Chapter 4: Acceptance Test Procedures

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4

Introduction

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.

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.

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.

NOTE

– Before using the LMF, read the Release Notes "Caveats" section in the *WinLMF On-Line Help SR2.16.x* for any applicable information.

– The ATP Test is to be performed on out-of-service sectors *only.*

– DO NOT substitute Test Equipment with other models not supported by the LMF.

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 that the TX/RX Paths by performing TX Calibration, TX Audit, and FER Tests.
2. Retrieve Calibration Data required for normal site operation.

Should failures occur while performing the specified tests, refer to the Basic Troubleshooting section of this manual for help in determining the failure point. Once the point of failure has been identified and corrected, refer to the BTS Optimization and ATP Test Matrix (Table C-1) to determine the applicable test that must be performed.

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 that the performance of the BTS Transmit Elements. These include the GLI, MCC, BBX, Trunking Modules, the LPA Modules, 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 Cards, 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, ensure that the following have been completed:

- BTS has been optimized (BBX Cards 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.
- CSM Cards, GLI Cards, BBX Cards, MCC Cards and TSU (if the RFDS is installed) have correct code and Data Loads.
- Primary CSM and GLI are INS_ACTIVE (bright green).
- MCC Cards are INS_ACTIVE (bright green).
- No BBX Cards are keyed (transmitting).
- BBX Cards are OOS_RAM (yellow).
- Test Cables are calibrated.
- Test Equipment has been selected, warmed–up 60 minutes, and calibrated.
- GPIB is on.
- BTS Transmit Connectors are properly terminated for the test(s) to be performed.

WARNING

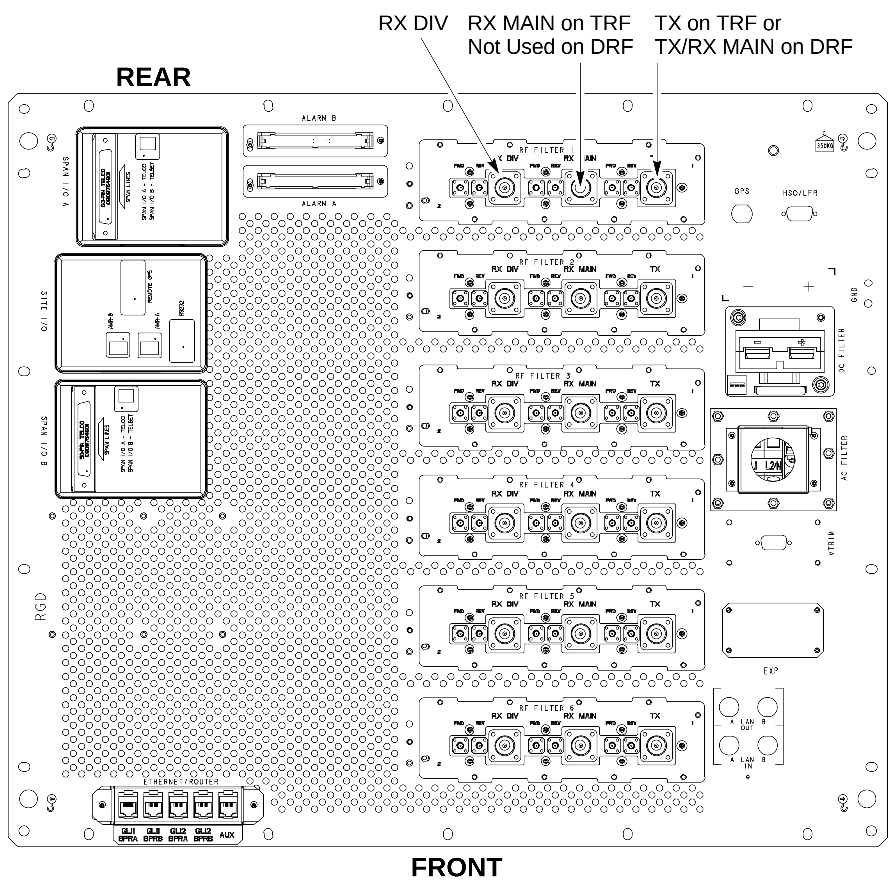
1. All Transmit Connectors must be properly terminated for all ATP Tests.
2. Before the FER is run, make sure that one of the following is done:
   – All transmitter Connectors are properly terminate
   OR
   – All LPA Modules are turned OFF (circuit breakers pulled)

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

TX/RX Antenna Connections

Figure 4-1 identifies the Frame Transmit and Receive Antenna Connections where measurements are to be taken.

Figure 4-1: TX and RX Antenna Connections on I/O Panel



ti-CDMA-WP-00214-v01-ildoc-ftw REF

Required Test Equipment

The following Test Equipment is required:

- LMF
- Power Meter (used with HP 8921A/600 and Advantest R3465)
- 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 OMC–R/CBSC place the carrier assigned to the LPA Modules 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

Perform the procedure in Table 4-1 to Set–up Test Equipment for all tests..

Table 4-1: Set–up Test Equipment – TX Output Verify/Control Tests Procedure		
✓	Step	Action
	1	***If it has not already been done***, interface the LMF Computer to the BTS. – Refer to Table 3-6 and Figure 3-3.
	2	***If it has not already been done***, start a *GUI* LMF Session and log into the BTS. – Refer to Table 3-10.
	3	***If it has not already been done***, connect Test Equipment for Acceptance Testing. – Refer to Figure 3-20, Figure 3-21, Figure 3-22, Figure 3-23, Figure 3-24, or Figure 3-25, as applicable, for the Test Equipment and Antenna Duplexing being used. *** IMPORTANT** LMF–based Measurements factor into TX Test Test Cable Insertion Loss between the RF Modem Frame 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 Test Cable Insertion Loss Values (refer to Table 3-35). – 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*.

4

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 that 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 items summarize the coverage of each Abbreviated Test.:

- **All TX/RX**: Performs all transmit and receive ATPs on the selected MCC Cards and BBX Cards.
- **All TX**: Performs complete set of transmit ATPs on the selected MCC Cards and BBX Cards. 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 MCC Cards and BBX Cards. Testing is the equivalent of performing the **FER** Test.

Abbreviated Acceptance Test Procedures

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

All TX/RX ATP Test

Perform the procedure in Table 4-2 to perform the Abbreviated, All–inclusive **Transmit And Receive** Test.

Table 4-2: All TX/RX Acceptance Test Procedure

✓	Step	Action
	1	Set–up the Test Equipment initially for Abbreviated Tests as described in Table 4-1. **NOTE** 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.

table continued on next page

Table 4-2: All TX/RX Acceptance Test Procedure		
✓	Step	Action
	2	Select the BBX Cards and MCC Cards 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. **NOTE** 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. – If it is not, obtain the latest **bts–#.cdf** (or **bts–#.necf**) and **cbsc–#.CDF File**s from the CBSC. **NOTE** If necessary, the correct Channel Number may be manually entered into the **Carrier # Channels** Box.
	6	Select the appropriate **RX Branch** (**BOTH**, **MAIN**, or **DIV**ersity) in the Pull–down Menu. *** IMPORTANT** 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. **NOTE** If a Companion Frame with the Inter–frame Diversity RX Cabling *dis*connected is being tested *do not select* **BOTH** in this step.
	7	In the **Rate Set** Box, select the appropriate Data Rate (**1**=9600 **3**=9600 1X) from the Pull–down Menu. **NOTE** The **Rate Set** selection of **3** is only available if 1X Cards are selected for the test.
	8	Enter the Channel Elements to be tested for the RX ATP in the **Channel Element(s)** Box. – By default, all Channel Elements are specified. – The Channel Element Numbers are 0.based; therefore, the first Channel Element is 0. **NOTE** Use one of the following methods to enter more than one Channel Element: – Enter non–sequential Channel Elements separated by a comma and no spaces (for example; 0,5,15). – Enter a range of sequential Channel Elements by typing the first and last Channel Elements separated by two periods (for example; 0..15).

table continued on next page

Table 4-2: All TX/RX Acceptance Test Procedure		
✓	Step	Action
	9	In the **Test Pattern** Box, select the Test Pattern to use for the Acceptance Tests from the Pull–down Menu. – Refer to "Test Pattern Drop–down Pick List" under "TX Calibration and the LMF" in the Bay Level Offset Calibration section of Chapter 3.
	10	Click **OK** to display a Status Bar followed by a **Directions** Pop–up Window.
	11	Execute the Cable Connection Directions as they are displayed, and click the **Continue** Button to begin testing. – As the ATP Process is completed, results will be displayed in the Status Report Window.
	12	Click either the **Save Results** Button or the **Dismiss** Button. *** IMPORTANT** If **Dismiss** is used, the test results *will not* be saved in the Test Report File.

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All TX ATP Test

Perform the procedures in Table 4-3 to perform the Abbreviated, All–inclusive **Transmit Test**.

Table 4-3: All TX Acceptance Test Procedure		
✓	Step	Action
	1	Set–up the Test Equipment for Abbreviated Tests per Table 4-1.
	2	Select the BBX Cards and MCC Cards 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. **NOTE** 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. – If it is not, obtain the latest **bts–#.cdf** (or **bts–#.necf**) and **cbsc–#.CDF File**s from the CBSC. **NOTE** If necessary, the correct Channel Number may be manually entered into the **Carrier # Channels** Box.

table continued on next page

Table 4-3: All TX Acceptance Test Procedure		
✓	Step	Action
	6	In the **Rate Set** Box, select the appropriate Transfer Rate (**1** = 9600, **3** = 9600 1X) from the Pull–down Menu. **NOTE** The Rate Set Selection of **3** is only available if 1X Cards are selected for the test.
	7	In the **Test Pattern** Box, select the Test Pattern to use for the Acceptance Test from the Pull–down Menu. – Refer to "Test Pattern Drop–down Pick List" under "TX Calibration and the LMF" in the Bay Level Offset Calibration section of Chapter 3.
	8	Click **OK** to display a Status Bar followed by a **Directions** Pop–up Window.
	9	Execute the Cable Connection Directions as they are displayed, and click the **Continue** Button to begin testing. – As the ATP Process is completed, results will be displayed in the Status Report Window.
	10	Click either the **Save Results** Button or the **Dismiss** Button. *** IMPORTANT** If **Dismiss** is used, the test results *will not* be saved in the Test Report File.

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All RX ATP Test

Perform the procedure in Table 4-4 to perform the Abbreviated, All–inclusive **Receive** Test.

Table 4-4: All RX Acceptance Test Procedure		
✓	Step	Action
	1	Set–up the Test Equipment for Abbreviated Tests per Table 4-1. **NOTE** 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 BBX Cards and MCC Cards 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. **NOTE** To select multiple items, hold down the **Shift** or **Ctrl** Key while clicking on Pick List Items to select multiple carrier(s)–sector(s).

table continued on next page

Table 4-4: All RX Acceptance Test Procedure		
✓	Step	Action
	5	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 File**s from the CBSC. **NOTE** If necessary, the correct Channel Number may be manually entered into the **Carrier # Channels** Box.
	6	Select the appropriate **RX Branch** (**BOTH**, **MAIN**, or **DIV**ersity) in the Pull–down Menu.
	7	In the **Rate Set** Box, select the appropriate Data Rate (**1**=9600, **2**=14400, **3**=9600 1X) from the Pull–down Menu. **NOTE** The **Rate Set** Selection of **1** is only available if non–1X Cards are selected for the test. The **Rate Set** Selection of **3** is only available if 1X Cards are selected for the test.
	8	Enter the Channel Elements to be tested for the RX ATP in the **Channel Element(s)** Box. – By default, all Channel Elements are specified. – The Channel Element Numbers are 0.based; that is the first Channel Element is 0. **NOTE** Use one of the following methods to enter more than one Channel Element: – Enter non–sequential Channel Elements separated by a comma and no spaces (for example; 0,5,15). – Enter a range of sequential Channel Elements by typing the first and last Channel Elements separated by two periods (for example; 0..15).
	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. – When the ATP Process is completed, results will be displayed in the Status Report Window.
	11	Click either the **Save Results** Button or the **Dismiss** Button. *** IMPORTANT** If **Dismiss** is used, the test results *will not* be saved in the Test Report File.

RX and TX Testing

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 BBX Cards 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 BBX Cards 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 MCC Cards 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, that 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 ± 2 dB**, and, that the Noise Floor of all EVEN–numbered "OFF" Walsh Channels measures **≤ –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 MCC Cards (full rate at one percent FER) at an RF Input Level of –119 dBm on the *Main* RX Antenna Paths using operator–selected, CDF–*equipped* MCC Cards and BBX Cards 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 Iinput Signal Level.

TX Spectral Purity Transmit Mask Acceptance Test

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 3-40. Refer to "TX Calibration and the LMF" in the Bay Level Offset Calibration section of Chapter 3 for more information on the Test Patterns..

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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 are enabled for Synch Channel (SCH), Paging Channel (PCH), and Traffic Channel (TCH) Elements from the selected MCC(s), as shown in Table 3-40.

Gain is set for the applicable channels on each antenna as shown in the table. The operator–selected BBX Cards 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
- 1.9 GHz: 31.0 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. Refer to also Figure 4-2):

- 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
- For 1.9 GHz:
  – At least **–45 dB** @ **+ 885 kHz** from Center Frequency
  – At least **–45 dB** @ **– 885 kHz** from Center Frequency
  – At least **–55 dB** @ **– 1980 kHz** from Center Frequency
  – At least **–55 dB** @ **+ 1980 kHz** from Center Frequency

Redundant BBX Testing

The BBX will then de–key, and if selected, the Redundant BBX will be assigned to the current TX Antenna Path under test. The test will then be repeated..

Spectral Purity TX Mask Acceptance Test

Perform the procedure in Table 4-5 to verify that the Transmit Spectral Mask Specification on the TX Antenna Paths for the selected BBX Cards.

Table 4-5: Spectral Purity Transmit Mask Test Procedure

✓	Step	Action
	1	Set–up the Test Equipment for TX Acceptance Tests per Table 4-1.
	2	Select the BBX Cards to be tested.
	3	If the **Test Pattern** to be used is **Standard**, **CDFPilot**, or **CDF**; select at least one MCC. – Refer to the “Test Pattern Drop–down Pick List” in the “BayLevel Offset Calibration” section of Chapter 3.
	4	Click on **Tests** in the BTS Menu Bar, and select **TX > TX Mask...** from the Pull–down Menus.
	5	Select the appropriate carrier(s) and sector(s) (carrier-bts#-sector#-carrier#) from those displayed in the **Channels/Carrier** Pick List. **NOTE** 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 File**s from the CBSC. **NOTE** 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 Pull–down Menu in the **Rate Set** Box. **NOTE** 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 Calibration from the Pull–down Menu. – Refer to the “Test Pattern Drop–down Pick List” under “TX Calibration and the LMF” in the Bay Level Offset Calibration section of Chapter 3.
	9	Click **OK** to display a Status Bar followed by a **Directions** Pop–up Window.

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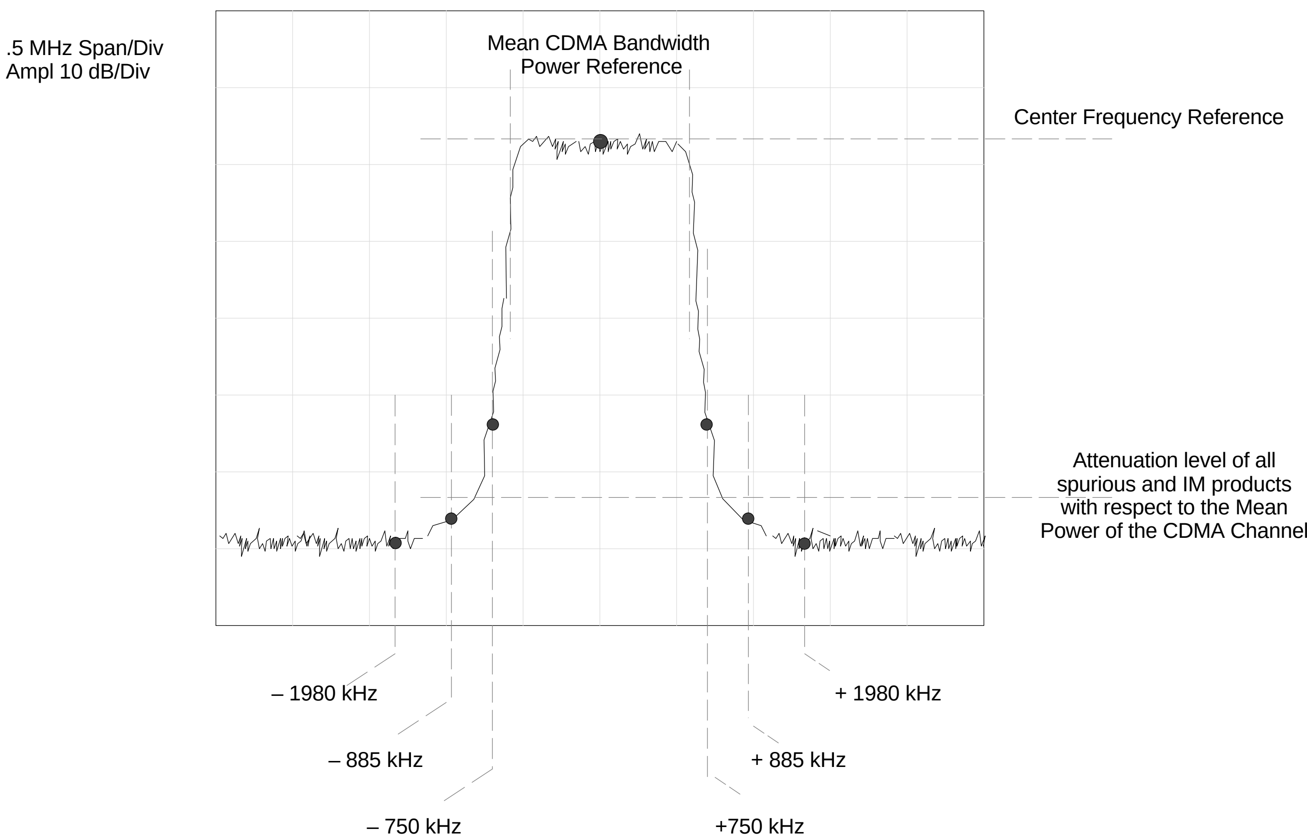
Table 4-5: Spectral Purity Transmit Mask Test Procedure		
✓	Step	Action
	10	Follow the Cable Connection Directions as they are displayed, and click the **Continue** Button to begin testing. – As the ATP Process is completed, results will be displayed in a Status Report Window.
	11	Click either the **Save Results** Button or the **Dismiss** Button. *** IMPORTANT** If **Dismiss** is used, the test results *will not* be saved in the Test Report File.

Figure 4-2: TX Mask Verification Spectrum Analyzer Display



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 MCC Cards will be forward–link disabled. The selected BBX Cards 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 **> 0.912**.

Redundant BBX Testing.

The BBX will then de–key, and if selected, the Redundant BBX will be assigned to the current TX Antenna Path under test. The test will then be repeated for the Redundant BBX..

Waveform Quality (Rho) Acceptance Test

Perform the procedure in Table 4-6 to verify that the Pilot Channel Element Waveform Quality (Rho) on the TX Antenna Paths for the selected BBX Cards.

Table 4-6: Waveform Quality (Rho) Test Procedure

✓	Step	Action
	1	Set–up the Test Equipment for TX Acceptance Tests per Table 4-1.
	2	Select the BBX Cards 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. **NOTE** To select multiple items, hold down the **Shift** or **Ctrl** Key while clicking on Pick List Items to select multiple carrier(s)–sector(s).

table continued on next page

Table 4-6: Waveform Quality (Rho) Test Procedure		
✓	Step	Action
	5	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 File**s from the CBSC. **NOTE** 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. – As the ATP Process is completed, results will be displayed in a Status Report Window.
	8	Click either the **Save Results** Button or the **Dismiss** Button. *** IMPORTANT** If **Dismiss** is used, the test results *will not* be saved in the Test Report File.

4

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 MCC Cards will be forward–link disabled. The selected BBX Cards 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).

.Redundant BBX Testing –

The BBX will then de–key, and if selected, the Redundant BBX will be assigned to the current TX Antenna Path under test. The test will then be repeated for the Redundant BBX..

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

Perform the procedure in Table 4-7 to verify that the Pilot Time Offset on the TX Antenna Paths for the selected BBX Cards.

Table 4-7: Test Pilot Time Offset

✓	Step	Action
	1	Set–up the Test Equipment for TX Acceptance Tests per Table 4-1.
	2	Select the BBX Cards to be tested.

table continued on next page

Table 4-7: Test Pilot Time Offset

✓	Step	Action
	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. **NOTE** 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. – If it is not, obtain the latest **bts–#.cdf** (or **bts–#.necf**) and **cbsc–#.CDF File**s from the CBSC. **NOTE** 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. – As the ATP Process is completed, results will be displayed in a Status Report Window.
	8	Click either the **Save Results** Button or the **Dismiss** Button. *** IMPORTANT** If **Dismiss** is used, the test results *will not* be saved in the Test Report File.

4

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 should be set to 262 for each antenna and the selected MCC Cards should 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 should have OCNS disabled, and are considered "OFF".

– Selected MCC Cards should be Forward–Link Enabled for the antenna (sector) under test..

Equipment Operation During Testing

The BBX should 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

– 1.9 GHz: 31.0 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 that the following parameters are met.

– Refer to Figure 4-3 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.

NOTE

When performing this test using the LMF and the MCC is an MCC8E or MCC24E, the Redundant BBX may fail or show marginal performance. This is due to a Timing Mismatch that the LMF does not address. Performing this test from the CBSC will not have this timing problem.

Redundant BBX Testing

The BBX will then de–key, and if selected, the Redundant BBX will be assigned to the current TX Antenna Path under test. The test will then be repeated for the Redundant BBX. Upon completion of the test, OCNS Channels will be disabled on the specified MCC Channel Elements..

Code Domain Power/Noise Floor Test

Perform the procedure in Table 4-8 to verify the Code Domain Power/Noise Floor of each selected BBX Carrier keyed–up at a specific frequency.

Table 4-8: Code Domain Power/Noise Floor Test Procedure

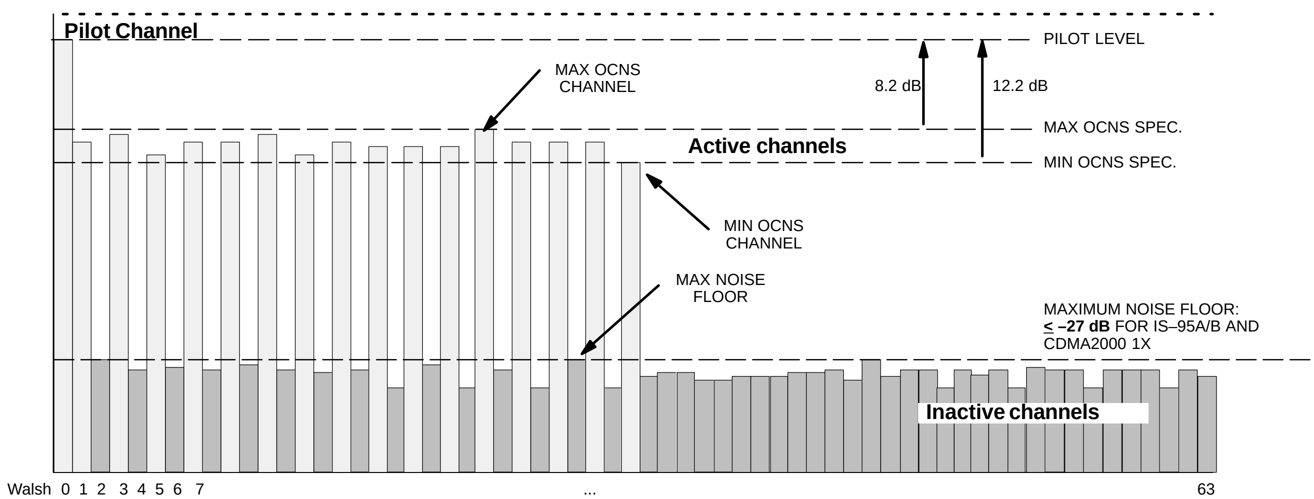
✓	Step	Action
	1	Set–up the Test Equipment for TX Acceptance Tests per Table 4-1.
	2	Select the BBX Cards and MCC Cards to be tested.
	3	Click on **Tests** in the BTS Menu Bar, and select **TX > Code Domain Power...** from the Pull–down Menus.
	4	Select the appropriate carrier(s) and sector(s) (carrier-bts#-sector#-carrier#) from those displayed in the **Channels/Carrier** Pick List. **NOTE** 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. – If it is not, obtain the latest **bts–#.cdf** (or **bts–#.necf**) and **cbsc–#.CDF File**s from the CBSC. **NOTE** If necessary, the correct Channel Number may be manually entered into the **Carrier # Channels** Box.
	6	If at least one MCC was selected in Step 3, select the appropriate Transfer Rate (**1** = 9600, **3** = 9600 1X) from the Pull–down Menu in the **Rate Set** Box. **NOTE** The **Rate Set** selection of **3** is only available if 1X Cards are selected for the test.

table continued on next page

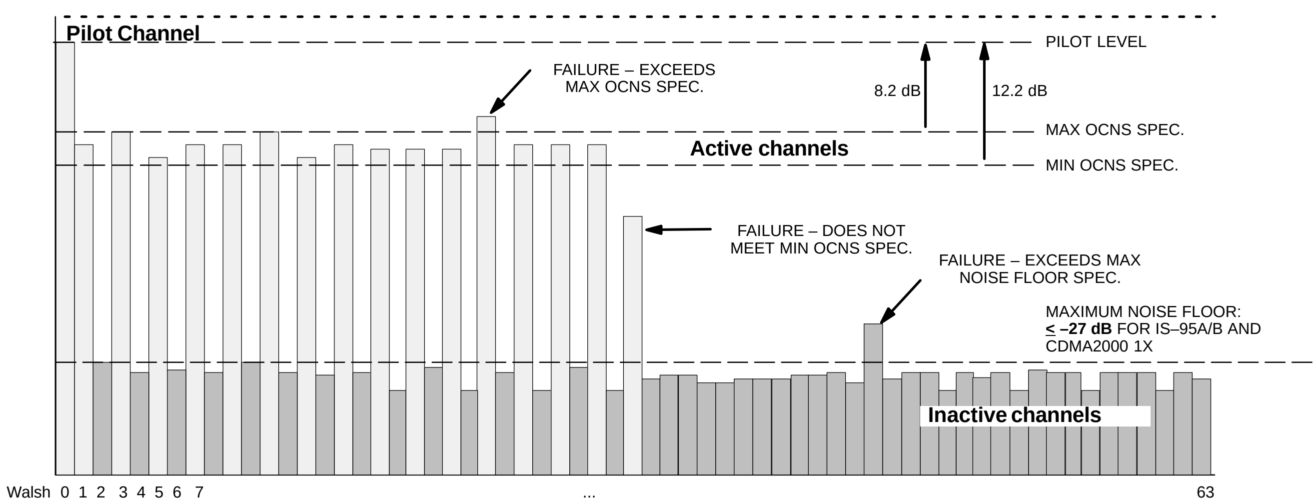
Table 4-8: Code Domain Power/Noise Floor Test Procedure		
✓	Step	Action
	7	Click **OK** to display a Status Bar followed by a **Directions** Pop–up Window.
	8	Follow the Cable Connection Directions as they are displayed, and click the **Continue** Button to begin testing. – As the ATP Process is completed, results will be displayed in a Status Report Window.
	9	Click either the **Save Results** Button or the **Dismiss** Button. *** IMPORTANT** If **Dismiss** is used, the test results *will not* be saved in the Test Report File.

4

Figure 4-3: 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 MCC Cards (full rate 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 MCC Cards will be enabled. Appropriate BBX(s) must be keyed in order to enable the RX Receive Circuitry. Operator–selected BBX Cards 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 Test Cable Insertion Losses. If selected, the Redundant BBX will be assigned to the current RX Antenna Paths under test..

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**

Redundant BBX Testing

After the test, the BBX and the Test Equipment will be de–keyed to shut down the Pilot Signal and the active Channel Element, respectively. If the Redundant BBX was tested, BBXR assignment to an active sector will also be reset..

FER Acceptance Test

Perform the procedure in Table 4-9 to verify the FER on RX Antenna Paths using selected MCC Cards and BBX Cards.

4

Table 4-9: FER Test Procedure		
✓	Step	Action
	1	Set–up the Test Equipment for RX Acceptance Tests per Table 4-1.
	2	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. *** IMPORTANT** Using the wrong MPC Setting can cause a false test failure.
	3	Select the BBX Cards and MCC Cards 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. **NOTE** 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 File**s from the CBSC. **NOTE** If necessary, the correct Channel Number may be manually entered into the **Carrier # Channels** Box.
	7	Select the appropriate **RX Branch** (**Both**, **Main**, or **Div**ersity) in the Pull–down Menu.
	8	In the **Rate Set** Box, select the appropriate Data Rate (**1**=9600, **2**=14400, **3**=9600 1X) from the Pull–down Menu. **NOTE** The **Rate Set** selection of **2** is only available if non–1X Cards are selected for the test. The **Rate Set** selection of **3** is only available if 1X Cards are selected for the test.
	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. – As the ATP Process is completed, results will be displayed in the Status Report Window.
	11	Click either the **Save Results** Button or the **Dismiss** Button. *** IMPORTANT** If **Dismiss** is used, the test results *will not* be saved in the Test Report File.

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 Report 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)

Perform the procedures in the Table 4-10 to view and create a printable file for the ATP Report.

Table 4-10: ATP Report Generation Procedure

✓	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 actions.
	5a	Select the desired file type (text, comma–delimited, HTML) for the report file from the Pull–down Menu at the bottom of the screen.
	5b	Click the **Save** Button to save the file. – The file will be saved in the selected format in the bts–# folder for the BTS selected.

Software Release Caveats

Software Release R2.16.5.x allows 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 the 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

Perform the procedures in Table 4-11 to copy the CAL Files from an LMF Computer to a 3.5 diskette.

Table 4-11: Copy CAL Files to a Diskette Procedure

✓	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–# F**older.
	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

Perform the procedures in Table 4-12 to copy CAL Files from a diskette to the CBSC.

Table 4-12: Copy CAL Files from Diskette to the CBSC Procedure

✓	Step	Action
	1	Log into the CBSC on the OMC–R UNIX Workstation using your Account Name and Password.
	2	Place the diskette containing the Calibration File(s) into the Workstation Diskette Drive.
	3	Enter **EJECT –q** and press the Enter Key.
	4	Enter **mount** and press the Enter Key. **NOTE** • Verify that the message “*floppy/no_name*” is displayed on the last line. – If the **EJECT** Command was previously entered, *floppy/no_name* will be appended with a number. – Use the explicit *floppy/no_name* reference displayed.

table continued on next page

Table 4-12: Copy CAL Files from Diskette to the CBSC Procedure		
✓	Step	Action
	5	Enter **cd /floppy/no_name** and press the Enter Key.
	6	Enter **ls –lia** and press the Enter Key. – Verify that the **bts–#.cal** file filename appears in the displayed Directory Listing.
	7	Enter **cd** and press the Enter Key.
	8	Enter **pwd** and press the Enter Key. – Verify that 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 actions.
	9a	Type the following command: **dos2unix** /floppy/no_name/**bts–#.cal bts–#.cal** Where: **#** = BTS Number for which the CAL File was created
	9b	Press the **Enter** Key. **NOTE** Other versions of UNIX do not support the `dos2unix` Command. In these cases, use the UNIX **cp** (Copy) Command. – The *copied* files contain DOS Line Feed Characters that must be edited out with a UNIX Text Editor.
	10	Enter **ls –l *.cal** and press the Enter Key. Verify that the CAL Files have been copied. – Verify that 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.

Notes

4

Chapter 5: Prepare to Leave the Site

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5

Notes

External Test Equipment Removal

Perform the procedure in Table 5-1 to disconnect the Test Equipment and configure the BTS for active service.

Table 5-1: External Test Equipment Removal Procedure

✓	Step	Action
		△ **WARNING** Make sure that no BBX Cards are keyed before performing this procedure. – Failure to do so can result in personal injury and damage to BTS LPA Modules.
	1	At the rear of the frame, disconnect all external Test Equipment from all TX and RX Connectors.
	2	Reconnect and visually inspect all TX and RX Antenna Feed Lines at the Frame RF Interface Panel. *** IMPORTANT** Verify that all Sector Antenna Feed Lines are connected to the correct Antenna Connectors on the frame. Crossed Antenna Cables will degrade Call Processing.

5

Bringing Modules into Service with the LMF

NOTE

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

If a Reason Code is present and/or data should/could not be loaded remotely from the CBSC, follow the steps outlined in Table 5-2 *as required* to bring BTS Processor Modules from an OOS State to an INS State.

Table 5-2: Bring Modules into Service Procedure

✓	Step	Action
	1	In the LMF GUI Environment, select the device(s) to be enabled by clicking on each one. *** IMPORTANT** • The MGLI and CSM must be INS_ACTIVE (bright green) before an MCC can be enabled.
	2	Enable the Processor Cards in the following order. 1. MGLI 2. CSM Cards 3. MCC Cards

table continued on next page

Table 5-2: Bring Modules into Service Procedure		
✓	Step	Action
	3	Click on **Device** in the BTS Menu Bar, and select **Enable** from the Pull–down Menu. – A Status Report Window is displayed. *** IMPORTANT** If a BBX is selected, a Transceiver Parameters Window is displayed to collect Keying Information. ***Do not enable the BBX.***
	4	Click **Cancel** to close the Transceiver Parameters Window, if applicable.
	5	Click **OK** to close the Status Report Window. – Bright Green is the color of devices that successfully change to INS.

LMF Removal

Perform the procedure in Table 5-3 as required to terminate the LMF *GUI* Session and remove the LMF Computer.

5

Table 5-3: Terminate the LMF Session and Remove the LMF Procedure		
✓	Step	Action
		! CAUTION Do not power down the LMF Computer without performing the procedure below; corrupted and/or lost Data Files may result.
	1	Log out of all BTS Sessions and exit the LMF by clicking on **File** in the LMF Window Menu Bar and selecting **Logout and Exit** from the Pull–down Menu.
	2	In the *Windows* Task Bar, click **Start** and select **Shutdown**.
	3	Click **Yes** when the **Shut Down Windows** Message appears.
	4	Wait for the system to shut down and the screen to go blank.
	5	Disconnect the LMF Computer Ethernet Port from the BTS Frame.
	6	Disconnect the LMF Computer Serial Port, the RS–232–to–GPIB Interface Box, and the GPIB Cables as required for equipment transport.

Re–connect BTS T1/E1 Spans

Before leaving the site, connect any T1 or E1 Span Connectors removed previously to allow the LMF to control the BTS. Refer to Table 5-4 and Figure 3-2.

Table 5-4: T1 or E1 Spans Re–connection Procedure

✓	Step	Action
	1	Re–connect any disconnected Span Connectors to the Span I/O A and B Boards.
	2	If equipped, ensure that the CSU is powered ON.
	3	Verify Span Status, ensuring that the OMC–R/CBSC can communicate with the BTS.

Final Checks Before Leaving Site

Make sure all requirements listed in Table 5-5 are completed before leaving the site.

Table 5-5: Check Before Leaving the Site Procedure

✓	Step	Action
	1	**For AC Frame only:** Validate the Vtrim Signal Cabling.
	2	Ensure that the Battery Voltage is 27 Volts at 25C. – If external batteries are provided by the Customer, ensure that the Customer Circuit Breaker is closed. **NOTE** A Low Voltage Disconnect must be in series with the external batteries.
	3	Verify that no Alarm Conditions are being reported to the CBSC after all Cabinet Doors are closed.

