 | Remove PDA. |

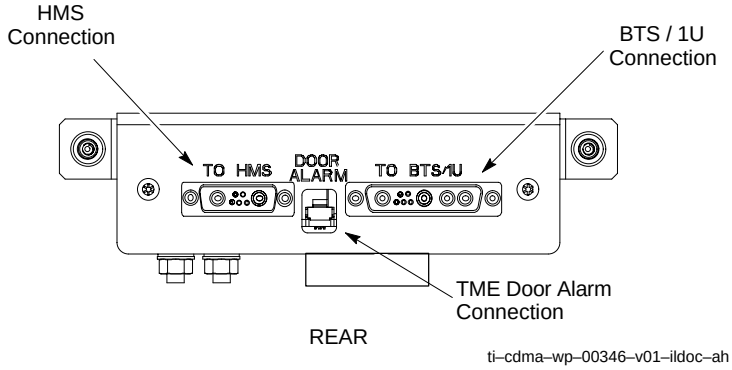
### Install PDA

Follow the procedure in Table 9-42 to install the PDA. See Figure 9-26 or Figure 9-27.

| Table 9-42: Procedure to Install PDA | |
|---|---|
| **Step** | **Action** |
| 1 | Hold PDA near its slot in the TME and connect the cables (previously disconnected) to the rear of the PDA. |
| 2 | Slide PDA in and secure to TME chassis by tightening the captive screws. |
| 3 | Place ground lug on ground studs of the PDA and secure using two M6 nuts and washers. Torque nuts to 3.4 N–M (30 in–lbs). |
| 4 | Verify that circuit breakers are disengaged (pulled out or set to “O” position). |
| 5 | Verify that DC power source is OFF. |
| 6 | Connect +27 V power plug. |
| 7 | Turn on DC power. |
| 8 | On PDA, set circuit breaker switch to “1” position. |
| 9 | Push in 1U circuit breaker. |
| 10 | Notify operator that replacement is complete and verify that no new alarms have been generated and that old alarms are cleared. |

**Figure 9-27:** Power Distribution Assembly



# Heat Management System

## Introduction

The procedures in this section cover only the removal and installation of the Heat Management System (HMS)

## System Impact/Considerations

If the HMS is failing or has failed there will be an interruption in call processing. It is recommended that power be disengaged from the TME.

## Required Items

### Documents

None

### Tools

- Screwdriver with T20 star bit
- Torque Driver  Wrench or Torque Ratchet Wrench
- Socket, 10 mm, 3/8–in or 1/4–in

### Replacement Item

- HMS
- Heater Elements
- Blower Fan
- HMS Controller

## Periodic Maintenance

The louvers over the HMS intake fan need to be inspected and cleaned in order to ensure proper operation of the TME/BTS. A vacuum cleaner or soft bristle brush is recommended to clean the louvers.

**NOTE**

The condition of the louvers must be monitored.  The recommended service interval is every 90 days, barring any previous inspections. Once environmental conditions at the site are established by inspection, it is possible that cleaning intervals may need to be adjusted to more or less than the nominal 90 day interval.

9

## Prerequisite

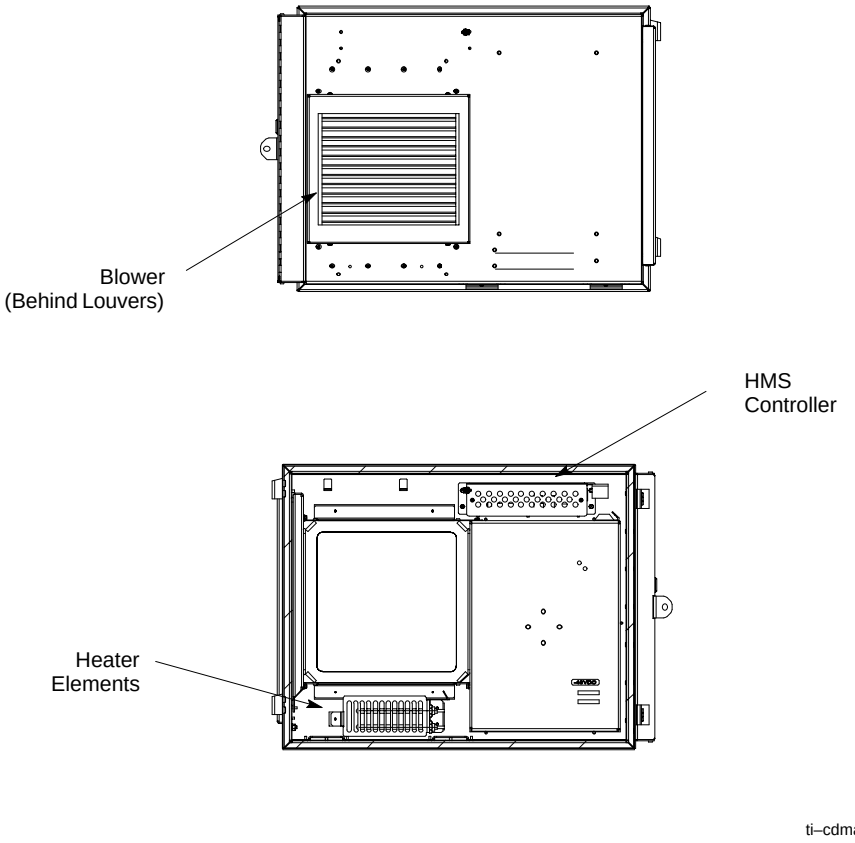
**IMPORTANT**

Coordinate this repair task with the OMC–R operator.

Contact the OMC–R operator before performing the replacement procedure. Tell the operator that the HMS or its components will be replaced and that alarms can be expected.

Upon completion of the replacement procedure, have the OMC–R operator verify that old alarms are cleared and that no new ones are reported.

**Figure 9-28:**Heat Management System




### Replacement Procedure

If desired, record the TME and HMS serial number of the failed unit in Table 9-69 at the end of this chapter.

#### Remove HMS

Follow the procedure in Table 9-43 to remove the HMS. See Figure 9-28.

| **Table 9-43:** Procedure to Remove HMS | |
|---|---|
| **Step** | **Action** |
| 1 | Notify operator that the HMS replacement procedure is starting and that alarms can be expected. |
| 2 | Turn off DC power to the TME. |
| 3 | Unlock and remove external lock |
| 4 | Use key to unlock HMS draw latch door. |
| 5 | Turn latches and slowly swing open HMS.<br>**! CAUTION**<br>Be aware of the heater elements, they will be hot to the touch if they have been in recent use.<br>Removing the HMS exposes the interior of the TME to the elements, cover the opening with a blanket, towel, tarp, card board, or equivalent item. |
| 6 | Use an driver wrench with socket to remove two M6 nuts and washers securing ground lug to HMS door. Disconnect DC power and HMS controller cable from HMS Controller. |
| 7 | Remove HMS and place on a flat surface, preferably a table of bench top.<br>**! CAUTION**<br>Be careful not to damage louvers protecting Blower Fan. |

### Install HMS

Follow the procedure in Table 9-44 to re–install the HMS.

| **Table 9-44:** Procedure to Re–install HMS | |
|---|---|
| **Step** | **Action** |
| 1 | Carefully lift HMS and set on TME hinge pins. |
| 2 | Place ground lug on ground studs of the HMS and secure using two M6 nuts and washers. Torque nuts to 3.4 N–M (30 in–lbs). |
| 3 | Connect DC Power and HMS controller cable to HMS Controller. |
| 4 | Close HMS be careful not to pinch any of the wiring. |
| 5 | Close HMS and secure using the two draw latches. Fold draw latch handles down. Verify that HMS is fully closed and seated. |
| 6 | Close HMS draw latch door and lock using key. |
| 7 | Lock HMS with external lock. |
| 8 | Notify operator that replacement is complete and verify that no new alarms have been generated and that old alarms are cleared. |

### Heater Element Replacement Procedure

This information is still under consideration at this time. Updated information will be supplied at a later date.

If desired, record the TME, HMS, and HMS Heater Elements serial number of the failed unit in Table 9-70 at the end of this chapter.

Perform the procedure in Table 9-45 to remove the Heater Elements.

**Table 9-45:** Procedure to Replace Heater Elements

| Step | Action |
|---|---|
| 1 | Perform the HMS removal procedure described in Table 9-43. |
| | **! CAUTION**<br>Heater Elements could still be hot, use caution when removing them. Recommend that thermal resistant gloves be worn to remove the heater elements. |
| 2 | |
| 3 | |
| 4 | |
| 5 | |

### Heater Element Installation Procedure

This information is still under consideration at this time. Updated information will be supplied at a later date.

Perform the procedure in Table 9-46 toinstall the Heater Elements.

**Table 9-46:** Procedure to Install Heater Elements

| Step | Action |
|---|---|
| 1 | |
| 2 | |
| 3 | |
| 4 | |
| 5 | Perform the procedure in Table 9-44 to install the HMS. |

**Figure 9-29:** HMS Heater Elements

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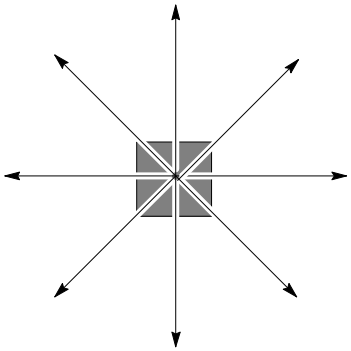


### HMS Controller Replacement Procedure

This information is still under consideration at this time. Updated information will be supplied at a later date.

If desired, record the TME, HMS, and HMS Controller serial number of the failed unit in Table 9-71 at the end of this chapter.

Perform the procedure in Table 9-47 to remove the HMS Controller.

**Table 9-47:** Procedure to Replace HMS Controller

| Step | Action |
|---|---|
| 1 | Perform the HMS removal procedure described in Table 9-43. |
| 2 | |
| 3 | |
| 4 | |
| 5 | |



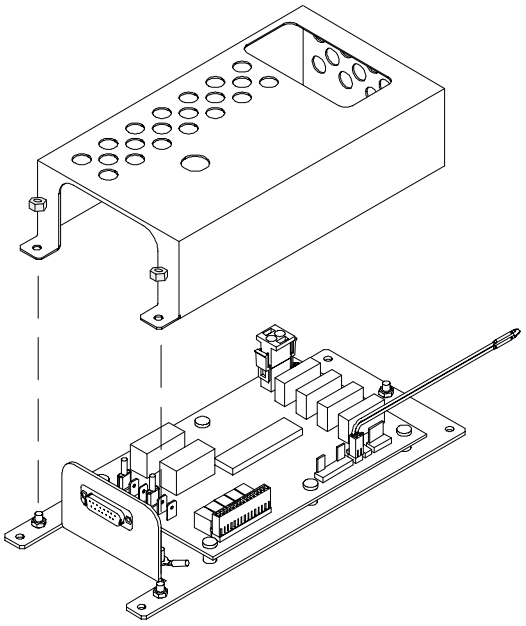
### HMS Controller Installation Procedure

This information is still under consideration at this time. Updated information will be supplied at a later date.

Perform the procedure in Table 9-48 to install the HMS Controller.

| **Table 9-48:** Procedure to Install HMS Controller | |
|---|---|
| **Step** | **Action** |
| 1 | |
| 2 | |
| 3 | |
| 4 | |
| 5 | Perform the procedure in Table 9-44 to install the HMS. |

**Figure 9-30:** HMS Controller



ti–cdma–wp–00263–v01–ildoc–ah

### Blower Fan Replacement Procedure

This information is still under consideration at this time. Updated information will be supplied at a later date.

If desired, record the TME, HMS, and Blower Fan serial number of the failed unit in Table 9-72 at the end of this chapter.

Perform the procedure in Table 9-47 to remove the Blower Fan.

| **Table 9-49:** Procedure to Replace Blower Fan | |
|---|---|
| **Step** | **Action** |
| 1 | Perform the procedure in Table 9-43 to remove the HMS. |
| 2 | |
| 3 | |
| 4 | |
| 5 | |

### Blower Fan Installation Procedure

This information is still under consideration at this time. Updated information will be supplied at a later date.

Perform the procedure in Table 9-48 to install the Blower Fan.

| **Table 9-50:** Procedure to Install Blower Fan | |
|---|---|
| **Step** | **Action** |
| 1 | |
| 2 | |
| 3 | |
| 4 | |
| 5 | Perform the procedure in Table 9-44 to install the HMS. |

**Figure 9-31:** Blower Fan

NOTE:
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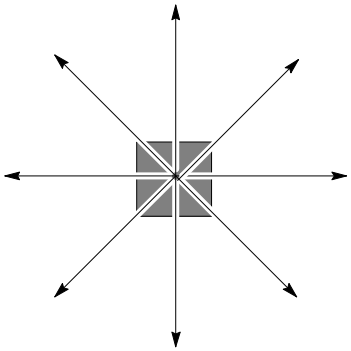
8 pt. Right Aligned Text

8 pt. Centered Text



# Thermal Management Enclosure

## Introduction

The procedures in this section cover only the removal and installation of the Thermal Management Enclosure (TME).

## System Impact/Considerations

If the TME enclosure has been damaged it will no longer environmetally protect the BTS. Thus, an interruption in call processingwill occur while the TME is replaced.

## Required Items

### Documents

None

### Tools

- Screwdriver with T20 star bit or T30 star bit
- Torque Driver Wrench or Torque Ratchet Wrench
- Socket, 8 mm, 3/8–in or 1/4–in
- 10 mm socket

### Replacement Item

- TME

## Prerequisite

**IMPORTANT**

Coordinate this repair task with the OMC–R operator.

Contact the OMC–R operator before performing the replacement procedure. Tell the operator that the Filter Tray will be replaced and that alarms can be expected.