5

Reset All Devices and Initialize Site Remotely

Devices in the BTS should not be left with Data and Code Loaded from the LMF. The Configuration Data and Code Loads used for normal operation could be different from those stored in the LMF Files.

The following two procedure, one for Circuit Backhaul and the other for Packet Backhaul, are provided to remotely reset the BTS Devices and then initialize the BTS.

Circuit Backhaul Remote Reset and Initialization

Perform the procedure in Table 5-6 to remotely reset the BTS Devices in a Circuit Backhaul BTS, and then remotely initialize the same BTS.

Table 5-6: Circuit Backhaul Remote Reset and Initialization Procedure

✓	Step	Action
	1	Terminate the LMF Session by performing the procedure in Table 5-3.
	2	Reconnect the Spans by performing the procedure in Table 5-4.
	3	From the BTS Site, contact the OMC–R and request the operator to perform a BTS Reset. **OR** At the BTS Site, perform the actions in Step 4 through Step 6.
	4	Unseat one GLI Card and wait for 30 seconds.
	5	Re–seat the GLI and wait for it to complete its Initialization Process (this takes about one minute).
	6	Repeat Step 4 and Step 5 for the second GLI.
	7	Depending on the number and configuration of installed operational GLI Cards, perform the following actions. • BTS with Redundant GLI Cards, *proceed to Step 8.* • BTS with a non–Redundant GLI or a non–operational Redundant GLI, *proceed to Step 9.*
	8	From the OMC–R, run the ACTIVATE Command on the BTS. – After the ACTIVATE Command has been executed, *proceed to Step 10.*
	9	From the OMC–R, perform the following actions.
	9a	ACTIVATE the GLI. – This action sets the NextLoad Attribute for the GLI to work with the current BSS Software Version.
	9b	Disable the GLI.
	9c	Enable the GLI. – This action allows the MM to load the software version specified by the NextLoad Attribute.
	9d	Once the GLI is INS_ACT, contact the OMC–R to again run the ACTIVATE Command on the BTS.

table continued on next page

Table 5-6: Circuit Backhaul Remote Reset and Initialization Procedure		
✓	Step	Action
	10	Once the GLI Cards are loaded with the specified Code Version, the active GLI will verify and update, as required, its RAM. – Also, if necessary, ROM Code Loads for the installed CSM, MCC, and BBX Cards using the DLM.
	11	After all activities at the site have been completed, contact the OMC–R to confirm that the BTS is under OMC–R control.

Packet Backhaul Remote Reset and Initialization

Perform the procedure in Table 5-7 to remotely reset the BTS Devices in a Packet Backhaul BTS, and then remotely initialize the same BTS.

Table 5-7: Packet Backhaul Remote Reset and Initialization Procedure		
✓	Step	Action
	1	Terminate the LMF Session by performing the procedure in Table 5-3.
	2	Reconnect the Spans by performing the procedure in Table 5-4.
	3	Determine which of the two types of PREACTIVATE Load Processes is applicable to your situation. **Rolling Upgrade**: This Load Process is only available when the BTS Cards are populated for Full Redundancy as applicable. **Quick Reboot**: This Load Process is used when Redundancy for the BTS Cards is not available. – The GLI3 disables and reboots to the new Load. This will cause all the other cards to go out of service. – Once it is rebooted, the GLI3 determines which cards require a new Load and then downloads the cards in the order that they establish communication with the GLI3 following their reboot. – The GLI3 can reload up to 16 devices simultaneously.
	4	From the BTS Site, contact the OMC–R and request the operator to PREACTIVATE the BTS to the required software version for the BSS.
	5	After all activities at the site have been completed, contact the OMC–R to confirm that the BTS is under OMC–R control.

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Chapter 6: Troubleshooting

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Overview

The information in this chapter addresses some of the scenarios likely to be encountered by Customer Field Engineering (CFE) Team Members while performing BTS Optimization and Acceptance Testing. This Troubleshooting Guide was created as an interim reference document for use in the field. It provides "what to do if" basic troubleshooting suggestions when the BTS Equipment does not perform according to the procedures documented in the manual.

Comments are consolidated from inputs provided by CFEs and information gained from experience in Motorola Labs and Classrooms.

Cannot Log into Cell-Site

Table 6-1: Login Failure Troubleshooting Procedures		
✓	Step	Action
	1	If the LED on either GLI is solid RED, it implies a hardware failure. Reset the GLI by re-seating it. – If re–seating the MGLI does not fix the problem, *proceed to Step 2*.
	2	Install a GLI Card in the Redundant GLI Slot and retry. **NOTE** A Red LED may also indicate no termination on an External LAN Connector (I/O Panel at the top of the frame or at the top of a Logical BTS Frame).
	3	**Circuit BTS:** Verify that the Span Line is disconnected at the Span I/O Card. **Circuit or Packet BTS:** Verify that the OMC–R has disabled the BTS.
	4	*"Ping"* the INS_ACTIVE GLI. – Refer to Table 3-15.
	5	Verify that the LMF is connected to the Primary LAN (LAN A) at one of the following locations. – The Service Shelf below the SCCP Cage. – The BTS I/O Panel at the top of the frame.
	6	If LAN A is not the active LAN, force a LAN Switch to LAN A by performing the procedure in Table 6-2.
	7	Verify that the LMF was configured properly.
	8	If a Xircom Parallel BNC LAN Interface is being used, verify that the BTS-LMF Cable is RG-58 (flexible black cable, less than 2.5 feet in length).
	9	Verify that the External LAN Connectors are properly terminated at either of the following two locations. – Service Shelf – BTS I/O Panel at the top of the frame.
	10	If the LMF is connected to the Primary LAN at the Service Shelf, verify that a T-Adapter is *not* used on the LMF Computer or on the Ethernet Hub/Adapter Connector.
	11	If the LMF is connected to the Primary LAN at the Service Shelf, try connecting to the Ethernet Out Port on the I/O Panel (top of frame) using the procedure in Table 3-7.
	12	Re-boot the LMF and retry.
	13	Re-seat the INS_ACTIVE GLI and retry.

table continued on next page

Table 6-1: Login Failure Troubleshooting Procedures		
✓	Step	Action
	14	Re-seat the INS_ACT GLI and retry.
	15	Verify that the GLI IP Addresses are configured properly by performing the procedure in Table 6-4.

Force LAN A Active (LMF Connection at I/O Panel LAN Connector)

Table 6-2: Procedure to Force Ethernet LAN A to Active State as Primary LAN (LMF Connection at I/O Panel LAN Connector)		
✓	Step	Action
	1	If LAN A is not the active LAN, make certain all External LAN Connectors are either terminated with 50Ω Loads or cabled to another frame.
	2	*If it has not already been done*, connect the LMF Computer to the Stand–alone or Starter Frame, as applicable (Table 3-6).
	3	*If it has not already been done*, start a *GUI* LMF Session and log into the BTS on the active LAN (Table 3-10).
	4	Remove the 50Ω Terminator from the LAN B IN Connector on the I/O Panel of the Stand–alone or Starter Frame. – The LMF Session will become inactive.
	5	Log into the BTS with the LMF (Table 3-10). – Forcing LAN A to the INS_ACTIVE State was successful if the LMF can log into the BTS and status any card in the cage. • If LAN A was successfully forced to an active state, *skip to Step 12.*
	6	With the 50Ω Terminator still removed from the LAN B IN Connector, remove the 50Ω Terminator from LAN B OUT Connector. – If more than one frame is connected to the LAN, remove the Terminator from the last frame in the chain.
	7	Again attempt to log the LMF into the BTS Frame on LAN A.
	8	If the LAN was successfully forced to an active state, *proceed to Step 12.* – Forcing the LAN to the INS_ACTIVE State was successful if the LMF can log into the BTS and status any card in the cage.
	9	With the 50Ω Terminators still removed from LAN B, unseat each GLI Gard in each frame connected to the LAN, until all are disconnected from the SCCP Backplanes.
	10	Reseat each GLI Card until all are reconnected.

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Table 6-2: Procedure to Force Ethernet LAN A to Active State as Primary LAN (LMF Connection at I/O Panel LAN Connector)		
✓	**Step**	**Action**
	11	Allow the GLI Cards to power up, then attempt to select and status cards in the SCCP Cages. • If LAN A is active, *proceed toStep 12.* • If LAN A is still not active, troubleshoot or continue troubleshooting following the procedures in Table 6-1.
	12	Replace the 50Ω Terminators removed from the LAN B IN and OUT connectors. **NOTE** To ensure the INS_ACT GLI Card does not swap LANs after LMF login, the 50Ω Terminator may be left off of the LAN B OUT connector until LMF operations are completed.

Force LAN A Active (LMF Connection at Service Shelf LAN Connector)

Table 6-3: Force Ethernet LAN A to Active State as Primary LAN, LMF Connection at Service Shelf LAN Connector		
✓	**Step**	**Action**
	1	If LAN A is not the active LAN, make certain all external LAN Connectors are either terminated with 50Ω Loads or cabled to another frame.
	2	*If it has not already been done*, connect the LMF Computer to LAN B on the Stand–alone or Starter Frame, as applicable (Table 3-6).
	3	*If it has not already been done*, start a *GUI* LMF Session and log into the BTS (Table 3-10).
	4	Remove the 50Ω Terminator from the LAN B IN Connector on the I/O Panel at the top of the Stand–alone or Starter Frame. – The LMF session will become inactive.
	5	Log the LMF out of the BTS.
	6	Disconnect the LMF Computer from the Service Shelf LAN B Connector and connect it to the LAN A Connector.
	7	Determine if LAN A is active and capable of accepting an LMF log–in by using the LMF Ping Utility to query the INS_ACT GLI (Table 3-15).
	8	If the INS_ACT GLI responds to the ping, log into the BTS on LAN A.
	9	Attempt to select and status a card in the BTS. – Forcing LAN A to active state was successful if the LMF can log in, select, and status any card in the cage. • If LAN A was successfully forced to an active state, *skip to Step 16.*

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Table 6-3: Force Ethernet LAN A to Active State as Primary LAN, LMF Connection at Service Shelf LAN Connector		
✓	Step	Action
	10	With the 50Ω Terminator still removed from the LAN B IN Connector, remove the 50Ω Terminator from LAN B OUT connector. – If more than one frame is connected to the LAN, remove the Terminator from the last frame in the chain.
	11	If LAN A was successfully forced to an active state, *skip to Step 16.* – Forcing LAN A to active state was successful if the LMF can log in, select, and status any card in the cage.
	12	With the 50Ω Terminators still removed from LAN B, unseat each GLI Card in each frame connected to the LAN, until all are disconnected from the SCCP Backplanes.
	13	Reseat each GLI Card until all are reconnected.
	14	Allow the GLI Cards to power up, then attempt to select and status cards in the SCCP Cages. • If LAN A is active, *proceed to Step 16.*
	15	If LAN A is still not active, troubleshoot or continue troubleshooting following the procedures in Table 6-1.
	16	Replace the 50Ω Terminators removed from the LAN B IN and OUT Connectors. **NOTE** To ensure the INS_ACT GLI Card does not swap LANs after LMF Login, the 50Ω Terminator may be left off of the LAN B OUT Connector until LMF Operations are completed.

6

Set the GLI IP Address

Table 6-4: Procedure to set GLI IP Address		
✓	Step	Action
	1	If it has not previously been done, establish an MMI Communication Session with the GLI Card as described in Table 3-14.
	2	Enter the following Command to display the IP Address and Subnet Mask Settings for the card: **config lg0 current** A response similar to the following will be displayed: `GLI3>config lg0 current` `lg0: IP Address is set to` `DEFAULT (configured based on Card location)` `lg0: netmask is set to` `DEFAULT (255.255.255.128)`

table continued on next page

Table 6-4: Procedure to set GLI IP Address		
✓	Step	Action
	3	If the IP Address setting response shows an IP Address rather than "`Default (configured based on Card location)`," enter the following: **config lg0 ip default** A response similar to the following will be displayed: `GLI3>config lg0 ip default` `_param_config_lg0_ip(): param_delete(): 0x00050001` `lg0: ip address set to DEFAULT`
	4	If the GLI Subnet Mask Setting does not display as "`DEFAULT (255.255.255.128)`," set it to default by entering the following command: **config lg0 netmask default** A response similar to the following will be displayed: `GLI3>config lg0 netmask default` `_param_config_lg0_netmask(): param_delete(): 0x00050001` `lg0: netmask set to DEFAULT`
	5	Set the GLI Route Default to default by entering the following command: **config route default default** A response similar to the following will be displayed: `GLI3>config route default default` `_esh_config_route_default(): param_delete(): 0x00050001` `route: default gateway set to DEFAULT`
	6	When changes are completed, close the MMI Session, and reset the GLI Card. **NOTE** Changes to the settings will not take effect unless the GLI is reset.
	7	Once the GLI is reset, re–establish MMI Communication with it and issue the following command to confirm its IP Address and Subnet Mask Settings: **config lg0 current** A response similar to the following will be displayed: `GLI3>config lg0 current` `lg0: IP Address is set to` `DEFAULT (configured based on Card location)` `lg0: netmask is set to` `DEFAULT (255.255.255.128)`
	8	Repeat Steps 1 through 7 for all remaining GLI Cards, including those in any additional inter–connected frames.

6

Cannot Communicate with Power Meter

Table 6-5: Power Meter Communication Failure Troubleshooting Procedure

✓	Step	Action
	1	Verify Power Meter is connected to LMF with GPIB Adapter.
	2	Verify Cable Connections as specified in Chapter 3.
	3	Verify that the GPIB Address of the Power Meter is set to the same value displayed in the applicable GPIB Address Box of the **LMF Options** Window **Test Equipment** Tab. – Refer to Table 3-29 or Table 3-30 and the Setting GPIB Addresses section of Appendix F for details.
	4	Verify that the GPIB Adapter DIP Backplane Configuration Switch Settings are correct. – Refer to Test Equipment Preparation section of Appendix F for details.
	5	Verify that the GPIB Adapter is not locked up. – Under normal conditions, only two green LEDs are ‘ON’ (Power and Ready). – If any other LED is continuously ‘ON’, then cycle GPIB Box Power and retry.
	6	Verify that the LMF Computer COM1 Port is not used by another application. – For example, if a HyperTerminal Window is open for MMI, close it.
	7	Reset *all* Test Equipment by clicking **Util** in the BTS Menu Bar and selecting **Test Equipment > Reset** from the Pull–down Menus.

6

Cannot Communicate with Communications System Analyzer

Table 6-6: Communications System Analyzer Communication Failure Troubleshooting Procedure

✓	Step	Action
	1	Verify that the analyzer is connected to LMF with GPIB Adapter.
	2	Verify that the Cable Connections are as specified in Chapter 3.
	3	Verify that the Analyzer GPIB Address is set to the same value displayed in the applicable GPIB Address Box of the **LMF Options** Window **Test Equipment** Tab. – Refer to Table 3-29 or Table 3-30 and the Setting GPIB Addresses section of Appendix F for details.
	4	Verify that the GPIB Adapter DIP Backplane Configuration Switch Settings are correct. – Refer to Test Equipment Preparation section of Appendix F for details.
	5	Verify that the GPIB Adapter is not locked up. – Under normal conditions, only two green LEDs are ‘ON’ (Power and Ready). – If any other LED is continuously ‘ON’, then cycle GPIB Box Power and retry.

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Table 6-6: Communications System Analyzer Communication Failure Troubleshooting Procedure		
✓	**Step**	**Action**
	6	Verify that the LMF Computer COM1 Port is not used by another application. – For example, if a HyperTerminal Window is open for MMI, close it.
	7	Reset *all* Test Equipment by clicking **Util** in the BTS Menu Bar and selecting **Test Equipment > Reset** from the Pull–down Menus.

Cannot Communicate with Signal Generator

Table 6-7: Signal Generator Communication Failure Troubleshooting Procedure		
✓	**Step**	**Action**
	1	Verify that the Signal Generator is connected to the LMF containing a GPIB Adapter.
	2	Verify that the Cable Connections are as specified in Chapter 3.
	3	Verify that the Signal Generator GPIB Address is set to the same value displayed in the applicable GPIB Address Box of the **LMF Options** Window **Test Equipment** Tab. – Refer to Table 3-29 or Table 3-30 and the Setting GPIB Addresses section of Appendix F for details.
	4	Verify that the GPIB Adapter DIP Backplane Configuration Switch Settings are correct. – Refer to Test Equipment Preparation section of Appendix F for details.
	5	Verify that the GPIB Adapter is not locked up. – Under normal conditions, only two green LEDs are 'ON' (Power and Ready). – If any other LED is continuously 'ON', then cycle GPIB Box Power and retry.
	6	Verify that the LMF Computer COM1 Port is not used by another application. – For example, if a HyperTerminal Window is open for MMI, close it.
	7	Reset *all* Test Equipment by clicking **Util** in the BTS Menu Bar and selecting **Test Equipment > Reset** from the Pull–down Menus.

Troubleshooting: Download

	Table 6-8: Code Download Failure Troubleshooting Procedure	
✓	**Step**	**Action**
	1	Verify that the T1 or E1 Span is disconnected from the BTS at Site I/O Boards. – Refer to Figure 3-2.
	2	Verify that the LMF can communicate with the BTS Devices using the LMF **Status** Function.
	3	Establish communications with the MGLI before trying to communicate with any other BTS Device. – The MGLI must be INS_ACTIVE (bright green).
	4	Verify that the target card is physically present in the cage and powered-up. • If the target card LED is solid red, it implies a hardware failure. • If the target card LED is bright green, *proceed to Step 9.*
	5	Reset the target card by re-seating it. • If the LED Alarm ***is still being reported***, *proceed to Step 6.* • If the LED Alarm ***is no longer being reported***, *proceed to Step 9.*
	6	Replace with the *same type of* card from another slot and retry.
	7	Re-seat the card and try again. • If the Download Portion completes and the Reset Portion fails, *proceed to Step 8.* • If a BBX or an MCC remains OOS_ROM (blue) after Code Download, *proceed to Step 9.* • If a BBX reports a Failure Message and is OOS_RAM, the Code Load was OK. – Use the LMF **Status** Function to verify the Load.
	8	Reset the device by selecting the device and selecting **Reset**.
	9	Use the LMF **Device > Status** Function to verify that the Code Load was accepted. • If the Code Load ***was accepted***, *proceed to Step 10.* • If the Code Load ***was not accepted***, *proceed to Table 6-9 to troubleshoot the Data Download Failure.*
	10	Use LMF **Device > Download > Flash** to load RAM Code into Flash Memory.

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Cannot Download DATA to Any Device (Card)

Table 6-9: Data Download Failure Troubleshooting Procedure

✓	Step	Action
	1	Re-seat the card and repeat the Code and Data Load Procedure.
	2	Verify that the ROM and RAM Code Loads are of the same release by statusing the card. – Refer to Download the BTS section of Chapter 3 for more information.

Cannot ENABLE Device

Before a device can be enabled (placed in service), it must be in the OOS_RAM State (yellow in LMF Display) with data downloaded to the device. The color of the device on the LMF changes to green once it is enabled.

The four Device States that can be displayed by the LMF are:

- ENABLED (bright green, INS_ACT)
- STANDBY (olive green, INS_STANDBY – Mate CSM and GLI only)
- DISABLED (yellow, OOS_RAM)
- RESET (blue, OOS_ROM)

6

Table 6-10: Device Enable (INS) Failure Troubleshooting Procedure

✓	Step	Action
	1	Re-seat the card and repeat the Code and Data Load Procedure.
	2	If the CSM cannot be enabled, verify that the CDF has correct latitude and longitude data for the Cell Site location and GPS Sync.
	3	Verify that the Primary CSM is in the INS_ACTIVE (bright green) State. **NOTE** MCC Cards will not enable without the CSM being INS.
	4	Verify that the 19.6608 MHz CSM Clock is present; MCC Cards will not enable without it. • If MCC Cards give “invalid or no System Time,” *proceed to Step 5.* **NOTE** BBX Cards should not be enabled for ATP Tests.
	5	Verify that the CSM is enabled.
	6	When all else fails, perform the following actions.
	6a	Log out of the BTS.
	6b	Exit the LMF.

table continued on next page

Table 6-10: Device Enable (INS) Failure Troubleshooting Procedure		
✓	Step	Action
	6c	Restart the application.
	6d	Log into the BTS.
	6e	Re–attempt Device Enable Actions.

LPA Errors

Table 6-11: LPA Errors		
✓	Step	Action
	1	If the LPA Modules continuously report alarms, cycle power by resetting the applicable DC PDA Circuit Breakers.
	2	Establish an MMI Session with the LPA (Table 3-14), connecting the cable to the applicable MMI Port on the ETIB.
	2a	Type `alarms` at the HyperTerminal Window Prompt and press **Enter**. – The resulting display may provide an indication of the problem.
	2b	Call Field Support for further assistance.

Bay Level Offset Calibration Failure

Table 6-12: BLO Calibration Failure Troubleshooting Procedure

✓	Step	Action
	1	Verify that the Power Meter or Communications System Analyzer is configured correctly. – Refer to the Test Equipment Set–up section of Chapter 3, and is connected to the proper BTS TX Antenna Connector.
	2	If a Power Meter is being used, perform the following actions.
	2a	Re-calibrate the Power Meter and verify it is calibrated correctly with Cal Factors from the Power Sensor. – Refer to Appendix F.
	2b	Verify that the Power Sensor is functioning properly by checking it with the 1–mW (0 dBm) Power Ref Signal.
	2c	Verify communication between the LMF and Power Meter is working by checking that the Meter Display is showing ***RES :***
	3	Verify that the parameters in the `bts–#.cdf` File are set correctly for the BTS Operating Band as follows: For 1900 MHz: Bandclass = 1; Freq_Band = 16 For 800 MHz: Bandclass = 0; Freq_Band = 8
	4	Verify that no LPA on the carrier is in Alarm State (rapidly flashing red LED). – If any LPAs are in Alarm State, *proceed to Step 5*. **NOTE** Under normal conditions, only two green LEDs are ‘ON’ (Power and Ready).
	5	Reset the LPA(s) by pulling the applicable circuit breaker on the DC PDA.
	6	After 5 seconds, push the circuit breaker back in.
	7	Verify that the GPIB Adapter is not locked up. – If any other LED is continuously ‘ON’, *proceed to Step 8*.
	8	Power-cycle (turn power off and on) the GPIB Box and retry the procedure.

Calibration Audit Failure

Table 6-13: Calibration Audit Failure Troubleshooting Procedure

✓	Step	Action
	1	Verify that the Power Meter or Communications System Analyzer is configured correctly. – Refer to the Test Equipment Set–up section of Chapter 3), and is connected to the proper BTS TX Antenna Connector.
	2	If a Power Meter is being used, perform the following actions.
	2a	Re-calibrate the Power Meter and verify it is calibrated correctly with Cal Factors from the Power Sensor. – Refer to Appendix F.
	2b	Verify that the Power Sensor is functioning properly by checking it with the 1–mW (0 dBm) Power Ref Signal.
	2c	Verify communication between the LMF and Power Meter is working by checking that the Meter Display is showing ***RES :***.
	3	Verify that no LPAs on the carrier are in Alarm State (rapidly flashing red LED). – If any LPAs are in Alarm State, *proceed to Step 4*.
	4	Reset the LPA(s) by performing the following actions.
	4a	Pull the applicable circuit breaker on the DC PDA, and,
	4b	After 5 seconds, push the circuit breaker back in.
	5	After Calibration, the BLO Data must be re-loaded to the BBX Cards before auditing. – Click on the BBX(s), and in the BTS Menu Bar select **Device > Download >BLO**. – Re-try the audit.
	6	Verify that the GPIB Adapter is not locked up. – Under normal conditions, only two green LEDs are ‘ON’ (Power and Ready). – If any other LED is continuously ‘ON’, *proceed to Step 7*.
	7	Power Cycle (turn power off and on) the GPIB Box and re–try.
	8	If Calibration is being performed for the *Redundant* BBX, ensure that the **Single–Sided BLO** Check Box is *not* checked in the **CDMA Test Parameters** Test Set–up Window.
	9	If additional items, such as Directional Couplers or Combiners, have been installed in the TX Path, make sure that *one* of the following has been done: • **Verify BLO** Check Box in the **CDMA Test Parameters** Test Set–up window is *un*checked. • The additional Path Losses have been added into each applicable sector using the **Util > Edit > TX Coupler Loss...** Function.

Overview

The Optimization (RF Path Characterization or Calibration) and Post-Calibration (Audit) Procedures measure and limit-check the BTS reported Transmit and Receive Levels of the path from each BBX to the back of the frame. When a fault is detected, it is specific to a Receive or Transmit Path. The Troubleshooting Process in this section determines the most probable cause of the fault.

As the Calibration and Audit Tests are performed, results are displayed in the LMF Test Status Report Window. When faults are encountered, the Test Procedure in progress continues running and displaying any further faults. If it appears that there are major faults, the test can be aborted.

The test results can be saved to a `bts-#.rpt` File in the<*x*>**:**<***lmf home directory*** `\cdma\bts-#` Folder. To do this, close the Test Status Report Window using the *Save Results* Button.

NOTE

Closing the Test Status Report Window with the *Dismiss* Button will delete the test results without saving them.

If a test is re–run or a new calibration, audit, or test is run and the results are saved, the previous test results in the `bts-#.rpt` File are overwritten. To prevent losing previous test results in the `bts-#.rpt` File, refer to the procedure in Table 4-10 before performing further testing with the LMF.

If there are major faults, recheck the Test Equipment Attachments for errors. If none are found, close the Test Status Report Window using the **Save Results** Button, and save the contents of the resulting `bts-#.rpt` file as described in Table 4-10. Also, note other specifics about the failure, and proceed with the Fault Isolation Procedure.

If Every Test Fails

If all tests fail, perform the procedure in Table 6-14.

Table 6-14: All Tests Fail Troubleshooting Procedure

✓	Step	Action
	1	Check the Calibration Equipment for proper operation by manually setting the Signal Generator Output Attenuator to the lowest Output Power Setting.
	2	Connect the Output Port to the Spectrum Analyzer RF Input Port.
	3	Set the Signal Generator Output Attenuator to –90 dBm, and switch on the RF Output.
	4	Verify that the Spectrum Analyzer can receive the signal, indicate the correct Signal Strength (accounting for the Cable Insertion Loss), and indicate the approximate frequency.

Verify BLO Check Box

When performing a Calibration with the **TX Calibration...** or **All Cal/Audit...** Functions, the **Verify BLO** Check Box should normally be checked. When a Calibration fails, determine if any items such as Directional Couplers or Combiners have been added to the TX Path.

If additional items have been installed in the path, try re–running the Calibration with **Verify BLO** *un*checked. If Calibration still does not pass, refer to the following paragraphs and use the TX Output Fault Isolation Flowchart to identify the most probable cause of the failure.

Single–Sided BLO Check Box

When performing a Calibration with the **TX Calibration...** or **All Cal/Audit...** Functions, the **Single–Sided BLO** Check Box should *not* be checked when the *Redundant* BBX is being calibrated. When a Calibration fails with the Redundant BBX selected, try re–running the Calibration with the **Single–Sided BLO** Check Box *un*checked.

– If the Calibration still fails, refer to the following paragraphs and use the TX Output Fault Isolation Flowchart to identify the most probable cause of the failure.

If Faults Are Isolated

If the Fault Reports are isolated between successful Path Checks, the root cause of the faults most likely lies with one or more of the Field Replaceable Unit (FRU) cards/modules.

– If more than one failure was reported, look for a common denominator in the data. For example, if any TX Test fails on one sector only, the BBX assigned to that sector (Table 1-5) is a likely cause. Also, look at the Severity of the failure.

– If the Path Loss is just marginally out of the relaxed specification limit during the Post-Calibration TX Audit, suspect excessive Test Cable Insertion Loss.

– If limits are missed by a wide margin, suspect incorrectly wired cables or total device failure.

Use the TX Output Fault Isolation Flowchart in Figure 6-1 to identify the strongest possible cause for a failed TX Test.

Fault Isolation Flowchart

The flowchart covers the Transmit Path.

– Transmit Paths usually fail the lower Test Limit, indicating excessive Loss in some component in the BTS Site or incorrect wiring.

– A failure of an upper Test Limit usually indicates a problem with the Test Set–up or external equipment.

Before replacing a suspected FRU, always repeat and verify that the test results to rule out a transient condition. If a BBX fails an Upper Limit in the Post–Calibration Audit Procedure, re–calibrate and verify that the out–of–tolerance condition for that BBX and/or sector before replacement.

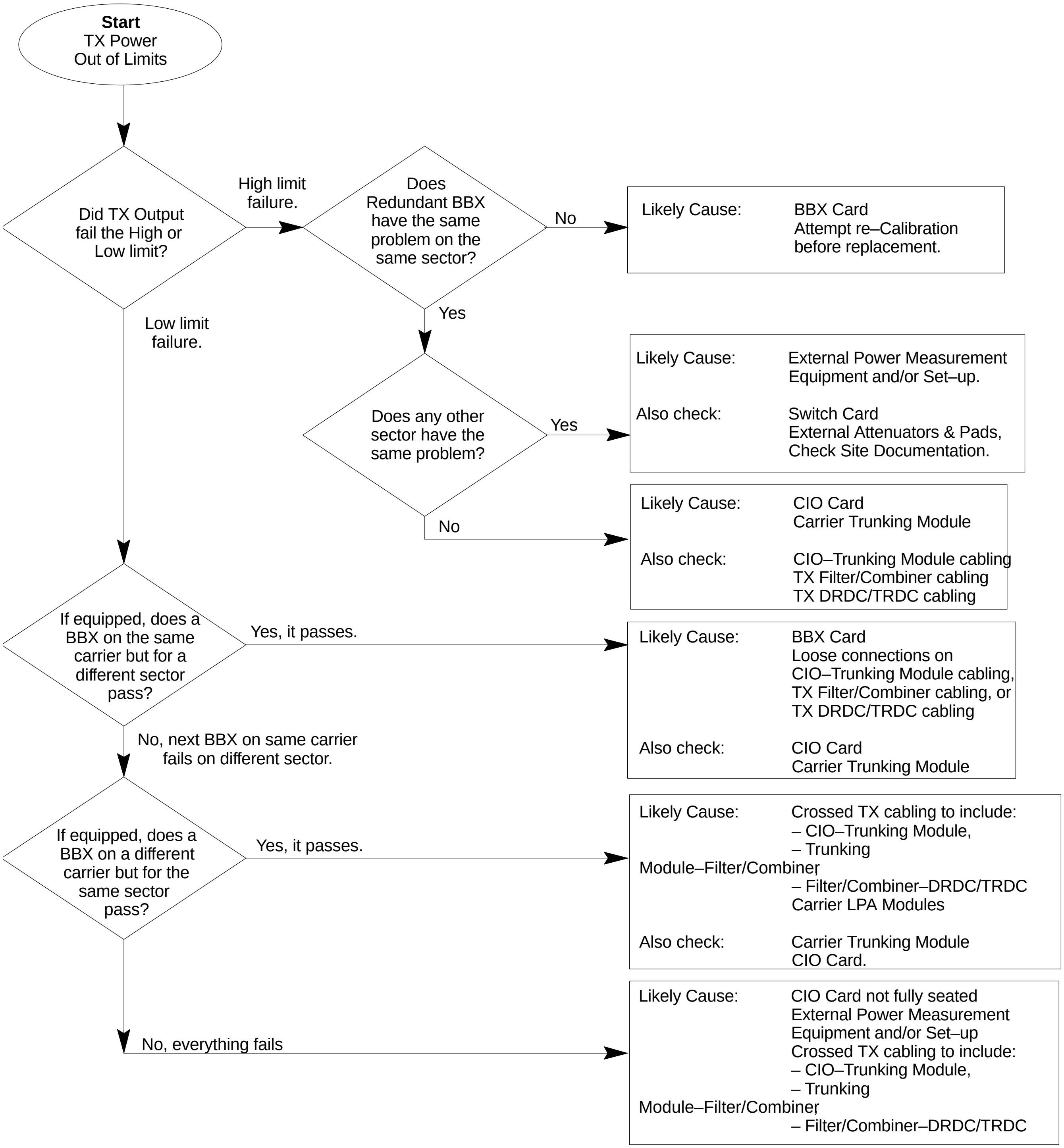
Flowchart Prerequisites

Before entering the Fault Isolation Sequence shown in the flowchart, ensure that the following items have been completed:

- GLI Cards, MCC Cards, and BBX Cards have been downloaded with the correct ROM Code, RAM Code, and data (Table 3-16, Table 3-17, and Table 3-18).
- MGLI, CSM Cards, and MCC Cards are enabled (Table 3-17, Table 3-20, and Table 3-21, respectively).
- Ensure that the LED on the correct CCD Card is *solid green*.
- Ensure no alarms are being reported by opening an LMF Alarm Window as outlined in *WinLMF On-Line Help SR2.16.x* .

TX Power Output Fault Isolation Flowchart

Figure 6-1: TX Output Fault Isolation Flowchart



6

BTS Passed Reduced ATP Tests but Has Forward Link Problem in Normal Operation

Perform the procedure in Table 6-15 to troubleshoot a Forward Link problem during normal operation after passing a reduced ATP.

Table 6-15: Forward Link Failure (BTS Passed Reduced ATP) Troubleshooting Procedure

✓	Step	Action
	1	Perform the following additional tests to troubleshoot a Forward Link problem:
	1a	– TX Mask
	1b	– TX Rho
	1c	– TX Code Domain

Cannot Perform TX Mask Measurement

Table 6-16: TX Mask Measurement Failure Troubleshooting Procedure

✓	Step	Action
	1	Verify that the TX Audit passes for the BBX(s).
	2	If performing manual measurement, verify that the analyzer is set–up correctly.
	3	Verify that no LPA in the sector is in Alarm State (flashing red LED).
	4	Re-set the LPA by pulling the circuit breaker, and, after 5 seconds, pushing it back in.

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Cannot Perform Rho or Pilot Time Offset Measurement

Table 6-17: Rho and Pilot Time Offset Measurement Failure Troubleshooting Procedure

✓	Step	Action
	1	Verify the presence of the RF Signal by switching to the Spectrum Analyzer Screen.
	2	Verify that the PN Offsets displayed on the analyzer is the same as the PN Offset in the CDF File.
	3	Re–load MGLI Code and Data, and repeat the test.
	4	If performing manual measurement, verify that the analyzer is set–up correctly.
	5	Verify that no LPA in the sector is in Alarm State (flashing red LED).
	6	Reset the LPA by pulling the circuit breaker, and, after 5 seconds, pushing back in.

table continued on next page

Table 6-17: Rho and Pilot Time Offset Measurement Failure Troubleshooting Procedure

✓	Step	Action
	7	If the Rho Value is unstable and varies considerably (e.g. .95,.92,.93), it may indicate that the GPS is still Phasing (trying to reach and maintain 0 Frequency Error).
	7a	Go to the Frequency Bar in the upper right corner of the Rho Meter and select Hz.
	7b	Press <Shift–avg> and enter 10, to obtain an average Rho Value. – This is an indication the GPS has not stabilized before going *INS* and may need to be re-initialized.

Cannot Perform Code Domain Power and Noise Floor Measurement

Table 6-18: Code Domain Power and Noise Floor Measurement Failure Troubleshooting Procedure

✓	Step	Action
	1	Verify the presence of the RF Signal by switching to the Spectrum Analyzer Screen on the Communications System Analyzer.
	2	Verify that the PN Offset displayed on analyzer is the same as the PN Offset being used in the CDF File.
	3	Disable and re-enable the MCC (one or more MCC Cards based on the extent of the failure).

Multi–FER Test Failure

Table 6-19: Multi-FER Failure Troubleshooting Procedure

✓	Step	Action
	1	Verify that the Test Equipment is configured correctly for an FER Test.
	2	Verify that the Test Equipment is locked to the 19.6608 MHz and Even Second Clocks. – On the HP 8921 Analyzer, the yellow LED (REF UNLOCK) must be **OFF**.
	3	Verify MCC Cards have been loaded with data and are INS_ACTIVE.
	4	Disable and re-enable the MCC (one or more based on the extent of the failure).
	5	Disable, re-load code and data, and re-enable the MCC (one or more MCC Cards based on extent of failure).
	6	Verify that the Antenna Connections to the frame are correct based on the LMF Directions Messages.

Problem Description

Many Clock Synchronization Manager (CSM) Card problems may be resolved in the field before sending the boards to the factory for repair. This section describes known CSM problems identified in Field Returns, some of which are field-repairable. Check these problems before returning suspect CSM Cards.

Intermittent 19.6608 MHz Reference Clock / GPS Receiver Operation

If problems are occurring with CSM Card Kit Numbers, SGLN1145 or SGLN4132, check the Suffix with the Kit Number. If the Kit Number has version "AB," then replace it with version ''BC'' or higher, and return the Model AB CSM Card to the Repair Center.

No GPS Reference Source

Correct Hardware

Check the CSM Cards for proper hardware configuration for the type of GPS in use and the SCCP Cage Slot where they are installed.

RF–GPS (Local GPS) – CSM Kit Number SGLN1145, which should be installed in Slot l, has an on-board GPS Receiver; while Kit Number SGLN4132, in Slot 2, does not have a GPS Receiver..

Remote GPS (RGPS) – Kit Number SGLN4132ED or later, which should be installed in *both* Slot 1 and Slot 2, does not have a GPS Receiver..

Any incorrectly configured board *must* be returned to the Repair Center. *Do not attempt to change hardware configuration in the field.*

– Also, verify that the GPS Antenna is not damaged and is installed per recommended guidelines.

Checksum Failure

The CSM could have corrupted data in its firmware resulting in a non-executable code. The problem is usually caused by either electrical disturbance, or interruption of data during a download. Attempt another download with no interruptions in the data transfer. Return the CSM Card back to the Repair Center if the attempt to reload fails.

GPS Bad RX Message Type

This problem is believed to be caused by a later version of CSM Software (3.5 or higher) being downloaded, via LMF, followed by an earlier version of CSM Software (3.4 or lower), being downloaded from the CBSC. Download again with CSM Software Code 3.5 or higher. Return the CSM Card back to the Repair Center if the attempt to reload fails.

CSM Reference Source Configuration Error

This problem is caused by an incorrect Reference (Clock) Source Configuration performed in the field by software download. CSM Kit Numbers SGLN1145 and SGLN4132 must have the proper Reference Sources configured, as shown in Table 6-20, to function correctly.

Table 6-20: CSM Reference (Clock) Sources by GPS Type and Kit Number

GPS Type	CSM Kit No.	Hardware Configuration	CSM Slot No.	Reference Source Configuration
RF GPS	SGLN1145	With GPS Receiver	1	Primary = Local GPS Backup = HSO
	SGLN4132	Without GPS Receiver	2	Primary = Mate GPS Backup = HSO
REMOTE GPS	SGLN4132ED or later	Without GPS Receiver	1	Primary = Remote GPS Backup = HSO
			2	Primary = Remote GPS Backup = HSO

Takes Too Long for CSM to Come INS

This problem may be caused by a delay in GPS Acquisition. Check the Accuracy Flag Status and/or current position. Refer to the CSM System Time/GPS and HSO Verification section of Chapter 3.

At least *one* satellite should be visible and tracked for the “surveyed” Mode, and *four* satellites should be visible and tracked for the “estimated” Mode. Also, verify that the correct Base Site Position Data is being used in “surveyed” Mode.

Introduction

The SCCP Backplane is a multi–layer printed circuit board that interconnects all of the SCCP Cards and Modules. The complexity of this board lends itself to possible improper diagnoses when problems occur.

Connector Functionality

The following Connector Overview describes the major types of Backplane Connectors along with the functionality of each. This will assist the CFE to:

- Determine which connector(s) is associated with a specific problem type.
- Isolate problems to a specific cable or connector.

Span Line Connector

The 50–pin Span Line Connector provides a primary and secondary (if used) Span Line Interface to each GLI in the SCCP Cage. The Span Line is used for MM/EMX Switch Control of the Master GLI and also all of the BBX Traffic.

Power Input (Return A and B Connectors)

Provides 27 Volt Input for use by the Power Supply Modules.

Power Supply Module Interface

Each Power Supply Module has a series of three different connectors to provide the needed inputs/outputs to the SCCP Backplane. These are:

- VCC/Ground Input Connector
- Harting–style Multiple Pin Interface
- +15V Analog Ground Output Connector

The Transceiver Power Module converts 27 Volts to a regulated +15, +6.5, +5.0 Volts to be used by the SCCP Cage Cards.

GLI Connector

This connector consists of a Harting 4SU Digital Connector and a 6–conductor COAXial Connector for RDM Distribution. The connectors provide inputs/outputs for the GLI Cards in the SCCP Backplane.

GLI Ethernet “A” and “B” Connections

These SMB Connectors are located on the SCCP Backplane and connect to the GLI Card. This interface provides all the Control and Data Communications over the Ethernet LAN between the Master GLI, the Redundant GLI, and the LMF.

BBX Connector

Each BBX Connector consists of a Harting 2SU/1SU Digital Connector and two 6–conductor COAXial Connectors. These connectors provide DC, Digital, and RF Inputs/Outputs for the BBX Cards in the SCCP Backplane.

CIO Connectors

- RF RX Antenna Path Signal Inputs are routed through RX Paths of the DRDCs or TRDCs at the RF Interface Panel (rear of the frame), and through COAXial Cables to the two MPC Cards.

  The three “A” (Main) Signals go to one MPC; the three “B” (Diversity) Signals to the other. The MPC outputs the low–noise–amplified signals through the SCCP Backplane to the CIO where the signals are split and sent to the appropriate BBX.
- A Digital Bus then routes the Baseband Signal through the BBX, to the SCCP Backplane, and then on to the MCC Slots.
- Digital TX Antenna Path Signals originate at the MCC Cards. Each output is routed from the MCC Slot through the SCCP Backplane to the appropriate BBX.
- TX RF Path Signal originates from the BBX, travels through the SCCP Backplane to the CIO, through the CIO, and then through multi-conductor COAXial Cabling to the Trunking Module and LPA Modules in the LPA Shelf.

SCCP Backplane Troubleshooting Procedure

The following tables provide standard procedures for troubleshooting problems that appear to be related to a defective SCCP Backplane. The tables are broken down into possible problems and steps that should be taken in an attempt to find the root cause.

NOTE

All steps in all tables should be followed before any attempt to replace the SCCP Backplane.

Digital Control Problems

No GLI Control via LMF (all GLI Cards)

Table 6-21: No GLI Control Through LMF (All GLI Cards)

✓	Step	Action
	1	Check the Ethernet LAN for proper connection, damage, shorts, or opens.
	2	Ensure that the LAN IN and OUT Connectors in the Power Entry Compartment are properly terminated.
	3	Ensure that the proper IP Address is entered in the Network Login Tab of the LMF Login Screen.
	4	Logout and exit from the LMF.
	5	Restart the LMF.
	6	Login to the BTS again.
	7	Verify SCCP Backplane Shelf ID DIP Switch is set correctly.
	8	Visually check the Master GLI Connectors (both card and backplane) for damage.
	9	Replace the Master GLI with a known good GLI.

No GLI Control through Span Line Connection (All GLI Cards)

Table 6-22: No GLI Control Through Span Line Connection (Both GLI Cards)

✓	Step	Action
	1	Verify that the SCCP Backplane Shelf ID DIP Switch is set correctly.
	2	Verify that the BTS and GLI Cards are correctly configured in the OMC–R/CBSC Database.
	3	Verify that the Span Configurations set in the GLI Cards match those in the OMC–R/CBSC Database. – Refer to Table 6-47.
	4	Visually check the Master GLI Connectors (both card and backplane) for damage.
	5	Replace the Master GLI with a known good GLI.
	6	Check the Span Line Cabling from the Punchblock to the Master GLI for proper connection and damage.

Table 6-23: MGLI Control Good – No Control Over Co–located GLI

✓	Step	Action
	1	Verify that the BTS and GLIs are correctly configured in the OMC–R/CBSC Database.
	2	Check the Ethernet Connections for proper connection, damage, shorts, or opens.
	3	Visually check all GLI Connectors (both card and backplane) for damage.
	4	Replace the remaining GLI with a known good GLI.

No AMR Control (MGLI good)

Table 6-24: MGLI Control Good – No Control Over AMR

✓	Step	Action
	1	Visually check the Master GLI Connectors (both card and backplane) for damage.
	2	Replace the Master GLI with a known good GLI.
	3	Replace the AMR with a known good AMR.

No BBX Control in the Shelf

Table 6-25: MGLI Control Good – No Control over Co–located BBX Cards

✓	Step	Action
	1	Visually check all GLI Connectors (both card and backplane) for damage.
	2	Replace the remaining GLI with a known good GLI.
	3	Visually check BBX Connectors (both card and backplane) for damage.
	4	Replace the BBX with a known good BBX.

No (or Missing) Span Line Traffic

Table 6-26: BBX Control Good – No (or Missing) Span Line Traffic

✓	Step	Action
	1	Visually check all GLI Connectors (both card and backplane) for damage.
	2	Replace the remaining GLI with a known good GLI.
	3	Visually check all Span Line Distribution (both connectors and cables) for damage.
	4	If the problem seems to be limited to one BBX, replace the BBX with a known good BBX.

No (or Missing) MCC24E/MCC8E Channel Elements

Table 6-27: No MCC–1X/MCC24E/MCC8E Channel Elements

✓	Step	Action
	1	Verify Channel Elements on a co–located MCC of the same type. (CDF MccType Codes: MCC8E = 0; MCC24E = 2; MCC–1X = 3)
	2	Check MCC Connectors (both card and backplane) for damage.
	3	If the problem seems to be limited to one MCC, replace it with a known good MCC of the same type.
	4	If no Channel Elements are active on *any* MCC, verify the Clock Reference to the CIO.

DC Power Problems

WARNING

Potentially lethal voltage and current levels are routed to the BTS Equipment.

This test must be carried out with a second person present, acting in a safety role.

Remove all rings, jewelry, and wrist watches prior to beginning this test.

No DC Input Voltage to SCCP Cage Power Supply Modules

Table 6-28: No DC Input Voltage to Power Supply Module Troubleshooting Procedure

✓	Step	Action
	1	Verify the DC Power is applied to the BTS Frame.
	2	Determine if any circuit breakers have tripped. • If a breaker has tripped, *proceed to Step 3.* • If breaker does not trip, there is probably a defective module or subassembly within the SCCP Cage. – Perform the tests in Table 2-2 to attempt to isolate the module.
	3	Remove all cards and modules from the SCCP Cage.
	4	Reset the circuit breaker. • If it ***does reset***, *proceed to Step 5.* • If it ***does not reset*** or ***trips again***, there is probably a cable or breaker problem within the frame or DC PDA.
	5	Verify that the PS1 and PS2 Circuit Breakers on the DC PDA are functional.
	6	Remove the BTS Frame Rear Access Panel (Figure 2-2), and use a voltmeter to determine if the Input Voltage is being routed to the SCCP Backplane. Measure the DC Voltage Levels between: • The PWR_IN_A and PWR_RTN_A Contacts on the extreme right side at the rear of the backplane. • The PWR_IN_B and PWR_RTN_B Contacts on the extreme right side at the rear of the backplane. **NOTE** If the voltage is not present, there is probably a cable or circuit breaker problem within the frame or DC PDA.
	7	If everything appears to be correct, visually inspect the PS1 and PS2 Power Supply Module Connectors.

table continued on next page

Table 6-28: No DC Input Voltage to Power Supply Module Troubleshooting Procedure		
✓	Step	Action
	8	Replace the Power Supply Modules with known good modules.
	9	If Steps 1 through 7 fail to indicate a problem, an SCCP Backplane failure has occurred (possibly an open trace).

No DC Voltage (+5, +6.5, or +15 Volts) to a Specific GLI, BBX, or Switch Module

Table 6-29: No DC Input Voltage to any SCCP Cage Module Troubleshooting Procedure		
✓	Step	Action
	1	If it has not been done, perform the procedure in Table 6-28.
	2	Inspect the SCCP Cage Card Connectors (both card and backplane) for damage.
	3	Replace suspect cards with known good cards.

TX and RX Signal Routing Problems

Table 6-30: TX and RX Signal Routing Problems Troubleshooting Procedure		
✓	Step	Action
	1	Inspect all Harting Cable Connectors and Backplane Connectors for damage in all the affected card slots.
	2	Perform the steps outlined in the RF Path Troubleshooting Flowchart in Figure 6-1.

Introduction

The RFDS is used to perform Pre–Calibration Verification and Post-Calibration Audits that limit-check the RFDS-generate and reported Receive Levels of every path from the RFDS through the Directional Coupler Coupled Paths. In the event of test failure, refer to the following tables.

All Tests Fail

Table 6-31: RFDS Fault Isolation – All Tests Fail Troubleshooting Procedure

Step	Action
1	Check the TX Calibration Equipment for proper operation by performing the following actions.
1a	Manually set the Signal Generator Output Attenuator to the lowest Output Power Setting.
1b	Connect the Output Port to the Spectrum Analyzer RF Input Port.
2	Set the Signal Generator Output Attenuator to –90 dBm, and switch on the RF Output.
3	Verify that the Spectrum Analyzer can do the following: – Receive the signal. – Indicate the correct Signal Strength (accounting for the Cable Insertion Loss). – Indicate the approximate frequency.
4	Visually inspect the RF Cabling. Make sure that the Directional Coupler Forward Port and Reflected Port are connected to the RFDS Antenna Select Unit on the RFDS.
5	Check the wiring against the Site Documentation Wiring Diagram or the *1X SC4812T Lite Hardware Installation* manual (68P09262A57)
6	Verify that all changes to the RFDS Parameter Settings have been downloaded.
7	Status the TSU to verify that the TSIC and SUA Software Versions are correct.
8	Check to see that all RFDS Cards show green on the Front Panel LEDs.
9	Visually check for external damage.
10	If any card LEDs do not show green, replace the RFDS with a known–good unit. – Re–test after replacement.

All RX and TX Paths Fail

If every Receive or Transmit Path fails, the problem most likely lies with the RF Converter Card or the Transceiver Card. Replace the RFDS with a known–good unit and retest.

All Tests Fail on a Single Antenna

If all path failures are on one Antenna Port (Forward or Reflected), perform the checks in Table 6-32.

Table 6-32: RFDS Fault Isolation – All Tests Fail on Single Antenna Path Troubleshooting Procedure

Step	Action
1	Visually inspect the frame internal RFDS Cabling to the suspect TRDC or DRDC.
2	Verify that the Forward and Reflected Ports connect to the correct RFDS Antenna Select Unit positions on the RFDS ASU Card. – Refer to the RFDS Installation Manual for details.
3	Replace the RFDS with a known–good unit.
4	Replace the RF Cables between the affected TRDC or DRDC and the RFDS.

6

Module Status Indicators

Each of the non-passive Plug-in Cards/Modules has a bi-color (green and red) Status Indicator LED located on the card/module Front Panel. The LED is labeled PWR/ALM. If both colors are turned on, the indicator appears yellow.

Each plug-in card/module, except for the Fan Module, has its own Alarm (Fault) Detection Circuitry that controls the state of the PWR/ALM LED.

The Fan TACH Signal of each Fan Module is monitored by the AMR Card. Based on the status of this signal, the AMR controls the state of the PWR/ALM LED on the Fan Module.

Module LED Status (except GLI3, CSM, BBX, MCC)

PWR/ALM LED

Table 6-33 describes the states of the Card/Module Status Indicator LEDs.

Table 6-33: Card/Module PWR/ALM LED States

LED State	Device Status
Solid GREEN	NORMAL (Fault–Free) Mode – No alarm present.
Solid RED	Alarm (Fault) Mode due to electrical or hardware failure. – An alarm is being reported.

Note that an Alarm (Fault) Indication may or may not be due to a complete card/module failure and normal service may or may not be reduced or interrupted.

Power Supply Module LED Status Combinations

The Power Supply Module (PWR CNVTR) has its own Alarm (Fault) Detection Circuitry that controls the state of the PWR/ALM LED.

PWR/ALM LED

Table 6-34 describes the states of the bi-color Status Indicator LED.

Table 6-34: Card/Module PWR/ALM LED States

LED State	Device Status
Solid GREEN	NORMAL (Fault–Free) Mode – No alarm present.
Solid RED	Alarm (Fault) Mode due to electrical or hardware failure. – An alarm is being reported.

6

CSM LED Status Combinations

PWR/ALM LED

The CSM Cards contain on-board Alarm Detection. Hardware and Software/Firmware Alarms are indicated via the Front Panel LEDs. Refer to Table 6-35.

After the Memory Tests, the CSM loads OOS–RAM Code from the Flash EPROM, if available.

– If not available, the OOS–ROM Code is loaded from the Flash EPROM.

Table 6-35: CSM Card PWR/ALM LED States

LED State	Device Status
Solid GREEN	Master CSM is locked on to the GPS or LFR while operating in INS_ACTIVE or INS_STANDBY Mode. – No alarm present.
Solid RED	1. Color during System Initialization. 2. Alarm (Fault) Mode – An alarm is being reported.
Fast Flashing GREEN	Standby CSM is locked on to the GPS or LFR while in INS_STANDBY Mode. – No alarm present.
Alternating Slow Flashing RED/ Fast Flashing GREEN	OOS_ROM Mode – An alarm is being reported.
Fast Flashing GREEN	1. OOS_RAM Mode 2. INS_ACTIVE Mode in DUMB Configuration. – No alarm present.
Alternating Fast Flashing RED/ Fast Flashing GREEN	OOS_RAM Mode – An alarm is being reported.
Alternating Fast Flashing RED/ Slow Flashing GREEN	OOS_RAM Mode and attempting to lock on to the GPS Signal. – An alarm is being reported.

table continued on next page

6

Table 6-35: CSM Card PWR/ALM LED States	
LED State	**Device Status**
Solid YELLOW	After a reset, the CSMs begin to boot. Color during the SRAM Test and the Flash EPROM Code Check Test. – If SRAM or Flash EPROM Tests fail, the LED changes to Steady RED and the CSM attempts to reboot.
OFF	1. No DC Power to the card. 2. The on-board fuse is open.

FREQ Monitor Connector

A Test Port provided on the CSM Front Panel via a BNC Receptacle allows monitoring of the 19.6608 MHz Clock Signal generated by the CSM. When both CSM 1 and CSM 2 are in an in-service (INS) condition, the CSM 2 Clock Signal Frequency is the same as that output by CSM 1.

The Clock Signal is a Sine Wave Signal with a Minimum Amplitude of +2 dBm (800 mVpp) into a 50 Ω Load connected to this port.

SYNC Monitor Connector

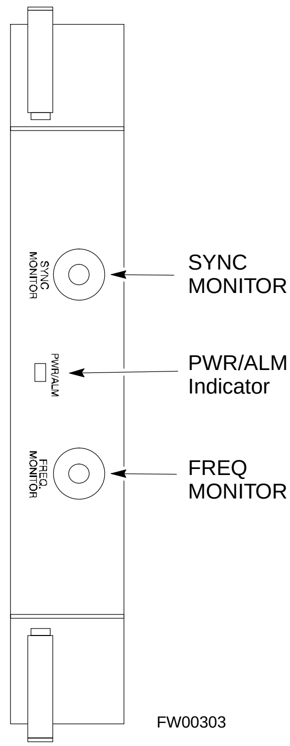
A Test Port provided at the CSM Front Panel via a BNC Receptacle allows monitoring of the “Even Second Clock” Reference Signal generated by the CSM Cards.

At this port, the Reference Signal is a Transistor–Transistor Logic (TTL) Active–High Signal with a Pulse Width of 153 nanoseconds.

MMI Connector

Behind the Front Panel – only accessible when the card is partially extended from its SCCP Cage Slot. The RS–232 MMI Port Connector is intended to be used primarily in the development or factory environment, but may be used in the field for Debug/Maintenance purposes.

Figure 6-2: CSM Front Panel LED and Monitor Ports



6

GLI3 LED Status Combinations

The GLI3 Card Indicators, Controls, and Connectors are described below and shown in Figure 6-3.

The Front Panel Indicators and Controls consist of:

- Four LEDs
- One Pushbutton

ACTIVE LED

Table 6-36: GLI Card ACTIVE LED States

LED State	Device Status
Solid GREEN	INS_ACTIVE Mode – This indication means that the GLI has Shelf Control and is providing control of the digital interfaces.
OFF	Not Active (i.e., INS_STANDBY). – The Mate GLI is INS_ACTIVE and operating normally.

MASTER LED

Table 6-37: GLI Card MASTER LED States	
LED State	**Device Status**
Solid GREEN	GLI is Master (also referred to as MGLI). – The GLI Card located in the Top Shelf is designated by hardware as the INS_ACTIVE GLI Card. – The GLI Card located in the Bottom Shelf is designated by hardware as the INS_STANDBY GLI Card.
OFF	GLI is non-master (i.e., Slave).

ALARM LED

Table 6-38: GLI Card ALARM LED States	
LED State	**Device Status**
Slow Flashing GREEN	INS_ACTIVE or INS_STANDBY Mode.
Solid GREEN	Turns ON briefly during System Initialization when the STATUS LED turns OFF.
OFF	GLI is operating normally.

STATUS LED

Table 6-39: GLI Card STATUS LED States	
LED State	**Device Status**
Slow Flashing GREEN	INS_ACTIVE or INS_STANDBY
Solid GREEN	Turns ON briefly during System Initialization when the ALARM LED turns OFF.
OFF	GLI is operating normally.

SPANS LED

Table 6-40: GLI Card STATUS LED States	
LED State	**Device Status**
Solid GREEN	GLI is operating normally.
Solid YELLOW	One or more of the equipped initialized Span Lines is receiving a Remote Alarm Indication Signal from the Remote End of the Span Line.

table continued on next page

Table 6-40: GLI Card STATUS LED States	
LED State	**Device Status**
Solid RED	One or more of the equipped initialized Span Lines is in Alarm Mode.
OFF	GLI is powered down, in Initialization Mode, or in INS_STANDBY Mode.

GLI3 Pushbutton and Connectors

Figure 6-3 shows the Front Panel of the GLI3 Card and includes a description of the components.

RESET Pushbutton

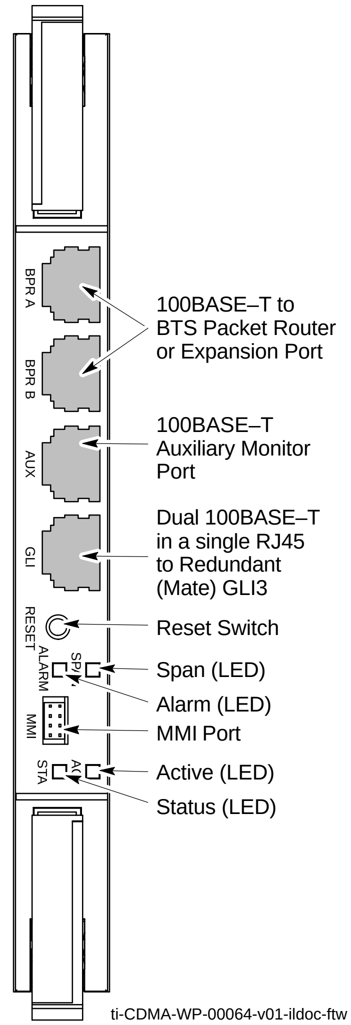
Depressing the RESET Pushbutton causes a partial reset of the CPU and a reset of all board devices. GLI3 will be placed in the OOS_ROM state (blue).

MMI Connector

The RS–232MMI Port Connector is intended primarily for development or factory use but may be used in the field for Debug/Maintenance purposes.

Figure 6-3: GLI3 Front Panel

LED	OPERATING STATUS
BPR A	Connects to either a BPR or Expansion Cage and is wired as an Ethernet hub.
BPR B	Connects to either a BPR or Expansion Cage and is wired as an Ethernet hub.
AUX	Wired as an Ethernet hub for direct connection to a personal computer with a standard Ethernet cable. It allows connection of an Ethernet "sniffer" when the Ethernet switch is properly configured for port monitoring. This port may also be connected to the optional Motorola MOSCAD–L Network Fault Management unit using a Crossover Ethernet cable.
GLI	Supports the cross–coupled Ethernet circuits to the Mate GLI using a standard Ethernet straight cable.
RESET	Pressing and releasing the switch resets all functions on the GLI3.
ALARM	OFF – operating normally. ON – briefly during power-up when the Alarm LED turns OFF. SLOW GREEN – when the GLI3 is INS (in-service).
Span	OFF – card is powered down, in initialization, or in standby. GREEN – operating normally. YELLOW – one or more of the equipped initialized spans is receiving a remote alarm indication signal from the far end. RED – one or more of the equipped initialized spans is in an alarm state.
MMI	An RS-232, serial, asynchronous communications link for use as an MMI port. This port supports 300 baud, up to a maximum of 115,200 baud communications.
STATUS	OFF – operating normally. ON – briefly during power-up when the Alarm LED turns OFF. SLOW GREEN – when the GLI3 is INS (in-service).
ACTIVE	Shows the operating status of the redundant cards. The redundant card toggles automatically if the active card is removed or fails. ON – active card operating normally. OFF – standby card operating normally.



6

BBX LED Status Combinations

PWR/ALM LED

All Broadband Transceiver (BBX) Cards have their own Alarm (Fault) Detection Circuitry that controls the state of the PWR/ALM LED.

Table 6-41 describes the states of the bi-color PWR/ALM LED.

Table 6-41: BBX Card PWR/ALM LED States

Physical and Alarm State	Off	Red	Green
Microprocessor in Reset	—	Continuous	—
OOS–ROM – No alarm	1.4s	—	0.2s
OOS–ROM – Alarm	—	1.4s	0.2s
OOS–RAM – No alarm	0.2s	—	0.2s

Table 6-41: BBX Card PWR/ALM LED States			
Physical and Alarm State	**Off**	**Red**	**Green**
OOS–RAM – Alarm	—	0.2s	0.2s
In Service – No alarm	—	—	Continuous
In Service – Alarm	—	0.2s	1.4s

ACTIVE LED

Table 6-42 describes the states of the ACTIVE LED:

Table 6-42: BBX Card ACTIVE LED States			
Physical and Alarm State	**Off**	**Red**	**Green**
Dekeyed	Continuous	—	—
Keyed	—	—	Continuous

MCC LED Status Combinations

The Multi-Channel CDMA (MCC–24/MCC–8E/MCC–1X) Card has Status Indicator LEDs and Connectors as described below. Refer to Figure 6-4. Note that the figure does not show the connectors; they are concealed by the removable lens. The location of the LEDs are as follows:

- PWR/ALM LED is at the top of the card.
- ACTIVE LED is at the bottom of the card.

PWR/ALM LED

Table 6-43: MCC Card PWR/ALM LED States	
LED State	**Device Status**
Solid RED	1. Briefly lit during System Initialization. 2. Alarm (Fault) Mode. – An alarm is being reported.
OFF	Operating normally.

ACTIVE LED

Table 6-44: MCC Card ACTIVE LED States	
LED State	**Device Status**
Solid GREEN	Card is code–loaded, enabled, and operating in INS_ACTIVE Mode, on-line, processing traffic. – No alarm present.
Slow Flashing GREEN	Card is not code–loaded. – No alarm present.

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Table 6-44: MCC Card ACTIVE LED States	
LED State	**Device Status**
Fast Flashing GREEN	Card is code–loaded but not enabled. – No alarm present.
Solid RED	Alarm (Fault) Mode. – An alarm is being reported.
Alternating Slow Flashing RED / Slow Flashing GREEN	The CHI Bus is inactive after System Initialization.
OFF	1. Card is inactive. 2. Card is off-line. 3. Card is not processing traffic.

Both PWR/ALM and ACTIVE LEDs

Table 6-45: MCC Card PWR/ALM and ACTIVE LED States	
LED State	**Device Status**
Solid RED	1. Card is in Reset Mode. 2. The BCP is inactive.

6

MMI Connectors

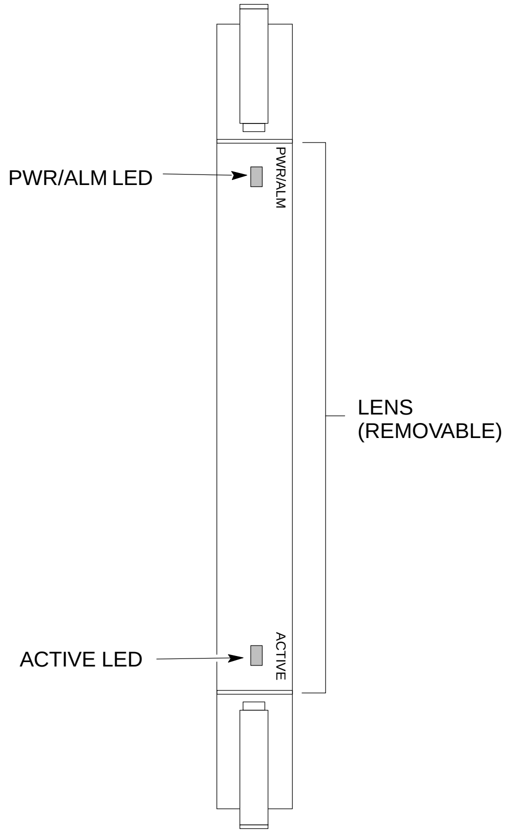
RS–232 Port Connector:
This Port Connector (four pin) is intended to be used primarily in Development and Factory environments, but may be used in the field for Debugging purposes.

– A Removable Lens covers this Port Connector.

The RJ–14 Ethernet Port Connector:
This Port Connector (eight pin) is intended to be used primarily in the Development environment, but may be used in the field for High Data Rate Debugging purposes.

– A Removable Lens covers this Port Connector.

Figure 6-4: MCC24 and MCC–1X Front Panel LEDs and LED Indications



LED	COLOR	OPERATING STATUS
PWR/ALM	RED	OFF – Operating normally ON – Briefly during Power–up and during failure conditions ***An alarm is generated in the event of a failure***
ACTIVE	GREEN	RAPIDLY FLASHING – Card is Code Loaded but not enabled SLOW FLASHING – Card is not Code Loaded ON – Card is Code Loaded and enabled (INS_ACT)
	RED	ON – 1) Briefly during Power–up 2) Continuously during fault conditions SLOW FLASHING (alternately with green) – Concentration Highway Interface (CHI) Bus inactive on Power–up

4812ETL0030–1

6

CLPA LED Status Combinations

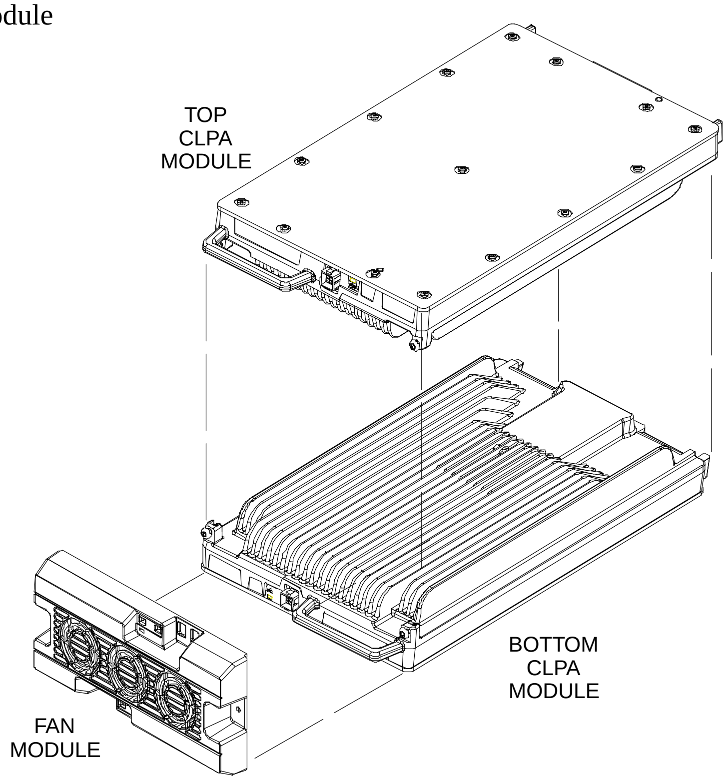
ETIB Board LED for the LPA Module

In the *SC* 4812T Lite Platform, the CLPA Module does not contain an LEDs. The LED on the CLPA Fan Module provides visual operational information for the CLPA Module. Refer to Figure 6-5.

Each LPA Module is provided with a bi–color LED on the ETIB Module next to the MMI Connector. Refer to Table 6-46.

Table 6-46: LPA ETIB Module LED	
LED State	**Device Status**
Solid GREEN	INS_ACTIVE Mode – No alarm present.
Alternating Flashing GREEN/ RED	INS_ACTIVE Mode • If a BBX **is keyed**, a Low Power Alarm is present. • If a BBX **is not keyed**, no alarm is present.
Flashing RED	Alarm (Fault) Mode – An LPA Alarm is being reported.