Upon completion of the replacement procedure, have the OMC–R operator verify that old alarms are cleared and that no new ones are reported.

## Replacement Procedure

### Remove TME

Follow the procedure in Table 9-51 to remove the TME.

**Table 9-51:** Procedure to Remove TME

| Step | Action |
|---|---|
| 1 | Notify operator that TME replacement procedure is starting and that alarms can be expected. |
| 2 | Perform Carrier Shutdown procedure as described in Table 10-4. |

table continued on next page

| **Table 9-51:** Procedure to Remove TME | |
|---|---|
| **Step** | **Action** |
| 3 | Disengage circuit breaker on the affected cCLPAs. |
| 4 | Use the key to unlock both doors of the TME. |
| 5 | Disengage TME PDA circuit breakers by pulling them out. |
| 6 | At the rear of the BTS disconnect antenna cables from BTS to TME. |
| 7 | *If not already done*, label individual cables as they are disconnected from the rear of the BTS. |
| 8 | Remove cover and disconnect DC power cables from BTS. |
| 9 | Use screwdriver to remove two screws securing ground lug to BTS. |
| 10 | Use key to unlock the HMS draw latch door. |
| 11 | Turn latches and open HMS. |
| 12 | Disconnect ground lug by removing two nuts and washers with the driver wrench and socket. |
| 13 | Disconnect DC power and HMS controller cable from HMS to TME. |
| 14 | Lift HMS off hinge pins on TME and place on a flat surface. See Figure 4-21.<br>**! CAUTION**<br>Be careful not to damage louvers protecting Blower Fan. |
| 15 | Remove 5 M6 screws securing BTS to TME. See Figure 4-19. |
| 16 | Slide BTS out of TME. |
| 17 | Disconnect all conduit hubs and cabling from bottom of TME. Label conduit and cabling as necessary. |
| 18 | Remove 6 M6 screws securing TME to Wall Mounting Bracket. See Figure 4-18. |
| 19 | Lift TME off of Wall Mounting Bracket. |

### Install TME

Follow the procedure in Table 9-52 to install the TME.

| **Table 9-52:** Procedure to Install TME | |
|---|---|
| **Step** | **Action** |
| 1 | Set the TME onto the Wall Mounting Bracket. Ensure that it rests in the slots of the Wall Mounting Bracket. See Figure 4-17. |
| 2 | Secure the TME to the Wall Mounting Bracket using 6 M6 screws. Torque screws to 3.4 N–M (30 in–lbs). See Figure 4-18. |
| 3 | Place BTS in TME opening and slide it in. |
| 4 | Secure BTS to TME using 5 M6 screws. Torque screws to 3.4 N–M (30 in–lbs). See Figure 4-19. |

table continued on next page

| **Table 9-52:** Procedure to Install TME | |
|---|---|
| **Step** | **Action** |
| 5 | Insert cables from conduit up through their respective access holes and connect to the BTS. |
| 6 | Tighten conduit hubs. |
| 7 | Use a screw driver and two screws to secure the ground lug to the BTS. |
| 8 | Connect antenna cables from BTS to TME. |
| 9 | Connect all cabling to connectors on bottom of the TME. |
| 10 | Install DC power wires to BTS, use a screwdriver to tighten screws holding wires. |
| 11 | Install cover over BTS DC power connection. |
| 12 | Set HMS on hinges on TME. |
| 13 | Using the driver wrench and socket, attach ground lug to HMS using two nuts and washers. |
| 14 | Connect DC power and HMS controller cable. |
| 15 | Close HMS and secure using the two draw latches. Fold draw latch handles down. Verify that HMS is fully closed and seated. |
| 16 | Close HMS draw latch door and lock using key. |
| 17 | Turn on DC power to TME. |
| 18 | Engage PDA circuit breakers (push in). |
| 19 | Engage circuit breaker on affected cCLPAs. |
| 20 | Notify operator that replacement is complete and verify that no new alarms have been generated and that old alarms are cleared. |
| 21 | Perform Carrier Startup Procedure as described in Table 10-7. |

# Power Distribution Enclosure

## Introduction

The procedures in this section cover only the removal and installation of the Powerl Distribution Enclosure (PDE).

## System Impact/Considerations

If the PDE enclosure has been damaged it will no longer environmetally protect the AC–to–DC power converter circuitry. Thus, an interruption in call processing will occur while the PDE is replaced.

## Replacement Procedure

Consult the manufacturer’s Field Replacement Unit (FRU) guide for removal and replacement information.

## Introduction

The Master Item Number Failure List is provided as a means of keeping a written record of the units that failed for any particular BTS or BTSes. The list is for logistical purposes only.

For the BTS Fan Module, use Table 9-53.

**Table 9-53:** Fan Module Item Number List

| Item | Number |
|---|---|
| BTS Number | |
| Fan Module Number | |

For the HSO/MSO Module, use Table 9-54.

**Table 9-54:** HSO or MSO Module Item Number List

| Item | Number |
|---|---|
| BTS Number | |
| HSO Module Number | |
| MSO Module Number | |

For the RGPS Head, use Table 9-55.

**Table 9-55:** RGPS Item Number List

| Item | Number |
|---|---|
| BTS Number | |
| RGPS Head Number | |

For the RF GPS Module, use Table 9-56.

**Table 9-56:** RF GPS Module Item Number List

| Item | Number |
|---|---|
| BTS Number | |
| RF GPS Number | |

For the PSM, use Table 9-57.

| **Table 9-57:** PSM Item Number List | |
|---|---|
| **Item** | **Number** |
| BTS Number | |
| PSM Number | |

For the CSA Card, use Table 9-58.

| **Table 9-58:** CSA Card Item Number List | |
|---|---|
| **Item** | **Number** |
| BTS Number | |
| CSA Card | |

For the GLI3 Card, use Table 9-59.

| **Table 9-59:** GLI3 Card Item Number List | |
|---|---|
| **Item** | **Number** |
| BTS Number | |
| GLI3 Card | |

For the MCC–1X, use Table 9-60.

| **Table 9-60:** MCC–1X Card Item Number List | |
|---|---|
| **Item** | **Number** |
| BTS Number | |
| MCC 1 | |
| MCC 2 | |
| MCC 3 | |

For the BBX–1X, use Table 9-61.

| **Table 9-61:** BBX–1X Card Item Number List | |
|---|---|
| **Item** | **Number** |
| BTS Number | |
| BBX 1 (SGLG4044) | |
| BBX 4 (SGLG4044) | |

For the cMPC, use Table 9-62.

| **Table 9-62:** Compact MPC Item Number List | |
|---|---|
| **Item** | **Number** |
| BTS Number | |
| Compact MPC Number | |

For the MCC–DO card, use Table 9-63.

| **Table 9-63:** MCC–DO Card Item Number List | |
|---|---|
| **Item** | **Number** |
| BTS Number | |
| MCC–Data Only Card | |

For the CBIO Board, use Table 9-64.

| **Table 9-64:** CBIO Board Item Number List | |
|---|---|
| **Item** | **Number** |
| BTS Number | |
| CBIO Board | |

For the SDCX Module, use Table 9-65.

| **Table 9-65:** SDCX Module Item Number List | |
|---|---|
| **Item** | **Number** |
| BTS Number | |
| SDCX Number | |

For the Filter Tray, use Table 9-66.

| **Table 9-66:** Filter Tray Kit Item Number List | |
|---|---|
| **Item** | **Number** |
| BTS Number | |
| Filter Tray Kit (SGLN6221) | |
| Filter Tray Kit (SGLN6220) | |
| Filter Tray Kit (SGLN6219) | |

For the cCLPA, use Table 9-67.

| **Table 9-67:** cCLPA Item Number List | |
|---|---|
| **Item** | **Number** |
| BTS Number | |
| cCLPA #1 (If used) | |
| cCLPA #2 (If used) | |

For the TME PDA, use Table 9-68.

| **Table 9-68:** TME PDA Item Number List | |
|---|---|
| **Item** | **Number** |
| TME Number | |
| PDA | |

For the TME HMS, use Table 9-69.

| **Table 9-69:** TME HMS Item Number List | |
|---|---|
| **Item** | **Number** |
| TME Number | |
| HMS Number | |

For the TME HMS Heater Elements, use Table 9-70.

| **Table 9-70:** TME HMS Heater Element Item Number List | |
|---|---|
| **Item** | **Number** |
| TME Number | |
| HMS Number | |
| Heater Element | |

For the TME HMS Controller, use Table 9-71.

| **Table 9-71:** TME HMS Controller Item Number List | |
|---|---|
| **Item** | **Number** |
| TME Number | |
| HMS Number | |
| HMS Controller Number | |

For the TME HMS Blower Fan, use Table 9-72.

| **Table 9-72:** TME HMS Blower Fan Item Number List | |
|---|---|
| **Item** | **Number** |
| TME Number | |
| HMS Number | |
| HMS Blower Fan Number | |

# Chapter 10: Reference Procedures Performed At OMC–R

## Table of Contents

**Notes**

# Reference Procedures Performed At OMC–R

## Introduction

The procedures in this chapter are referenced during various FRU replacement procedures and are performed by the OMC–R operator. These reference procedure covers the following:

- Accessing OMCR CLI window
- Circuit BTS shut down and restore procedures for:
  - BTS
  - Sector
  - Carrier
- Packet BTS shut down and restore procedures for:
  - BTS
  - Sector
  - Carrier

## Accessing OMC–R CLI Window

Many of the FRU procedures require the OMC–R operator to manipulate BTS logical devices. This is achieved via UNO or the OMC–R (Operations and Maintenance Center – Radio) Command Line Interface (CLI).

The operator enters commands via UNO or OMC–R CLI.

**IMPORTANT**

Should there be any issues which affect UNO or the OMC–R CLI operations, command dependent replacement procedures cannot be performed.

### OMC–R CLI access procedure

The following procedure is performed by the OMC–R operator at the OMC–R terminal.

**Table 10-1:** Login and Access Alarm Window Procedure

| ✓ | Step | Action |
|---|---|---|
| | 1 | Login by entering the user name. |
| | 2 | Enter the password at the system prompt. |
| | 3 | Open an UNO Alarm Manager window and an OMC–R CLI window from the pull down menu using the mouse button. |
| | 4 | Verify that the filter display is set to the BTS–# where the work is being performed. This ensures that any BTS–# alarms, encountered while installing the hardware, can be observed and rectified. |

### Shut Down Site Signaling Functions for a Circuit BTS

If a complete site shutdown is required for the FRU replacement, follow the procedure in Table 10-2 to disable the circuit BTS site.

**CAUTION**

This site shut down procedure takes a BTS out–of–service (OOS), but does not affect other BTSs. To minimize system impact, it may be advisable (but not necessary) to perform this procedure during a maintenance window.

**IMPORTANT**

The **EDIT REDIRECT** or **REDIRECT2** command does NOT affect calls in progress and does NOT move these calls to another BTS. The command only prevents future calls from being originated on the targeted BTS. If active call processing is still taking place in the target BTS, wait for any active calls to terminate before disabling the BTS.

**NOTE**

Refer to the *System Commands Reference* manual (68P09256A58) part/of *Cellular System Administration CDMA2000 1X* – 99R09255A10 CD–ROM for a complete explanation of OMCR commands.

**Table 10-2:** Shut Down Site Signaling Functions Procedure For a Circuit BTS

| ✓ | Step | Action |
|---|---|---|
| | 1 | Open a CLI window. Refer to the *Accessing OMC–R CLI Window* section on page 10-2. |
| | | *** IMPORTANT**<br>It is recommended that you redirect subscribers to another site/carrier and then wait for any active calls to terminate before disabling the BTS. |
| | 2 | If you want to redirect subscribers and then wait for any active calls to terminate before disabling the BTS, go to step 3.<br>If you are not concerned about redirecting subscribers and waiting for any active calls to terminate and you just want to disable the BTS, perform step 13 and step 15 only. |

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**Table 10-2:** Shut Down Site Signaling Functions Procedure For a Circuit BTS

| ✓ | Step | Action |
|---|---|---|
| | | **NOTE**<br>The REDIRECT command is used to redirect subscribers to an 1.9 GHz site or to invoke the REDIRECT2 command which is then used to redirect subscribers to a different CDMA carrier frequency. REDIRECT2 is the preferred command if an alternate CDMA carrier is available. |
| | 3 | *** IMPORTANT**<br>Record the values shown in the following system display response. These values are used to answer the prompts for the EDIT REDIRECT command when restoring signaling operations at the end of the replacement procedure.<br><br>View the status of the BTS signaling redirect parameters for all carriers equipped for the BTS by entering the following command at the prompt:<br><br>`omc-000000>`**DISPLAY BTS-**`<bts#>` **REDIRECT**<br><br>Observe the following *typical* system display response for a BTS (this example shows initial standard values):<br><br>`Access Overload Class Redirect Flags`<br>`RETURN ROTATE RECORD EXP IGNORE SYS`<br>`CARRIER ID IF FAIL 0 0 0 0 0 0 0 0 0 0 1 1 1 1 1 1 TIMER TYPE SID CDMA ORDERING`<br>`(bts-sector-carrier) 0 1 2 3 4 5 6 7 8 9 0 1 2 3 4 5 (sec)`<br>`CARRIER-1-1-1 N N N N N N N N N N N N N N N N 4 1 0 N CUSTOM` |

. . . continued on next page

| **Table 10-2:** Shut Down Site Signaling Functions Procedure For a Circuit BTS | | |
|---|---|---|
| ✓ | **Step** | **Action** |
| | | **NOTE**<br>This step edits the REDIRECT parameters so that the Global Service Redirect Message to be broadcast on the paging channel redirects all subscribers away from the BTS and onto a different BTS or system. |
| | 4 | Enter the following command at the prompt:<br>`omc-000000>`**EDIT BTS–**`<bts#>` **REDIRECT!**<br>The system prompts you to enter each command parameter value one at a time. Answer the prompts in the following order:<br>*<accolc0>*enter **Y**, *<accolc1>*enter **Y**, *... <accolc15>* enter **Y**<br>(All Access Overload Classes *must* be set to yes to ensure that all subscribers are redirected.)<br>*<returniffail>* , enter **N**<br>(Must be set to no to ensure that subscribers do not return if redirect is unsuccessful.)<br>*<recordtype>* , enter **1** or **2**<br>(A value of 2 will invoke REDIRECT2 which is used to redirect subscribers to a CDMA channel at a neighbor site. A value of 1 redirects subscribers to an 1.9 GHz site. This example uses 2.)<br>*<expectedsid>* , enter **13**<br>(Use the Area ID the subscriber units should expect to find on the system where they are being redirected. This example uses 13. The valid range is 0 – 32767; the default is 0.)<br>*<ignorecdma>* , enter **Y**<br>*<sysordering>* , enter **CUSTOM**<br>(The system acquisition ordering value tells the mobiles the order to use when attempting to obtain service on the different analog systems. Valid values are: CUSTOM – use custom system selection; AONLY – try the A system only; BONLY – use the B system only; AFIRST – try the A system first. If unsuccessful, try the B system; BFIRST – try the B system first. If unsuccessful, try the A system; AORB – try A or B. If unsuccessful try the alternative system; CUSTOM is the default.)<br>*<rotatetimer>* , enter **4**<br>(Call processing continuously rotates, circular right–shifts, the Y/N values of Access Overload Class Redirect Flags 0 to 9. Values are shifted one flag at the end of the timer period; then timer re–starts. Valid values are 0–255; 4 is the default.)<br>The system displays the command to be sent. Verify the command syntax.<br>`omc-000000>Accept [yes/no]?`<br>Enter **Y** to accept the command or **N** to go back and enter the correct value(s). |

. . . continued on next page

**Table 10-2:** Shut Down Site Signaling Functions Procedure For a Circuit BTS

| ✓ | Step | Action |
|---|---|---|
| | 5 | View the status of the signaling REDIRECT parameters to verify that the applicable BTS is ready for global redirect.<br><br>omc-000000>**DISPLAY BTS-**<bts#> **REDIRECT**<br><br>Ensure that the values in the system display response match the values input in Step 4 (see example below).<br><br>Access Overload Class Redirect Flags: 0 0 0 0 0 0 0 0 0 0 1 1 1 1 1 1 / 0 1 2 3 4 5 6 7 8 9 0 1 2 3 4 5<br>CARRIER ID (bts-sector-carrier): CARRIER-1-1-1<br>RETURN IF FAIL: N<br>Access Overload Class Redirect Flags: Y Y Y Y Y Y Y Y Y Y Y Y Y Y Y Y<br>ROTATE TIMER (SEC): 4<br>RECORD TYPE: 2<br>EXP SID: 13<br>IGNORE CDMA: Y<br>SYS ORDERING: CUSTOM |
| | 6 | If 2 was entered for *<recordtype>* in step 4, go to step 7.<br><br>If 1 was entered for *<recordtype>* in step 4, go to step 10. |
| | 7 | *** IMPORTANT**<br>Record the values shown in the following system display response. These values are used to answer the prompts for the EDIT REDIRECT2 command when restoring signaling operations at the end of the replacement procedure.<br><br>View the status of the BTS signaling redirect parameters for all carriers equipped for the BTS by entering the following command at the prompt:<br><br>omc-000000>**DISPLAY BTS-**<bts#> **REDIRECT2**<br><br>Observe the following *typical* system display response for a BTS (this example shows initial standard values):<br><br>REDIRECT CHAN: 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15<br>CARRIER ID (bts-sector-carrier): CARRIER-1-1-1<br>EXP NID: 65535<br>BAND CLASS: CDMA800<br>REDIRECT CHAN: - - - - - - - - - - - - - - - |

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**Table 10-2:** Shut Down Site Signaling Functions Procedure For a Circuit BTS

| ✓ | Step | Action |
|---|---|---|
| | | **NOTE**<br>This step edits the REDIRECT2 parameters so that the Global Service Redirect Message to be broadcast on the paging channel redirects all subscribers away from the BTS with the failed equipment and onto a CDMA channel at a neighbor site. |
| | 8 | Enter the following command at the prompt:<br>`omc-000000>`**EDIT BTS-**`<bts#>` **REDIRECT2!**<br>The system prompts you to enter each command parameter value one at a time. Answer the prompts in the following order:<br>*expecting an integer number (from 0 to 65535)*<br>*<EXPNID= ? >*<br>(Use the Network ID the subscriber units should expect to find on the system they are being redirected to. This example uses 555.)<br>*expecting an integer number (from 0 to 2047)*<br>*<CHAN1= ? >, <CHAN2= ? > ... <CHAN15= ?>*<br>(A list of CDMA channels for neighbor sites that the subscriber units can use for redirection. This example uses 200, 350, 400, 725, 75, 175, 100, 575, and 775.)<br>*expecting an enumerated value:*<br>*CDMA1900 CDMA800 CDMA900 JAPANCDMA CDMA2100*<br>*<BANDCLASS= ? >*<br>(Use CDMA1900 for 1.9 GHz systems, and CDMA800 for 1.9 GHz systems. This example uses CDMA800.)<br>The system displays the command to be sent. Verify the command syntax.<br>`omc-000000>Accept [yes/no]?`<br>Enter **Y** to accept the command or **N** to go back and enter the correct value(s). |
| | 9 | View the status of the BTS signaling REDIRECT2 parameters to verify that the BTS is ready for maintenance.<br>`omc-000000>`**DISPLAY BTS-**`<bts#>` **REDIRECT2**<br>Ensure that the values in the system display response match the values input in Step 8 (see example below). |

```
                                                                REDIRECT CHAN
     CARRIER ID          EXP      BAND
(bts-sector-carrier)    NID      CLASS     1    2    3    4    5    6    7    8    9    10   11   12   13   14   15
--------------------  -------  ---------  ---  ---  ---  ---  ---  ---  ---  ---  ---  ---  ---  ---  ---  ---  ---
     CARRIER-1-1-1      555     CDMA800   200  350  400  725   75  175  100  575  775   -    -    -    -    -    -
```

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**Table 10-2:** Shut Down Site Signaling Functions Procedure For a Circuit BTS

| ✓ | Step | Action |
|---|---|---|
| | 10 | View the existing congestion control parameters for all carriers equipped for the BTS by entering the following command at the prompt:<br>`omc-000000>`**DISPLAY BTS–**`<bts#>` **CONGESTCONF**<br>Observe the following *typical* system display response for a BTS:<br>`CARRIER NEWCALL REG AGG`<br>`(bts#-sector#-carrier#) SET ALARMFLAG ALARMFLAG ALARMFLAG ANALOGREDIRECT GLOBALREDIRECT`<br>`1-1-1 1 ENABLE ENABLE ENABLE DISABLE DISABLE` |
| | | **NOTE**<br>In this step, you will change the value of the Global Service Redirection Flag (GLOBALREDIRECT) in the congestion control parameters so that the Global Service Redirect Message is broadcast on all of the sector paging channels at the BTS. |
| | 11 | Enter the following command at the prompt using the applicable BTS number:<br>`omc-000000>`**EDIT BTS –**`<bts#>` **CONGESTCONF !**<br>The system prompts you to enter each control parameter value one at a time. Skip through the prompts until you get to the following:<br>*`<globalredirect>`*, enter **ENABLE**<br>(This will force the Global Service Redirect Message to be broadcast on all of the sector paging channels at the BTS.)<br>The system displays the values of the control parameters. Verify that only the GLOBALREDIRECT value changed.<br>`omc-000000>Accept [yes/no]?`<br>Enter **Y** to accept the change.<br>Now the Global Service Redirection Message is sent over the sector paging channels. All subscribers are redirected away from the BTS and onto a different system or CDMA carrier channel. This effectively shuts down the BTS. |
| | 12 | Verify that the CONGESTCONF *`globalredirect`* is enabled for each carrier at the BTS by entering the following command at the prompt:<br>`omc-000000>`**DISPLAY BTS–**`<bts#>` **CONGESTCONF**<br>Observe the following *typical* system display response for a BTS:<br>`CARRIER NEWCALL REG AGG`<br>`(bts#-sector#-carrier#) SET ALARMFLAG ALARMFLAG ALARMFLAG ANALOGREDIRECT GLOBALREDIRECT`<br>`1-1-1 1 ENABLE ENABLE ENABLE DISABLE ENABLE` |
| | 13 | Display the status of all devices at the BTS by entering the following command at the prompt:<br>`omc-000000>`**DISPLAY BTS–**`<bts#>` **STATUS**<br>Record the system response for all devices that are OOS_AUTOMATIC. This information will be used for later reference when restoring site signaling operations. |

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| **Table 10-2:** Shut Down Site Signaling Functions Procedure For a Circuit BTS | | |
|---|---|---|
| ✓ | **Step** | **Action** |
| | 14 | Wait three minutes to allow any active calls to terminate. |
| | 15 | Disable the BTS by entering the following command at the prompt:<br>`omc-000000>`**DISABLE BTS–**`<bts#>` **UNC** |

### Shut Down Sector Signaling Functions for a Circuit BTS

If a sector shutdown is required for the FRU replacement and the site is currently under CBSC control, follow the procedure in Table 10-3 to disable the sector.

**CAUTION**

This sector shut down procedure takes a sector out–of–service (OOS) but does not affect the other sectors. To minimize system impact, it may be advisable (but not necessary) to perform this procedure during a maintenance window.

**IMPORTANT**

The **EDIT SECTOR REDIRECT** or **REDIRECT2** command does NOT affect calls in progress and does NOT move these calls to another sector/carrier. The command only prevents future calls from being originated on the targeted sector/carrier. If active call processing is still taking place in the target sector/carrier, wait for any active calls to terminate before disabling the sector/carrier.

**NOTE**

Refer to the *System Commands Reference* manual (68P09256A58) part/of *Cellular System Administration CDMA2000 1X* – 99R09255A10 CD–ROM for a complete explanation of OMC–R commands.

| **Table 10-3:** Shut Down Sector Signaling Functions Procedure For a Circuit BTS | | |
|---|---|---|
| ✓ | **Step** | **Action** |
| **AT THE OMCR** | | |
| | 1 | Open a CLI window. Refer to the *Accessing OMC–R CLI Window* section on page 10-2. |

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**Table 10-3:** Shut Down Sector Signaling Functions Procedure For a Circuit BTS

| ✓ | Step | Action |
|---|---|---|
| | | *** IMPORTANT**<br>It is recommended that you redirect subscribers to another sector/carrier and then wait for any active calls to terminate before disabling the sector/carrier. |
| | 2 | If you want to redirect subscribers and then wait for any active calls to terminate before disabling the sector/carrier, go to step 3.<br>If you are not concerned about redirecting subscribers and waiting for any active calls to terminate and you just want to disable the sector/carrier, perform steps 13 through 16. |
| | | **NOTE**<br>The REDIRECT command is used to redirect subscribers to an 1.9 GHz site or to invoke the REDIRECT2 command which is then used to redirect subscribers to a different CDMA carrier frequency. REDIRECT2 is the preferred command if an alternate CDMA carrier is available. |
| | | *** IMPORTANT**<br>Record the values shown in the following system display response. These values are used to answer the prompts for the EDIT SECTOR REDIRECT command when restoring signaling operations at the end of the replacement procedure. |
| | 3 | View the status of the sector signaling redirect parameters for all carriers equipped for the sector by entering the following command at the prompt:<br>`omc-000000>`**DISPLAY SECTOR-**`<bts#>`**-**`<sector#>` **REDIRECT**<br>Observe the following *typical* system display response for sector 2 (this example shows initial standard values): |

```
                                  Access Overload Class Redirect Flags   ROTATE
     CARRIER ID          RETURN     0 0 0 0 0 0 0 0 0 0 1 1 1 1 1 1      TIMER    RECORD   EXP   IGNORE     SYS
(bts-sector-carrier)    IF FAIL     0 1 2 3 4 5 6 7 8 9 0 1 2 3 4 5      (SEC)     TYPE    SID    CDMA    ORDERING
--------------------    -------     - - - - - - - - - - - - - - - -      -----     ----    ---    ----    --------
    CARRIER-1-1-1           N       N N N N N N N N N N N N N N N N        4         1      0      N       CUSTOM
```