Figure 6-5: CLPA Module



Span Problems (No Control Link)

Table 6-47: Control Link Failure Troubleshooting Procedure

✓	Step	Action
	1	Connect the LMF Computer to the MMI Port on the applicable MGLI3/GLI3 as shown in Figure 6-6.
	2	Start an MMI Communication Session with the applicable MGLI3/GLI3 by using the *Windows* Desktop Shortcut Icon. – Refer to Table 3-14.
	3	Once the connection window opens, press the LMF Computer **Enter** Key until the `GLI3>` Prompt is obtained.
	4	At the `GLI3>` Prompt, enter: **config ni current <cr>** (equivalent of `Span view` command) The system will respond with a display similar to the following: `The frame format in flash is set to use T1_2.` `Equalization:` `  Span A - Default (0-131 feet for T1/J1, 120 Ohm for E1)` `  Span B - Default (0-131 feet for T1/J1, 120 Ohm for E1)` `  Span C - Default (0-131 feet for T1/J1, 120 Ohm for E1)` `  Span D - Default (0-131 feet for T1/J1, 120 Ohm for E1)` `  Span E - Default (0-131 feet for T1/J1, 120 Ohm for E1)` `  Span F - Default (0-131 feet for T1/J1, 120 Ohm for E1)` `Linkspeed: Default (56K for T1 D4 AMI, 64K otherwise)` `Currently, the link is running at the default rate` `The actual rate is 0` **NOTE** Defaults for Span Equalization are 0–131 feet for T1/J1 Spans and 120 Ohm for E1. Default Link Speed is 56K for T1 D4 AMI Spans and 64K for all other types. There is no need to change from defaults unless the OMC–R/CBSC Span Configuration requires it.
	5	The Span Configurations loaded in the GLI must match those in the OMC–R/CBSC Database for the BTS. • If they ***do***, *proceed to Step 6.* • If they ***do not***, *proceed to Table 6-48.*
	6	Repeat Steps 1 through 5 for all remaining GLI Cards.
	7	If the Span Settings are correct, verify the EDLC Parameters using the `show` Command. – Check for any Alarm Conditions that indicate the Span is not operating correctly. • Try looping back the Span Line from the DSX Panel to the MM, and verify that the looped signal is good. • Listen for a Control Tone on the appropriate Timeslot from the Base Site and MM.

table continued on next page

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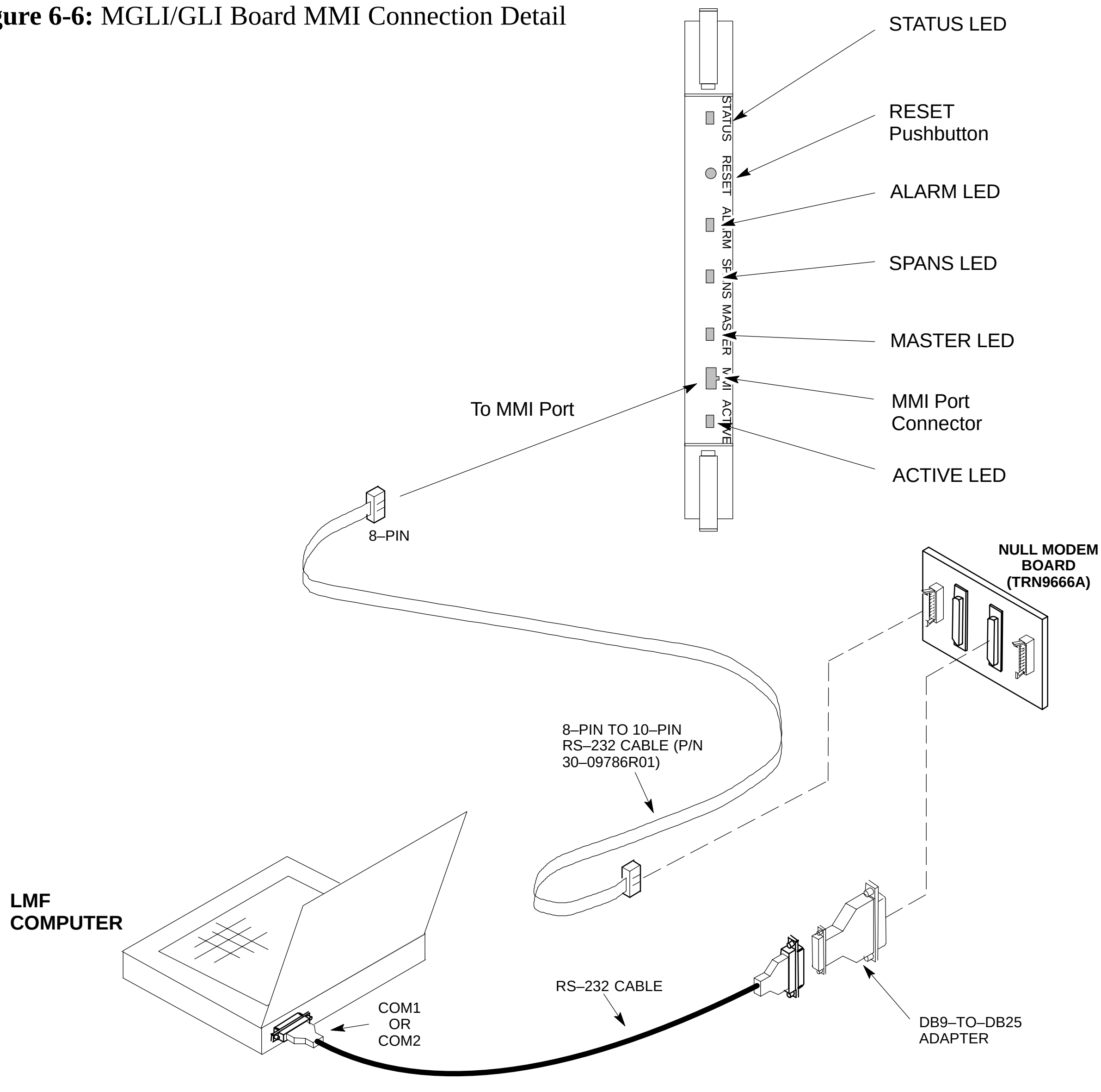
Table 6-47: Control Link Failure Troubleshooting Procedure		
✓	Step	Action
	8	Exit the GLI MMI Session and HyperTerminal Connection by performing the following actions.
	8a	Select **File** from the Connection Window Menu Bar.
	8b	Select **Exit** from the Pull–down Menu.

Figure 6-6: MGLI/GLI Board MMI Connection Detail



Set BTS Site Span Configuration

NOTE

Perform the following procedure *ONLY* if Span Configurations loaded in the MGLI3/GLI3s do not match those in the OMC–R/CBSC database, *AND ONLY* when the exact Configuration Data is available.

Loading incorrect Span Configuration Data will render the site inoperable.

Table 6-48: Set BTS Span Parameter Configuration Procedure

✓	Step	Action
	1	If not previously done, connect the LMF Computer to the MMI Port on the applicable MGLI3/GLI3 as shown in Figure 6-6.
	2	If there is no MMI Communication Session in progress with the applicable MGLI3/GLI3, initiate one by using the *Windows* Desktop Shortcut Icon. – Refer to Table 3-14.
	3	At the `GLI3>` Prompt, enter the following command `GLI3>`**config ni format** *<option>* **<cr>** – The terminal will display a response similar to the following: `COMMAND SYNTAX: config ni format option` `Next available options:` `LIST - option : Span Option` `E1_1 : E1_1 - E1 HDB3 CRC4 no TS16` `E1_2 : E1_2 - E1 HDB3 no CRC4 no TS16` `E1_3 : E1_3 - E1 HDB3 CRC4 TS16` `E1_4 : E1_4 - E1 HDB3 no CRC4 TS16` `T1_1 : T1_1 - D4, AMI, No ZCS` `T1_2 : T1_2 - ESF, B8ZS` `J1_1 : J1_1 - ESF, B8ZS (Japan) - Default` `J1_2 : J1_2 - ESF, B8ZS` `T1_3 : T1_3 - D4, AMI, ZCS>` **NOTE** With this command, all active (in–use) Spans will be set to the same format.

table continued on next page

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Table 6-48: Set BTS Span Parameter Configuration Procedure		
✓	Step	Action
	4	To set or change the Span Type, enter the correct option from the list at the Entry Prompt (>), as shown in the following example. > **T1_2 <cr>** – An acknowledgement similar to the following will be displayed: `The value has been programmed. It will take effect after the next reset.` `GLI3>` **NOTE** The entry is case–sensitive and must be typed *exactly* as it appears in the list. – If the entry is typed incorrectly, a response similar to the following will be displayed: `CP:  Invalid command` `GLI3>`
	5	If the current MGLI/GLI Span Rate must be changed, enter the following MMI Command: **config ni Link Speed <cr>** – The terminal will display a response similar to the following: `Next available options:` `LIST -  Link Speed : Span Linkspeed` `56K : 56K (default for T1_1 and T1_3 systems)` `64K : 64K (default for all other Span Configurations)` `>` **NOTE** With this command, all active (in–use) Spans will be set to the same Link Speed.
	6	To set or change the Span Link Speed, enter the required option from the list at the Entry Prompt (>), as shown in the following example: > **64K <cr>** – An acknowledgement similar to the following will be displayed: `The value has been programmed.  It will take effect after the next reset.` `GLI3>` **NOTE** The entry is case–sensitive and must be typed *exactly* as it appears in the list. – If the entry is typed incorrectly, a response similar to the following will be displayed: `CP: Invalid command` `GLI3>`

table continued on next page

	Step	Action
	7	If the Span Equalization must be changed, enter the following MMI Command: **config ni equal <cr>** – The terminal will display a response similar to the following: `COMMAND SYNTAX: config ni equal Span equal` `Next available options:` `LIST - Span : Span` `a : Span A` `b : Span B` `c : Span C` `d : Span D` `e : Span E` `f : Span F` `>`
	8	At the Entry Prompt (>), enter the designator from the list for the Span to be changed as shown in the following example: > **a <cr>** – The terminal will display a response similar to the following: `COMMAND SYNTAX: config ni equal a equal` `Next available options:` `LIST - equal : Span Equalization` `0 : 0-131 feet (default for T1/J1)` `1 : 132-262 feet` `2 : 263-393 feet` `3 : 394-524 feet` `4 : 525-655 feet` `5 : LONG HAUL` `6 : 75 OHM` `7 : 120 OHM (default for E1)` `>`
	9	At the Entry Prompt (>), enter the code for the required equalization from the list as shown in the following example: > **0 <cr>** – The terminal will display a response similar to the following: `> 0` `The value has been programmed. It will take effect after the next reset.` `GLI3>`
	10	Repeat Step 7 through Step 9 for each in–use Span.

Table 6-48: Set BTS Span Parameter Configuration Procedure

table continued on next page

Table 6-48: Set BTS Span Parameter Configuration Procedure

✓	Step	Action
	11	Press the RESET Button on the MGLI3/GLI3 for changes to take effect. *** IMPORTANT** After executing the **config ni format**, **config ni Link Speed**, and/or **config ni equal** commands, the affected MGLI/GLI Card *MUST* be reset and reloaded for changes to take effect. Although defaults are shown, *always* consult the Site Documentation for Span Type and Link Speed used at the site.
	12	Once the MGLI/GLI has reset, execute the following command to verify Span Settings are as required: **config ni current <cr>** (equivalent of `Span view` command) – The system will respond with a display similar to the following: `The frame format in flash is set to use T1_2.` `Equalization:` `  Span A – 0–131 feet` `  Span B – 0–131 feet` `  Span C – Default (0–131 feet for T1/J1, 120 Ohm for E1)` `  Span D – Default (0–131 feet for T1/J1, 120 Ohm for E1)` `  Span E – Default (0–131 feet for T1/J1, 120 Ohm for E1)` `  Span F – Default (0–131 feet for T1/J1, 120 Ohm for E1)` `Linkspeed: 64K` `Currently, the link is running at 64K` `The actual rate is 0` • If the Span Configuration ***is correct***, *return to Step 6 of Table 6-47.* • If the Span Configuration ***is not correct***, *proceed to Step 13.*
	13	Perform the applicable step from this table to change it.
	14	Repeat Step 11 and Step 12 to verify required changes have been programmed.

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Notes

Appendix A: Data Sheets

Appendix Content

Optimization (Pre–ATP) Data Sheets A-1
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Notes

Verification of Test Equipment Used

Table A-1: Verification of Test Equipment Used

Manufacturer	Model	Serial Number

Comments:____

____

Optimization (Pre–ATP) Data Sheets – continued

Site Checklist

Table A-2: Site Checklist

OK	Parameter	Specification	Comments
❑	Deliveries	Per established procedures	
❑	Floor Plan	Verified	
	Inter Frame Cables:		
❑	Ethernet	Per procedure	
❑	Frame Ground	Per procedure	
❑	Power	Per procedure	
	Factory Data:		
❑	BBX	Per procedure	
❑	Test Panel	Per procedure	
❑	RFDS	Per procedure	
❑	Site Temperature		
❑	Dress Covers/Brackets		

Preliminary Operations

Table A-3: Preliminary Operations

OK	Parameter	Specification	Comments
❑	Frame ID DIP Switches	Per Site Equipage	
❑	Ethernet LAN Verification	Verified per procedure	

Comments:____

Pre–Power and Initial Power Tests

Table A-4: Pre–power Checklist

OK	Parameter	Specification	Comments
❑	Pre–Power–up Tests	Table 2-2	
	Internal Cables:		
❑	Span	Verified	
❑	CSM	Verified	
❑	Power	Verified	
	Ethernet Connectors:		
❑	LAN A Ohms	Verified	
❑	LAN B Ohms	Verified	
❑	LAN A Shield	Installed	
❑	LAN B Shield	Installed	
❑	LAN A IN & OUT Terminators	Isolated	
❑		Isolated	
❑	LAN B IN & OUT Terminators	Installed	
	Ethernet Boots		
❑	Air Impedance Cage (single cage)	Installed	
❑	Initial Power–up Tests	Table 2-5	
❑	Frame Fans	Operational	
❑	LEDs	Illuminated	

Comments:____

General Optimization Checklist

Table A-5: General Optimization Checklist

OK	Parameter	Specification	Comments
	Preparing the LMF		
❑	Load LMF Software	Table 3-2	
❑	Create site–specific BTS directory	Table 3-3	
❑	Create HyperTerminal Connection	Table 3-4	
❑	LMF–to–BTS Connection	Table 3-6	
❑	Verify GLI2 Ethernet Address Settings	Table 6-4	
❑	Ping LAN A	Table 3-15	
❑	Ping LAN B	Table 3-15	
❑	Verify ROM Code Loads for Software Release	Table 3-16	
❑	Download/Enable MGLI2	Table 3-17	
❑	Download/Enable GLI2	Table 3-17	
❑	Set Site Span Configuration	Table 6-47	
❑	Set CSM Clock Source	Table 3-19	
❑	Enable CSM Cards	Table 3-20	
❑	Download/Enable MCC Cards (24/8E/1X)	Table 3-18	
❑	Download BBX Cards (2 or 1X)	Table 3-18	
❑	Program TSU NAM	Table 3-52	
❑	Test Set Calibration	Table 3-36	
❑	Test Cable Calibration	Table 3-32	

Comments:____

GPS Receiver Operation

Table A-6: GPS Receiver Operation

OK	Parameter	Specification	Comments
❑	GPS Receiver Control Task State: **tracking satellites**	Verify parameter	
❑	Initial Position Accuracy:	Verify: Estimated or Surveyed	
❑	Current Position: **lat** **lon** **height**	RECORD in msec and cm. Also convert to deg min sec.	
❑	Current Position: satellites tracked Estimated: **(>4) satellites tracked,(>4) satellites visible** Surveyed: **(≥1) satellite tracked,(>4) satellites visible**	Verify parameter as appropriate	
❑	GPS Receiver Status:Current Dilution of Precision (PDOP or HDOP): (<**30)**	Verify parameter	
❑	Current Reference Source: **Number: 0; Status: Good; Valid: Yes**	Verify parameter	

Comments:____

LPA IM Reduction

Table A-7: LPA IM Reduction

OK	Parameter			Specification	Comments
	LPA #	Carrier			
		2:1 3–Sector	BP 3–Sector		
❑	1A	C1	C1	No Alarms	
❑	1B	C1	C1	No Alarms	
❑	1C	C1	C1	No Alarms	
❑	1D	C1	C1	No Alarms	
❑	3A	C2	C2	No Alarms	
❑	3B	C2	C2	No Alarms	
❑	3C	C2	C2	No Alarms	
❑	3D	C2	C2	No Alarms	

Comments:____

TX Bay Level Offset / Power Output Verification for 3–Sector Configurations

One Carrier and Two Carrier Non–adjacent Channels

Table A-8: TX BLO Calibration (Three Sector: One Carrier and Two Carrier Non–adjacent Channels)

OK	Parameter	Specification	Comments
❑	Calibrate Carrier 1	TX Bay Level Offset = 45 dB (±5 dB) prior to Calibration	BBX2–1, ANT–1A = ______dB BBX2–r, ANT–1A = ______dB
❑			BBX2–2, ANT–2A = ______dB BBX2–r, ANT–2A = ______dB
❑			BBX2–3, ANT–3A = ______dB BBX2–r, ANT–3A = ______dB
❑	Calibrate Carrier 2	TX Bay Level Offset = 45 dB (±5 dB) prior to Calibration	BBX2–4, ANT–1B = ______dB BBX2–r, ANT–1B = ______dB
❑			BBX2–5, ANT–2B = ______dB BBX2–r, ANT–2B = ______dB
❑			BBX2–6, ANT–3B = ______dB BBX2–r, ANT–3B = ______dB
❑	Calibration Audit Carrier 1	0 dB (±0.5 dB) for Gain Set Resolution Post–Calibration	BBX2–1, ANT–1A = ______dB BBX2–r, ANT–1A = ______dB
❑			BBX2–2, ANT–2A = ______dB BBX2–r, ANT–2A = ______dB
❑			BBX2–3, ANT–3A = ______dB BBX2–r, ANT–3A = ______dB
❑	Calibration Audit Carrier 2	0 dB (±0.5 dB) for Gain Set Resolution Post–Calibration	BBX2–4, ANT–1B = ______dB BBX2–r, ANT–1B = ______dB
❑			BBX2–5, ANT–2B = ______dB BBX2–r, ANT–2B = ______dB
❑			BBX2–6, ANT–3B = ______dB BBX2–r, ANT–3B = ______dB

Comments:____

____

Two Carrier Adjacent Channel

Table A-9: TX Bay Level Offset Calibration (Three Sector: Two Carrier Adjacent Channels)

OK	Parameter	Specification	Comments
❑	Calibrate Carrier 1	TX Bay Level Offset = 45 dB (typical), 38 dB (minimum) prior to Calibration	BBX2–1, ANT–1A = ______dB BBX2–r, ANT–1A = ______dB
❑			BBX2–2, ANT–2A = ______dB BBX2–r, ANT–2A = ______dB
❑			BBX2–3, ANT–3A = ______dB BBX2–r, ANT–3A = ______dB
❑	Calibrate Carrier 2	TX Bay Level Offset = 45 dB (typical), 38 dB (minimum) prior to Calibration	BBX2–4, ANT–1B = ______dB BBX2–r, ANT–1B = ______dB
❑			BBX2–5, ANT–2B = ______dB BBX2–r, ANT–2B = ______dB
❑			BBX2–6, ANT–3B = ______dB BBX2–r, ANT–3B = ______dB
❑	Calibration Audit Carrier 1	0 dB ($\pm$0.5 dB) for Gain Set Resolution Post–Calibration	BBX2–1, ANT–1A = ______dB BBX2–r, ANT–1A = ______dB
❑			BBX2–2, ANT–2A = ______dB BBX2–r, ANT–2A = ______dB
❑			BBX2–3, ANT–3A = ______dB BBX2–r, ANT–3A = ______dB
❑	Calibration Audit Carrier 2	0 dB ($\pm$0.5 dB) for Gain Set Resolution Post–Calibration	BBX2–4, ANT–1B = ______dB BBX2–r, ANT–1B = ______dB
❑			BBX2–5, ANT–2B = ______dB BBX2–r, ANT–2B = ______dB
❑			BBX2–6, ANT–3B = ______dB BBX2–r, ANT–3B = ______dB

Comments:____

____

TX Antenna VSWR

Table A-10: TX Antenna VSWR

OK	Parameter	Specification	Data
❑	VSWR – Antenna 1A	< (1.5 : 1)	
❑	VSWR – Antenna 2A	< (1.5 : 1)	
❑	VSWR – Antenna 3A	< (1.5 : 1)	
❑	VSWR – Antenna 1B	< (1.5 : 1)	
❑	VSWR – Antenna 2B	< (1.5 : 1)	
❑	VSWR – Antenna 3B	< (1.5 : 1)	

Comments:____

____

RX Antenna VSWR

Table A-11: RX Antenna VSWR

OK	Parameter	Specification	Data
❑	VSWR – Antenna 1A	< (1.5 : 1)	
❑	VSWR – Antenna 2A	< (1.5 : 1)	
❑	VSWR – Antenna 3A	< (1.5 : 1)	
❑	VSWR – Antenna 1B	< (1.5 : 1)	
❑	VSWR – Antenna 2B	< (1.5 : 1)	
❑	VSWR – Antenna 3B	< (1.5 : 1)	

Comments:____

____

Alarm Verification

OK	Parameter	Specification	Data
❑	Verify CDI Alarm Input Operation.	BTS Relay #XX – Contact Alarm Sets/Clears	

Table A-12: CDI Alarm Input Verification

Comments:____

Site Serial Number Check List

Date ____________________ Site ____________________

SCCP Cage

NOTE

For BBX Cards and MCC Cards, enter the type as well as Serial Number; for example, BBX2, BBX–1X, MCC8, MCC24, MCC–1X.

Site I/O A	____________________
Site I/O B	____________________
SCCP Cage	____________________
CSM–1	____________________
CSM–2	____________________
HSO	____________________
CCD–1	____________________
CCD–2	____________________
AMR–1	____________________
AMR–2	____________________
MPC–1	____________________
MPC–2	____________________
Fan–1	____________________
Fan–2	____________________
GLI2–1	____________________
GLI2–2	____________________
GLI2–2	____________________
BBX–1	____________________
BBX–2	____________________
BBX–3	____________________
BBX–4	____________________
BBX–5	____________________
BBX–6	____________________
BBX–R1	____________________
MCC–1	____________________
MCC–2	____________________
MCC–3	____________________

MCC–4 ______________________________

CIO ______________________________

SWITCH ______________________________

PS–1 ______________________________

PS–2 ______________________________

LPA Modules

PA 1A ______________________________

PA 1B ______________________________

PA 1C ______________________________

PA 1D ______________________________

PA 3A ______________________________

PA 3B ______________________________

PA 3C ______________________________

PA 3D ______________________________

Appendix B: PN Offset/I & Q Offset Register Programming Information

B

Appendix Content

PN Offset Programming Information B-1
PN Offset Background B-1
PN Offset Usage B-1

B

Notes

B

PN Offset Background

All Channel Elements transmitted from a BTS in a specific 1.25 MHz CDMA Channel are orthogonally spread by 1 of 64 possible Walsh Code Functions; additionally, they are also spread by a Quadrature Pair of PN Sequences unique to each sector.

Overall, the mobile uses this to differentiate multiple signals transmitted from the same BTS (and surrounding BTS) Sectors, and to synchronize to the next strongest sector.

The PN Offset per Sector is stored on the BBX Cards, where the corresponding I and Q Registers reside.

The PN Offset Values are determined by BTS Sector (Antenna) based on the applicable CDF Data Field Content. A breakdown of this information is found in Table B-1.

PN Offset Usage

There are three basic RF Chip Delays currently in use. It is important to determine which RF Chip Delay is valid to be able to test the BTS Functionality. This can be done by ascertaining if the CDF `FineTxAdj` Value was set to "on" when the MCC was downloaded with "image data".

The `FineTxAdj` Value is used to compensate for the Processing Delay (approximately 20 μS) in the BTS using any type of mobile meeting IS–97 Specifications.

Observe the following guidelines:

- If the `FineTxAdj` Value in the CDF is 101 (65 HEX), the FineTxAdj has not been set. The I and Q Values from the 0 Chip Delay Column of Table B-1 MUST be used.

If the `FineTxAdj` Value in the CDF File is 213 (D5 HEX), FineTxAdj has been set for the *14 Chip Delay column of Table B-1*.

- If the `FineTxAdj` value in the CDF File is 197 (C5 HEX), FineTxAdj has been set for the *13Chip Delay column of Table B-1*.

NOTE

CDF File I and Q Values can be represented in DECIMAL or HEX.

If using HEX, add 0x before the HEX Value.

If necessary, convert HEX values in Table B-1 to decimal before comparing them to CDF File I and Q Value Assignments.

  – If a Qualcomm Mobile is used, select I and Q Values from the *13–Chip Delay column of Table B-1*.
  – If a mobile is used that does not have the "One Chip Offset" problem (any mobile meeting the IS–97 Specification), select from the *14–Chip Delay column of Table B-1*.

NOTE

If the wrong I and Q Values are used with the wrong `FineTxAdj` Parameter, System Timing problems will occur.

This will cause the energy transmitted to be “smeared” over several Walsh Codes (instead of the single Walsh Code that it was assigned to), causing erratic operation.

Evidence of Smearing is usually identified by Walsh Channels not at correct levels or being present when not selected in the Code Domain Power Test.

Table B-1: PnMaskI and PnMaskQ Values for PilotPn

Pilot PN	14–Chip Delay I (Dec.)	14–Chip Delay Q (Dec.)	14–Chip Delay I (Hex.)	14–Chip Delay Q (Hex.)	13–Chip Delay I (Dec.)	13–Chip Delay Q (Dec.)	13–Chip Delay I (Hex.)	13–Chip Delay Q (Hex.)	0–Chip Delay I (Dec.)	0–Chip Delay Q (Dec.)	0–Chip Delay I (Hex.)	0–Chip Delay Q (Hex.)
0	17523	23459	4473	5BA3	29673	25581	73E9	63ED	4096	4096	1000	1000
1	32292	32589	7E24	7F4D	16146	29082	3F12	719A	9167	1571	23CF	0623
2	4700	17398	125C	43F6	2350	8699	092E	21FB	22417	7484	5791	1D3C
3	14406	26333	3846	66DD	7203	32082	1C23	7D52	966	6319	03C6	18AF
4	14899	4011	3A33	0FAB	19657	18921	4CC9	49E9	14189	2447	376D	098F
5	17025	2256	4281	08D0	28816	1128	7090	0468	29150	24441	71DE	5F79
6	14745	18651	3999	48DB	19740	27217	4D1C	6A51	18245	27351	4745	6AD7
7	2783	1094	0ADF	0446	21695	547	54BF	0223	1716	23613	06B4	5C3D
8	5832	21202	16C8	52D2	2916	10601	0B64	2969	11915	29008	2E8B	7150
9	12407	13841	3077	3611	18923	21812	49EB	5534	20981	5643	51F5	160B
10	31295	31767	7A3F	7C17	27855	28727	6CCF	7037	24694	28085	6076	6DB5
11	7581	18890	1D9D	49CA	24350	9445	5F1E	24E5	11865	18200	2E59	4718
12	18523	30999	485B	7917	30205	29367	75FD	72B7	6385	21138	18F1	5292
13	29920	22420	74E0	5794	14960	11210	3A70	2BCA	27896	21937	6CF8	55B1
14	25184	20168	6260	4EC8	12592	10084	3130	2764	25240	25222	6298	6286
15	26282	12354	66AA	3042	13141	6177	3355	1821	30877	109	789D	006D
16	30623	11187	779F	2BB3	27167	23525	6A1F	5BE5	30618	6028	779A	178C
17	15540	11834	3CB4	2E3A	7770	5917	1E5A	171D	26373	22034	6705	5612
18	23026	10395	59F2	289B	11513	23153	2CF9	5A71	314	15069	013A	3ADD
19	20019	28035	4E33	6D83	30409	30973	76C9	78FD	17518	4671	446E	123F
20	4050	27399	0FD2	6B07	2025	31679	07E9	7BBF	21927	30434	55A7	76E2
21	1557	22087	0615	5647	21210	25887	52DA	651F	2245	11615	08C5	2D5F
22	30262	2077	7636	081D	15131	18994	3B1B	4A32	18105	19838	46B9	4D7E
23	18000	13758	4650	35BE	9000	6879	2328	1ADF	8792	14713	2258	3979
24	20056	11778	4E58	2E02	10028	5889	272C	1701	21440	241	53C0	00F1
25	12143	3543	2F6F	0DD7	18023	18647	4667	48D7	15493	24083	3C85	5E13
26	17437	7184	441D	1C10	29662	3592	73DE	0E08	26677	7621	6835	1DC5
27	17438	2362	441E	093A	8719	1181	220F	049D	11299	19144	2C23	4AC8
28	5102	25840	13EE	64F0	2551	12920	09F7	3278	12081	1047	2F31	0417
29	9302	12177	2456	2F91	4651	23028	122B	59F4	23833	26152	5D19	6628
30	17154	10402	4302	28A2	8577	5201	2181	1451	20281	22402	4F39	5782
31	5198	1917	144E	077D	2599	19842	0A27	4D82	10676	21255	29B4	5307
32	4606	17708	11FE	452C	2303	8854	08FF	2296	16981	30179	4255	75E3
33	24804	10630	60E4	2986	12402	5315	3072	14C3	31964	7408	7CDC	1CF0
34	17180	6812	431C	1A9C	8590	3406	218E	0D4E	26913	115	6921	0073
35	10507	14350	290B	380E	17749	7175	4555	1C07	14080	1591	3700	0637
36	10157	10999	27AD	2AF7	16902	23367	4206	5B47	23842	1006	5D22	03EE
37	23850	25003	5D2A	61AB	11925	32489	2E95	7EE9	27197	32263	6A3D	7E07
38	31425	2652	7AC1	0A5C	27824	1326	6CB0	052E	22933	1332	5995	0534
39	4075	19898	0FEB	4DBA	22053	9949	5625	26DD	30220	12636	760C	315C
40	10030	2010	272E	07DA	5015	1005	1397	03ED	12443	4099	309B	1003
41	16984	25936	4258	6550	8492	12968	212C	32A8	19854	386	4D8E	0182
42	14225	28531	3791	6F73	18968	31109	4A18	7985	14842	29231	39FA	722F
43	26519	11952	6797	2EB0	25115	5976	621B	1758	15006	25711	3A9E	646F
44	27775	31947	6C7F	7CCB	26607	28761	67EF	7059	702	10913	02BE	2AA1
45	30100	25589	7594	63F5	15050	32710	3ACA	7FC6	21373	8132	537D	1FC4
46	7922	11345	1EF2	2C51	3961	22548	0F79	5814	23874	20844	5D42	516C
47	14199	28198	3777	6E26	19051	14099	4A6B	3713	3468	13150	0D8C	335E
48	17637	13947	44E5	367B	29602	21761	73A2	5501	31323	18184	7A5B	4708
49	23081	8462	5A29	210E	31940	4231	7CC4	1087	29266	19066	7252	4A7A
50	5099	9595	13EB	257B	22565	23681	5825	5C81	16554	29963	40AA	750B

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PN Offset Programming Information – continued

Table B-1: PnMaskI and PnMaskQ Values for PilotPn

Pilot PN	14–Chip Delay				13–Chip Delay				0–Chip Delay			
	I (Dec.)	Q (Dec.)	I (Hex.)	Q (Hex.)	I (Dec.)	Q (Dec.)	I (Hex.)	Q (Hex.)	I (Dec.)	Q (Dec.)	I (Hex.)	Q (Hex.)
51	32743	4670	7FE7	123E	28195	2335	6E23	091F	22575	6605	582F	19CD
52	7114	14672	1BCA	3950	3557	7336	0DE5	1CA8	31456	29417	7AE0	72E9
53	7699	29415	1E13	72E7	24281	30543	5ED9	774F	8148	22993	1FD4	59D1
54	19339	20610	4B8B	5082	29717	10305	7415	2841	19043	27657	4A63	6C09
55	28212	6479	6E34	194F	14106	17051	371A	429B	25438	5468	635E	155C
56	29587	10957	7393	2ACD	26649	23386	6819	5B5A	10938	8821	2ABA	2275
57	19715	18426	4D03	47FA	30545	9213	7751	23FD	2311	20773	0907	5125
58	14901	22726	3A35	58C6	19658	11363	4CCA	2C63	7392	4920	1CE0	1338
59	20160	5247	4EC0	147F	10080	17411	2760	4403	30714	5756	77FA	167C
60	22249	29953	56E9	7501	31396	29884	7AA4	74BC	180	28088	00B4	6DB8
61	26582	5796	67D6	16A4	13291	2898	33EB	0B52	8948	740	22F4	02E4
62	7153	16829	1BF1	41BD	23592	28386	5C28	6EE2	16432	23397	4030	5B65
63	15127	4528	3B17	11B0	19547	2264	4C5B	08D8	9622	19492	2596	4C24
64	15274	5415	3BAA	1527	7637	17583	1DD5	44AF	7524	26451	1D64	6753
65	23149	10294	5A6D	2836	31974	5147	7CE6	141B	1443	30666	05A3	77CA
66	16340	17046	3FD4	4296	8170	8523	1FEA	214B	1810	15088	0712	3AF0
67	27052	7846	69AC	1EA6	13526	3923	34D6	0F53	6941	26131	1B1D	6613
68	13519	10762	34CF	2A0A	19383	5381	4BB7	1505	3238	15969	0CA6	3E61
69	10620	13814	297C	35F6	5310	6907	14BE	1AFB	8141	24101	1FCD	5E25
70	15978	16854	3E6A	41D6	7989	8427	1F35	20EB	10408	12762	28A8	31DA
71	27966	795	6D3E	031B	13983	20401	369F	4FB1	18826	19997	498A	4E1D
72	12479	9774	30BF	262E	18831	4887	498F	1317	22705	22971	58B1	59BB
73	1536	24291	0600	5EE3	768	24909	0300	614D	3879	12560	0F27	3110
74	3199	3172	0C7F	0C64	22511	1586	57EF	0632	21359	31213	536F	79ED
75	4549	2229	11C5	08B5	22834	19046	5932	4A66	30853	18780	7885	495C
76	17888	21283	45E0	5323	8944	26541	22F0	67AD	18078	16353	469E	3FE1
77	13117	16905	333D	4209	18510	28472	484E	6F38	15910	12055	3E26	2F17
78	7506	7062	1D52	1B96	3753	3531	0EA9	0DCB	20989	30396	51FD	76BC
79	27626	7532	6BEA	1D6C	13813	3766	35F5	0EB6	28810	24388	708A	5F44
80	31109	25575	7985	63E7	27922	32719	6D12	7FCF	30759	1555	7827	0613
81	29755	14244	743B	37A4	27597	7122	6BCD	1BD2	18899	13316	49D3	3404
82	26711	28053	6857	6D95	26107	30966	65FB	78F6	7739	31073	1E3B	7961
83	20397	30408	4FAD	76C8	30214	15204	7606	3B64	6279	6187	1887	182B
84	18608	5094	48B0	13E6	9304	2547	2458	09F3	9968	21644	26F0	548C
85	7391	16222	1CDF	3F5E	24511	8111	5FBF	1FAF	8571	9289	217B	2449
86	23168	7159	5A80	1BF7	11584	17351	2D40	43C7	4143	4624	102F	1210
87	23466	174	5BAA	00AE	11733	87	2DD5	0057	19637	467	4CB5	01D3
88	15932	25530	3E3C	63BA	7966	12765	1F1E	31DD	11867	18133	2E5B	46D5
89	25798	2320	64C6	0910	12899	1160	3263	0488	7374	1532	1CCE	05FC
90	28134	23113	6DE6	5A49	14067	25368	36F3	6318	10423	1457	28B7	05B1
91	28024	23985	6D78	5DB1	14012	24804	36BC	60E4	9984	9197	2700	23ED
92	6335	2604	18BF	0A2C	23951	1302	5D8F	0516	7445	13451	1D15	348B
93	21508	1826	5404	0722	10754	913	2A02	0391	4133	25785	1025	64B9
94	26338	30853	66E2	7885	13169	29310	3371	727E	22646	4087	5876	0FF7
95	17186	15699	4322	3D53	8593	20629	2191	5095	15466	31190	3C6A	79D6
96	22462	2589	57BE	0A1D	11231	19250	2BDF	4B32	2164	8383	0874	20BF
97	3908	25000	0F44	61A8	1954	12500	07A2	30D4	16380	12995	3FFC	32C3
98	25390	18163	632E	46F3	12695	27973	3197	6D45	15008	27438	3AA0	6B2E
99	27891	12555	6CF3	310B	26537	22201	67A9	56B9	31755	9297	7C0B	2451
100	9620	8670	2594	21DE	4810	4335	12CA	10EF	31636	1676	7B94	068C

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Table B-1: PnMaskI and PnMaskQ Values for PilotPn

Pilot PN	14–Chip Delay I (Dec.)	14–Chip Delay Q (Dec.)	14–Chip Delay I (Hex.)	14–Chip Delay Q (Hex.)	13–Chip Delay I (Dec.)	13–Chip Delay Q (Dec.)	13–Chip Delay I (Hex.)	13–Chip Delay Q (Hex.)	0–Chip Delay I (Dec.)	0–Chip Delay Q (Dec.)	0–Chip Delay I (Hex.)	0–Chip Delay Q (Hex.)
101	6491	1290	195B	050A	23933	645	5D7D	0285	25414	12596	6346	3134
102	16876	4407	41EC	1137	8438	18087	20F6	46A7	7102	19975	1BBE	4E07
103	17034	1163	428A	048B	8517	19577	2145	4C79	20516	20026	5024	4E3A
104	32405	12215	7E95	2FB7	28314	23015	6E9A	59E7	19495	8958	4C27	22FE
105	27417	7253	6B19	1C55	25692	16406	645C	4016	17182	19143	431E	4AC7
106	8382	8978	20BE	2312	4191	4489	105F	1189	11572	17142	2D34	42F6
107	5624	25547	15F8	63CB	2812	32729	0AFC	7FD9	25570	19670	63E2	4CD6
108	1424	3130	0590	0C3A	712	1565	02C8	061D	6322	30191	18B2	75EF
109	13034	31406	32EA	7AAE	6517	15703	1975	3D57	8009	5822	1F49	16BE
110	15682	6222	3D42	184E	7841	3111	1EA1	0C27	26708	22076	6854	563C
111	27101	20340	69DD	4F74	25918	10170	653E	27BA	6237	606	185D	025E
112	8521	25094	2149	6206	16756	12547	4174	3103	32520	9741	7F08	260D
113	30232	23380	7618	5B54	15116	11690	3B0C	2DAA	31627	9116	7B8B	239C
114	6429	10926	191D	2AAE	23902	5463	5D5E	1557	3532	12705	0DCC	31A1
115	27116	22821	69EC	5925	13558	25262	34F6	62AE	24090	17502	5E1A	445E
116	4238	31634	108E	7B92	2119	15817	0847	3DC9	20262	18952	4F26	4A08
117	5128	4403	1408	1133	2564	18085	0A04	46A5	18238	15502	473E	3C8E
118	14846	689	39FE	02B1	7423	20324	1CFF	4F64	2033	17819	07F1	459B
119	13024	27045	32E0	69A5	6512	31470	1970	7AEE	25566	4370	63DE	1112
120	10625	27557	2981	6BA5	17680	31726	4510	7BEE	25144	31955	6238	7CD3
121	31724	16307	7BEC	3FB3	15862	20965	3DF6	51E5	29679	30569	73EF	7769
122	13811	22338	35F3	5742	19241	11169	4B29	2BA1	5064	7350	13C8	1CB6
123	24915	27550	6153	6B9E	24953	13775	6179	35CF	27623	26356	6BE7	66F4
124	1213	22096	04BD	5650	21390	11048	538E	2B28	13000	32189	32C8	7DBD
125	2290	23136	08F2	5A60	1145	11568	0479	2D30	31373	1601	7A8D	0641
126	31551	12199	7B3F	2FA7	27727	23023	6C4F	59EF	13096	19537	3328	4C51
127	12088	1213	2F38	04BD	6044	19554	179C	4C62	26395	25667	671B	6443
128	7722	936	1E2A	03A8	3861	468	0F15	01D4	15487	4415	3C7F	113F
129	27312	6272	6AB0	1880	13656	3136	3558	0C40	29245	2303	723D	08FF
130	23130	32446	5A5A	7EBE	11565	16223	2D2D	3F5F	26729	16362	6869	3FEA
131	594	13555	0252	34F3	297	21573	0129	5445	12568	28620	3118	6FCC
132	25804	8789	64CC	2255	12902	24342	3266	5F16	24665	6736	6059	1A50
133	31013	24821	7925	60F5	27970	32326	6D42	7E46	8923	2777	22DB	0AD9
134	32585	21068	7F49	524C	28276	10534	6E74	2926	19634	24331	4CB2	5F0B
135	3077	31891	0C05	7C93	22482	28789	57D2	7075	29141	9042	71D5	2352
136	17231	5321	434F	14C9	28791	17496	7077	4458	73	107	0049	006B
137	31554	551	7B42	0227	15777	20271	3DA1	4F2F	26482	4779	6772	12AB
138	8764	12115	223C	2F53	4382	22933	111E	5995	6397	13065	18FD	3309
139	15375	4902	3C0F	1326	20439	2451	4FD7	0993	29818	30421	747A	76D5
140	13428	1991	3474	07C7	6714	19935	1A3A	4DDF	8153	20210	1FD9	4EF2
141	17658	14404	44FA	3844	8829	7202	227D	1C22	302	5651	012E	1613
142	13475	17982	34A3	463E	19329	8991	4B81	231F	28136	31017	6DE8	7929
143	22095	19566	564F	4C6E	31479	9783	7AF7	2637	29125	30719	71C5	77FF
144	24805	2970	60E5	0B9A	24994	1485	61A2	05CD	8625	23104	21B1	5A40
145	4307	23055	10D3	5A0F	22969	25403	59B9	633B	26671	7799	682F	1E77
146	23292	15158	5AFC	3B36	11646	7579	2D7E	1D9B	6424	17865	1918	45C9
147	1377	29094	0561	71A6	21344	14547	5360	38D3	12893	26951	325D	6947
148	28654	653	6FEE	028D	14327	20346	37F7	4F7A	18502	25073	4846	61F1
149	6350	19155	18CE	4AD3	3175	27477	0C67	6B55	7765	32381	1E55	7E7D
150	16770	23588	4182	5C24	8385	11794	20C1	2E12	25483	16581	638B	40C5

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Table B-1: PnMaskI and PnMaskQ Values for PilotPn

Pilot PN	14–Chip Delay I (Dec.)	14–Chip Delay Q (Dec.)	14–Chip Delay I (Hex.)	14–Chip Delay Q (Hex.)	13–Chip Delay I (Dec.)	13–Chip Delay Q (Dec.)	13–Chip Delay I (Hex.)	13–Chip Delay Q (Hex.)	0–Chip Delay I (Dec.)	0–Chip Delay Q (Dec.)	0–Chip Delay I (Hex.)	0–Chip Delay Q (Hex.)
151	14726	10878	3986	2A7E	7363	5439	1CC3	153F	15408	32087	3C30	7D57
152	25685	31060	6455	7954	25594	15530	63FA	3CAA	6414	97	190E	0061
153	21356	30875	536C	789B	10678	29297	29B6	7271	8164	7618	1FE4	1DC2
154	12149	11496	2F75	2CE8	18026	5748	466A	1674	10347	93	286B	005D
155	28966	24545	7126	5FE1	14483	25036	3893	61CC	29369	16052	72B9	3EB4
156	22898	9586	5972	2572	11449	4793	2CB9	12B9	10389	14300	2895	37DC
157	1713	20984	06B1	51F8	21128	10492	5288	28FC	24783	11129	60CF	2B79
158	30010	30389	753A	76B5	15005	30054	3A9D	7566	18400	6602	47E0	19CA
159	2365	7298	093D	1C82	21838	3649	554E	0E41	22135	14460	5677	387C
160	27179	18934	6A2B	49F6	25797	9467	64C5	24FB	4625	25458	1211	6372
161	29740	23137	742C	5A61	14870	25356	3A16	630C	22346	15869	574A	3DFD
162	5665	24597	1621	6015	23232	32310	5AC0	7E36	2545	27047	09F1	69A7
163	23671	23301	5C77	5B05	32747	25534	7FEB	63BE	7786	26808	1E6A	68B8
164	1680	7764	0690	1E54	840	3882	0348	0F2A	20209	7354	4EF1	1CBA
165	25861	14518	6505	38B6	25426	7259	6352	1C5B	26414	27834	672E	6CBA
166	25712	21634	6470	5482	12856	10817	3238	2A41	1478	11250	05C6	2BF2
167	19245	11546	4B2D	2D1A	29766	5773	7446	168D	15122	552	3B12	0228
168	26887	26454	6907	6756	25939	13227	6553	33AB	24603	27058	601B	69B2
169	30897	15938	78B1	3E42	28040	7969	6D88	1F21	677	14808	02A5	39D8
170	11496	9050	2CE8	235A	5748	4525	1674	11AD	13705	9642	3589	25AA
171	1278	3103	04FE	0C1F	639	18483	027F	4833	13273	32253	33D9	7DFD
172	31555	758	7B43	02F6	27761	379	6C71	017B	14879	26081	3A1F	65E1
173	29171	16528	71F3	4090	26921	8264	6929	2048	6643	21184	19F3	52C0
174	20472	20375	4FF8	4F97	10236	27127	27FC	69F7	23138	11748	5A62	2DE4
175	5816	10208	16B8	27E0	2908	5104	0B5C	13F0	28838	32676	70A6	7FA4
176	30270	17698	763E	4522	15135	8849	3B1F	2291	9045	2425	2355	0979
177	22188	8405	56AC	20D5	11094	24150	2B56	5E56	10792	19455	2A28	4BFF
178	6182	28634	1826	6FDA	3091	14317	0C13	37ED	25666	19889	6442	4DB1
179	32333	1951	7E4D	079F	28406	19955	6EF6	4DF3	11546	18177	2D1A	4701
180	14046	20344	36DE	4F78	7023	10172	1B6F	27BC	15535	2492	3CAF	09BC
181	15873	26696	3E01	6848	20176	13348	4ED0	3424	16134	15086	3F06	3AEE
182	19843	3355	4D83	0D1B	30481	18609	7711	48B1	8360	30632	20A8	77A8
183	29367	11975	72B7	2EC7	26763	22879	688B	595F	14401	27549	3841	6B9D
184	13352	31942	3428	7CC6	6676	15971	1A14	3E63	26045	6911	65BD	1AFF
185	22977	9737	59C1	2609	32048	23864	7D30	5D38	24070	9937	5E06	26D1
186	31691	9638	7BCB	25A6	27701	4819	6C35	12D3	30300	2467	765C	09A3
187	10637	30643	298D	77B3	17686	30181	4516	75E5	13602	25831	3522	64E7
188	25454	13230	636E	33AE	12727	6615	31B7	19D7	32679	32236	7FA7	7DEC
189	18610	22185	48B2	56A9	9305	25960	2459	6568	16267	12987	3F8B	32BB
190	6368	2055	18E0	0807	3184	19007	0C70	4A3F	9063	11714	2367	2DC2
191	7887	8767	1ECF	223F	24247	24355	5EB7	5F23	19487	19283	4C1F	4B53
192	7730	15852	1E32	3DEC	3865	7926	0F19	1EF6	12778	11542	31EA	2D16
193	23476	16125	5BB4	3EFD	11738	20802	2DDA	5142	27309	27928	6AAD	6D18
194	889	6074	0379	17BA	20588	3037	506C	0BDD	12527	26637	30EF	680D
195	21141	31245	5295	7A0D	30874	29498	789A	733A	953	10035	03B9	2733
196	20520	15880	5028	3E08	10260	7940	2814	1F04	15958	10748	3E56	29FC
197	21669	20371	54A5	4F93	31618	27125	7B82	69F5	6068	24429	17B4	5F6D
198	15967	8666	3E5F	21DA	20223	4333	4EFF	10ED	23577	29701	5C19	7405
199	21639	816	5487	0330	31635	408	7B93	0198	32156	14997	7D9C	3A95
200	31120	22309	7990	5725	15560	26030	3CC8	65AE	32709	32235	7FC5	7DEB

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Table B-1: PnMaskI and PnMaskQ Values for PilotPn												
	14–Chip Delay				13–Chip Delay				0–Chip Delay			
Pilot PN	I (Dec.)	Q (Dec.)	I (Hex.)	Q (Hex.)	I (Dec.)	Q (Dec.)	I (Hex.)	Q (Hex.)	I (Dec.)	Q (Dec.)	I (Hex.)	Q (Hex.)
201	3698	29563	0E72	737B	1849	30593	0739	7781	23557	30766	5C05	782E
202	16322	13078	3FC2	3316	8161	6539	1FE1	198B	17638	5985	44E6	1761
203	17429	10460	4415	28DC	29658	5230	73DA	146E	3545	6823	0DD9	1AA7
204	21730	17590	54E2	44B6	10865	8795	2A71	225B	9299	20973	2453	51ED
205	17808	20277	4590	4F35	8904	27046	22C8	69A6	6323	10197	18B3	27D5
206	30068	19988	7574	4E14	15034	9994	3ABA	270A	19590	9618	4C86	2592
207	12737	6781	31C1	1A7D	18736	17154	4930	4302	7075	22705	1BA3	58B1
208	28241	32501	6E51	7EF5	26360	28998	66F8	7146	14993	5234	3A91	1472
209	20371	6024	4F93	1788	30233	3012	7619	0BC4	19916	12541	4DCC	30FD
210	13829	20520	3605	5028	19154	10260	4AD2	2814	6532	8019	1984	1F53
211	13366	31951	3436	7CCF	6683	28763	1A1B	705B	17317	22568	43A5	5828
212	25732	26063	6484	65CF	12866	31963	3242	7CDB	16562	5221	40B2	1465
213	19864	27203	4D98	6A43	9932	31517	26CC	7B1D	26923	25216	692B	6280
214	5187	6614	1443	19D6	23537	3307	5BF1	0CEB	9155	1354	23C3	054A
215	23219	10970	5AB3	2ADA	31881	5485	7C89	156D	20243	29335	4F13	7297
216	28242	5511	6E52	1587	14121	17663	3729	44FF	32391	6682	7E87	1A1A
217	6243	17119	1863	42DF	24033	28499	5DE1	6F53	20190	26128	4EDE	6610
218	445	16064	01BD	3EC0	20750	8032	510E	1F60	27564	29390	6BAC	72CE
219	21346	31614	5362	7B7E	10673	15807	29B1	3DBF	20869	8852	5185	2294
220	13256	4660	33C8	1234	6628	2330	19E4	091A	9791	6110	263F	17DE
221	18472	13881	4828	3639	9236	21792	2414	5520	714	11847	02CA	2E47
222	25945	16819	6559	41B3	25468	28389	637C	6EE5	7498	10239	1D4A	27FF
223	31051	6371	794B	18E3	28021	16973	6D75	424D	23278	6955	5AEE	1B2B
224	1093	24673	0445	6061	21490	32268	53F2	7E0C	8358	10897	20A6	2A91
225	5829	6055	16C5	17A7	23218	17903	5AB2	45EF	9468	14076	24FC	36FC
226	31546	10009	7B3A	2719	15773	23984	3D9D	5DB0	23731	12450	5CB3	30A2
227	29833	5957	7489	1745	27540	17822	6B94	459E	25133	8954	622D	22FA
228	18146	11597	46E2	2D4D	9073	22682	2371	589A	2470	19709	09A6	4CFD
229	24813	22155	60ED	568B	24998	25977	61A6	6579	17501	1252	445D	04E4
230	47	15050	002F	3ACA	20935	7525	51C7	1D65	24671	15142	605F	3B26
231	3202	16450	0C82	4042	1601	8225	0641	2021	11930	26958	2E9A	694E
232	21571	27899	5443	6CFB	31729	30785	7BF1	7841	9154	8759	23C2	2237
233	7469	2016	1D2D	07E0	24390	1008	5F46	03F0	7388	12696	1CDC	3198
234	25297	17153	62D1	4301	24760	28604	60B8	6FBC	3440	11936	0D70	2EA0
235	8175	15849	1FEF	3DE9	24103	20680	5E27	50C8	27666	25635	6C12	6423
236	28519	30581	6F67	7775	26211	30086	6663	7586	22888	17231	5968	434F
237	4991	3600	137F	0E10	22639	1800	586F	0708	13194	22298	338A	571A
238	7907	4097	1EE3	1001	24225	17980	5EA1	463C	26710	7330	6856	1CA2
239	17728	671	4540	029F	8864	20339	22A0	4F73	7266	30758	1C62	7826
240	14415	20774	384F	5126	19959	10387	4DF7	2893	15175	6933	3B47	1B15
241	30976	24471	7900	5F97	15488	25079	3C80	61F7	15891	2810	3E13	0AFA
242	26376	27341	6708	6ACD	13188	31578	3384	7B5A	26692	8820	6844	2274
243	19063	19388	4A77	4BBC	29931	9694	74EB	25DE	14757	7831	39A5	1E97
244	19160	25278	4AD8	62BE	9580	12639	256C	315F	28757	19584	7055	4C80
245	3800	9505	0ED8	2521	1900	23724	076C	5CAC	31342	2944	7A6E	0B80
246	8307	26143	2073	661F	16873	32051	41E9	7D33	19435	19854	4BEB	4D8E
247	12918	13359	3276	342F	6459	21547	193B	542B	2437	10456	0985	28D8
248	19642	2154	4CBA	086A	9821	1077	265D	0435	20573	17036	505D	428C
249	24873	13747	6129	35B3	24900	21733	6144	54E5	18781	2343	495D	0927
250	22071	27646	5637	6BFE	31435	13823	7ACB	35FF	18948	14820	4A04	39E4

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Table B-1: PnMaskI and PnMaskQ Values for PilotPn

Pilot PN	14–Chip Delay I (Dec.)	14–Chip Delay Q (Dec.)	14–Chip Delay I (Hex.)	14–Chip Delay Q (Hex.)	13–Chip Delay I (Dec.)	13–Chip Delay Q (Dec.)	13–Chip Delay I (Hex.)	13–Chip Delay Q (Hex.)	0–Chip Delay I (Dec.)	0–Chip Delay Q (Dec.)	0–Chip Delay I (Hex.)	0–Chip Delay Q (Hex.)
251	13904	1056	3650	0420	6952	528	1B28	0210	23393	1756	5B61	06DC
252	27198	1413	6A3E	0585	13599	19710	351F	4CFE	5619	19068	15F3	4A7C
253	3685	3311	0E65	0CEF	22242	18507	56E2	484B	17052	28716	429C	702C
254	16820	4951	41B4	1357	8410	18327	20DA	4797	21292	31958	532C	7CD6
255	22479	749	57CF	02ED	31287	20298	7A37	4F4A	2868	16097	0B34	3EE1
256	6850	6307	1AC2	18A3	3425	17005	0D61	426D	19538	1308	4C52	051C
257	15434	961	3C4A	03C1	7717	20444	1E25	4FDC	24294	3320	5EE6	0CF8
258	19332	2358	4B84	0936	9666	1179	25C2	049B	22895	16682	596F	412A
259	8518	28350	2146	6EBE	4259	14175	10A3	375F	27652	6388	6C04	18F4
260	14698	31198	396A	79DE	7349	15599	1CB5	3CEF	29905	12828	74D1	321C
261	21476	11467	53E4	2CCB	10738	22617	29F2	5859	21415	3518	53A7	0DBE
262	30475	8862	770B	229E	27221	4431	6A55	114F	1210	3494	04BA	0DA6
263	23984	6327	5DB0	18B7	11992	16999	2ED8	4267	22396	6458	577C	193A
264	1912	7443	0778	1D13	956	16565	03BC	40B5	26552	10717	67B8	29DD
265	26735	28574	686F	6F9E	26087	14287	65E7	37CF	24829	8463	60FD	210F
266	15705	25093	3D59	6205	20348	32574	4F7C	7F3E	8663	27337	21D7	6AC9
267	3881	6139	0F29	17FB	22084	17857	5644	45C1	991	19846	03DF	4D86
268	20434	22047	4FD2	561F	10217	25907	27E9	6533	21926	9388	55A6	24AC
269	16779	32545	418B	7F21	28949	29100	7115	71AC	23306	21201	5B0A	52D1
270	31413	7112	7AB5	1BC8	27786	3556	6C8A	0DE4	13646	31422	354E	7ABE
271	16860	28535	41DC	6F77	8430	31111	20EE	7987	148	166	0094	00A6
272	8322	10378	2082	288A	4161	5189	1041	1445	24836	28622	6104	6FCE
273	28530	15065	6F72	3AD9	14265	21328	37B9	5350	24202	6477	5E8A	194D
274	26934	5125	6936	1405	13467	17470	349B	443E	9820	10704	265C	29D0
275	18806	12528	4976	30F0	9403	6264	24BB	1878	12939	25843	328B	64F3
276	20216	23215	4EF8	5AAF	10108	25451	277C	636B	2364	25406	093C	633E
277	9245	20959	241D	51DF	17374	26323	43DE	66D3	14820	21523	39E4	5413
278	8271	3568	204F	0DF0	16887	1784	41F7	06F8	2011	8569	07DB	2179
279	18684	26453	48FC	6755	9342	32150	247E	7D96	13549	9590	34ED	2576
280	8220	29421	201C	72ED	4110	30538	100E	774A	28339	22466	6EB3	57C2
281	6837	24555	1AB5	5FEB	23690	25033	5C8A	61C9	25759	12455	649F	30A7
282	9613	10779	258D	2A1B	17174	23345	4316	5B31	11116	27506	2B6C	6B72
283	31632	25260	7B90	62AC	15816	12630	3DC8	3156	31448	21847	7AD8	5557
284	27448	16084	6B38	3ED4	13724	8042	359C	1F6A	27936	28392	6D20	6EE8
285	12417	26028	3081	65AC	18832	13014	4990	32D6	3578	1969	0DFA	07B1
286	30901	29852	78B5	749C	28042	14926	6D8A	3A4E	12371	30715	3053	77FB
287	9366	14978	2496	3A82	4683	7489	124B	1D41	12721	23674	31B1	5C7A
288	12225	12182	2FC1	2F96	17968	6091	4630	17CB	10264	22629	2818	5865
289	21458	25143	53D2	6237	10729	32551	29E9	7F27	25344	12857	6300	3239
290	6466	15838	1942	3DDE	3233	7919	0CA1	1EEF	13246	30182	33BE	75E6
291	8999	5336	2327	14D8	16451	2668	4043	0A6C	544	21880	0220	5578
292	26718	21885	685E	557D	13359	25730	342F	6482	9914	6617	26BA	19D9
293	3230	20561	0C9E	5051	1615	26132	064F	6614	4601	27707	11F9	6C3B
294	27961	30097	6D39	7591	26444	29940	674C	74F4	16234	16249	3F6A	3F79
295	28465	21877	6F31	5575	26184	25734	6648	6486	24475	24754	5F9B	60B2
296	6791	23589	1A87	5C25	23699	24622	5C93	602E	26318	31609	66CE	7B79
297	17338	26060	43BA	65CC	8669	13030	21DD	32E6	6224	22689	1850	58A1
298	11832	9964	2E38	26EC	5916	4982	171C	1376	13381	3226	3445	0C9A
299	11407	25959	2C8F	6567	18327	31887	4797	7C8F	30013	4167	753D	1047
300	15553	3294	3CC1	0CDE	20400	1647	4FB0	066F	22195	25624	56B3	6418

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Table B-1: PnMaskI and PnMaskQ Values for PilotPn

Pilot PN	14–Chip Delay I (Dec.)	14–Chip Delay Q (Dec.)	14–Chip Delay I (Hex.)	14–Chip Delay Q (Hex.)	13–Chip Delay I (Dec.)	13–Chip Delay Q (Dec.)	13–Chip Delay I (Hex.)	13–Chip Delay Q (Hex.)	0–Chip Delay I (Dec.)	0–Chip Delay Q (Dec.)	0–Chip Delay I (Hex.)	0–Chip Delay Q (Hex.)
301	17418	30173	440A	75DD	8709	29906	2205	74D2	30380	10924	76AC	2AAC
302	14952	15515	3A68	3C9B	7476	20593	1D34	5071	15337	23096	3BE9	5A38
303	52	5371	0034	14FB	26	17473	001A	4441	10716	22683	29DC	589B
304	27254	10242	6A76	2802	13627	5121	353B	1401	13592	10955	3518	2ACB
305	15064	28052	3AD8	6D94	7532	14026	1D6C	36CA	2412	17117	096C	42DD
306	10942	14714	2ABE	397A	5471	7357	155F	1CBD	15453	15837	3C5D	3DDD
307	377	19550	0179	4C5E	20844	9775	516C	262F	13810	22647	35F2	5877
308	14303	8866	37DF	22A2	19007	4433	4A3F	1151	12956	10700	329C	29CC
309	24427	15297	5F6B	3BC1	32357	21468	7E65	53DC	30538	30293	774A	7655
310	26629	10898	6805	2A92	26066	5449	65D2	1549	10814	5579	2A3E	15CB
311	20011	31315	4E2B	7A53	30405	29461	76C5	7315	18939	11057	49FB	2B31
312	16086	19475	3ED6	4C13	8043	26677	1F6B	6835	19767	30238	4D37	761E
313	24374	1278	5F36	04FE	12187	639	2F9B	027F	20547	14000	5043	36B0
314	9969	11431	26F1	2CA7	17064	22639	42A8	586F	29720	22860	7418	594C
315	29364	31392	72B4	7AA0	14682	15696	395A	3D50	31831	27172	7C57	6A24
316	25560	4381	63D8	111D	12780	18098	31EC	46B2	26287	307	66AF	0133
317	28281	14898	6E79	3A32	26348	7449	66EC	1D19	11310	20380	2C2E	4F9C
318	7327	23959	1C9F	5D97	24479	24823	5F9F	60F7	25724	26427	647C	673B
319	32449	16091	7EC1	3EDB	28336	20817	6EB0	5151	21423	10702	53AF	29CE
320	26334	9037	66DE	234D	13167	24474	336F	5F9A	5190	30024	1446	7548
321	14760	24162	39A8	5E62	7380	12081	1CD4	2F31	258	14018	0102	36C2
322	15128	6383	3B18	18EF	7564	16971	1D8C	424B	13978	4297	369A	10C9
323	29912	27183	74D8	6A2F	14956	31531	3A6C	7B2B	4670	13938	123E	3672
324	4244	16872	1094	41E8	2122	8436	084A	20F4	23496	25288	5BC8	62C8
325	8499	9072	2133	2370	16713	4536	4149	11B8	23986	27294	5DB2	6A9E
326	9362	12966	2492	32A6	4681	6483	1249	1953	839	31835	0347	7C5B
327	10175	28886	27BF	70D6	16911	14443	420F	386B	11296	8228	2C20	2024
328	30957	25118	78ED	621E	28070	12559	6DA6	310F	30913	12745	78C1	31C9
329	12755	20424	31D3	4FC8	18745	10212	4939	27E4	27297	6746	6AA1	1A5A
330	19350	6729	4B96	1A49	9675	17176	25CB	4318	10349	1456	286D	05B0
331	1153	20983	0481	51F7	21392	26311	5390	66C7	32504	27743	7EF8	6C5F
332	29304	12372	7278	3054	14652	6186	393C	182A	18405	27443	47E5	6B33
333	6041	13948	1799	367C	23068	6974	5A1C	1B3E	3526	31045	0DC6	7945
334	21668	27547	54A4	6B9B	10834	31729	2A52	7BF1	19161	12225	4AD9	2FC1
335	28048	8152	6D90	1FD8	14024	4076	36C8	0FEC	23831	21482	5D17	53EA
336	10096	17354	2770	43CA	5048	8677	13B8	21E5	21380	14678	5384	3956
337	23388	17835	5B5C	45AB	11694	27881	2DAE	6CE9	4282	30656	10BA	77C0
338	15542	14378	3CB6	382A	7771	7189	1E5B	1C15	32382	13721	7E7E	3599
339	24013	7453	5DCD	1D1D	32566	16562	7F36	40B2	806	21831	0326	5547
340	2684	26317	0A7C	66CD	1342	32090	053E	7D5A	6238	30208	185E	7600
341	19018	5955	4A4A	1743	9509	17821	2525	459D	10488	9995	28F8	270B
342	25501	10346	639D	286A	24606	5173	601E	1435	19507	3248	4C33	0CB0
343	4489	13200	1189	3390	22804	6600	5914	19C8	27288	12030	6A98	2EFE
344	31011	30402	7923	76C2	27969	15201	6D41	3B61	2390	5688	0956	1638
345	29448	7311	7308	1C8F	14724	16507	3984	407B	19094	2082	4A96	0822
346	25461	3082	6375	0C0A	24682	1541	606A	0605	13860	23143	3624	5A67
347	11846	21398	2E46	5396	5923	10699	1723	29CB	9225	25906	2409	6532
348	30331	31104	767B	7980	27373	15552	6AED	3CC0	2505	15902	09C9	3E1E
349	10588	24272	295C	5ED0	5294	12136	14AE	2F68	27806	21084	6C9E	525C
350	32154	27123	7D9A	69F3	16077	31429	3ECD	7AC5	2408	25723	0968	647B

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Pilot PN	14–Chip Delay I (Dec.)	14–Chip Delay Q (Dec.)	14–Chip Delay I (Hex.)	14–Chip Delay Q (Hex.)	13–Chip Delay I (Dec.)	13–Chip Delay Q (Dec.)	13–Chip Delay I (Hex.)	13–Chip Delay Q (Hex.)	0–Chip Delay I (Dec.)	0–Chip Delay Q (Dec.)	0–Chip Delay I (Hex.)	0–Chip Delay Q (Hex.)
351	29572	5578	7384	15CA	14786	2789	39C2	0AE5	13347	13427	3423	3473
352	13173	25731	3375	6483	18538	31869	486A	7C7D	7885	31084	1ECD	796C
353	10735	10662	29EF	29A6	17703	5331	4527	14D3	6669	24023	1A0D	5DD7
354	224	11084	00E0	2B4C	112	5542	0070	15A6	8187	23931	1FFB	5D7B
355	12083	31098	2F33	797A	17993	15549	4649	3CBD	18145	15836	46E1	3DDC
356	22822	16408	5926	4018	11411	8204	2C93	200C	14109	6085	371D	17C5
357	2934	6362	0B76	18DA	1467	3181	05BB	0C6D	14231	30324	3797	7674
358	27692	2719	6C2C	0A9F	13846	19315	3616	4B73	27606	27561	6BD6	6BA9
359	10205	14732	27DD	398C	16958	7366	423E	1CC6	783	13821	030F	35FD
360	7011	22744	1B63	58D8	23649	11372	5C61	2C6C	6301	269	189D	010D
361	22098	1476	5652	05C4	11049	738	2B29	02E2	5067	28663	13CB	6FF7
362	2640	8445	0A50	20FD	1320	24130	0528	5E42	15383	29619	3C17	73B3
363	4408	21118	1138	527E	2204	10559	089C	293F	1392	2043	0570	07FB
364	102	22198	0066	56B6	51	11099	0033	2B5B	7641	6962	1DD9	1B32
365	27632	22030	6BF0	560E	13816	11015	35F8	2B07	25700	29119	6464	71BF
366	19646	10363	4CBE	287B	9823	23041	265F	5A01	25259	22947	62AB	59A3
367	26967	25802	6957	64CA	25979	12901	657B	3265	19813	9612	4D65	258C
368	32008	2496	7D08	09C0	16004	1248	3E84	04E0	20933	18698	51C5	490A
369	7873	31288	1EC1	7A38	24240	15644	5EB0	3D1C	638	16782	027E	418E
370	655	24248	028F	5EB8	20631	12124	5097	2F5C	16318	29735	3FBE	7427
371	25274	14327	62BA	37F7	12637	21959	315D	55C7	6878	2136	1ADE	0858
372	16210	23154	3F52	5A72	8105	11577	1FA9	2D39	1328	8086	0530	1F96
373	11631	13394	2D6F	3452	18279	6697	4767	1A29	14744	10553	3998	2939
374	8535	1806	2157	070E	16763	903	417B	0387	22800	11900	5910	2E7C
375	19293	17179	4B5D	431B	29822	28593	747E	6FB1	25919	19996	653F	4E1C
376	12110	10856	2F4E	2A68	6055	5428	17A7	1534	4795	5641	12BB	1609
377	21538	25755	5422	649B	10769	31857	2A11	7C71	18683	28328	48FB	6EA8
378	10579	15674	2953	3D3A	17785	7837	4579	1E9D	32658	25617	7F92	6411
379	13032	7083	32E8	1BAB	6516	17385	1974	43E9	1586	26986	0632	696A
380	14717	29096	397D	71A8	19822	14548	4D6E	38D4	27208	5597	6A48	15DD
381	11666	3038	2D92	0BDE	5833	1519	16C9	05EF	17517	14078	446D	36FE
382	25809	16277	64D1	3F95	25528	20982	63B8	51F6	599	13247	0257	33BF
383	5008	25525	1390	63B5	2504	32742	09C8	7FE6	16253	499	3F7D	01F3
384	32418	20465	7EA2	4FF1	16209	27076	3F51	69C4	8685	30469	21ED	7705
385	22175	28855	569F	70B7	31391	30311	7A9F	7667	29972	17544	7514	4488
386	11742	32732	2DDE	7FDC	5871	16366	16EF	3FEE	22128	28510	5670	6F5E
387	22546	20373	5812	4F95	11273	27126	2C09	69F6	19871	23196	4D9F	5A9C
388	21413	9469	53A5	24FD	30722	23618	7802	5C42	19405	13384	4BCD	3448
389	133	26155	0085	662B	20882	32041	5192	7D29	17972	4239	4634	108F
390	4915	6957	1333	1B2D	22601	17322	5849	43AA	8599	20725	2197	50F5
391	8736	12214	2220	2FB6	4368	6107	1110	17DB	10142	6466	279E	1942
392	1397	21479	0575	53E7	21354	26575	536A	67CF	26834	28465	68D2	6F31
393	18024	31914	4668	7CAA	9012	15957	2334	3E55	23710	19981	5C9E	4E0D
394	15532	32311	3CAC	7E37	7766	28967	1E56	7127	27280	16723	6A90	4153
395	26870	11276	68F6	2C0C	13435	5638	347B	1606	6570	4522	19AA	11AA
396	5904	20626	1710	5092	2952	10313	0B88	2849	7400	678	1CE8	02A6
397	24341	423	5F15	01A7	32346	20207	7E5A	4EEF	26374	15320	6706	3BD8
398	13041	2679	32F1	0A77	18600	19207	48A8	4B07	22218	29116	56CA	71BC
399	23478	15537	5BB6	3CB1	11739	20580	2DDB	5064	29654	5388	73D6	150C
400	1862	10818	0746	2A42	931	5409	03A3	1521	13043	22845	32F3	593D

Table B-1: PnMaskI and PnMaskQ Values for PilotPn

. . . continued on next page

Table B-1: PnMaskI and PnMaskQ Values for PilotPn

Pilot PN	14–Chip Delay I (Dec.)	14–Chip Delay Q (Dec.)	14–Chip Delay I (Hex.)	14–Chip Delay Q (Hex.)	13–Chip Delay I (Dec.)	13–Chip Delay Q (Dec.)	13–Chip Delay I (Hex.)	13–Chip Delay Q (Hex.)	0–Chip Delay I (Dec.)	0–Chip Delay Q (Dec.)	0–Chip Delay I (Hex.)	0–Chip Delay Q (Hex.)
401	5850	23074	16DA	5A22	2925	11537	0B6D	2D11	24457	28430	5F89	6F0E
402	5552	20250	15B0	4F1A	2776	10125	0AD8	278D	17161	8660	4309	21D4
403	12589	14629	312D	3925	18758	21166	4946	52AE	21314	2659	5342	0A63
404	23008	29175	59E0	71F7	11504	30407	2CF0	76C7	28728	8803	7038	2263
405	27636	13943	6BF4	3677	13818	21767	35FA	5507	22162	19690	5692	4CEA
406	17600	11072	44C0	2B40	8800	5536	2260	15A0	26259	22169	6693	5699
407	17000	29492	4268	7334	8500	14746	2134	399A	22180	8511	56A4	213F
408	21913	5719	5599	1657	31516	17687	7B1C	4517	2266	17393	08DA	43F1
409	30320	7347	7670	1CB3	15160	16485	3B38	4065	10291	11336	2833	2C48
410	28240	12156	6E50	2F7C	14120	6078	3728	17BE	26620	13576	67FC	3508
411	7260	25623	1C5C	6417	3630	31799	0E2E	7C37	19650	22820	4CC2	5924
412	17906	27725	45F2	6C4D	8953	30746	22F9	781A	14236	13344	379C	3420
413	5882	28870	16FA	70C6	2941	14435	0B7D	3863	11482	20107	2CDA	4E8B
414	22080	31478	5640	7AF6	11040	15739	2B20	3D7B	25289	8013	62C9	1F4D
415	12183	28530	2F97	6F72	17947	14265	461B	37B9	12011	18835	2EEB	4993
416	23082	24834	5A2A	6102	11541	12417	2D15	3081	13892	16793	3644	4199
417	17435	9075	441B	2373	29661	24453	73DD	5F85	17336	9818	43B8	265A
418	18527	32265	485F	7E09	30207	28984	75FF	7138	10759	4673	2A07	1241
419	31902	3175	7C9E	0C67	15951	18447	3E4F	480F	26816	13609	68C0	3529
420	18783	17434	495F	441A	30079	8717	757F	220D	31065	10054	7959	2746
421	20027	12178	4E3B	2F92	30413	6089	76CD	17C9	8578	10988	2182	2AEC
422	7982	25613	1F2E	640D	3991	31802	0F97	7C3A	24023	14744	5DD7	3998
423	20587	31692	506B	7BCC	31205	15846	79E5	3DE6	16199	17930	3F47	460A
424	10004	25384	2714	6328	5002	12692	138A	3194	22310	25452	5726	636C
425	13459	18908	3493	49DC	19353	9454	4B99	24EE	30402	11334	76C2	2C46
426	13383	25816	3447	64D8	19443	12908	4BF3	326C	16613	15451	40E5	3C5B
427	28930	4661	7102	1235	14465	18214	3881	4726	13084	11362	331C	2C62
428	4860	31115	12FC	798B	2430	29433	097E	72F9	3437	2993	0D6D	0BB1
429	13108	7691	3334	1E0B	6554	16697	199A	4139	1703	11012	06A7	2B04
430	24161	1311	5E61	051F	32480	19635	7EE0	4CB3	22659	5806	5883	16AE
431	20067	16471	4E63	4057	30433	28183	76E1	6E17	26896	20180	6910	4ED4
432	2667	15771	0A6B	3D9B	21733	20721	54E5	50F1	1735	8932	06C7	22E4
433	13372	16112	343C	3EF0	6686	8056	1A1E	1F78	16178	23878	3F32	5D46
434	28743	21062	7047	5246	27123	10531	69F3	2923	19166	20760	4ADE	5118
435	24489	29690	5FA9	73FA	32260	14845	7E04	39FD	665	32764	0299	7FFC
436	249	10141	00F9	279D	20908	24050	51AC	5DF2	20227	32325	4F03	7E45
437	19960	19014	4DF8	4A46	9980	9507	26FC	2523	24447	25993	5F7F	6589
438	29682	22141	73F2	567D	14841	25858	39F9	6502	16771	3268	4183	0CC4
439	31101	11852	797D	2E4C	28014	5926	6D6E	1726	27209	25180	6A49	625C
440	27148	26404	6A0C	6724	13574	13202	3506	3392	6050	12149	17A2	2F75
441	26706	30663	6852	77C7	13353	30175	3429	75DF	29088	10193	71A0	27D1
442	5148	32524	141C	7F0C	2574	16262	0A0E	3F86	7601	9128	1DB1	23A8
443	4216	28644	1078	6FE4	2108	14322	083C	37F2	4905	7843	1329	1EA3
444	5762	10228	1682	27F4	2881	5114	0B41	13FA	5915	25474	171B	6382
445	245	23536	00F5	5BF0	20906	11768	51AA	2DF8	6169	11356	1819	2C5C
446	21882	18045	557A	467D	10941	27906	2ABD	6D02	21303	11226	5337	2BDA
447	3763	25441	0EB3	6361	22153	32652	5689	7F8C	28096	16268	6DC0	3F8C
448	206	27066	00CE	69BA	103	13533	0067	34DD	8905	14491	22C9	389B
449	28798	13740	707E	35AC	14399	6870	383F	1AD6	26997	8366	6975	20AE
450	32402	13815	7E92	35F7	16201	21703	3F49	54C7	15047	26009	3AC7	6599