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**Table 10-3:** Shut Down Sector Signaling Functions Procedure For a Circuit BTS

| ✓ | Step | Action |
|---|---|---|
| | | **NOTE**<br>This step edits the REDIRECT parameters so that the Global Service Redirect Message to be broadcast on the paging channel redirects all subscribers away from the sector with the failed equipment and onto a different sector, BTS, or system. |
| | 4 | Enter the following command at the prompt:<br>`omc-000000>`**EDIT SECTOR–**`<bts#>`**–**`<sector#>` **REDIRECT !**<br>The system prompts you to enter each command parameter value one at a time. Answer the prompts in the following order:<br>*`<accolc0>`*enter **Y**, *`<accolc1>`*enter **Y**, . . . *`<accolc15>`*enter **Y**<br>(All Access Overload Classes *must* be set to yes to ensure that all subscribers are redirected.)<br>*`<returniffail>`* , enter **N**<br>(Must be set to no to ensure that subscribers do not return if redirect is unsuccessful.)<br>*`<recordtype>`* , enter **1** or **2**<br>(A value of 2 will invoke REDIRECT2 which is used to redirect subscribers to a CDMA channel at a neighbor sector/site. A value of 1 redirects subscribers to an 1.9 GHz site. This example uses 2.)<br>*`<expectedsid>`* , enter **13**<br>(Use the Area ID the subscriber units should expect to find on the system where they are being redirected. This example uses 13. The valid range is 0 – 32767; the default is 0.)<br>*`<ignorecdma>`* , enter **Y**<br>*`<sysordering>`* , enter **CUSTOM**<br>(The system acquisition ordering value tells the mobiles the order to use when attempting to obtain service on the different analog systems. Valid values are: CUSTOM – use custom system selection; AONLY – try the A system only; BONLY – use the B system only; AFIRST – try the A system first. If unsuccessful, try the B system; BFIRST – try the B system first. If unsuccessful, try the A system; AORB – try A or B. If unsuccessful try the alternative system; CUSTOM is the default.)<br>*`<rotatetimer>`* , enter **4**<br>(Call processing continuously rotates, circular right–shifts, the Y/N values of Access Overload Class Redirect Flags 0 to 9. Values are shifted one flag at the end of the timer period; then timer re–starts. Valid values are 0–255; 4 is the default.)<br>The system displays the command to be sent. Verify the command syntax.<br>`omc-000000>Accept [yes/no]?`<br>Enter **Y** to accept the command or **N** to go back and enter the correct value(s). |

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**Table 10-3:** Shut Down Sector Signaling Functions Procedure For a Circuit BTS

| ✓ | Step | Action |
|---|---|---|
| | 5 | View the status of the sector signaling REDIRECT parameters to verify that the applicable sector is ready for global redirect.<br><br>omc-000000>**DISPLAY SECTOR–**<bts#>**–**<sector#> **REDIRECT**<br><br>Ensure that the values in the system display response match the values input in Step 4 (see example below).<br><br>Access Overload Class Redirect Flags: 0 0 0 0 0 0 0 0 0 0 1 1 1 1 1 1 / 0 1 2 3 4 5 6 7 8 9 0 1 2 3 4 5<br>ROTATE TIMER (SEC): 4<br>RECORD TYPE: 2<br>EXP SID: 13<br>IGNORE CDMA: Y<br>SYS ORDERING: CUSTOM<br>CARRIER ID (bts-sector-carrier): CARRIER-1-1-1<br>RETURN IF FAIL: N<br>Y Y Y Y Y Y Y Y Y Y Y Y Y Y Y Y |
| | 6 | If 2 was entered for *<recordtype>* in step 4, go to step 7.<br><br>If 1 was entered for *<recordtype>* in step 4, go to step 10. |
| | 7 | *** IMPORTANT**<br>Record the values shown in the following system display response. These values are used to answer the prompts for the EDIT SECTOR REDIRECT2 command when restoring signaling operations at the end of the replacement procedure.<br><br>View the status of the sector signaling REDIRECT2 parameters for all carriers equipped for the sector by entering the following command at the prompt:<br><br>omc-000000>**DISPLAY SECTOR–**<bts#>**–**<sector#> **REDIRECT2**<br><br>Observe the following *typical* system display response for sector 2 (this example shows initial standard values):<br><br>REDIRECT CHAN 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15<br>CARRIER ID (bts-sector-carrier): CARRIER-1-1-1<br>EXP NID: 65535<br>BAND CLASS: CDMA800<br>– – – – – – – – – – – – – – – |

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**Table 10-3:** Shut Down Sector Signaling Functions Procedure For a Circuit BTS

| ✓ | Step | Action |
|---|---|---|
| | | **NOTE**<br>This step edits the REDIRECT2 parameters so that the Global Service Redirect Message to be broadcast on the paging channel redirects all subscribers away from the sector with the failed equipment and onto a CDMA channel at a neighbor sector/site. |
| | 8 | Enter the following command at the prompt:<br>`omc-000000>`**EDIT SECTOR-**`<bts#>`**-**`<sector#>` **REDIRECT2 !**<br>The system prompts you to enter each command parameter value one at a time. Answer the prompts in the following order:<br>*expecting an integer number (from 0 to 65535)*<br>*<EXPNID= ? >*<br>(Use the Network ID the subscriber units should expect to find on the system they are being redirected to. This example uses 555.)<br>*expecting an integer number (from 0 to 2047)*<br>*<CHAN1= ? >, <CHAN2= ? > ... <CHAN15= ?>*<br>(A list of CDMA channels for neighbor sites that the subscriber units can use for redirection. This example uses 200, 350, 400, 725, 75, 175, 100, 575, and 775.)<br>*expecting an enumerated value:*<br>*CDMA1900 CDMA800 CDMA900 JAPANCDMA CDMA2100*<br>*<BANDCLASS= ? >*<br>(Use CDMA1900 for 1.9 GHz systems, and CDMA800 for 800 MHz systems. This example uses CDMA1900.)<br>The system displays the command to be sent. Verify the command syntax.<br>`omc-000000>Accept [yes/no]?`<br>Enter **Y** to accept the command or **N** to go back and enter the correct value(s). |
| | 9 | View the status of the sector signaling REDIRECT2 parameters to verify that the sector is ready for maintenance.<br>`omc-000000>`**DISPLAY SECTOR-**`<bts#>`**-**`<sector#>` **REDIRECT2**<br>Ensure that the values in the system display response match the values input in Step 8 (see example below).<br><br>REDIRECT CHAN<br>CARRIER ID EXP BAND<br>(bts-sector-carrier) NID CLASS 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15<br>CARRIER-1-1-1 555 CDMA800 200 350 400 725 75 175 100 575 775 - - - - - - |

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**Table 10-3:** Shut Down Sector Signaling Functions Procedure For a Circuit BTS

| ✓ | Step | Action |
|---|---|---|
| | 10 | View the existing congestion control parameters for all carriers equipped for the applicable sector by entering the following command at the prompt:<br>`omc-000000>`**DISPLAY SECTOR–**`<bts#>`**–**`<sector#>` **CONGESTCONF**<br>Observe the following *typical* system display response for sector 2:<br>CARRIER (bts#-sector#-carrier#) / SET / NEWCALL ALARMFLAG / REG ALARMFLAG / AGG ALARMFLAG / ANALOGREDIRECT / GLOBALREDIRECT<br>1-1-1 / 1 / ENABLE / ENABLE / ENABLE / DISABLE / DISABLE |
| | 11 | **NOTE**<br>In this step, you will change the value of the Global Service Redirection Flag (GLOBALREDIRECT) in the congestion control parameters so that the Global Service Redirect Message is broadcast on the sector paging channel.<br>Enter the following command at the prompt:<br>`omc-000000>`**EDIT SECTOR–**`<bts#>`**–**`<sector#>` **CONGESTCONF !**<br>The system prompts you to enter each control parameter value one at a time. Skip through the prompts until you get to the following:<br>*`<globalredirect>`*, enter **ENABLE**<br>(This forces the Global Service Redirect Message to be broadcast on the sector paging channel.)<br>The system displays the values of the control parameters. Verify that only the GLOBALREDIRECT value changed.<br>`omc-000000>Accept [yes/no]?`<br>Enter **Y** to accept the change.<br>Now the Global Service Redirection Message is sent over the sector paging channels. All subscribers are redirected away from the sector and onto a different system. This effectively shuts down the sector. |
| | 12 | Verify that the CONGESTCONF *`globalredirect`* is enabled for each carrier on the sector by entering the following command at the prompt:<br>`omc-000000>`**DISPLAY SECTOR–**`<bts#>`**–**`<sector#>` **CONGESTCONF**<br>Observe the following *typical* system display response for sector 2:<br>CARRIER (bts#-sector#-carrier#) / SET / NEWCALL ALARMFLAG / REG ALARMFLAG / AGG ALARMFLAG / ANALOGREDIRECT / GLOBALREDIRECT<br>1-1-1 / 1 / ENABLE / ENABLE / ENABLE / DISABLE / ENABLE |

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**Table 10-3:** Shut Down Sector Signaling Functions Procedure For a Circuit BTS

| ✓ | Step | Action |
|---|---|---|
| | 13 | Display the status of all devices at the BTS by entering the following command at the prompt:<br>`omc-000000>`**DISPLAY BTS-**`<bts#>` **STATUS**<br>Observe the following *typical* system response:<br><br>DEVICE CBSC STATUS Config Data DEVSYNC Calibration Data Calibration Sync<br>BTS-1 1 INS n/a n/a n/a<br>BTSSPAN-1-1 1 INS n/a n/a n/a<br>BTSLINK-1-1 1 INS n/a n/a n/a<br>GLI-1-1 1 INS-ACTIVE GOOD n/a n/a<br>CSA-1-1 1 INS_ACTIVE GOOD n/a n/a<br>BBX-1-1 1 INS-ACTIVE GOOD GOOD n/a<br>BBX-1-2 1 INS-STANDBY GOOD GOOD n/a<br>MCC-1-1 1 INS GOOD n/a n/a<br><br>Record the system response for all devices that are OOS_AUTOMATIC. |
| | 14 | Wait three minutes to allow any active calls to terminate. |
| | 15 | Disable all BBX cards by entering the following command at the prompt:<br>`omc-000000>`**DISABLE BBX-**`bts#-bbx#` **UNC** |
| | 16 | Display the status of all devices at the BTS by entering the following command at the prompt:<br>`omc-000000>`**DISPLAY BTS-**`<bts#>` **STATUS**<br>Observe the system response.<br>Verify that the BBX cards have been disabled and are OOS_MANUAL. |

### Shut Down Carrier Signaling Functions for a Circuit BTS

If a carrier shutdown is required for the FRU replacement and the site is currently under CBSC control, follow the procedure in Table 10-4 to disable the carrier at a circuit BTS.

**CAUTION**

This carrier shut down procedure takes a carrier out–of–service (OOS) but does not affect the other carriers. To minimize system impact, it may be advisable (but not necessary) to perform this procedure during a maintenance window.

**IMPORTANT**

The **EDIT CARRIER REDIRECT** or **REDIRECT2** command does NOT affect calls in progress and does NOT move these calls to another sector/carrier. The command only prevents future calls from being originated on the targeted sector/carrier. If active call processing is still taking place in the target sector/carrier, wait for any active calls to terminate before disabling the sector/carrier.

**NOTE**

Refer to the *System Commands Reference* manual (68P09256A58) part/of *Cellular System Administration CDMA2000 1X* – 99R09255A10 CD–ROM for a complete explanation of OMCR commands.

**Table 10-4:** Shut Down Carrier Signaling Functions Procedure For a Circuit BTS

| ✓ | Step | Action |
|---|---|---|
| **AT THE OMC–R** | | |
| | 1 | Open a CLI window. Refer to the *Accessing OMC–R CLI Window* section on page 10-2. |
| | | *** IMPORTANT**<br>It is recommended that you redirect subscribers to another sector/carrier and then wait for any active calls to terminate before disabling the sector/carrier. |
| | 2 | If you want to redirect subscribers and then wait for any active calls to terminate before disabling the sector/carrier, go to step 3.<br>If you are not concerned about redirecting subscribers and waiting for any active calls to terminate and you just want to disable the sector/carrier, perform steps 15 through 18. |

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**Table 10-4:** Shut Down Carrier Signaling Functions Procedure For a Circuit BTS

| ✓ | Step | Action |
|---|---|---|
| | | **NOTE**<br>The REDIRECT command is used to redirect subscribers to an 1.9 GHz site or to invoke the REDIRECT2 command which is then used to redirect subscribers to a different CDMA carrier frequency. REDIRECT2 is the preferred command if an alternate CDMA carrier is available. |
| | | *** IMPORTANT**<br>Record the values shown in the following system display response. These values are used to answer the prompts for the EDIT CARRIER REDIRECT command when restoring signaling operations at the end of the replacement procedure. |
| | 3 | View the status of the carrier signaling REDIRECT parameters for an applicable carrier equipped for a specific sector by entering the following command at the prompt:<br>`omc-000000>`**DISPLAY CARRIER-**`<bts#>`**-**`<sector#>`**-**`<carrier#>` **REDIRECT**<br>Observe the following *typical* system display response for carrier 1, sector 2 (this example shows initial standard values): |

```
                                    Access Overload Class Redirect Flags   ROTATE
    CARRIER ID          RETURN        0 0 0 0 0 0 0 0 0 0 1 1 1 1 1 1      TIMER     RECORD    EXP    IGNORE      SYS
(bts-sector-carrier)    IF FAIL       0 1 2 3 4 5 6 7 8 9 0 1 2 3 4 5      (SEC)     TYPE      SID    CDMA     ORDERING
--------------------    -------       - - - - - - - - - - - - - - - -      -----     ----      ---    ----     -------
    CARRIER-1-1-1           N         N N N N N N N N N N N N N N N N        4         1         0      N       CUSTOM
```