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Table B-1: PnMaskI and PnMaskQ Values for PilotPn

Pilot PN	14–Chip Delay I (Dec.)	14–Chip Delay Q (Dec.)	14–Chip Delay I (Hex.)	14–Chip Delay Q (Hex.)	13–Chip Delay I (Dec.)	13–Chip Delay Q (Dec.)	13–Chip Delay I (Hex.)	13–Chip Delay Q (Hex.)	0–Chip Delay I (Dec.)	0–Chip Delay Q (Dec.)	0–Chip Delay I (Hex.)	0–Chip Delay Q (Hex.)
451	13463	3684	3497	0E64	19355	1842	4B9B	0732	17460	5164	4434	142C
452	15417	23715	3C39	5CA3	20428	24685	4FCC	606D	17629	17126	44DD	42E6
453	23101	15314	5A3D	3BD2	31950	7657	7CCE	1DE9	10461	21566	28DD	543E
454	14957	32469	3A6D	7ED5	19686	29014	4CE6	7156	21618	21845	5472	5555
455	23429	9816	5B85	2658	31762	4908	7C12	132C	11498	28149	2CEA	6DF5
456	12990	4444	32BE	115C	6495	2222	195F	08AE	193	9400	00C1	24B8
457	12421	5664	3085	1620	18834	2832	4992	0B10	16140	19459	3F0C	4C03
458	28875	7358	70CB	1CBE	27061	3679	69B5	0E5F	13419	7190	346B	1C16
459	4009	27264	0FA9	6A80	22020	13632	5604	3540	10864	3101	2A70	0C1D
460	1872	28128	0750	6DE0	936	14064	03A8	36F0	28935	491	7107	01EB
461	15203	30168	3B63	75D8	19553	15084	4C61	3AEC	18765	25497	494D	6399
462	30109	29971	759D	7513	27422	29877	6B1E	74B5	27644	29807	6BFC	746F
463	24001	3409	5DC1	0D51	32560	18580	7F30	4894	21564	26508	543C	678C
464	4862	16910	12FE	420E	2431	8455	097F	2107	5142	4442	1416	115A
465	14091	20739	370B	5103	19029	26301	4A55	66BD	1211	4871	04BB	1307
466	6702	10191	1A2E	27CF	3351	24027	0D17	5DDB	1203	31141	04B3	79A5
467	3067	12819	0BFB	3213	21549	22325	542D	5735	5199	9864	144F	2688
468	28643	19295	6FE3	4B5F	26145	27539	6621	6B93	16945	12589	4231	312D
469	21379	10072	5383	2758	30737	5036	7811	13AC	4883	5417	1313	1529
470	20276	15191	4F34	3B57	10138	21399	279A	5397	25040	8549	61D0	2165
471	25337	27748	62F9	6C64	24748	13874	60AC	3632	7119	14288	1BCF	37D0
472	19683	720	4CE3	02D0	30625	360	77A1	0168	17826	8503	45A2	2137
473	10147	29799	27A3	7467	16897	29711	4201	740F	4931	20357	1343	4F85
474	16791	27640	4197	6BF8	28955	13820	711B	35FC	25705	15381	6469	3C15
475	17359	263	43CF	0107	28727	20159	7037	4EBF	10726	18065	29E6	4691
476	13248	24734	33C0	609E	6624	12367	19E0	304F	17363	24678	43D3	6066
477	22740	16615	58D4	40E7	11370	28239	2C6A	6E4F	2746	23858	0ABA	5D32
478	13095	20378	3327	4F9A	18499	10189	4843	27CD	10952	7610	2AC8	1DBA
479	10345	25116	2869	621C	17892	12558	45E4	310E	19313	18097	4B71	46B1
480	30342	19669	7686	4CD5	15171	26710	3B43	6856	29756	20918	743C	51B6
481	27866	14656	6CDA	3940	13933	7328	366D	1CA0	14297	7238	37D9	1C46
482	9559	27151	2557	6A0F	17275	31547	437B	7B3B	21290	30549	532A	7755
483	8808	28728	2268	7038	4404	14364	1134	381C	1909	16320	0775	3FC0
484	12744	25092	31C8	6204	6372	12546	18E4	3102	8994	20853	2322	5175
485	11618	22601	2D62	5849	5809	25112	16B1	6218	13295	26736	33EF	6870
486	27162	2471	6A1A	09A7	13581	19183	350D	4AEF	21590	10327	5456	2857
487	17899	25309	45EB	62DD	29477	32594	7325	7F52	26468	24404	6764	5F54
488	29745	15358	7431	3BFE	27592	7679	6BC8	1DFF	13636	7931	3544	1EFB
489	31892	17739	7C94	454B	15946	27801	3E4A	6C99	5207	5310	1457	14BE
490	23964	12643	5D9C	3163	11982	22157	2ECE	568D	29493	554	7335	022A
491	23562	32730	5C0A	7FDA	11781	16365	2E05	3FED	18992	27311	4A30	6AAF
492	2964	19122	0B94	4AB2	1482	9561	05CA	2559	12567	6865	3117	1AD1
493	18208	16870	4720	41E6	9104	8435	2390	20F3	12075	7762	2F2B	1E52
494	15028	10787	3AB4	2A23	7514	23341	1D5A	5B2D	26658	15761	6822	3D91
495	21901	18400	558D	47E0	31510	9200	7B16	23F0	21077	12697	5255	3199
496	24566	20295	5FF6	4F47	12283	27039	2FFB	699F	15595	24850	3CEB	6112
497	18994	1937	4A32	0791	9497	19956	2519	4DF4	4921	15259	1339	3B9B
498	13608	17963	3528	462B	6804	27945	1A94	6D29	14051	24243	36E3	5EB3
499	27492	7438	6B64	1D0E	13746	3719	35B2	0E87	5956	30508	1744	772C
500	11706	12938	2DBA	328A	5853	6469	16DD	1945	21202	13982	52D2	369E

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Table B-1: PnMaskI and PnMaskQ Values for PilotPn

Pilot PN	14–Chip Delay I (Dec.)	14–Chip Delay Q (Dec.)	14–Chip Delay I (Hex.)	14–Chip Delay Q (Hex.)	13–Chip Delay I (Dec.)	13–Chip Delay Q (Dec.)	13–Chip Delay I (Hex.)	13–Chip Delay Q (Hex.)	0–Chip Delay I (Dec.)	0–Chip Delay Q (Dec.)	0–Chip Delay I (Hex.)	0–Chip Delay Q (Hex.)
501	14301	19272	37DD	4B48	19006	9636	4A3E	25A4	11239	25039	2BE7	61CF
502	23380	29989	5B54	7525	11690	29870	2DAA	74AE	30038	24086	7556	5E16
503	11338	8526	2C4A	214E	5669	4263	1625	10A7	30222	21581	760E	544D
504	2995	18139	0BB3	46DB	21513	27985	5409	6D51	13476	21346	34A4	5362
505	23390	3247	5B5E	0CAF	11695	18539	2DAF	486B	2497	28187	09C1	6E1B
506	14473	28919	3889	70F7	19860	30279	4D94	7647	31842	23231	7C62	5ABF
507	6530	7292	1982	1C7C	3265	3646	0CC1	0E3E	24342	18743	5F16	4937
508	20452	20740	4FE4	5104	10226	10370	27F2	2882	25857	11594	6501	2D4A
509	12226	27994	2FC2	6D5A	6113	13997	17E1	36AD	27662	7198	6C0E	1C1E
510	1058	2224	0422	08B0	529	1112	0211	0458	24594	105	6012	0069
511	12026	6827	2EFA	1AAB	6013	17257	177D	4369	16790	4534	4196	11B6

B

Notes

Appendix C: FRU Optimization / ATP Test Matrix

Appendix Content

C

FRU Optimization/ATP Test Matrix C-1
Usage & Background C-1
Detailed Optimization/ATP Test Matrix C-1

Notes

FRU Optimization/ATP Test Matrix

Usage and Background

Periodic maintenance of a site may also mandate Re–Optimization of specific portions of the site. An outline of some basic guidelines is included in the following tables.

NOTE

Re–Optimization Actions listed for any assembly detailed in the tables below must be performed *anytime* an RF Cable associated with it is replaced.

C

Detailed Optimization/ATP Test Matrix

Table C-1 outlines in more detail the tests that would need to be performed if one of the BTS Components were to fail and be replaced. It is also assumes that all modules are placed OOS–ROM via the LMF until Full Redundancy of all applicable modules is implemented.

The following guidelines should also be noted when using this table:

NOTE

Not every procedure required to bring the site back in service is indicated in Table C-1. It is meant to be used as a guideline ONLY.

The table assumes that the user is familiar enough with the BTS Optimization/Acceptance Test Procedure to understand which Test Equipment Set–ups, Calibrations, and BTS Site preparation will be required before performing the table number procedures referenced.

Passive BTS components (such as the Bandpass Filters and 2:1 Combiners) only require a TX Calibration Audit to be performed in lieu of a Full Path Calibration.

- If the TX Path Calibration Audit fails, the entire RF Path Calibration will need to be repeated.
- If the RF Path Calibration fails, further troubleshooting is warranted.

NOTE

If any significant change in signal level results from any component being replaced in the RX or TX Signal Flow Paths, it would be identified by re–running the RX and TX Calibration Audit Command.

When the CIO is replaced, the SCCP Cage remains powered up. The BBX Cards may need to be removed, then re–installed into their original slots, and re–downloaded (Code and BLO Data). RX and TX Calibration Audits should then be performed on the affected Carrier Sectors.

Table C-1: SC 4812ET Lite BTS Optimization and ATP Test Matrix

Doc Table #	Description	DRF or TRF	RX Cables	TX Cables	MPC / EMPC	CIO	SCCP Shelf Assembly (Backplane)	BBX2/BBX–1X	MCC24E/MCC8E/MCC–1X	CSM/GPS	HSO/HSOX	50–pair Punchblock (with RGPS)	RGD/20–pair Punchblock with RGD	CCD Card	GLI2	ETIB or Associated Cables	LPAC Cable	LPA or LPA Trunking Module	LPA Bandpass Filter or Combiner	Switch Card	RFDS Cables	RFDS
Table 3-17 / Table 3-18 /	Download Code/Data						•	•	•	•					•							•
Table 3-20	Enable CSM Cards						•			•		D	D			9						
Table 3-24	GPS & HSO Initialization / Verification						•			•	•	D	●	•		9						
Table 3-41	TX Path Calibration	4		4		1	1	4							*		3	3	4	7		
Table 3-42	Download Offsets to BBX	4					1	4							*							
Table 3-43	TX Path Audit	4		4		1	1	4							*			3	4	7		
Table 3-51	RFDS Path Calibration and Offset Data Download	6	5	4		1	1	6							*			3	4		6	6
Table 4-5	Spectral Purity TX Mask	4					1	4							*			*	*	*		
Table 4-6	Waveform Quality (Rho)	4				*	1	4		*				*	*	10		*	*			
Table 4-7	Pilot Time Offset	4				*	1	4		*				*	*			*	*			
Table 4-8	Code Domain Power / Noise Floor	4					1	4	8	8				8	*			*	*			
Table 4-9	FER Test	5	5		5	2	2	5	8	8				8	*					7		
Table 3-53 through Table 3-55	Alarm Tests															●						

table continued next page

Table C-1: SC 4812ET Lite BTS Optimization and ATP Test Matrix

Doc Table #	Description	DRF or TRF	RX Cables	TX Cables	MPC / EMPC	CIO	SCCP Shelf Assembly (Backplane)	BBX2/BBX–1X	MCC24E/MCC8E/MCC–1X	CSM/GPS	HSO/HSOX	50–pair Punchblock (with RGPS)	RGD/20–pair Punchblock with RGD	CCD Card	GLI2	ETIB or Associated Cables	LPAC Cable	LPA or LPA Trunking Module	LPA Bandpass Filter or Combiner	Switch Card	RFDS Cables	RFDS
OPTIMIZATION AND TEST LEGEND:																						

● Required

* Perform if determined necessary for additional fault isolation, repair assurance, or required for site certification.

1. Perform on all carrier & sector TX Paths to the SCCP Cage.
2. Perform on all carrier & sector main and Diversity RX Paths to the SCCP Cage.
3. Perform on all primary & redundant TX Paths of affected carrier. (LPAC replacement affects all carriers.)
4. Perform on affected carrier & sector TX Path(s) (BBXR replacement affects *all* carrier & sector TX Paths).
5. Perform on the affected carrier and sector RX Path(s) (BBXR replacement affects *all* carrier RX Paths).
6. Perform on *all RF Paths* of the affected carrier & sector (RFDS replacement affects all carriers).
7. Perform with *Redundant* BBX for *at least* one sector on one carrier.
8. Verify performance by performing on one sector of one carrier only.
9. Perform only if RGD/RGPS or HSO expansion was installed.
10. Verify performance by performing testing on one sector of *each* carrier.

Notes

Appendix D: BBX Gain Set Point vs. BTS Output

Appendix Content

BBX Gain Set Point vs. BTS Output D-1
Usage &andBackground D-1

D

Notes

Usage and Background

Table D-1 outlines the relationship between the *total* of all Code Domain Channel Element Gain Settings (digital root sum of the squares) and the BBX Gain Set Point between 33.0 dBm and 44.0 dBm. The resultant RF Output (as measured in dBm at the BTS Antenna Connector) is shown in the table. The table assumes that the BBX Bay Level Offset (BLO) Values have been calculated.

As an illustration, consider a BBX keyed–up to produce a CDMA Carrier with only the Pilot Channel (no MCC Cards Forward Link enabled). Pilot Gain is set to 262.

In this case, the BBX Gain Set Point is shown to correlate exactly to the actual RF Output anywhere in the 33 to 44 dBm Output Range. This is the level used to calibrate the BTS.

Table D-1: BBX Gain Set Point vs. Actual BTS Output (in dBm)

dBm➧ Gain➘	44	43	42	41	40	39	38	37	36	35	34	33
541	–	–	–	–	–	–	–	43.3	42.3	41.3	40.3	39.3
533	–	–	–	–	–	–	–	43.2	42.2	41.2	40.2	39.2
525	–	–	–	–	–	–	–	43	42	41	40	39
517	–	–	–	–	–	–	–	42.9	41.9	40.9	39.9	38.9
509	–	–	–	–	–	–	–	42.8	41.8	40.8	39.8	38.8
501	–	–	–	–	–	–	–	42.6	41.6	40.6	39.6	38.6
493	–	–	–	–	–	–	43.5	42.5	41.5	40.5	39.5	38.5
485	–	–	–	–	–	–	43.4	42.4	41.4	40.4	39.4	38.4
477	–	–	–	–	–	–	43.2	42.2	41.2	40.2	39.2	38.2
469	–	–	–	–	–	–	43.1	42.1	41.1	40.1	39.1	38.1
461	–	–	–	–	–	–	42.9	41.9	40.9	39.9	38.9	37.9
453	–	–	–	–	–	–	42.8	41.8	40.8	39.8	38.8	37.8
445	–	–	–	–	–	43.6	42.6	41.6	40.6	39.6	38.6	37.6
437	–	–	–	–	–	43.4	42.4	41.4	40.4	39.4	38.4	37.4
429	–	–	–	–	–	43.3	42.3	41.3	40.3	39.3	38.3	37.3
421	–	–	–	–	–	43.1	42.1	41.1	40.1	39.1	38.1	37.1
413	–	–	–	–	–	43	42	41	40	39	38	37
405	–	–	–	–	–	42.8	41.8	40.8	39.8	38.8	37.8	36.8

table continued next page

D

Table D-1: BBX Gain Set Point vs. Actual BTS Output (in dBm)

dBm→ Gain↓	44	43	42	41	40	39	38	37	36	35	34	33
397	–	–	–	–	43.6	42.6	41.6	40.6	39.6	38.6	37.6	36.6
389	–	–	–	–	43.4	42.4	41.4	40.4	39.4	38.4	37.4	36.4
381	–	–	–	–	43.3	42.3	41.3	40.3	39.3	38.3	37.3	36.3
374	–	–	–	–	43.1	42.1	41.1	40.1	39.1	38.1	37.1	36.1
366	–	–	–	–	42.9	41.9	40.9	39.9	38.9	37.9	36.9	35.9
358	–	–	–	–	42.7	41.7	40.7	39.7	38.7	37.7	36.7	35.7
350	–	–	–	43.5	42.5	41.5	40.5	39.5	38.5	37.5	36.5	35.5
342	–	–	–	43.3	42.3	41.3	40.3	39.3	38.3	37.3	36.3	35.3
334	–	–	–	43.1	42.1	41.1	40.1	39.1	38.1	37.1	36.1	35.1
326	–	–	–	42.9	41.9	40.9	39.9	38.9	37.9	36.9	35.9	34.9
318	–	–	–	42.7	41.7	40.7	39.7	38.7	37.7	36.7	35.7	34.7
310	–	–	43.5	42.5	41.5	40.5	39.5	38.5	37.5	36.5	35.5	34.5
302	–	–	43.2	42.2	41.2	40.2	39.2	38.2	37.2	36.2	35.2	34.2
294	–	–	43	42	41	40	39	38	37	36	35	34
286	–	–	42.8	41.8	40.8	39.8	38.8	37.8	36.8	35.8	34.8	33.8
278	–	43.5	42.5	41.5	40.5	39.5	38.5	37.5	36.5	35.5	34.5	33.5
270	–	43.3	42.3	41.3	40.3	39.3	38.3	37.3	36.3	35.3	34.3	33.3
262	–	43	42	41	40	39	38	37	36	35	34	33
254	–	42.7	41.7	40.7	39.7	38.7	37.7	36.7	35.7	34.7	33.7	32.7
246	43.4	42.4	41.4	40.4	39.4	38.4	37.4	36.4	35.4	34.4	33.4	32.4
238	43.2	42.2	41.2	40.2	39.2	38.2	37.2	36.2	35.2	34.2	33.2	32.2
230	42.9	41.9	40.9	39.9	38.9	37.9	36.9	35.9	34.9	33.9	32.9	31.9
222	42.6	41.6	40.6	39.6	38.6	37.6	36.6	35.6	34.6	33.6	32.6	31.6
214	42.2	41.2	40.2	39.2	38.2	37.2	36.2	35.2	34.2	33.2	32.2	31.2

Appendix E: CDMA Operating Frequency Programming Information

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CDMA Operating Frequency Programming Information

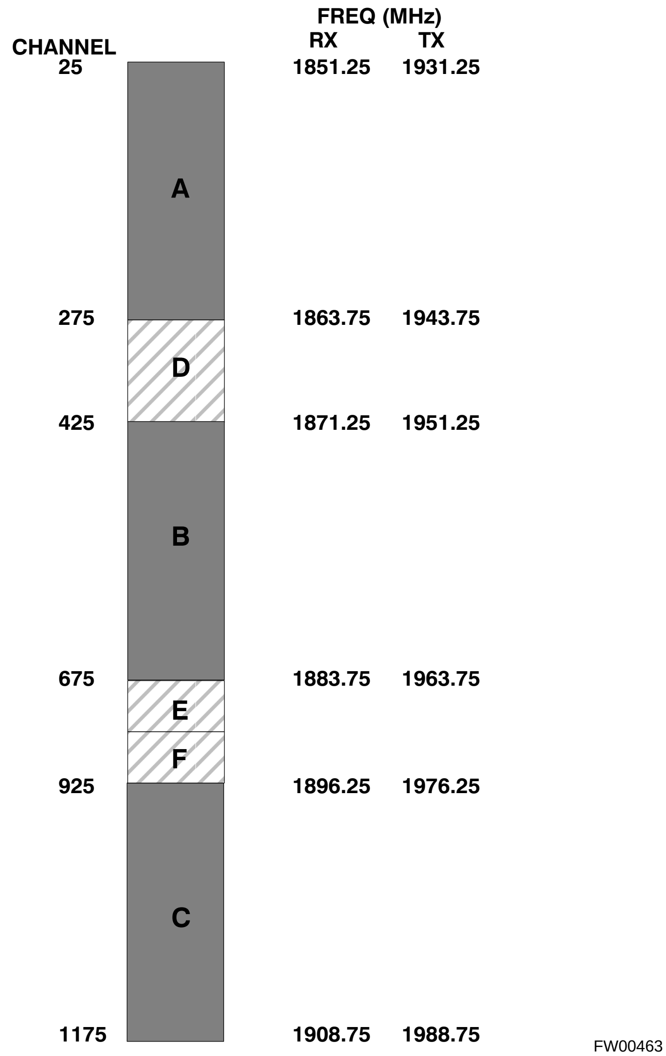
Introduction

Programming of each of the BTS BBX Synthesizers is performed by the BTS GLI2s via the Concentration Highway Interface (CHI) Bus. This programming data determines the Transmit and Receive Transceiver Operating Frequencies (Channels) for each BBX.

1900 MHz PCS Channels

Figure E-1 shows the valid channels for the North American PCS 1900 MHz Frequency Spectrum. There are 10 CDMA Wireline or Non–wireline Band Channels used in a CDMA System (unique per Customer Operating System).

Figure E-1: North America PCS Frequency Spectrum (CDMA Allocation)



Calculating 1900 MHz Center Frequencies

Table E-1 shows selected 1900 MHz CDMA Candidate Operating Channels, listed in both decimal and hexadecimal, and the corresponding Transmit and Receive Frequencies. Center Frequencies (in MHz) for channels not shown in the table may be calculated as follows:

- TX = 1930 + 0.05 * Channel#
  Example: Channel 262
  TX = 1930 + 0.05 * 262 = 1943.10 MHz
- RX = TX – 80
  Example: Channel 262
  RX = 1943.10 – 50 = 1863.10 MHz

Actual frequencies used depend on the Customer CDMA System Frequency Plan.

Each CDMA Channel requires a 1.77 MHz Frequency Segment. The actual CDMA Carrier is 1.23 MHz wide, with a 0.27 MHz Guard Band on both sides of the carrier.

Minimum Frequency Separation required between any CDMA Carrier and the nearest NAMPS/AMPS Carrier is 900 kHz (center-to-center).

Table E-1: 1900 MHz TX and RX Frequency vs. Channel

Channel Number Decimal	Hex	Transmit Frequency (MHz) Center Frequency	Receive Frequency (MHz) Center Frequency
25	0019	1931.25	1851.25
50	0032	1932.50	1852.50
75	004B	1933.75	1853.75
100	0064	1935.00	1855.00
125	007D	1936.25	1856.25
150	0096	1937.50	1857.50
175	00AF	1938.75	1858.75
200	00C8	1940.00	1860.00
225	00E1	1941.25	1861.25
250	00FA	1942.50	1862.50
275	0113	1943.75	1863.75
300	012C	1945.00	1865.00
325	0145	1946.25	1866.25
350	015E	1947.50	1867.50
375	0177	1948.75	1868.75
400	0190	1950.00	1870.00
425	01A9	1951.25	1871.25
450	01C2	1952.50	1872.50

table continued next page

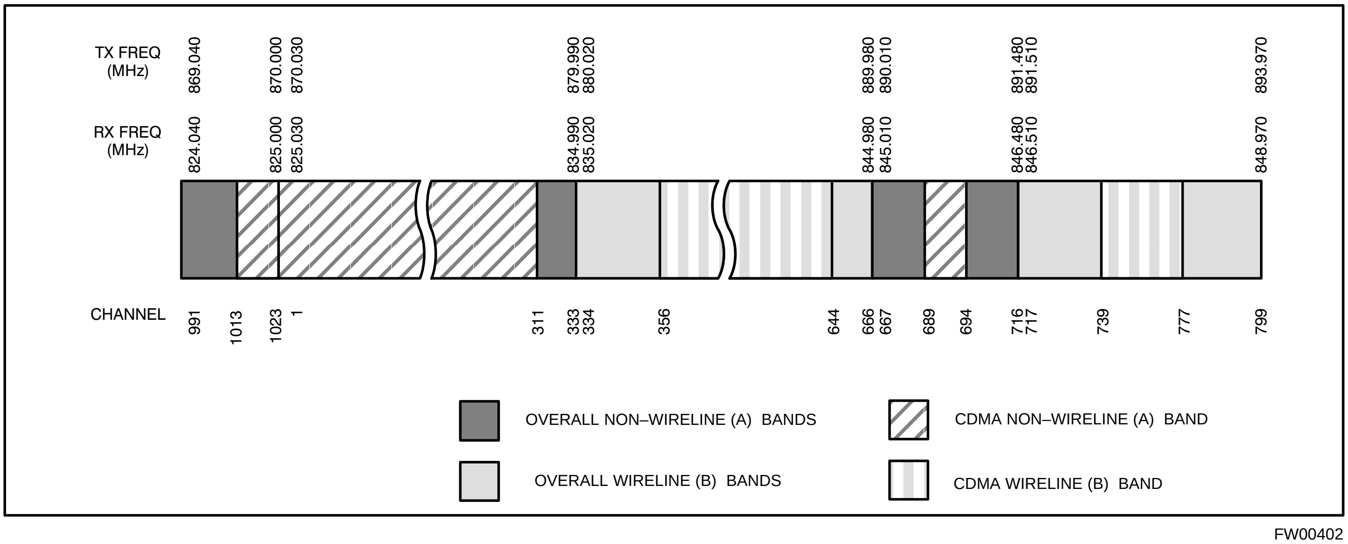
Table E-1: 1900 MHz TX and RX Frequency vs. Channel			
Channel Number Decimal	Hex	Transmit Frequency (MHz) Center Frequency	Receive Frequency (MHz) Center Frequency
475	01DB	1953.75	1873.75
500	01F4	1955.00	1875.00
525	020D	1956.25	1876.25
550	0226	1957.50	1877.50
575	023F	1958.75	1878.75
600	0258	1960.00	1880.00
625	0271	1961.25	1881.25
650	028A	1962.50	1882.50
675	02A3	1963.75	1883.75
700	02BC	1965.00	1885.00
725	02D5	1966.25	1886.25
750	02EE	1967.50	1887.50
775	0307	1968.75	1888.75
800	0320	1970.00	1890.00
825	0339	1971.25	1891.25
850	0352	1972.50	1892.50
875	036B	1973.75	1893.75
900	0384	1975.00	1895.00
925	039D	1976.25	1896.25
950	03B6	1977.50	1897.50
975	03CF	1978.75	1898.75
1000	03E8	1980.00	1900.00
1025	0401	1981.25	1901.25
1050	041A	1982.50	1902.50
1075	0433	1983.75	1903.75
1100	044C	1985.00	1905.00
1125	0465	1986.25	1906.25
1150	047E	1987.50	1807.50
1175	0497	1988.75	1908.75

E

800 MHz CDMA Channels

Figure E-2 shows the valid channels for the North American Cellular Telephone Frequency Spectrum. There are 10 CDMA Wireline or Non–Wireline Band Channels used in a CDMA System (unique per Customer Operating System).

Figure E-2: North American Cellular Telephone System Frequency Spectrum (CDMA Allocation)



Calculating 800 MHz Center Frequencies

Table E-2 shows selected 800 MHz CDMA Candidate Operating Channels, listed in both decimal and hexadecimal, and the corresponding Transmit and Receive Frequencies. Center Frequencies (in MHz) for channels not shown in the table may be calculated as follows:

- Channels 1–777
  TX = 870 + 0.03 * Channel#
  Example: Channel 262
  TX = 870 + 0.03*262 = 877.86 MHz
- Channels 1013–1023
  TX = 870 + 0.03 * (Channel# – 1023)
  Example: Channel 1015
  TX = 870 +0.03 *(1015 – 1023) = 869.76 MHz
- RX = TX – 45 MHz
  Example: Channel 262
  RX = 877.86 –45 = 832.86 MHz

Table E-2: 800 MHz TX and RX Frequency vs. Channel			
Channel Number Decimal	Hex	Transmit Frequency (MHz) Center Frequency	Receive Frequency (MHz) Center Frequency
1	0001	870.0300	825.0300
25	0019	870.7500	825.7500
50	0032	871.5000	826.5000
75	004B	872.2500	827.2500
100	0064	873.0000	828.0000
125	007D	873.7500	828.7500
150	0096	874.5000	829.5000
175	00AF	875.2500	830.2500
200	00C8	876.0000	831.0000
225	00E1	876.7500	831.7500
250	00FA	877.5000	832.5000
275	0113	878.2500	833.2500
300	012C	879.0000	834.0000
325	0145	879.7500	834.7500
350	015E	880.5000	835.5000
375	0177	881.2500	836.2500
400	0190	882.0000	837.0000
425	01A9	882.7500	837.7500
450	01C2	883.5000	838.5000
475	01DB	884.2500	839.2500
500	01F4	885.0000	840.0000
525	020D	885.7500	840.7500
550	0226	886.5000	841.5000
575	023F	887.2500	842.2500
600	0258	888.0000	843.0000
625	0271	888.7500	843.7500
650	028A	889.5000	844.5000
675	02A3	890.2500	845.2500

table continued next page

Table E-2: 800 MHz TX and RX Frequency vs. Channel			
Channel Number Decimal	**Hex**	**Transmit Frequency (MHz) Center Frequency**	**Receive Frequency (MHz) Center Frequency**
700	02BC	891.0000	846.0000
725	02D5	891.7500	846.7500
750	02EE	892.5000	847.5000
775	0307	893.2500	848.2500
NOTE Channel Numbers 778 through 1012 are not used.			
1013	03F5	869.7000	824.7000
1023	03FF	870.0000	825.0000

E

Appendix F: Test Equipment Preparation

Appendix Content

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Notes

Purpose

This appendix provides information on pre–testing set–up for the following Test Equipment Items (not required for the Cybertest Test Set):

- Agilent E7495A Test Equipment Set–up
- Agilent E4406A Transmitter Test Set
- Agilent E4432B Signal Generator
- Advantest R3267 Spectrum Analyzer
- Advantest R3562 Signal Generator
- Agilent 8935 Analyzer (formerly HP 8935)
- HP 8921 with PCS Interface Analyzer
- Advantest R3465 Analyzer
- Motorola CyberTest
- HP 437 Power Meter
- Gigatronics 8541C Power Meter
- GPIB Adapter

Pre–testing set–up information covered includes verification and setting GPIB Addresses, Inter–unit Cabling, Connectivity Testing, Pre–test Control Settings, and Equipment Calibration for items that are not calibrated with the **Calibrate Test Equipment** Function of the LMF.

The following procedures cover verification and changing GPIB Addresses for the various items of CDMA Test Equipment supported by the LMF.

Agilent R7495A Test Equipment Set–up

This Test Equipment requires a warm-up period of at least 30 minutes before BTS Testing or Calibration begins.

Using the Agilent E7495A with the LMF

The Agilent E7495A does not require the use of the 19MHz Frequency Reference; if connected, it will be ignored. The Even Sec SYNC Connection is required.

The Agilent E7495A Signal Generator is only calibrated down to –80db. In order to achieve accurate FER Testing, ensure that the RX Set–up includes at least 40db of Attenuation. This will ensure the Signal Generator will output sufficient power to operate in the calibrated range.

Set the IP Address as described in Table F-1.

Table F-1: Set IP Address on Agilent E7495A Test Set

✓	Step	Action
	1	Use the **System Button** > **Controls** >**IPAdmin** to set an IP Address on the E7495A as **128.0.0.49**, and Netmask to **255.255.255.128**.

Connections

It is recommended that you use a hub with BNC and RJ–45 Connections. Suggested Models: Netgear Model EN104 (4 Port) or EN108 (8 Port).

IMPORTANT

Do NOT use Model Numbers ending with “TP”; those have no BNC Connectors.

The LMF connects to the hub, which in turn, connects to the BTS and to the Agilent E7495A.

Agilent E7495A to Hub – This is an Ethernet Cable, RJ–45 to RJ–45.

LMF to Hub – Use one of the following cables to connect the LMF to the Hub:

– Ethernet Cable, RJ–45 to RJ–45 – Make sure that the LAN Card is set for either AUTO or to use RJ–45 only.

– COAX Cable between LAN Card and Hub – Use a “T” on the hub and connect a cable between the other end of the “T” and the BTS LAN Connection.

Hub to BTS – Use BNC “T” Connector on the hub. If your hub doesn’t have BNC Ports, use a BNC to UTP Adapter.

Detecting Test Equipment

Check that no other equipment is connected to the LMF. Agilent equipment must be connected to the LAN to detect it. Then perform the procedures described in Table F-2.

Table F-2: Agilent E7495A Test Equipment Detection Procedure

✓	Step	Action
	1	Click the **Tools** Menu.
	2	Choose **Options**.
	3	Check **Agilent E7495A** Option in non–GPIB Test Equipment and enter its IP Address.
	4	Click **Apply** and wait a moment.
	5	Click **Dismiss**.

F

Power Sensor Calibration

Table F-3 describes the E7495A Power Sensor Calibration.

Table F-3: E7495A Power Sensor Calibration Procedure

✓	Step	Action
	1	Display the Power Meter Screen.
	2	Zero the Power Meter by performing the following actions. – Make sure you are connected as shown in Figure F-1.
	2a	Press the Zero Softkey.
	2b	Press the Continue Softkey.
	3	Calibrate the Power Meter by performing the following actions.
	3a	Press Ref CF.
	3b	Enter the Reference Cal Factor, reading it off the label on the Power Sensor Head.
	3c	Press Calibrate.
	3d	Connect the Power Sensor. – Refer to Figure F-2.
	3e	Press Continue.
	3f	Press Cal Factor.
	3g	Enter the Cal Factor from the label on the Power Sensor Head. – Select a Cal Factor that is within the operating frequency of the Base Station.

Figure F-1: Agilent E7495A Pre–Power Sensor Calibration Connection

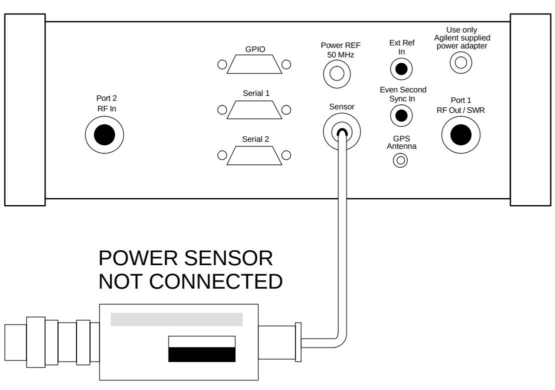

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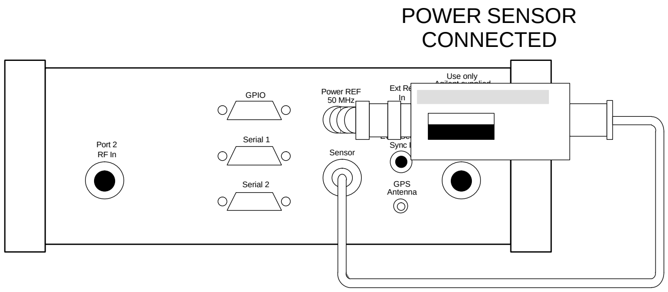
Figure F-2: Agilent E7495A Power Sensor Calibration Connection



Cable Calibration

Follow the directions in the WinLMF Program to calibrate cables.

– Calibrate the Short Test Cable (refer to Figure 3-15 on Page 3-66) and two 10 dB Pads to get a Base Line and then calibrate the TX and RX set–up. Since you need at least 40 dB of Loss when doing the FER Test, the set–up for RX is the same as TX.

ATP Set–up

TX Path Calibration Set–up is shown in Test Equipment Set–up. Refer to Figure 3-18 on Page 3-69.

F

Verifying and Setting GPIB Addresses

Agilent E4406A Transmitter Tester GPIB Address

Refer to Figure F-3 and perform the procedure in Table F-4 to verify and, if necessary, change the Agilent E4406A GPIB Address.

Figure F-3: Setting Agilent E4406A GPIB Address

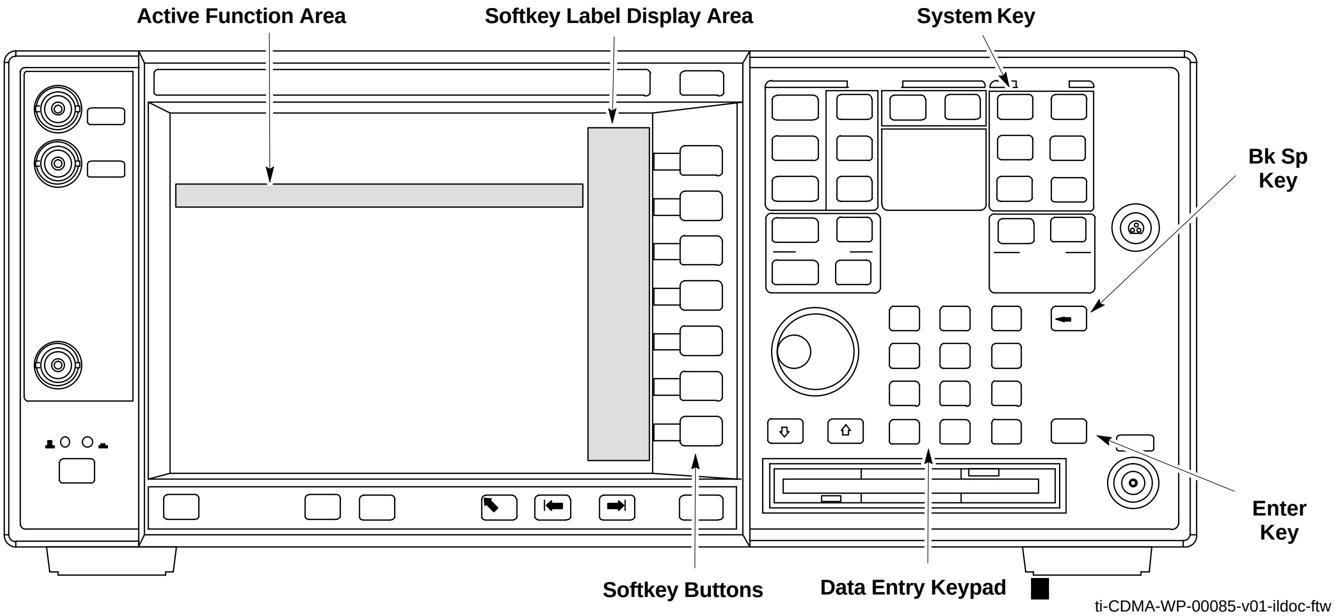


Table F-4: Verify and Change Agilent E4406A GPIB Address Procedure

✓	Step	Action
	1	In the **SYSTEM** section of the Instrument Front Panel, press the **System** Key. – The Softkey Labels displayed on the right side of the instrument screen changes.
	2	Press the **Config I/O** Softkey Button to the right of the instrument screen. – The Softkey Labels changes. – The current instrument GPIB Address will be displayed below the **GPIB Address** Softkey Label.
	3	If the current GPIB Address is not set to **18**, perform the following actions to change it.
	3a	Press the GPIB Address Softkey Button. – In the on–screen Active Function Area, **GPIB Address** will be displayed followed by the current GPIB Address.

table continued on next page

F

Table F-4: Verify and Change Agilent E4406A GPIB Address Procedure		
✓	Step	Action
	3b	On the Front Panel Data Entry Keypad, enter the Analyzer GPIB Address of **18**. – The **GPIB Address** Label changes to **Enter**. – Characters typed wi the Keypad replaces the current GPIB Address in the Active Function Area. **NOTE** To correct an entry, press the **Bk Sp** Key to delete one character at a time.
	3c	Press the **Enter** Softkey Button or the Keypad **Enter** Key to set the new GPIB Address. – The **Config I/O** Softkey Labels will re–appear. – The new GPIB Address will be displayed under the **GPIB Address** Softkey Label.

F

Agilent E4432B Signal Generator GPIB Address

Refer to Figure F-4 and perform the procedure in Table F-5 to verify and, if necessary, change the Agilent E4432B GPIB Address.

Figure F-4: Setting Agilent E4432B GPIB Address

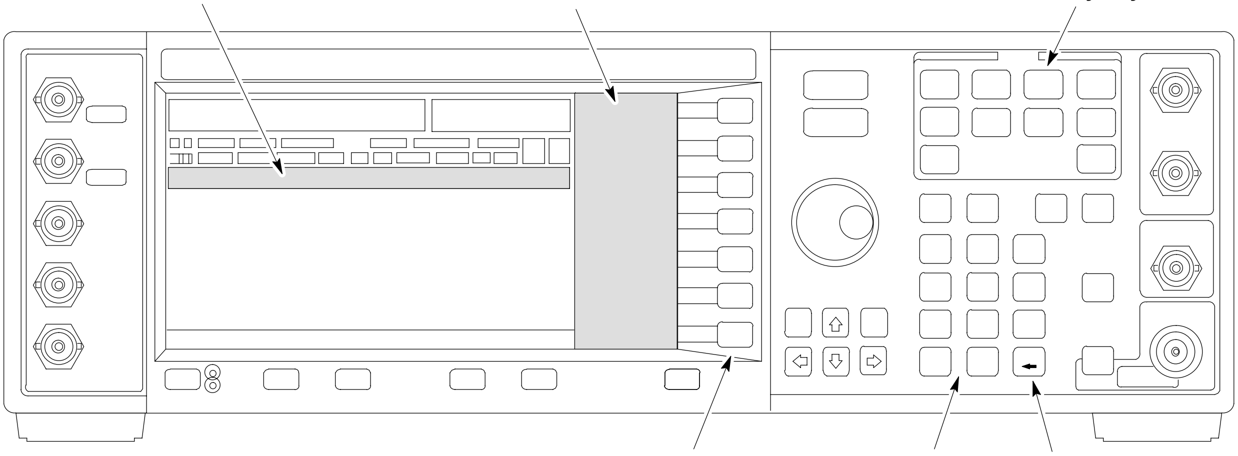


Table F-5: Verify that and Change Agilent E4432B GPIB Address

✓	Step	Action
	1	In the **MENUS** section of the Instrument Front Panel, press the **Utility** Key. – The Softkey Labels displayed on the right side of the instrument screen changes.
	2	Press the **GPIB/RS232** Softkey Button to the right of the instrument screen. – The Softkey Labels changes. – The current instrument GPIB Address will be displayed below the **GPIB Address** Softkey Label.
	3	If the current GPIB Address is not set to **1**, perform the following to change it:
	3a	Press the **GPIB Address** Softkey Button. – The **GPIB Address** Label and current GPIB Address changes to boldface. – In the on–screen Active Entry Area, **Address:** is displayed followed by the current GPIB Address
	3b	On the Front Panel Numeric Keypad, enter the Signal Generator GPIB Address of **1**. – The **GPIB Address** Label changes to **Enter**. – Characters typed in the Keypad replace the current GPIB Address in the Active Entry Display. **NOTE** To correct an entry, press the Backspace Key at the lower right of the Keypad to delete one character a a time.
	3c	Press the **Enter** Softkey Button to set the new GPIB Address. – The new GPIB Address will be displayed under the **GPIB Address** Softkey Label.

Advantest R3267 Spectrum Analyzer GPIB Address

Refer to Figure F-5 and perform the procedure in Table F-6 to verify and, if necessary, change the Advantest R3267 Spectrum Analyzer GPIB Address.

Figure F-5: Setting Advantest R3267 GPIB Address

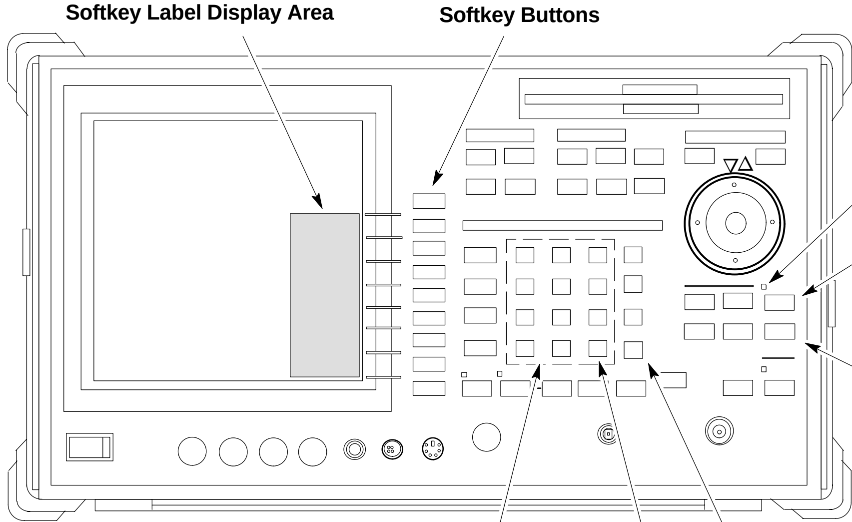


Table F-6: Verify that and Change Advantest R3267 GPIB Address

✓	Step	Action
	1	If the **REMOTE** LED is lighted, press the **LCL** Key. – The LED extinguishes.
	2	Press the **CONFIG** Key. – **CONFIG** Softkey Labels will appear in the Softkey Label display area of the instrument display. – The current GPIB Address will be displayed below the **GPIB Address** Softkey Label.
	3	If the current GPIB Address is not set to **18**, perform the following to change it:
	3a	Press the **GPIB Address** Softkey. – A **GPIB Address Entry** window will open in the instrument display showing the current GPIB Address.

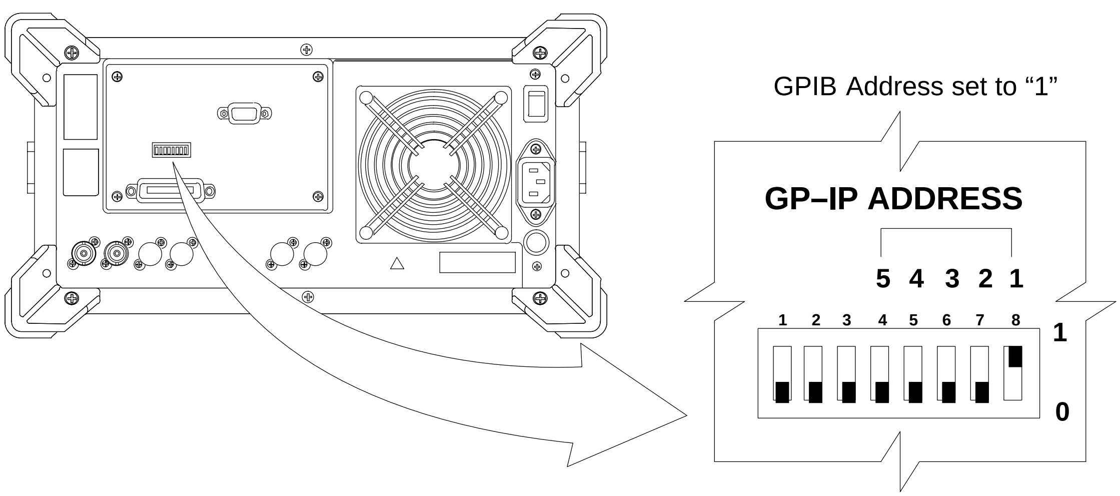
table continued on next page

Table F-6: Verify that and Change Advantest R3267 GPIB Address		
✓	Step	Action
	3b	Enter **18** on the Keypad in the **ENTRY Section** of the Instrument Front Panel. – Characters typed on the Keypad will replace the address displayed in the **GPIB Address Entry** Window. **NOTE** To correct an entry, press the **BS** (Backspace) Key at the lower right of the Keypad to delete one character at a time.
	3c	Press the **ENTR** Key to the lower right of the Keypad to set the new GPIB Address. – The **GPIB Address Entry** window closes. – The new address is displayed in the bottom portion of the **GPIB Address** Softkey Label.

Advantest R3562 Signal Generator GPIB Address

Set the **GP–IP ADDRESS** Switch on the rear of the Advantest R3562 Signal Generator to Address **1** as shown in Figure F-6.

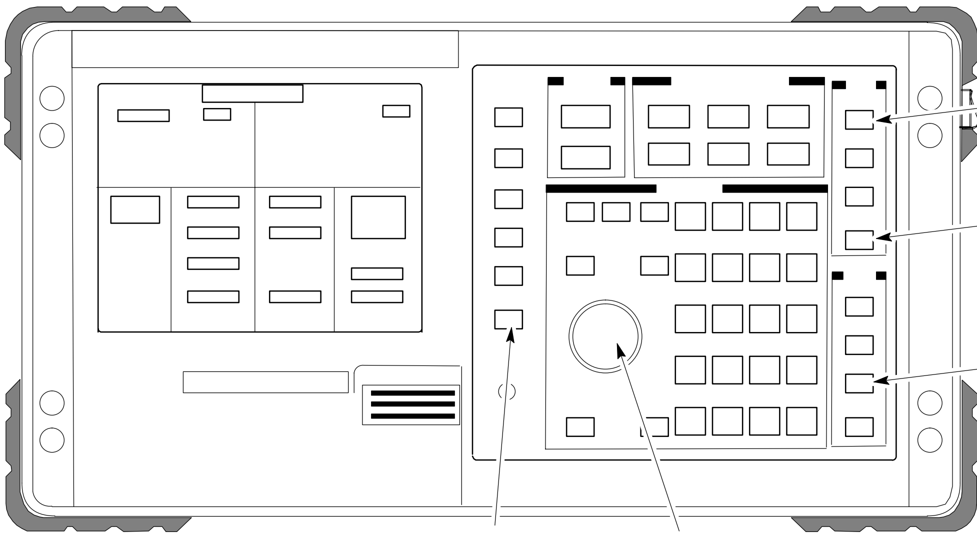
Figure F-6: Advantest R3562 GPIB Address Switch Setting



Agilent 8935 Series E6380 (formerly HP 8935) Test Set GPIB Address

Refer to Figure F-7 and perform the procedure in Table F-7 to verify and, if necessary, change the Agilent 8935 GPIB Address.

Figure F-7: Agilent 8935 Test Set



NOTE

This procedure assumes that the Test Equipment is set–up and ready for testing.

Table F-7: Verify and/or Change Agilent 8935 (formerly HP 8935) GPIB Address Procedure

✓	Step	Action
		NOTE The HP I/O Configuration MUST be set to **Talk & Listen,** or *no* device on the GPIB will be accessible. – Consult Test Equipment OEM Documentation for additional information as required.
	1	To verify that the GPIB Addresses are set correctly, press **Shift** and **LOCAL** on the Agilent 8935. – The current HP–IB Address is displayed at the top of the screen. **NOTE** HP–IB is the same as GPIB.
	2	If the current GPIB Address is not set to **18**, perform the following actions to change it:
	2a	Press **Shift** and **Inst Config**.
	2b	Turn the **Cursor Control** Knob to move the cursor to the **HP–IB Adrs** Field.

table continued on next page

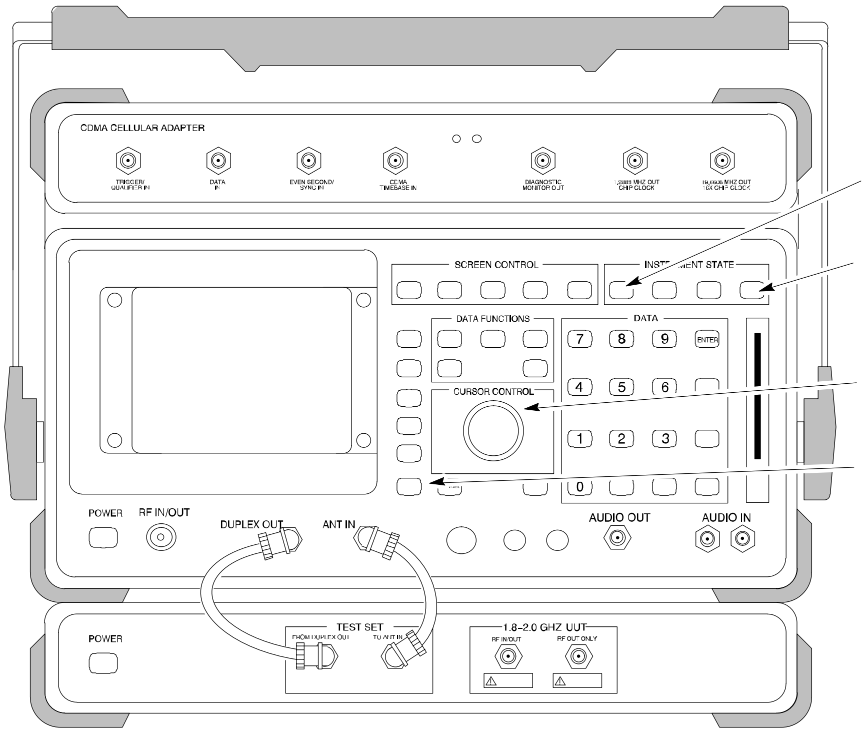
Table F-7: Verify and/or Change Agilent 8935 (formerly HP 8935) GPIB Address Procedure		
✓	**Step**	**Action**
	2c	Press the **Cursor Control** Knob to select the field.
	2d	Turn the **Cursor Control** Knob as required to change the address to **18**.
	2e	Press the **Cursor Control** Knob to set the address.
	3	Press **Preset** to return to normal operation.

F

Hewlett Packard HP 8921A and HP83236A/B GPIB Address

Refer to Figure F-8 and perform the procedure in Table F-8 to verify and, if necessary, change the HP 8921A HP 83236A GPIB Addresses.

Figure F-8: HP 8921A and HP 83236A/B



NOTE

This procedure assumes that the Test Equipment is set–up and ready for testing.

Table F-8: Verify and/or Change HP 8921A and HP 83236A GPIB Addresses Procedure

✓	Step	Action
	1	To verify that the GPIB Addresses are set correctly, press **Shift** and **LOCAL** on the HP 8921A. – The current HP–IB Address is displayed at the top of the screen. **NOTE** HP–IB is the same as GPIB.
	2	If the current HP–IB Address is not set to **18**, perform the following actions to change it.
	2a	Turn the **Cursor Control** Knob to move the cursor to **More** and press the knob to select the field.
	2b	Turn the **Cursor Control** Knob to move the cursor to **I/O Config** and press the knob to select the field.

table continued on next page

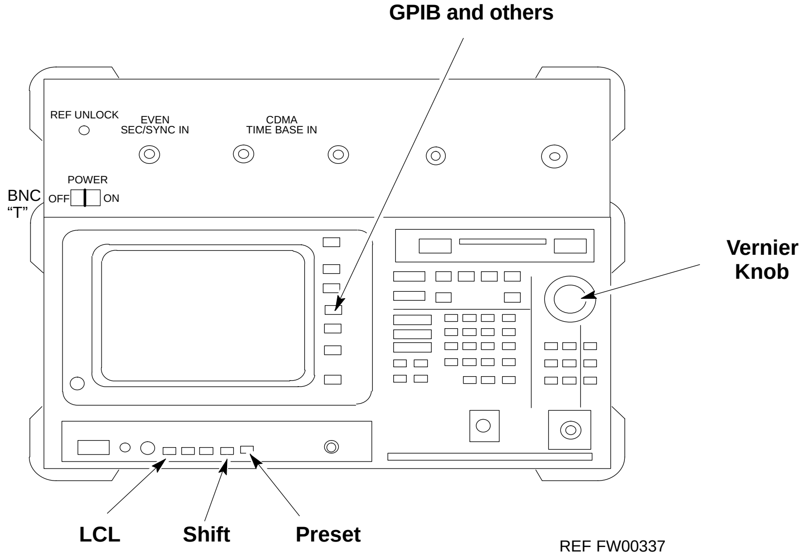
F

Table F-8: Verify and/or Change HP 8921A and HP 83236A GPIB Addresses Procedure		
✓	**Step**	**Action**
	2c	Turn the **Cursor Control** Knob to move the cursor to **Adrs** and press the knob to select the field.
	2d	Turn the **Cursor Control** Knob to change the HP–IB Address to **18** and press the knob to set the address.
	2e	Press **Shift** and **Preset** to return to normal operation.
	3	To set the HP 83236A (or B) PCS Interface GPIB Address = **19**, set the DIP Switches as follows: – A1=1, A2=1, A3=0, A4=0, A5=1, HP–IB/Ser = 1

Advantest R3465 Communications Test Set GPIB Address

Refer to Figure F-9 and perform the procedure in Table F-9 to verify and, if necessary, change the GPIB Address for the Advantest R3465.

Figure F-9: R3465 Communications Test Set



NOTE

This procedure assumes that the Test Equipment is set–up and ready for testing.

Table F-9: Verify and/or Change Advantest R3465 GPIB Address Procedure

✓	Step	Action
	1	To verify that the GPIB Address is set correctly, perform the following:
	1a	Press **SHIFT** then **PRESET**.
	1b	Press **LCL**.
	1c	Press the **GPIB and Others** CRT Menu Key to view the current address.
	2	If the current GPIB Address is not set to **18**, perform the following actions to change it.
	2a	Turn the Vernier Knob as required to select **18**.
	2b	Press the Vernier Knob to set the address.
	3	To return to normal operation, press **Shift** and **Preset**.

F

Motorola CyberTest GPIB Address

Perform the procedure in Table F-10 to verify and, if necessary, change the GPIB Address on the Motorola CyberTest. Changing the GPIB Address requires the following items:

- Motorola CyberTest Communications Analyzer.
- Computer running Windows 3.1/Windows 95 (or later).
- Motorola CyberTAME Software Program named “TAME”.
- Parallel Printer Port Cable (shipped with the CyberTest unit).

NOTE

This procedure assumes that the Test Equipment is set–up and ready for testing.

Table F-10: Verify and/or Change Motorola CyberTest GPIB Address Procedure

✓	Step	Action
	1	On the LMF Desktop, locate the CyberTAME Icon.
	2	Double–click on the CyberTAME Icon to run the CyberTAME Application.
	3	In the CyberTAME Window Taskbar, under **Special,** select **IEEE.488.2.** – The CyberTAME Software will query the CyberTest Analyzer for its current GPIB Address. – It then will open the IEEE 488.2 Dialog Box.
	4	If the current GPIB Address is not **18**, perform the following actions to change it.
	4a	Set the GPIB Address to **18**. – Use the UP and DOWN Increment Arrows. or – Double–click in the field and type the number.
	4b	Click on the **OK** Button. – The new address will be written to the CyberTest through the Parallel Port and saved.
	5	Verify that the address has been set by repeating Steps 3 and 4. – The new address should now appear in the IEEE 488.2 Dialog Box Address Field.

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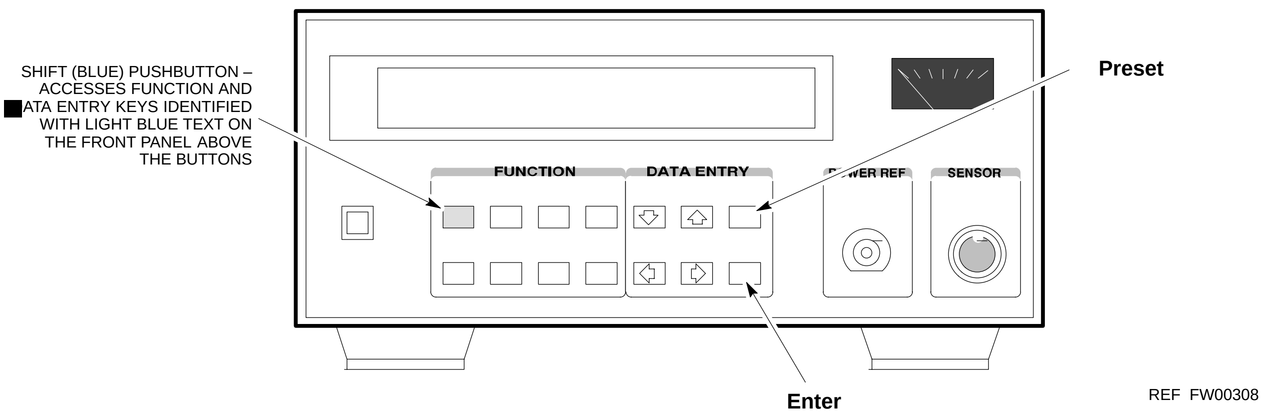
HP 437 Power Meter GPIB Address

Refer to Figure F-10 and follow the steps in Table F-11 to verify and, if necessary, change the HP 437 GPIB Address.

Figure F-10: HP 437 Power Meter



NOTE

This procedure assumes that the Test Equipment is set–up and ready for testing.

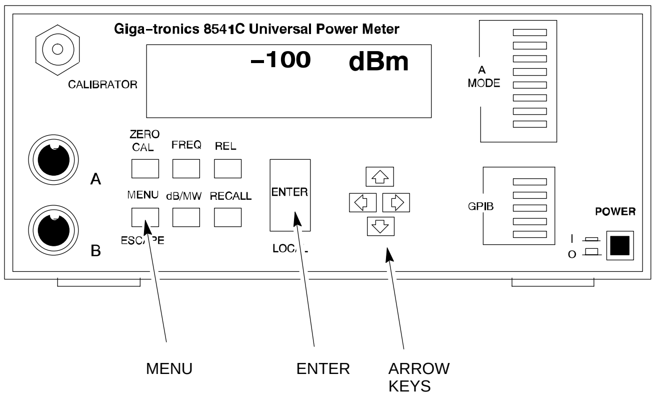
Table F-11: Verify and/or Change the HP 437 Power Meter GPIB Address Procedure

✓	Step	Action
	1	Press **Shift** and **PRESET**.
	2	Use the ⏶ (UP) Arrow Key to navigate to the HP–IB ADRS and press **ENTER**. – The HP–IB Address is displayed. **NOTE** HP–IB is the same as GPIB.
	3	If the current GPIB Address is not set to **13**, perform the following actions to change it.
	3a	Use the ⏶ (UP) and ⏷ (DOWN) Arrow Keys to change the HP–IB ADRS to **13**.
	3b	Press **ENTER** to set the new address.
	4	Press **Shift** and **ENTER** to return to a standard configuration.

Gigatronics 8541C Power Meter GPIB Address

Refer to Figure F-11 and follow the steps in Table F-12 to verify and, if necessary, change the Gigatronics 8541C Power Meter GPIB Address.

Figure F-11: Gigatronics 8541C Power Meter Detail



NOTE

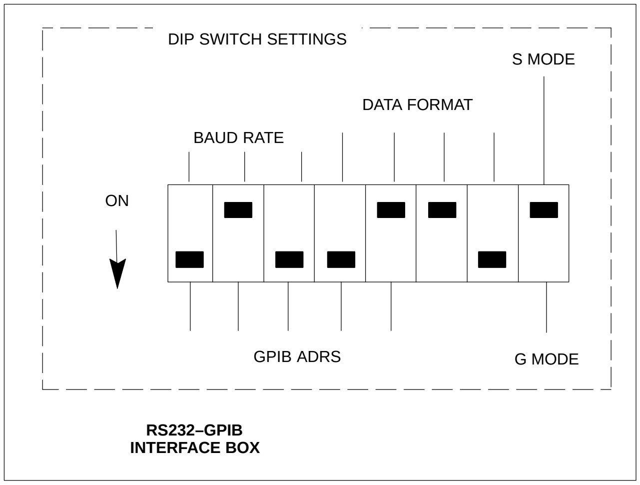
This procedure assumes that the Test Equipment is set–up and ready for testing.

Table F-12: Verify and/or Change Gigatronics 8541C Power Meter GPIB Address		
✓	**Step**	**Action**
	1	**! CAUTION** Do not connect/disconnect the Power Meter Sensor Cable with AC Power applied to the meter. Disconnection could result in destruction of the Sensing Element or miscalibration. Press **MENU**.
	2	Use the ▼ Arrow Key to select **CONFIG MENU** and press **ENTER**.
	3	Use the ▼ Arrow Key to select **GPIB** and press **ENTER**. The current **Mode** and GPIB **Address** are displayed.
	4	If the **Mode** is not set to **8541C**, perform the following to change it: Use the ◀ ▶ Arrow Keys as required to select **MODE**. Use the ▼▲ Arrow Keys as required to set **MODE** to **8541C**.
	5	If the GPIB Address is not set to **13**, perform the following to change it: Use the ▶ Arrow Key to select **ADDRESS**. Use the ▼▲ Arrow Keys as required to set the GPIB Address to **13**.
	6	Press **ENTER** to return to normal operation.

RS232 GPIB Interface Adapter

Ensure that the RS–232 GPIB Interface adapter DIP Switches are set as shown in Figure F-12.

Figure F-12: RS232 GPIB Interface Adapter



F

Inter–Unit Connection, Testing, and Control Settings

The following illustrations, tables, and procedures provide the information necessary to prepare various items of CDMA Test Equipment supported by the LMF for BTS Calibration and/or Acceptance Testing.

HP 8921A with PCS Interface Test Equipment Connections

The following diagram depicts the rear panels of the HP 8921A Test Equipment as configured to perform automatic tests. All Test Equipment is controlled by the LMF via an IEEE–488/GPIB Bus.

The LMF expects each piece of Test Equipment to have a factory-set GPIB Address (refer to Table F-8 and Figure F-8). If there is a communications problem between the LMF and any piece of Test Equipment, verify that the GPIB Addresses have been set correctly and that the GPIB Cables are firmly connected to the Test Equipment.

Figure F-13 shows the connections when *not using* an external 10 MHz Rubidium Reference.