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**Table 10-4:** Shut Down Carrier Signaling Functions Procedure For a Circuit BTS

| ✓ | Step | Action |
|---|---|---|
| | | **NOTE**<br>This step edits the REDIRECT parameters so that the Global Service Redirect Message to be broadcast on the paging channel redirects subscribers assigned to the sector carrier away from the carrier/sector with the failed equipment and onto a different carrier, sector, BTS, or system. |
| | 4 | Enter the following command at the prompt:<br>`omc-000000>`**EDIT CARRIER–**`<bts#>`**–**`<sector#>`**-**`<carrier#>` **REDIRECT !**<br>The system prompts you to enter each command parameter value one at a time. Answer the prompts in the following order:<br>*`<accolc0>`*enter **Y**, *`<accolc1>`*enter **Y**, . . . *`<accolc15>`*enter **Y**<br>(All Access Overload Classes *must* be set to yes to ensure that all subscribers are redirected.)<br>*`<returniffail>`* , enter **N**<br>(Must be set to no to ensure that subscribers do not return if redirect is unsuccessful.)<br>*`<recordtype>`* , enter **1** or **2**<br>(A value of 2 will invoke REDIRECT2 which is used to redirect subscribers to a CDMA channel at a neighbor sector/site. A value of 1 redirects subscribers to an 1.9 GHz site. This example uses 2.)<br>*`<expectedsid>`* , enter **13**<br>(Use the Area ID the subscriber units should expect to find on the system where they are being redirected. This example uses 13. The valid range is 0 – 32767; the default is 0.)<br>*`<ignorecdma>`* , enter **Y**<br>*`<sysordering>`* , enter **CUSTOM**<br>(The system acquisition ordering value tells the mobiles the order to use when attempting to obtain service on the different analog systems. Valid values are: CUSTOM – use custom system selection; AONLY – try the A system only; BONLY – use the B system only; AFIRST – try the A system first. If unsuccessful, try the B system; BFIRST – try the B system first. If unsuccessful, try the A system; AORB – try A or B. If unsuccessful try the alternative system; CUSTOM is the default.)<br>*`<rotatetimer>`* , enter **4**<br>(Call processing continuously rotates, circular right–shifts, the Y/N values of Access Overload Class Redirect Flags 0 to 9. Values are shifted one flag at the end of the timer period; then timer re–starts. Valid values are 0–255; 4 is the default.)<br>The system displays the command to be sent. Verify the command syntax.<br>`omc-000000>Accept [yes/no]?`<br>Enter **Y** to accept the command or **N** to go back and enter the correct value(s). |

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**Table 10-4:** Shut Down Carrier Signaling Functions Procedure For a Circuit BTS

| ✓ | Step | Action |
|---|---|---|
| | 5 | View the status of the carrier signaling redirect parameters to verify that the carrier is ready for maintenance.<br><br>omc-000000>**DISPLAY CARRIER-**<bts#>**-**<sector#>**-**<carrier#> **REDIRECT**<br><br>Ensure that the values in the system display response match the values input in Step 4 (see example below).<br><br>Access Overload Class Redirect Flags: 0 0 0 0 0 0 0 0 0 0 1 1 1 1 1 1 (0 1 2 3 4 5 6 7 8 9 0 1 2 3 4 5)<br>CARRIER ID (bts-sector-carrier): CARRIER-1-1-1<br>RETURN IF FAIL: N<br>Access Overload Class Redirect Flags: Y Y Y Y Y Y Y Y Y Y Y Y Y Y Y Y<br>ROTATE TIMER (SEC): 4<br>RECORD TYPE: 2<br>EXP SID: 13<br>IGNORE CDMA: Y<br>SYS ORDERING: CUSTOM |
| | 6 | Repeat Steps 3 through 5 as required for other sectors with this carrier. |
| | 7 | If 2 was entered for <*recordtype*> in step 4, go to step 8.<br><br>If 1 was entered for <*recordtype*> in step 4, go to step 12. |
| | 8 | *** IMPORTANT**<br>Record the values shown in the following system display response. These values are used to answer the prompts for the EDIT CARRIER REDIRECT2 command when restoring signaling operations at the end of the replacement procedure.<br><br>View the status of the carrier signaling redirect parameters for the carrier and sector by entering the following command at the prompt:<br><br>omc-000000>**DISPLAY CARRIER-**<bts#>**-**<sector#>**-**<carrier#> **REDIRECT2**<br><br>Observe the following *typical* system display response for carrier 1, sector 2 (this example shows initial standard values):<br><br>CARRIER ID (bts-sector-carrier): CARRIER-1-1-1<br>EXP NID: 65535<br>BAND CLASS: CDMA800<br>REDIRECT CHAN 1: –<br>REDIRECT CHAN 2: –<br>REDIRECT CHAN 3: –<br>REDIRECT CHAN 4: –<br>REDIRECT CHAN 5: –<br>REDIRECT CHAN 6: –<br>REDIRECT CHAN 7: –<br>REDIRECT CHAN 8: –<br>REDIRECT CHAN 9: –<br>REDIRECT CHAN 10: –<br>REDIRECT CHAN 11: –<br>REDIRECT CHAN 12: –<br>REDIRECT CHAN 13: –<br>REDIRECT CHAN 14: –<br>REDIRECT CHAN 15: – |

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**Table 10-4:** Shut Down Carrier Signaling Functions Procedure For a Circuit BTS

| ✓ | Step | Action |
|---|---|---|
| | | **NOTE**<br>This step edits the redirect parameters so that the Global Service Redirect Message to be broadcast on the paging channel redirects all subscribers away from the carrier with the failed equipment and onto a different CDMA carrier frequency. |
| | 9 | Enter the following command at the prompt:<br>`omc-000000>`**EDIT CARRIER–**`<bts#>`**–**`<sector#>`**-**`<carrier#>` **REDIRECT2 !**<br>The system prompts you to enter each command parameter value one at a time. Answer the prompts in the following order:<br>*expecting an integer number (from 0 to 65535)*<br>*<EXPNID= ? >*<br>(Use the Network ID the subscriber units should expect to find on the system they are being redirected to. This example uses 555.)<br>*expecting an integer number (from 0 to 2047)*<br>*<CHAN1= ? >, <CHAN2= ? > ... <CHAN15= ?>*<br>(A list of CDMA channels for neighbor sites that the subscriber units can use for redirection. This example uses 200, 350, 400, 725, 75, 175, 100, 575, and 775.)<br>*expecting an enumerated value:*<br>*CDMA1900 CDMA800 CDMA900 JAPANCDMA CDMA2100*<br>*<BANDCLASS= ? >*<br>(Use CDMA1900 for 1.9 GHz systems, and CDMA800 for 800 MHz systems. This example uses CDMA1900.)<br>The system displays the command to be sent. Verify the command syntax.<br>`omc-000000>Accept [yes/no]?`<br>Enter **Y** to accept the command or **N** to go back and enter the correct value(s). |
| | 10 | View the status of the carrier signaling redirect parameters to verify that the sector is ready for maintenance.<br>`omc-000000>`**DISPLAY CARRIER–**`<bts#>`**–**`<sector#>`**-**`<carrier#>` **REDIRECT2**<br>Ensure that the values in the system display response match the values input in Step 9 (see example below). |
| | 11 | Repeat Steps 8 through 10 as required for other sectors with this carrier. |

```
                                                    REDIRECT CHAN
    CARRIER ID          EXP      BAND
(bts-sector-carrier)    NID      CLASS     1    2    3    4    5    6    7    8    9    10   11   12   13   14   15
--------------------  -----  ---------- ---  ---  ---  ---  ---  ---  ---  ---  ---  ---  ---  ---  ---  ---  ---
  CARRIER-1-1-1         555    CDMA800  200  350  400  725  75   175  100  575  775  -    -    -    -    -    -
```

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**Table 10-4:** Shut Down Carrier Signaling Functions Procedure For a Circuit BTS

| ✓ | Step | Action |
|---|---|---|
| | 12 | View the existing congestion control parameters for the applicable carrier equipped for a specific sector by entering the following command at the prompt:<br>`omc-000000>`**DISPLAY CARRIER-**`<bts#>`**-**`<sector#>`**-**`<carrier#>` **CONGESTCONF**<br>Observe the following *typical* system display response for carrier 1, sector 2:<br>CARRIER (bts#-sector#-carrier#) / SET / NEWCALL ALARMFLAG / REG ALARMFLAG / AGG ALARMFLAG / ANALOGREDIRECT / GLOBALREDIRECT<br>146-2-1 / 1 / ENABLE / ENABLE / ENABLE / DISABLE / DISABLE |
| | | **NOTE**<br>In this step, you will change the value of the Global Service Redirection Flag (GLOBALREDIRECT) in the congestion control parameters so that the Global Service Redirect Message is broadcast on the sector paging channel of a specific carrier. |
| | 13 | Enter the following command at the prompt using the carrier number and the applicable sector number:<br>`omc-000000>`**EDIT CARRIER-**`<bts#>`**-**`<sector#>`**-**`<carrier#>` **CONGESTCONF !**<br>The system prompts you to enter each control parameter value one at a time. Skip through the prompts until you get to the following:<br>*`<globalredirect>`*, enter **ENABLE**<br>(This will force the Global Service Redirect Message to be broadcast on the sector paging channel.)<br>The system displays the values of the control parameters. Verify that only the GLOBALREDIRECT value changed.<br>`omc-000000>Accept [yes/no]?`<br>Enter **Y** to accept the change.<br>Now the Global Service Redirection Message is sent over the sector paging channel. All subscribers are redirected away from the carrier/sector and onto a different system. This effectively shuts down the carrier/sector. |
| | 14 | Repeat Steps 12 and 13 as required for other sectors, selecting the proper sector number for the sector# parameter. |

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**Table 10-4:** Shut Down Carrier Signaling Functions Procedure For a Circuit BTS

| ✓ | Step | Action |
|---|---|---|
| | 15 | Display the status of all devices at the BTS by entering the following command at the prompt:<br>`omc-000000>`**DISPLAY BTS-**`<bts#>` **STATUS**<br>Observe the following *typical* system response:<br><br>DEVICE CBSC STATUS Config Data DEVSYNC Calibration Data Calibration Sync<br>BTS-1 1 INS n/a n/a n/a<br>BTSSPAN-1-1 1 INS n/a n/a n/a<br>BTSLINK-1-1 1 INS n/a n/a n/a<br>MGLI-1-1 1 INS-ACTIVE GOOD n/a n/a<br>CSA-1-1 1 INS_ACTIVE GOOD n/a n/a<br>BBX-1-1 1 INS-ACTIVE GOOD GOOD n/a<br>BBX-1-2 1 INS-STANDBY GOOD GOOD n/a<br>MCC-1-1 1 INS GOOD n/a n/a<br>MCC-1-2 1 INS GOOD n/a n/a<br>MCC-1-3 1 INS GOOD n/a n/a<br><br>Record the system response for all devices that are OOS_AUTOMATIC. |
| | 16 | Wait three minutes to allow any active calls to terminate. |
| | 17 | Disable all BBX cards by entering the following command at the prompt:<br>`omc-000000>`**DISABLE BBX-**`bts#-bbx#` **UNC** |
| | 18 | Display the status of all devices at the BTS by entering the following command at the prompt:<br>`omc-000000>`**DISPLAY BTS-**`<bts#>` **STATUS**<br>Observe the system response.<br>Verify that the BBX cards on the have been disabled and are OOS_MANUAL. |

### Restore Site Signaling Operations for a Circuit BTS

Restore site signaling operations according to the procedure in Table 10-5.

**Table 10-5:** Restore Site Signaling Operations Procedure For a Circuit BTS

| ✓ | Step | Action |
|---|---|---|
| **AT THE OMCR** | | |
| | 1 | Open a CLI window. Refer to the *Accessing OMC–R CLI Window* section on page 10-2. |
| | 2 | Enable the BTS by entering the following command at the prompt:<br>`omc-000000>`**ENABLE BTS-**`<bts#>` **UNC** |
| | 3 | Display the status of all devices at the BTS by entering the following command at the prompt:<br>`omc-000000>`**DISPLAY BTS-**`<bts#>` **STATUS**<br>Observe the system response.<br>Make sure that there are not more OOS_AUTOMATIC devices than what was observed in step 13 of the shut down site signaling functions procedure for a circuit BTS Table 10-2. Devices that were previously OOS_AUTOMATIC may now be INS. |
| | 4 | If you *did not* redirect subscribers according to the steps in the shut down site signaling functions procedure for a circuit BTS Table 10-2, **STOP** here.<br>If you *did* redirect subscribers according to the steps in the shut down site signaling functions procedure for a circuit BTS Table 10-2, perform the remaining steps of this table. |
| | 5 | View the existing congestion control parameters for all carriers equipped for the BTS by entering the following command at the prompt:<br>`omc-000000>`**DISPLAY BTS-**`<bts#>` **CONGESTCONF**<br>Observe the following *typical* system display response for a BTS: |

```
        CARRIER                NEWCALL      REG         AGG
(bts#-sector#-carrier#)  SET  ALARMFLAG  ALARMFLAG  ALARMFLAG  ANALOGREDIRECT  GLOBALREDIRECT
-----------------------  ---  ---------  ---------  ---------  --------------  --------------
        1-1-1              1    ENABLE     ENABLE     ENABLE        DISABLE         ENABLE
```

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**Table 10-5:** Restore Site Signaling Operations Procedure For a Circuit BTS

| ✓ | Step | Action |
|---|---|---|
| | | **NOTE**<br>In this step, you will change the value of the Global Service Redirection Flag (GLOBALREDIRECT) in the congestion control parameters so that the Global Service Redirect Message is only broadcast on the sector paging channel when there is traffic congestion in the sector. |
| | 6 | Enter the following command at the prompt using the applicable BTS number:<br>`omc-000000>`**EDIT BTS –**`<bts#>` **CONGESTCONF !**<br>The system prompts you to enter each control parameter value one at a time. Skip through the prompts until you get to the following:<br>*`<globalredirect>`*, enter **DISABLE**<br>(This will revert the Global Service Redirect Message to congestion control.)<br>The system displays the values of the control parameters. Verify that only the GLOBALREDIRECT value changed.<br>`omc-000000>Accept [yes/no]?`<br>Enter **Y** to accept the change.<br>Now the Global Service Redirection Message will only be sent over the sector paging channels when there is traffic congestion in the sector. |
| | 7 | Enter the following command at the prompt:<br>`omc-000000>`**DISPLAY BTS–**`<bts#>` **CONGESTCONF**<br>Observe the system display response.<br>Verify that the CONGESTCONF *`globalredirect`* is disabled for each carrier at the BTS. |
| | 8 | View the status of the signaling REDIRECT parameters for all carriers equipped for the applicable BTS by entering the following command at the prompt:<br>`omc-000000>`**DISPLAY BTS–**`<bts#>` **REDIRECT**<br>Observe that the values in the system display response should match the values input in step 4 of the shut down site signaling functions procedure for a circuit BTS Table 10-2 (see example below). |

```
                                  Access Overload Class Redirect Flags   ROTATE
     CARRIER ID          RETURN     0 0 0 0 0 0 0 0 0 0 1 1 1 1 1 1      TIMER     RECORD    EXP    IGNORE      SYS
(bts-sector-carrier)     IF FAIL    0 1 2 3 4 5 6 7 8 9 0 1 2 3 4 5      (SEC)      TYPE     SID    CDMA     ORDERING
--------------------     -------    - - - - - - - - - - - - - - - -      -----      ----     ----    ---     --------
   CARRIER-1-1-1           N        Y Y Y Y Y Y Y Y Y Y Y Y Y Y Y Y        4          2        13      Y       CUSTOM
```

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**Table 10-5:** Restore Site Signaling Operations Procedure For a Circuit BTS

| ✓ | Step | Action |
|---|---|---|
| | | *** IMPORTANT**<br>In this step, use the values recorded in step 3 of the shut down site signaling functions procedure for a circuit BTS Table 10-2 to answer the prompts for the EDIT BTS REDIRECT command; except for record type enter 2.<br>**NOTE**<br>This step shows the entry of initial standard values which is consistent with the original example; except record type must be 2. Your entries may be different. |
| | 9 | Restore the values of all REDIRECT parameters by entering the following command at the prompt:<br>`omc-000000>`**EDIT BTS–**`<bts#>` **REDIRECT !**<br>The system will prompt you to enter each command parameter one at a time. Answer the prompts in the following order (Note that the following specified values are consistent with the original example. Yours may be different):<br>*<accolc0>* enter **N**, *<accolc1>*enter **N**, *. . . <accolc15>*enter **N**<br>*<returniffail>* , enter **N**<br>*<recordtype>* , enter **2**<br>*<expectedsid>* , enter **0**<br>*<ignorecdma>* , enter **N**<br>*<sysordering>* , enter **CUSTOM**<br>*<rotatetimer>* , enter **4**<br>The system will display the command that will be sent. Verify the command syntax.<br>`omc-000000>Accept [yes/no]?`<br>Enter **Y** to accept the command or **N** to go back and enter the correct value(s). |
| | 10 | View the status of the signaling REDIRECT parameters by entering the following command at the prompt:<br>`omc-000000>`**DISPLAY BTS–**`<bts#>` **REDIRECT**<br>Ensure that the values in the system display response match the values input by the operator in step 9 (see example below). |

```
                                Access Overload Class Redirect Flags
                      RETURN                                              ROTATE  RECORD   EXP   IGNORE    SYS
     CARRIER ID       IF FAIL  0 0 0 0 0 0 0 0 0 0 1 1 1 1 1 1            TIMER    TYPE    SID    CDMA   ORDERING
(bts-sector-carrier)            0 1 2 3 4 5 6 7 8 9 0 1 2 3 4 5            (sec)
--------------------  -------  - - - - - - - - - - - - - - - -            ------  ------  -----  ------  --------
  CARRIER-1 -1-1        N      N N N N N N N N N N N N N N N N              4       2       0      N       CUSTOM
```

### Restore Sector Signaling Operations for a Circuit BTS

Restore sector signaling operations according to the procedure in Table 10-6.

**Table 10-6:** Restore Sector Signaling Operations Procedure For a Circuit BTS

| ✓ | Step | Action |
|---|---|---|
| **AT THE OMCR** | | |
| | 1 | Open a CLI window. Refer to the *Accessing OMCR CLI Window* section on page 10-2. |
| | 2 | Enable all BBX cards that were disabled in step 15 of the shut down sector signaling functions procedure for a circuit BTS Table 10-2 by entering the following command at the prompt:<br>`omc-000000>`**ENABLE BBX-**`bts#-bbx#` **UNC** |
| | 3 | Display the status of all devices at the BTS by entering the following command at the prompt:<br>`omc-000000>`**DISPLAY BTS-**`<bts#>` **STATUS**<br>Observe the system response.<br>Make sure that there are not more OOS_AUTOMATIC devices than what was observed in step 13 of the shut down sector signaling functions procedure for a circuit BTS Table 10-2. Verify that the BBX cards have been enabled and are INS_ACTIVE and INS_STANDBY respectively. |
| | 4 | If you *did not* redirect subscribers according to the steps in the shut down sector signaling functions procedure for a circuit BTS Table 10-2, stop here.<br>If you *did* redirect subscribers according to the steps in the shut down sector signaling functions procedure for a circuit BTS Table 10-2, perform the remaining steps of this table. |
| | 5 | View the congestion control parameters for all carriers equipped for the applicable sector by entering the following command at the prompt:<br>`omc-000000>`**DISPLAY SECTOR-**`<bts#>-<sector#>` **CONGESTCONF**<br>Observe the following *typical* system display response for sector 2: |

```
      CARRIER                          NEWCALL        REG            AGG
(bts#-sector#-carrier#)     SET      ALARMFLAG     ALARMFLAG      ALARMFLAG      ANALOGREDIRECT     GLOBALREDIRECT
-----------------------     ---      ---------     ---------      ---------      --------------     --------------
        1-1-1                1        ENABLE        ENABLE         ENABLE          DISABLE            ENABLE
```

. . . continued on next page

**Table 10-6:** Restore Sector Signaling Operations Procedure For a Circuit BTS

| ✓ | Step | Action |
|---|---|---|
| | | **NOTE**<br>In this step, you will change the value of the Global Service Redirection Flag (GLOBALREDIRECT) in the congestion control parameters so that the Global Service Redirect Message is only broadcast on the sector paging channel when there is traffic congestion in the sector. |
| | 6 | Enter the following command at the prompt using the applicable sector number:<br>`omc-000000>`**EDIT SECTOR–**`<bts#>`**–**`<sector#>` **CONGESTCONF !**<br>The system will prompt you to enter each control parameter value one at a time. Skip through the prompts until you get to the following:<br>*`<globalredirect>`* , enter **DISABLE**<br>(This will revert the Global Service Redirect Message to congestion control.)<br>The system will display the values of the control parameters. Verify that only the GLOBALREDIRECT value changed.<br>`omc-000000>Accept [yes/no]?`<br>Enter **Y** to accept the change.<br>Now the Global Service Redirection Message will only be sent over the sector paging channels when there is traffic congestion in the sector. |
| | 7 | Enter the following command at the prompt:<br>`omc-000000>`**DISPLAY SECTOR–**`<bts#>`**–**`<sector#>` **CONGESTCONF**<br>Observe the system display response.<br>Verify that the CONGESTCONF *`globalredirect`* is disabled for each carrier on the sector. |
| | 8 | View the status of the sector signaling REDIRECT parameters for all carriers equipped for the applicable sector by entering the following command at the prompt:<br>`omc-000000>`**DISPLAY SECTOR–**`<bts#>`**–**`<sector#>` **REDIRECT**<br>Observe that the values in the system display response should match the values input in step 4 of the shut down sector signaling functions procedure for a circuit BTS Table 10-2 (see example below). |

```
                                  Access Overload Class Redirect Flags   ROTATE
     CARRIER ID           RETURN     0 0 0 0 0 0 0 0 0 0 1 1 1 1 1 1      TIMER    RECORD    EXP    IGNORE     SYS
(bts-sector-carrier)     IF FAIL     0 1 2 3 4 5 6 7 8 9 0 1 2 3 4 5      (SEC)     TYPE     SID    CDMA    ORDERING
--------------------     -------     - - - - - - - - - - - - - - - -      -----     ----     ----    ---     --------
CARRIER-1-1-1              N         Y Y Y Y Y Y Y Y Y Y Y Y Y Y Y Y       4         2        13      Y       CUSTOM
```

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**Table 10-6:** Restore Sector Signaling Operations Procedure For a Circuit BTS

| ✓ | Step | Action |
|---|---|---|
| | | *** IMPORTANT**<br>In this step, use the values recorded in step 3 of the shut down sector signaling functions procedure for a circuit BTS Table 10-2 to answer the prompts for the EDIT SECTOR REDIRECT command; except for record type enter 2.<br>**NOTE**<br>This step shows the entry of initial standard values which is consistent with the original example; except record type must be 2. Your entries may be different. |
| | 9 | Restore the values of all REDIRECT parameters by entering the following command at the prompt:<br>`omc-000000>`**EDIT SECTOR–**`<bts#>`**–**`<sector#>` **REDIRECT !**<br>The system will prompt you to enter each command parameter one at a time. Answer the prompts in the following order (Note that the following specified values are consistent with the original example. Yours may be different):<br>*<accolc0>* enter **N**, *<accolc1>*enter **N**, *. . . <accolc15>*enter **N**<br>*<returniffail>* , enter **N**<br>*<recordtype>* , enter **2**<br>*<expectedsid>* , enter **0**<br>*<ignorecdma>* , enter **N**<br>*<sysordering>* , enter **CUSTOM**<br>*<rotatetimer>* , enter **4**<br>The system will display the command that will be sent. Verify the command syntax.<br>`omc-000000>Accept [yes/no]?`<br>Enter **Y** to accept the command or **N** to go back and enter the correct value(s). |
| | 10 | View the status of the sector signaling REDIRECT parameters by entering the following command at the prompt:<br>`omc-000000>`**DISPLAY SECTOR–**`<bts#>`**–**`<sector#>` **REDIRECT**<br>Ensure that the values in the system display response match the values input by the operator in step 9 (see example below). |

```
                                  Access Overload Class Redirect Flags   ROTATE
     CARRIER ID          RETURN       0 0 0 0 0 0 0 0 0 0 1 1 1 1 1 1     TIMER     RECORD    EXP    IGNORE      SYS
(bts-sector-carrier)     IF FAIL      0 1 2 3 4 5 6 7 8 9 0 1 2 3 4 5     (SEC)     TYPE      SID    CDMA     ORDERING
--------------------     -------      - - - - - - - - - - - - - - - -     -----     ----      ---    ----     -------
    CARRIER-1-1-1          N          N N N N N N N N N N N N N N N N       4         2        0      N       CUSTOM
```

### Restore Carrier Signaling Operations for a Circuit BTS

Restore carrier signaling operations according to the procedure in Table 10-7.

**Table 10-7:** Restore Carrier Signaling Operations Procedure For a Circuit BTS

| ✓ | Step | Action |
|---|---|---|
| | 1 | Open a CLI window. Refer to the *Accessing OMCR CLI Window* section on page 10-2. |
| | 2 | Enable all BBX cards that were disabled in step 17 of the shut down carrier signaling functions procedure for a circuit BTS Table 10-4 by entering the following command at the prompt:<br>`omc-000000>`**ENABLE BBX–**`bts#–bbx#` **UNC** |
| | 3 | Display the status of all devices at the BTS by entering the following command at the prompt:<br>`omc-000000>`**DISPLAY BTS–**`<bts#>` **STATUS**<br>Observe the system response.<br>Make sure that there are not more OOS_AUTOMATIC devices than what was observed in step 15 of the shut down carrier signaling functions procedure for a circuit BTS Table 10-4. Verify that the BBX cards have been enabled and are INS_ACTIVE and INS_STANDBY respectively. |
| | 4 | If you *did not* redirect subscribers according to the steps in the shut down carrier signaling functions procedure for a circuit BTS Table 10-4, stop here.<br>If you *did* redirect subscribers according to the steps in the shut down carrier signaling functions procedure for a circuit BTS Table 10-4, perform the remaining steps of this table. |
| | 5 | View the congestion control parameters for all carriers equipped for the applicable sector by entering the following command at the prompt:<br>`omc-000000>`**DISPLAY SECTOR–**`<bts#>`**–**`<sector#>` **CONGESTCONF**<br>Observe the following *typical* system display response for sector 2: |

```
      CARRIER                          NEWCALL        REG          AGG
(bts#-sector#-carrier#)     SET      ALARMFLAG     ALARMFLAG    ALARMFLAG     ANALOGREDIRECT     GLOBALREDIRECT
-----------------------     ---      ---------     ---------    ---------     --------------     --------------
       1-1-1                 1        ENABLE        ENABLE       ENABLE          DISABLE            ENABLE
```

. . . continued on next page

**Table 10-7:** Restore Carrier Signaling Operations Procedure For a Circuit BTS

| ✓ | Step | Action |
|---|---|---|
| | | **NOTE**<br>In this step, you will change the value of the Global Service Redirection Flag (GLOBALREDIRECT) in the congestion control parameters so that the Global Service Redirect Message is only broadcast on the sector paging channel of a specific carrier when there is traffic congestion in the carrier/sector. |
| | 6 | Enter the following command at the prompt using one of the applicable carrier number and the applicable sector number:<br>`omc-000000>`**EDIT CARRIER–**`<bts#>`**–**`<sector#>`**–**`<carrier#>` **CONGESTCONF !**<br>The system will prompt you to enter each control parameter value one at a time. Skip through the prompts until you get to the following:<br>*`<globalredirect>`*, enter **DISABLE**<br>(This will revert the Global Service Redirect Message to congestion control.)<br>The system will display the values of the control parameters. Verify that only the GLOBALREDIRECT value changed.<br>`omc-000000>Accept [yes/no]?`<br>Enter **Y** to accept the change.<br>Now the Global Service Redirection Message will only be sent over the sector paging channel when there is traffic congestion in the carrier/sector. |
| | 7 | Repeat step 6 for each remaining sector number disabled in step 14 of the shut down carrier signaling functions procedure for a circuit BTS Table 10-4. |
| | 8 | View the status of the carrier signaling redirect parameters to verify the applicable carrier equipped for the specific sector.<br>`omc-000000>`**DISPLAY CARRIER–**`<bts#>`**–**`<sector#>`**–**`<carrier#>` **REDIRECT**<br>Observe that the values in the system display response should match the values input in step 4 of the shut down carrier signaling functions procedure for a circuit BTS Table 10-4.<br>Access Overload Class Redirect Flags: 0 0 0 0 0 0 0 0 0 0 1 1 1 1 1 1 |
| | | CARRIER ID (bts-sector-carrier): CARRIER-146-2-1<br>RETURN IF FAIL: N<br>Access Overload Class Redirect Flags: Y Y Y Y Y Y Y Y Y Y Y Y Y Y Y Y<br>ROTATE TIMER (SEC): 4<br>RECORD TYPE: 2<br>EXP SID: 13<br>IGNORE CDMA: Y<br>SYS ORDERING: CUSTOM |
| | 9 | Enter the following command at the prompt:<br>`omc-000000>`**DISPLAY BTS–**`<bts#>` **CONGESTCONF**<br>Observe the system display response.<br>Verify that the CONGESTCONF *`globalredirect`* is disabled for the specific carrier on each the applicable sectors. |

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**Table 10-7:** Restore Carrier Signaling Operations Procedure For a Circuit BTS

| ✓ | Step | Action |
|---|---|---|
| | | *** IMPORTANT**<br>In this step, use the values recorded in step 3 of the shut down carrier signaling functions procedure for a circuit BTS Table 10-4 to answer the prompts for the EDIT CARRIER REDIRECT command; except for record type enter 2.<br>**NOTE**<br>This step shows the entry of initial standard values which is consistent with the original example; except record type must be 2. Your entries may be different. |
| | 10 | Restore the values of all REDIRECT parameters by entering the following command at the prompt:<br>`omc-000000>`**EDIT CARRIER–**`<bts#>`**–**`<sector#>`**–**`<carrier#>` **REDIRECT !**<br>The system will prompt you to enter each command parameter one at a time. Answer the prompts in the following order (Note that the following specified values are consistent with the original example. Yours may be different):<br>*<accolc0>* enter **N**, *<accolc1>*enter **N**, *. . . <accolc15>*enter **N**<br>*<returniffail>* , enter **N**<br>*<recordtype>* , enter **2**<br>*<expectedsid>* , enter **0**<br>*<ignorecdma>* , enter **N**<br>*<sysordering>* , enter **CUSTOM**<br>*<rotatetimer>* , enter **4**<br>The system will display the command that will be sent. Verify the command syntax.<br>`omc-000000>Accept [yes/no]?`<br>Enter **Y** to accept the command or **N** to go back and enter the correct value(s). |
| | 11 | Repeat steps 5 and 10, as required, for each remaining sector number disabled in step 14 of the shut down carrier signaling functions procedure for a circuit BTS Table 10-4. |
| | 12 | View the status of the signaling REDIRECT parameters by entering the following command at the prompt:<br>`omc-000000>`**DISPLAY BTS–**`<bts#>` **REDIRECT**<br>Ensure that the values in the system display response match the values for the specific carrier on each the applicable sector(s) input by the operator in step 10 (see example below). |

```
                                Access Overload Class Redirect Flags
                      RETURN                                              ROTATE  RECORD   EXP   IGNORE    SYS
     CARRIER ID       IF FAIL  0 0 0 0 0 0 0 0 0 0 1 1 1 1 1 1            TIMER    TYPE    SID    CDMA   ORDERING
(bts-sector-carrier)            0 1 2 3 4 5 6 7 8 9 0 1 2 3 4 5            (sec)
--------------------  -------  - - - - - - - - - - - - - - - -            ------  ------  -----  ------  --------
  CARRIER-1-1-1         N      N N N N N N N N N N N N N N N N              4       2       0      N       CUSTOM
```

### Shut Down Site Signaling Functions for a Packet BTS

If a complete site shutdown is required for the FRU replacement, follow the procedure in Table 10-8 to disable the packet BTS site.

**CAUTION**

This site shut down procedure takes a BTS out–of–service (OOS), but does not affect the other BTSs. To minimize system impact, it may be advisable (but not necessary) to perform this procedure during a maintenance window.

**IMPORTANT**

The **EDIT BTS REDIRECT** or **REDIRECT2** command does NOT affect calls in progress and does NOT move these calls to another BTS. The command prevents future calls from being originated on the targeted BTS and also redirects subscribers to another site/carrier. If active call processing is still taking place in the target BTS, wait for any active calls to terminate before locking/disabling the BTS resources.

**IMPORTANT**

The **SHUTDOWN** command does NOT affect calls in progress and does NOT move these calls to another BTS. Shutdown is a camp–on state, it prevents future calls from being originated on the targeted resource and waits for calls to terminate. When the resource becomes idle, it is automatically transitioned to the locked/disabled state. Shutdown does not redirect subscribers to another site/carrier.
Shutdown camp–on time is indefinite. Shutdown can be aborted at anytime by invoking the **LOCK** or **DISABLE** command.

**NOTE**

Refer to the *System Commands Reference* manual (68P09256A58) part/of *Cellular System Administration CDMA2000 1X* – 99R09255A10 CD–ROM for a complete explanation of OMC–R commands.

**Table 10-8:** Shut Down Site Signaling Functions Procedure For a Packet BTS

| ✓ | Step | Action |
|---|---|---|
| **AT THE OMC–R** | | |
| | 1 | Open a CLI window. Refer to the *Accessing OMC–R CLI Window* section on page 10-2. |
| | 2 | *** IMPORTANT**<br>It is recommended that you redirect subscribers to another site/carrier and then wait for any active calls to terminate before locking/disabling the BTS.<br>**NOTE**<br>SHUTDOWN and REDIRECT both prevent future calls from being originated on the targeted resource, but only SHUTDOWN waits indefinitely for the calls to terminate. When the resource becomes idle, SHUTDOWN automatically transitions the resource to the locked/disabled state.<br>If you are not concerned about redirecting subscribers and waiting for any active calls to terminate and you just want to lock/disable the BTS, perform step 13 and step 18 only.<br>If you are not concerned about redirecting subscribers but you want to use SHUTDOWN and wait for all active calls to terminate before locking/disabling the BTS, perform step 13, step 16 and step 17.<br>If you want to redirect subscribers and then wait for any active calls to terminate before locking/disabling the BTS, go to step 3. |
| | | **NOTE**<br>The REDIRECT command is used to redirect subscribers to an 1.9 GHz site or to invoke the REDIRECT2 command which is then used to redirect subscribers to a different CDMA carrier frequency. REDIRECT2 is the preferred command if an alternate CDMA carrier is available. |
| | 3 | *** IMPORTANT**<br>Record the values shown in the following system display response. These values are used to answer the prompts for the EDIT BTS REDIRECT command when restoring signaling operations at the end of the replacement procedure.<br>View the status of the BTS signaling redirect parameters for all carriers equipped for the BTS by entering the following command at the prompt:<br>`omc-000000>`**DISPLAY BTS–**`<bts#>` **REDIRECT**<br>Observe the following *typical* system display response for a BTS (this example shows initial standard values): |

```
                                Access Overload Class Redirect Flags
                    RETURN                                                  ROTATE  RECORD   EXP   IGNORE    SYS
     CARRIER ID     IF FAIL  0 0 0 0 0 0 0 0 0 0 1 1 1 1 1 1                TIMER    TYPE    SID    CDMA   ORDERING
(bts-sector-carrier)         0 1 2 3 4 5 6 7 8 9 0 1 2 3 4 5                (sec)
--------------------  -------  - - - - - - - - - - - - - - - -              ------  ------  -----  ------  --------
  CARRIER-146-1-1        N     N N N N N N N N N N N N N N N N                 4       1       0      N       CUSTOM
```

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**Table 10-8:** Shut Down Site Signaling Functions Procedure For a Packet BTS

| ✓ | Step | Action |
|---|---|---|
| | | **NOTE**<br>This step edits the REDIRECT parameters so that the Global Service Redirect Message to be broadcast on the paging channel redirects all subscribers away from the BTS and onto a different BTS or system. |
| | 4 | Enter the following command at the prompt:<br>`omc-000000>`**EDIT BTS–**`<bts#>` **REDIRECT!**<br>The system prompts you to enter each command parameter value one at a time. Answer the prompts in the following order:<br>*`<accolc0>`*enter **Y**, *`<accolc1>`*enter **Y**, `...` *`<accolc15>`* enter **Y**<br>(All Access Overload Classes *must* be set to yes to ensure that all subscribers are redirected.)<br>*`<returniffail>`* , enter **N**<br>(Must be set to no to ensure that subscribers do not return if redirect is unsuccessful.)<br>*`<recordtype>`* , enter **1** or **2**<br>(A value of 2 will invoke REDIRECT2 which is used to redirect subscribers to a CDMA channel at a neighbor site. A value of 1 redirects subscribers to an 1.9 GHz site. This example uses 2.)<br>*`<expectedsid>`* , enter **13**<br>(Use the Area ID the subscriber units should expect to find on the system where they are being redirected. This example uses 13. The valid range is 0 – 32767; the default is 0.)<br>*`<ignorecdma>`* , enter **Y**<br>*`<sysordering>`* , enter **CUSTOM**<br>(The system acquisition ordering value tells the mobiles the order to use when attempting to obtain service on the different analog systems. Valid values are: CUSTOM – use custom system selection; AONLY – try the A system only; BONLY – use the B system only; AFIRST – try the A system first. If unsuccessful, try the B system; BFIRST – try the B system first. If unsuccessful, try the A system; AORB – try A or B. If unsuccessful try the alternative system; CUSTOM is the default.)<br>*`<rotatetimer>`* , enter **4**<br>(Call processing continuously rotates, circular right–shifts, the Y/N values of Access Overload Class Redirect Flags 0 to 9. Values are shifted one flag at the end of the timer period; then timer re–starts. Valid values are 0–255; 4 is the default.)<br>The system displays the command to be sent. Verify the command syntax.<br>`omc-000000>Accept [yes/no]?`<br>Enter **Y** to accept the command or **N** to go back and enter the correct value(s). |

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**Table 10-8:** Shut Down Site Signaling Functions Procedure For a Packet BTS

| ✓ | Step | Action |
|---|---|---|
| | 5 | View the status of the signaling REDIRECT parameters to verify that the applicable BTS is ready for global redirect.<br>omc-000000>**DISPLAY BTS-**<bts#> **REDIRECT**<br>Ensure that the values in the system display response match the values input in Step 4 (see example below).<br>Access Overload Class Redirect Flags: 0 0 0 0 0 0 0 0 0 0 1 1 1 1 1 1<br>0 1 2 3 4 5 6 7 8 9 0 1 2 3 4 5<br>CARRIER ID (bts-sector-carrier): CARRIER-146-1-1<br>RETURN IF FAIL: N<br>Access Overload Class Redirect Flags: Y Y Y Y Y Y Y Y Y Y Y Y Y Y Y Y<br>ROTATE TIMER (SEC): 4<br>RECORD TYPE: 2<br>EXP SID: 13<br>IGNORE CDMA: Y<br>SYS ORDERING: CUSTOM |
| | 6 | If 2 was entered for *<recordtype>* in step 4, go to step 7.<br>If 1 was entered for *<recordtype>* in step 4, go to step 10. |
| | 7 | *** IMPORTANT**<br>Record the values shown in the following system display response. These values are used to answer the prompts for the EDIT BTS REDIRECT2 command when restoring signaling operations at the end of the replacement procedure.<br>View the status of the BTS signaling redirect parameters for all carriers equipped for the BTS by entering the following command at the prompt:<br>omc-000000>**DISPLAY BTS-**<bts#> **REDIRECT2**<br>Observe the following *typical* system display response for a BTS (this example shows initial standard values):<br>CARRIER ID (bts-sector-carrier): CARRIER-146-1-1<br>EXP NID: 65535<br>BAND CLASS: CDMA1900<br>REDIRECT CHAN 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15: - - - - - - - - - - - - - - - |

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**Table 10-8:** Shut Down Site Signaling Functions Procedure For a Packet BTS

| ✓ | Step | Action |
|---|---|---|
| | | **NOTE**<br>This step edits the REDIRECT2 parameters so that the Global Service Redirect Message to be broadcast on the paging channel redirects all subscribers away from the BTS with the failed equipment and onto a CDMA channel at a neighbor site. |
| | 8 | Enter the following command at the prompt:<br>`omc-000000>`**EDIT BTS-**`<bts#>` **REDIRECT2!**<br>The system prompts you to enter each command parameter value one at a time. Answer the prompts in the following order:<br>*expecting an integer number (from 0 to 65535)*<br>*<EXPNID= ? >*<br>(Use the Network ID the subscriber units should expect to find on the system they are being redirected to. This example uses 555.)<br>*expecting an integer number (from 0 to 2047)*<br>*<CHAN1= ? >, <CHAN2= ? > ... <CHAN15= ?>*<br>(A list of CDMA channels for neighbor sites that the subscriber units can use for redirection. This example uses 200, 350, 400, 725, 75, 175, 100, 575 and 950.)<br>*expecting an enumerated value:*<br>*CDMA1900 CDMA800 CDMA900 JAPANCDMA*<br>*<BANDCLASS= ? >*<br>(Use CDMA1900 for 1.9 GHz systems, and CDMA800 for 800 MHz systems. This example uses CDMA1900.)<br>The system displays the command to be sent. Verify the command syntax.<br>`omc-000000>Accept [yes/no]?`<br>Enter **Y** to accept the command or **N** to go back and enter the correct value(s). |
| | 9 | View the status of the BTS signaling REDIRECT2 parameters to verify that the BTS is ready for maintenance.<br>`omc-000000>`**DISPLAY BTS-**`<bts#>` **REDIRECT2**<br>Ensure that the values in the system display response match the values input in Step 8 (see example below).<br><br>REDIRECT CHAN<br>CARRIER ID (bts-sector-carrier) / EXP NID / BAND CLASS / 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15<br>CARRIER-146-1-1 555 CDMA1900 200 350 400 725 75 175 100 575 950 – – – – – – |

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**Table 10-8:** Shut Down Site Signaling Functions Procedure For a Packet BTS

| ✓ | Step | Action |
|---|---|---|
| | 10 | View the existing congestion control parameters for all carriers equipped for the BTS by entering the following command at the prompt:<br>`omc-000000>`**DISPLAY BTS–**`<bts#>` **CONGESTCONF**<br>Observe the following *typical* system display response for a BTS:<br>`CARRIER NEWCALL REG AGG`<br>`(bts#-sector#-carrier#) SET ALARMFLAG ALARMFLAG ALARMFLAG ANALOGREDIRECT GLOBALREDIRECT`<br>`146-1-1 1 ENABLE ENABLE ENABLE DISABLE DISABLE` |
| | 11 | **NOTE**<br>In this step, you will change the value of the Global Service Redirection Flag (GLOBALREDIRECT) in the congestion control parameters so that the Global Service Redirect Message is broadcast on all of the sector paging channels at the BTS.<br>Enter the following command at the prompt using the applicable BTS number:<br>`omc-000000>`**EDIT BTS –**`<bts#>` **CONGESTCONF !**<br>The system prompts you to enter each control parameter value one at a time. Skip through the prompts until you get to the following:<br>*`<globalredirect>`*, enter **ENABLE**<br>(This will force the Global Service Redirect Message to be broadcast on all of the sector paging channels at the BTS.)<br>The system displays the values of the control parameters. Verify that only the GLOBALREDIRECT value changed.<br>`omc-000000>Accept [yes/no]?`<br>Enter **Y** to accept the change.<br>Now the Global Service Redirection Message is sent over the sector paging channels. All subscribers are redirected away from the BTS and onto a different system or CDMA carrier channel. This effectively shuts down the BTS. |
| | 12 | Verify that the CONGESTCONF *`globalredirect`* is enabled for each carrier at the BTS by entering the following command at the prompt:<br>`omc-000000>`**DISPLAY BTS–**`<bts#>` **CONGESTCONF**<br>Observe the following *typical* system display response for a BTS:<br>`CARRIER NEWCALL REG AGG`<br>`(bts#-sector#-carrier#) SET ALARMFLAG ALARMFLAG ALARMFLAG ANALOGREDIRECT GLOBALREDIRECT`<br>`146-1-1 1 ENABLE ENABLE ENABLE DISABLE ENABLE` |

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| **Table 10-8:** Shut Down Site Signaling Functions Procedure For a Packet BTS | | |
|---|---|---|
| ✓ | **Step** | **Action** |
| | 13 | Display the status of all devices at the BTS by entering the following command at the prompt:<br>`omc-000000>`**DISPLAY BTS–**`<bts#>` **STATUS**<br>Record the system response for all devices that are OOS_AUTOMATIC. This information will be used for later reference when restoring site signaling operations. |
| | | **NOTE**<br>SHUTDOWN and REDIRECT both prevent future calls from being originated on the targeted resource, but only SHUTDOWN waits indefinitely for the calls to terminate. When the resource becomes idle, SHUTDOWN automatically transitions the resource to the locked/disabled state. |
| | 14 | If you redirected subscribers but do not want to use SHUTDOWN, go to step 15.<br>If you redirected subscribers and want to use SHUTDOWN, go to step 16. |
| | 15 | Wait three minutes to allow any active calls to terminate then go to step 18. |
| | 16 | Shutdown all carriers equipped for the BTS by repeatedly entering the following command at the prompt:<br>`omc-000000>`**SHUTDOWN CARRIER–**`<bts#>`**–**`<sector#>`**-**`<carrier#>`<br>Repeat this command for each sector–carrier associated with each carrier. |
| | 17 | Observe that the system automatically returns a “Network Element State Change Event” message for each carrier being shutdown. This message shows the old and new states for the carrier. The CARRIER will go from UNLOCKED/ENABLED/ACTIVE to SHUTTINGDOWN/ENABLED/ACTIVE to LOCKED/DISABLED/IDLE.<br>When all BTS carriers shutdown in step 16 are reported as LOCKED/DISABLED/IDLE, the BTS will be reported as UNLOCKED/ENABLED/IDLE.<br>If you determine that it is taking too long for carriers to shutdown and the BTS to transition to UNLOCKED/ENABLED/IDLE state, perform step 18 to abort the shutdown process and LOCK/DISABLE the BTS. |
| | 18 | Lock/disable the BTS by entering either of the following commands at the prompt:<br>`omc-000000>`**DISABLE BTS–**`<bts#>` **UNC**<br>`omc-000000>`**LOCK BTS–**`<bts#>` |

### Shut Down Sector Signaling Functions for a Packet BTS

If a sector shutdown is required for the FRU replacement and the site is currently under CBSC control, follow the procedure in Table 10-9 to disable the sector at a packet BTS.

**CAUTION**

This sector shut down procedure takes a sector out–of–service (OOS), but does not affect the other sectors. To minimize system impact, it may be advisable (but not necessary) to perform this procedure during a maintenance window.

**IMPORTANT**

The **EDIT SECTOR REDIRECT** or **REDIRECT2** command does NOT affect calls in progress and does NOT move these calls to another sector/carrier. The command only prevents future calls from being originated on the targeted sector/carrier. If active call processing is still taking place in the target sector/carrier, wait for any active calls to terminate before disabling the sector/carrier.

**IMPORTANT**

The **SHUTDOWN** command does NOT affect calls in progress and does NOT move these calls to another BTS. Shutdown is a camp–on state, it prevents future calls from being originated on the targeted resource and waits for calls to terminate. When the resource becomes idle, it is automatically transitioned to the locked/disabled state. Shutdown does not redirect subscribers to another site/carrier.
Shutdown camp–on time is indefinite. Shutdown can be aborted at anytime by invoking the **LOCK** or **DISABLE** command.

**NOTE**

Refer to the *System Commands Reference* manual (68P09256A58) part/of *Cellular System Administration CDMA2000 1X* – 99R09255A10 CD–ROM for a complete explanation of OMC–R commands.

**Table 10-9:** Shut Down Sector Signaling Functions Procedure For a Packet BTS

| ✓ | Step | Action |
|---|---|---|
| **AT THE OMC–R** | | |
| | 1 | Open a CLI window. Refer to the *Accessing OMC–R CLI Window* section on page 10-2. |
| | 2 | *** IMPORTANT**<br>It is recommended that you redirect subscribers to another sector/carrier and then wait for any active calls to terminate before locking/disabling the sector/carrier.<br>**NOTE**<br>SHUTDOWN and REDIRECT both prevent future calls from being originated on the targeted resource, but only SHUTDOWN waits indefinitely for the calls to terminate. When the resource becomes idle, SHUTDOWN automatically transitions the resource to the locked/disabled state.<br>If you are not concerned about redirecting subscribers and waiting for any active calls to terminate and you just want to lock/disable the sector/carrier, perform step 13 and step 18 only.<br>If you are not concerned about redirecting subscribers but you want to use SHUTDOWN and wait for all active calls to terminate before locking/disabling the sector/carrier, perform step 13, step 16 and step 17.<br>If you want to redirect subscribers and then wait for any active calls to terminate before locking/disabling the sector/carrier, go to step 3. |
| | | **NOTE**<br>The REDIRECT command is used to redirect subscribers to an 1.9 GHz site or to invoke the REDIRECT2 command which is then used to redirect subscribers to a different CDMA carrier frequency. REDIRECT2 is the preferred command if an alternate CDMA carrier is available. |
| | 3 | *** IMPORTANT**<br>Record the values shown in the following system display response. These values are used to answer the prompts for the EDIT SECTOR REDIRECT command when restoring signaling operations at the end of the replacement procedure.<br>View the status of the sector signaling redirect parameters for all carriers equipped for the sector by entering the following command at the prompt:<br>`omc-000000>`**DISPLAY SECTOR–**`<bts#>`**–**`<sector#>` **REDIRECT**<br>Observe the following *typical* system display response for sector 1 (this example shows initial standard values):<br>`Access Overload Class Redirect Flags  ROTATE`<br>`CARRIER ID  RETURN  0 0 0 0 0 0 0 0 0 0 1 1 1 1 1 1  TIMER  RECORD  EXP  IGNORE  SYS`<br>`(bts-sector-carrier)  IF FAIL  0 1 2 3 4 5 6 7 8 9 0 1 2 3 4 5  (SEC)  TYPE  SID  CDMA  ORDERING`<br>`CARRIER-1-2-1  N  N N N N N N N N N N N N N N N N  4  1  0  N  CUSTOM` |

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**Table 10-9:** Shut Down Sector Signaling Functions Procedure For a Packet BTS

| ✓ | Step | Action |
|---|---|---|
| | | **NOTE**<br>This step edits the REDIRECT parameters so that the Global Service Redirect Message to be broadcast on the paging channel redirects all subscribers away from the sector with the failed equipment and onto a different sector, BTS, or system. |
| | 4 | Enter the following command at the prompt:<br>`omc-000000>`**EDIT SECTOR–**`<bts#>`**–**`<sector#>` **REDIRECT !**<br>The system prompts you to enter each command parameter value one at a time. Answer the prompts in the following order:<br>*`<accolc0>`*enter **Y**, *`<accolc1>`*enter **Y**, . . . *`<accolc15>`*enter **Y**<br>(All Access Overload Classes *must* be set to yes to ensure that all subscribers are redirected.)<br>*`<returniffail>`* , enter **N**<br>(Must be set to no to ensure that subscribers do not return if redirect is unsuccessful.)<br>*`<recordtype>`* , enter **1** or **2**<br>(A value of 2 will invoke REDIRECT2 which is used to redirect subscribers to a CDMA channel at a neighbor sector/site. A value of 1 redirects subscribers to an 1.9 GHz site. This example uses 2.)<br>*`<expectedsid>`* , enter **13**<br>(Use the Area ID the subscriber units should expect to find on the system where they are being redirected. This example uses 13. The valid range is 0 – 32767; the default is 0.)<br>*`<ignorecdma>`* , enter **Y**<br>*`<sysordering>`* , enter **CUSTOM**<br>(The system acquisition ordering value tells the mobiles the order to use when attempting to obtain service on the different analog systems. Valid values are: CUSTOM – use custom system selection; AONLY – try the A system only; BONLY – use the B system only; AFIRST – try the A system first. If unsuccessful, try the B system; BFIRST – try the B system first. If unsuccessful, try the A system; AORB – try A or B. If unsuccessful try the alternative system; CUSTOM is the default.)<br>*`<rotatetimer>`* , enter **4**<br>(Call processing continuously rotates, circular right–shifts, the Y/N values of Access Overload Class Redirect Flags 0 to 9. Values are shifted one flag at the end of the timer period; then timer re–starts. Valid values are 0–255; 4 is the default.)<br>The system displays the command to be sent. Verify the command syntax.<br>`omc-000000>Accept [yes/no]?`<br>Enter **Y** to accept the command or **N** to go back and enter the correct value(s). |

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**Table 10-9:** Shut Down Sector Signaling Functions Procedure For a Packet BTS

| ✓ | Step | Action |
|---|---|---|
| | 5 | View the status of the sector signaling REDIRECT parameters to verify that the applicable sector is ready for global redirect.<br>omc-000000>**DISPLAY SECTOR-**<bts#>**-**<sector#> **REDIRECT**<br>Ensure that the values in the system display response match the values input in Step 4 (see example below). |
| | 6 | If 2 was entered for *<recordtype>* in step 4, go to step 7.<br>If 1 was entered for *<recordtype>* in step 4, go to step 10. |
| | 7 | *** IMPORTANT**<br>Record the values shown in the following system display response. These values are used to answer the prompts for the EDIT SECTOR REDIRECT2 command when restoring signaling operations at the end of the replacement procedure.<br>View the status of the sector signaling REDIRECT2 parameters for all carriers equipped for the sector by entering the following command at the prompt:<br>omc-000000>**DISPLAY SECTOR-**<bts#>**-**<sector#> **REDIRECT2**<br>Observe the following *typical* system display response for sector 1 (this example shows initial standard values): |

```
                                  Access Overload Class Redirect Flags   ROTATE
     CARRIER ID          RETURN     0 0 0 0 0 0 0 0 0 0 1 1 1 1 1 1      TIMER     RECORD    EXP    IGNORE      SYS
(bts-sector-carrier)     IF FAIL    0 1 2 3 4 5 6 7 8 9 0 1 2 3 4 5      (SEC)      TYPE     SID    CDMA     ORDERING
--------------------     -------    - - - - - - - - - - - - - - - -      -----      ----     ----    ---     --------
CARRIER-1-2-1              N        Y Y Y Y Y Y Y Y Y Y Y Y Y Y Y Y        4         2       13      Y       CUSTOM
```

```
                                                                REDIRECT CHAN
     CARRIER ID          EXP      BAND
(bts-sector-carrier)     NID      CLASS     1    2    3    4    5    6    7    8    9    10   11   12   13   14   15
--------------------     -----    --------  ---  ---  ---  ---  ---  ---  ---- ---- ---- ---- ---- ---- ---- ---  ----
  CARRIER-146-2-1        65535    CDMA1900  -    -    -    -    -    -    -    -    -    -    -    -    -    -    -
```

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