Table F-13: HP 8921A/600 Communications Test Set Rear Panel Connections without Rubidium Reference

From Test Set:	To Interface:		Connector Type
8921A	83203B CDMA	83236A PCS	
CW RF OUT	CW RF IN		SMC–Female – SMC–Female
114.3 MHZ IF OUT	114.3 MHZ IF IN		SMC–Female – SMC–Female
IQ RF IN	IQ RF OUT		SMC–Female – SMC–Female
DET OUT	AUX DSP IN		SMC–Female – SMC–Female
CONTROL I/O	CONTROL I/O		45–pin Custom BUS
10 MHZ OUT	SYNTH REF IN		BNC–Male – BNC–Male
HPIB INTERFACE		HPIB INTERFACE	HPIB Cable
	10 MHZ OUT	REF IN	BNC–Male – BNC–Male

F

Figure F-13: HP 8921A/600 Cable Connections for 10 MHz Signal and GPIB without Rubidium Reference

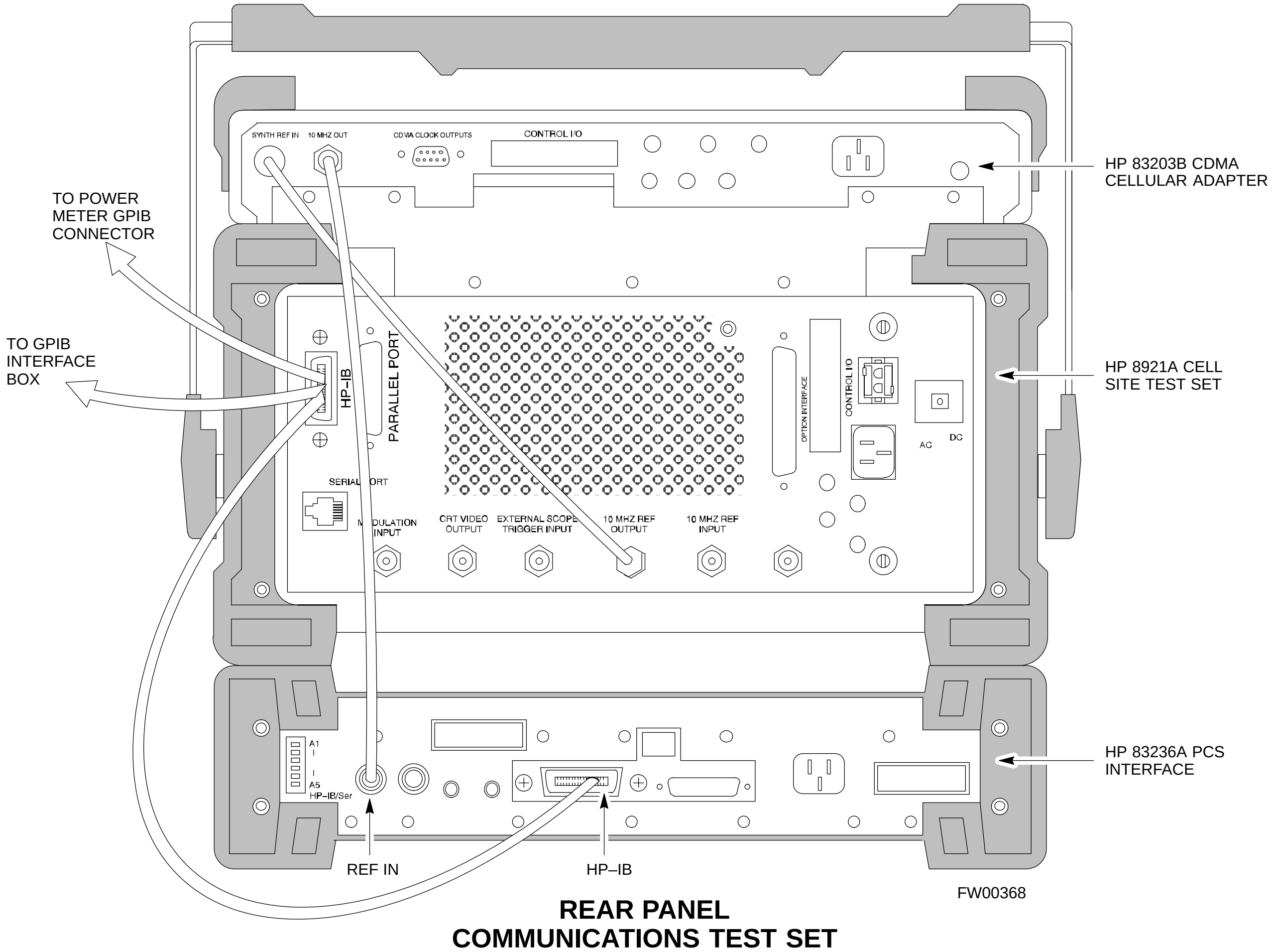
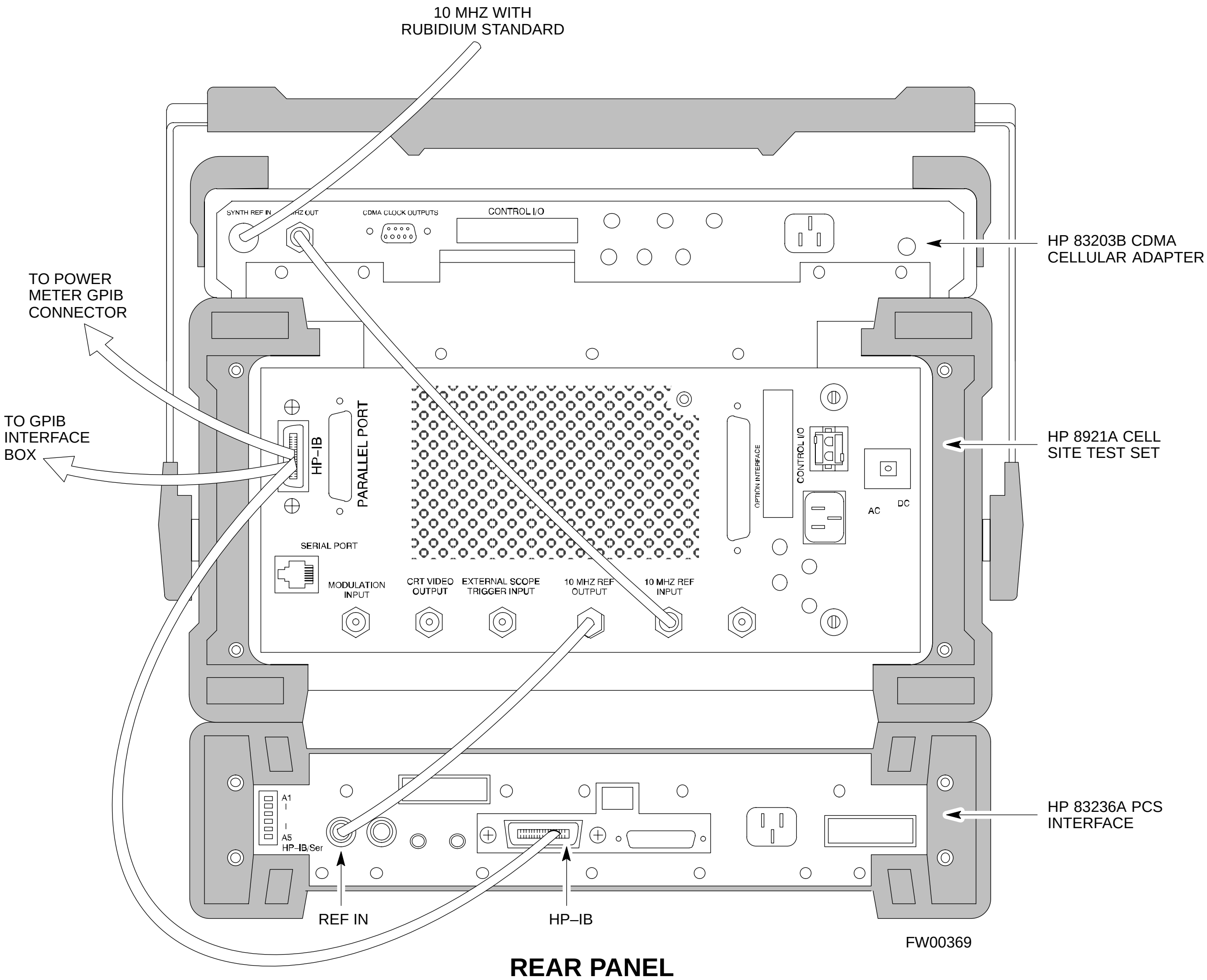


Table F-14: HP 8921A/600 Communications Test Set Rear Panel Connections with Rubidium Reference			
From Test Set:	**To Interface:**		**Connector Type**
8921A	**83203B CDMA**	**83236A PCS**	
CW RF OUT	CW RF IN		SMC–Female – SMC–Female
114.3 MHZ IF OUT	114.3 MHZ IF IN		SMC–Female – SMC–Female
IQ RF IN	IQ RF OUT		SMC–Female – SMC–Female
DET OUT	AUX DSP IN		SMC–Female – SMC–Female
CONTROL I/O	CONTROL I/O		45–pin custom BUS
10 MHZ OUT		REF IN	BNC–Male – BNC–Male
HPIB INTERFACE		HPIB INTERFACE	HPIB Cable
10 MHZ INPUT	10 MHZ OUT		BNC–Male – BNC–Male

Figure F-14 shows the connections when *using* an external 10 MHz Rubidium Reference.

Figure F-14: HP 8921A/600 Cable Connections for 10 MHz Signal and GPIB with Rubidium Reference



REAR PANEL
COMMUNICATIONS TEST SET

HP 8921A with PCS Interface System Connectivity Test

Perform the procedure in Table F-15 to verify that the connections between the PCS Interface and the HP 8921A are correct and cables are intact. The software also performs basic functionality checks of each instrument.

NOTE

Disconnect other GPIB Devices, especially system controllers, from the system before running the connectivity software.

Table F-15: System Connectivity Test Procedure

✓	Step	Action
		NOTE Perform this procedure *only after* Test Equipment has been allowed to warm–up and stabilize for a *minimum of 60 minutes*.
	1	Insert the HP 83236A Manual Control/System Card into the Memory Card Slot.
	2	Press the **[PRESET]** Pushbutton**.**
	3	Press the Screen Control **[TESTS]** Pushbutton to display the “Tests” Main Menu Screen.
	4	Position the cursor on **Select Procedure Location** and select it by pressing the Cursor Control Knob.
	5	In the **Choices** Selection Box, select **Card.**
	6	Position the cursor on **Select Procedure Filename** and select it by pressing the Cursor Control Knob.
	7	In the Choices Selection Box, select **SYS_CONN**.
	8	Position the cursor on **RUN TEST** and select it. – The software will provide operator prompts through completion of the Connectivity Set–up.
	9	Perform the following action when the test is complete. – Position cursor on **STOP TEST** and select it. OR – Press the **[K5]** Pushbutton.
	10	To return to the Main Menu, press the **[K5]** Pushbutton.
	11	Press the **[PRESET]** Pushbutton**.**

Pretest Set–up for HP 8921A

Before the HP 8921A CDMA Analyzer is used for LMF–controlled testing, it must be set–up correctly for automatic testing.

Table F-16: Pretest Set–up for HP 8921A

✓	Step	Action
	1	Unplug the Memory Card if it is plugged in.
	2	Press the **CURSOR CONTROL** Knob.
	3	Position the cursor on **IO CONFIG** (under **To Screen** and **More**) and select it.
	4	Select Mode and set for **Talk&Lstn**.

Pretest Set–up for Agilent 8935

Before the Agilent 8935 Analyzer is used for LMF–controlled testing, it must be set–up correctly for automatic testing.

Table F-17: Pretest Set–up for Agilent 8935

✓	Step	Action
	1	Unplug the Memory Card if it is plugged in.
	2	Press the **Shift** Button and then press the **I/O Config** Button.
	3	Press the **Push to Select** Knob.
	4	Position the cursor on **IO CONFIG** and select it.
	5	Select **Mode** and set for **Talk&Lstn**.

Advantest R3465 Connection

The following diagram depicts the Rear Panel of the Advantest R3465 Test Equipment as configured to perform automatic tests. All Test Equipment is controlled by the LMF via an IEEE–488/GPIB Bus. The LMF expects each piece of Test Equipment to have a factory-set GPIB Address. Refer to Table F-9 and Figure F-9.

If there is a communications problem between the LMF and any piece of Test Equipment, verify that the GPIB Addresses have been set correctly and that the GPIB Cables are firmly connected to the Test Equipment.

Figure F-15 shows the connections when *not using* an external 10 MHz Rubidium Reference.

Figure F-15: Cable Connections for Test Set without 10 MHz Rubidium Reference

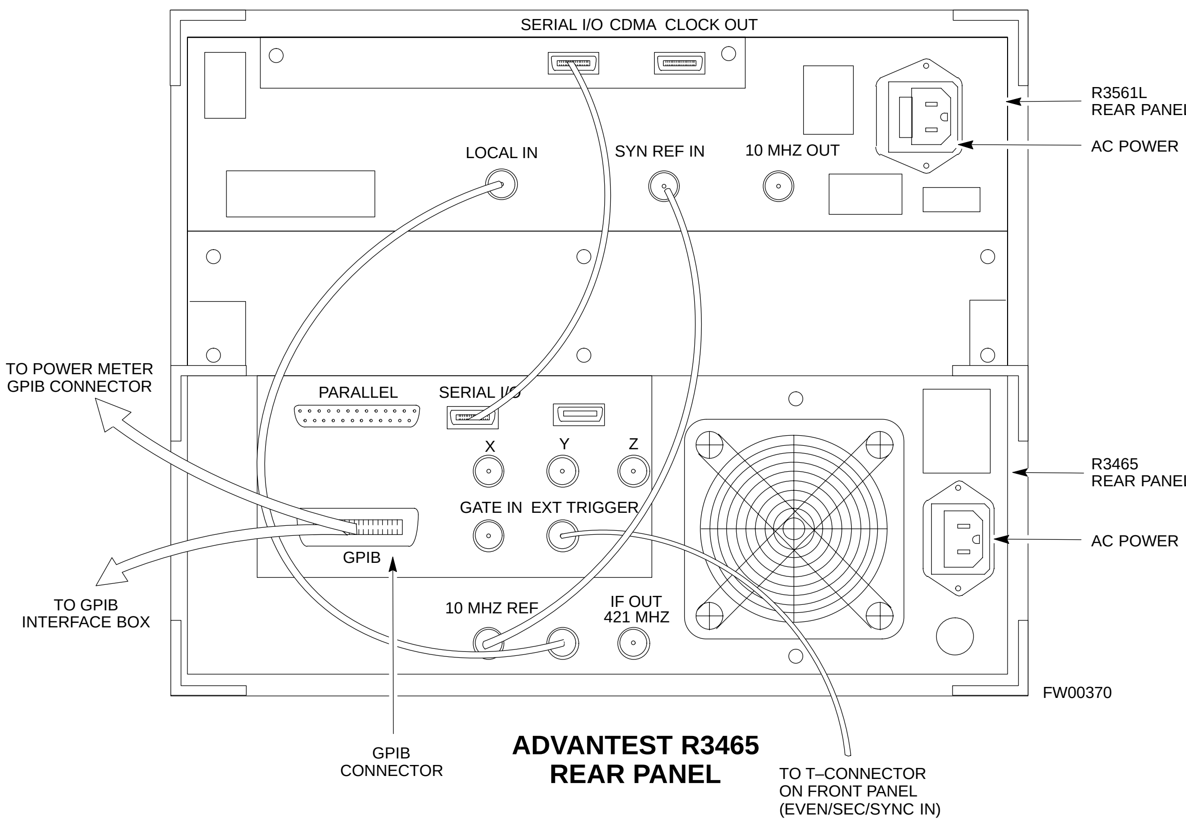
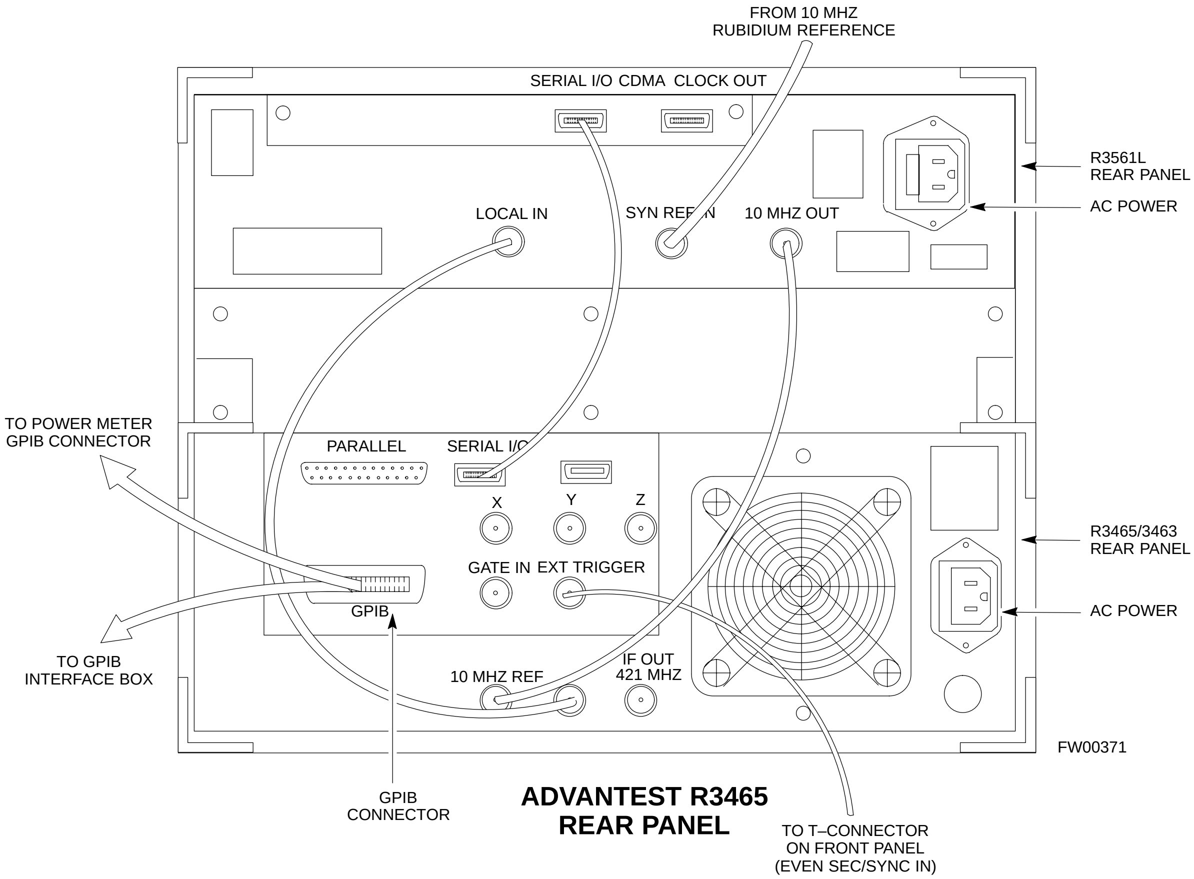


Figure F-16 shows the connections when *using* an external 10 MHz Rubidium Reference.

Figure F-16: Cable Connections for Test Set with 10 MHz Rubidium Reference



F

R3465 GPIB Clock Set–up

Table F-18 describes the steps to set the clock for the **Advantest** R3465 Equipment.

Table F-18: Advantest R3465 Clock Set–up Procedure		
✓	**Step**	**Action**
	1	Observe the current date and time displayed in upper right of the CRT Display.
	2	If the date and time are incorrect, perform the following to change them:
	2a	Push the **Date/Time CRT Menu Key**.
	2b	Rotate the Vernier Knob to select and set.
	2c	Push the Vernier Knob to enter.
	2d	Press the **SHIFT** Button, then press the **PRESET** Button (just below the CRT Display).

Pretest Set–up for Advantest R3465

Before the Advantest R3465 Analyzer is used for LMF–controlled testing, it must be set–up correctly for automatic testing.

Table F-19: Pretest Set–up for Advantest R346		
✓	**Step**	**Action**
	1	Press the **SHIFT** Button so the LED next to it is illuminated.
	2	Press the **RESET** Button.

F

Agilent 8932/E4432B Test Equipment Interconnection

To perform FER Testing on a 1X BTS with the Agilent 8935, a 1X–capable Signal Generator, such as the Agilent E4432B, must be used in conjunction with the CDMA Base Station Test Set. For proper operation, the Test Equipment Items must be interconnected as follows.

10 MHz Reference Signal

Connect a BNC (M)–BNC (M) Cable from the 8935 **10 MHz REF OUT Connector** to the E4432B **10MHz IN Connector** as shown in Figure F-17.

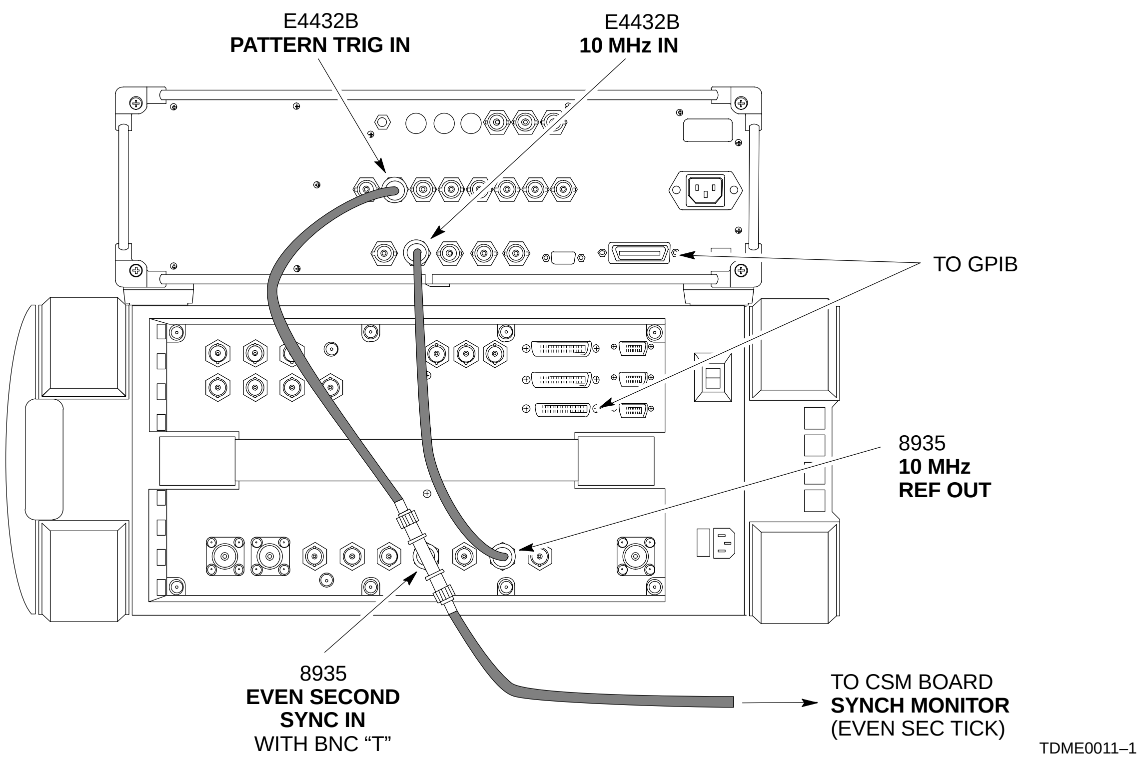
Even Second Pulse Reference

Refer to Figure F-17, and connect a BNC “T” Connector to the 8935 **EVEN SEC SYNC IN** Connector.

– Connect a BNC (M)–BNC (M) Cable from one side of the BNC “T” to the E4432B **PATTERN TRIG IN** Connector.

– Connect the other side of the BNC “T” to the CSM Card **SYNC MONITOR** Connector using a BNC (M)–BNC (M) Cable..

Figure F-17: Agilent 8935/E4432B 10MHz Reference and Even Second Clock Connections

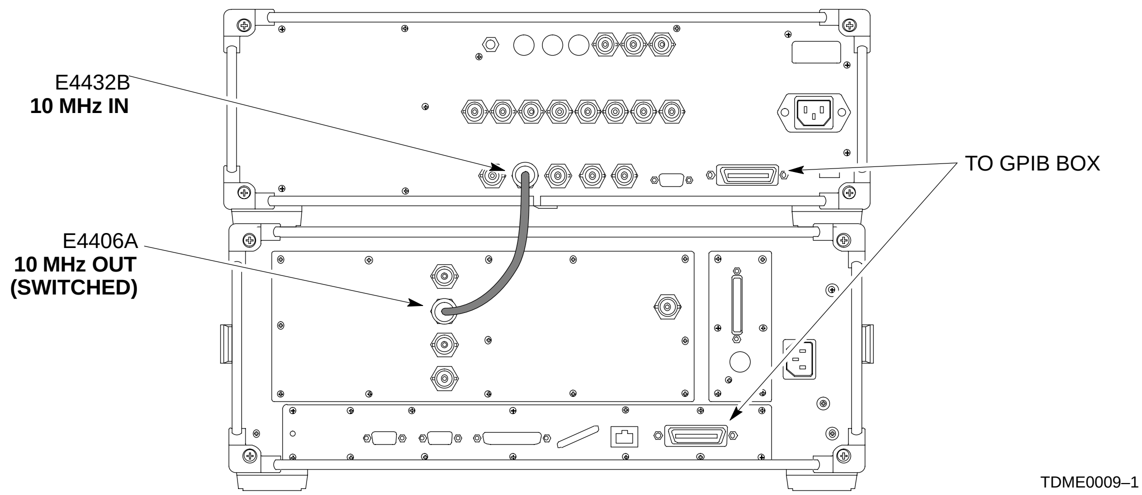


Agilent E4406A/E4432B Test Equipment Interconnection

To provide proper operation during testing when both units are required, the 10 MHz Reference Signal from the E4406A Transmitter Test Set must be provided to the E4432B Signal Generator.

– Connect a BNC (M)–BNC (M) Cable from the E4406A **10 MHz OUT (SWITCHED)** Connector to the E4432B **10MHz IN** Connector as shown in Figure F-18.

Figure F-18: Agilent 10 MHz Reference Connections



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Advantest R3267/R3562 Test Equipment Interconnection

To provide proper operation during testing when both units are required, the R3257 Spectrum Analyzer must be interconnected with the R3562 Signal Generator as follows:

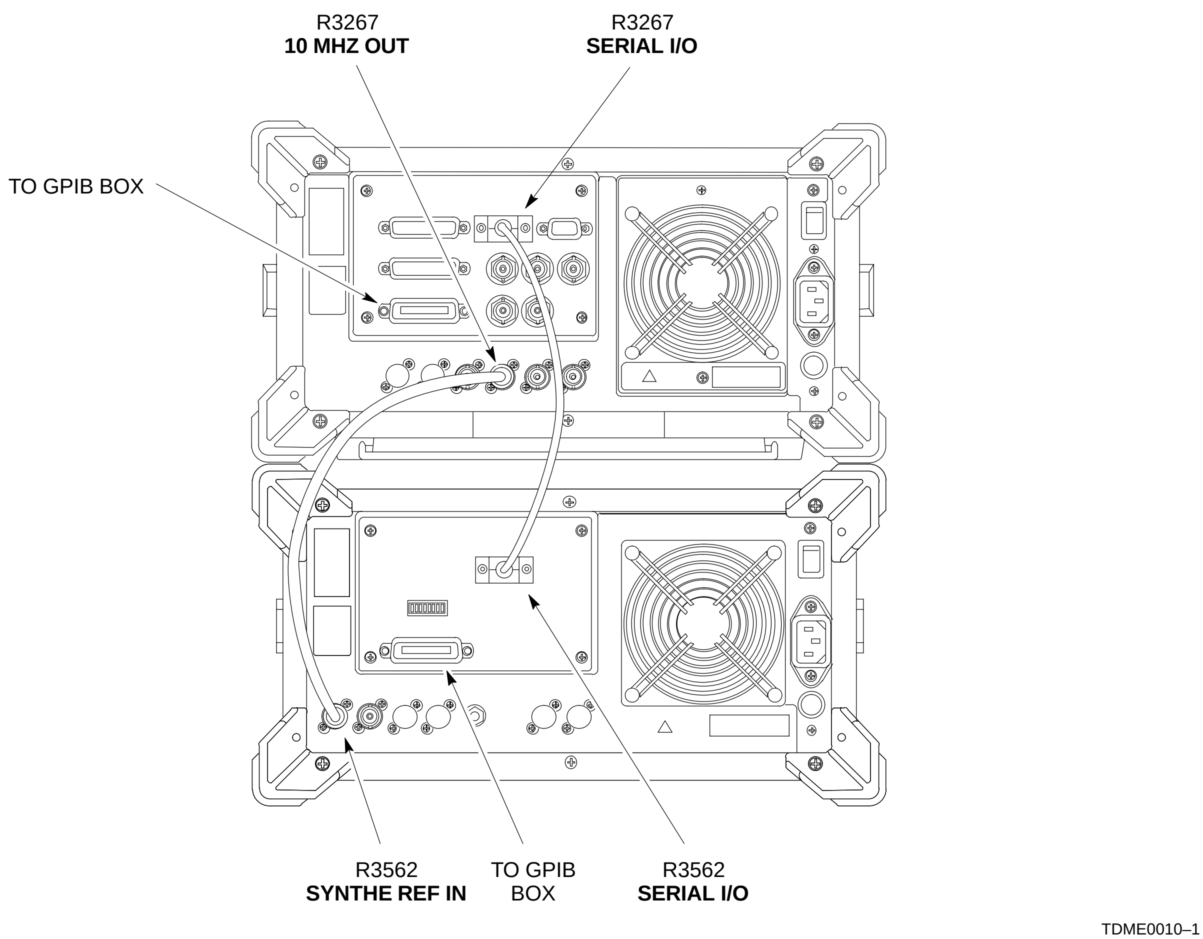
10 MHz Reference Signal

Connect a BNC (M)–BNC (M) Cable between the R3562 **SYNTHE REF IN** Connector and the R3267 **10 MHz OUT** Connector as shown in Figure F-19..

Serial I/O

Using the AdvanTest Cable provided, connect the R3267 **SERIAL I/O** Connector to the R3562 **SERIAL I/O** Connector as shown in Figure F-19..

Figure F-19: Advantest 10 MHz Reference and Serial I/O Connections



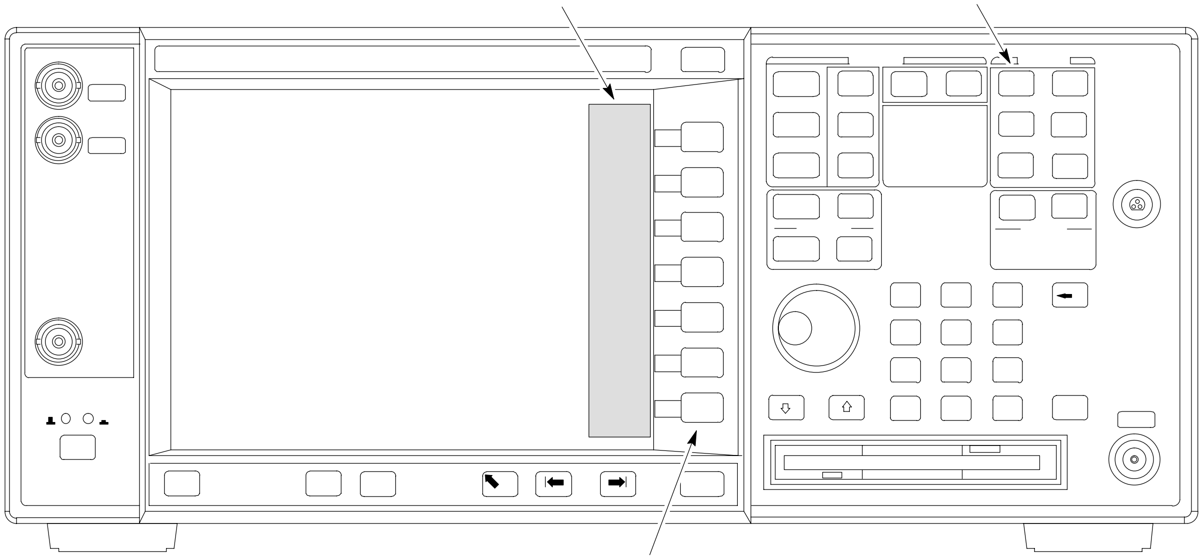
F

Calibration Without the LMF

Several Test Equipment Items used in the Optimization Process require Pre–Calibration actions or Calibration Verification that are not supported by the LMF. Procedures to perform these activities for the applicable Test Equipment Items are covered in this section.

Agilent E4406A Transmitter Tester Self–alignment (Calibration)

Figure F-20: Performing Agilent E4406A Self–alignment (Calibration)



Refer to Figure F-20 and perform the procedure in Table F-20 to perform the Agilent E4406A Self–alignment (Calibration).

Table F-20: Agilent E4406A Self–alignment (Calibration) Procedure

✓	Step	Action
	1	In the **SYSTEM** section of the Instrument Front Panel, press the **System** Key. – The Softkey Labels displayed on the right side of the instrument screen changes.
	2	Press the **Alignments** Softkey Button to the right of the instrument screen. – The Softkey Labels changes.
	3	Press the **Align All Now** Softkey Button. – All other instrument functions will be suspended during the alignment. – The display changes to show progress and results of the alignments performed. – The alignment will take less than one minute.

Calibrating HP 437 Power Meter

Precise Transmit Output Power Calibration Measurements are made using a Bolometer–type Broadband Power Meter with a sensitive **Power Sensor**. Perform the procedure in Table F-21 to enter information unique to the Power Sensor before calibrating the Test Set–up. Refer to Figure F-21 as required.

NOTE

This procedure must be done *before* the Automated Calibration to enter Power Sensor–specific Calibration Values.

Figure F-21: Power Meter Detail

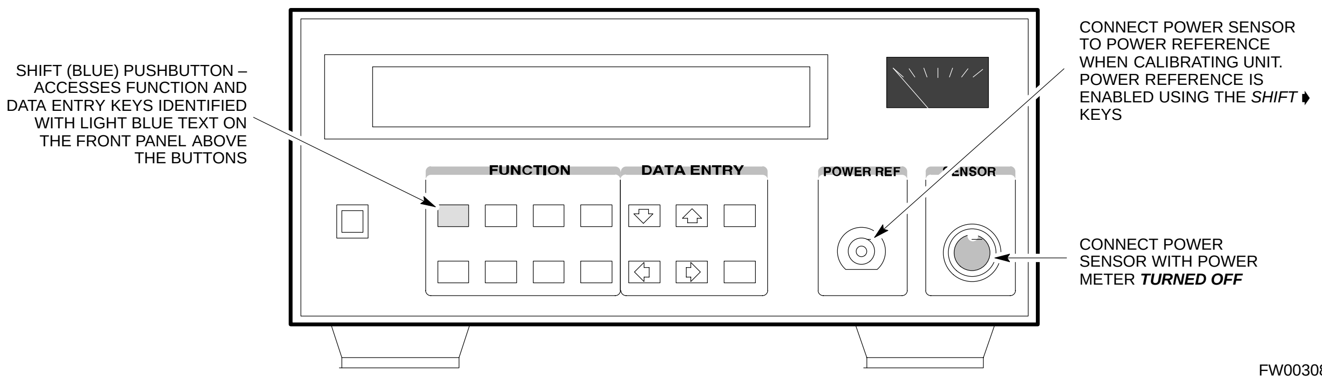


Table F-21: HP 437 Power Meter Calibration Procedure		
✓	**Step**	**Action**
		! CAUTION Do not connect/disconnect the Power Meter Sensor Cable with AC Power applied to the meter. – Disconnection could result in destruction of the Sensing Element or mis–calibration.
	1	Make sure the Power Meter **AC LINE** Pushbutton is **OFF**.
	2	Connect the Power Sensor Cable to the **SENSOR** Input.
	3	Set the **AC LINE** Pushbutton to **ON.** *** IMPORTANT** The Calibration should be performed only after the Power Meter and Sensor have been allowed to warm–up and stabilize for a *minimum of 60 minutes*.

table continued on next page

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Table F-21: HP 437 Power Meter Calibration Procedure

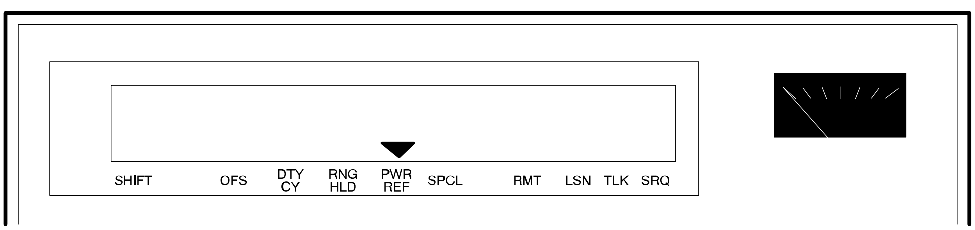
✓	Step	Action
	4	Perform the following actions to set or verify that the correct Power Sensor Model:
	4a	Press **[SHIFT]** then **[◀]** to select **SENSOR.**
	4b	Identify the Power Sensor Model Number from the Sensor Label.
	4c	Use the **[▲]** or **[▼]** Button to select the appropriate model; then press **[ENTER]**.
	5	Ensure that the Power Reference Output is OFF. – Refer to the illustration for Step 9.
	6	Observe the instrument display to determine if the triangular indicator over **PWR REF** is displayed. • If the triangular indicator ***is not displayed***, *proceed to Step 7*. • If the triangular indicator ***is displayed***: – *Proceed to Step 8.* – Press **[SHIFT]** then **[▶]** to turn it off.
	7	Press **[ZERO]**. – The display will show "Zeroing ******." – Wait for the process to complete.
	8	Connect the Power Sensor to the **POWER REF** Output.
	9	Turn on the **PWR REF** by performing the following actions.
	9a	Press **[SHIFT]** then **[▶]**.
	9b	Verify that the triangular indicator (below) appears in the display above **PWR REF**. 
	10	Perform the following actions to set the **REF CF%**.
	10a	Press (**[SHIFT]** then **[ZERO]**) for **CAL**.
	10b	Enter the Sensor's **REF CF%** from the Sensor's Decal using the Arrow Keys and press **[ENTER]**. – The Power Meter will display `"CAL *****"` for a few seconds. **NOTE** If the REF CAL FACTOR (REF CF) is not shown on the Power Sensor, assume it to be 100%.

table continued on next page

Table F-21: HP 437 Power Meter Calibration Procedure

✓	Step	Action
	11	Perform the following actions to set the **CAL FAC %**:
	11a	Press **[SHIFT]** then **[FREQ]** for **CAL FAC**.
	11b	On the Sensor's Decal, locate an approximate Calibration Percentage Factor (**CF%**) at 2 GHz.
	11c	Enter the Sensor's Calibration % (**CF%**) using the Arrow Keys and press **[ENTER]**. – When complete, the Power Meter will typically display 0.05 dBm; any reading between 0.00 and 0.10 is normal.
	12	To turn off the **PWR REF**, perform the following actions.
	12a	Press **[SHIFT]** then **[▶]**.
	12b	Disconnect the Power Sensor from the **POWER REF** Output.

F

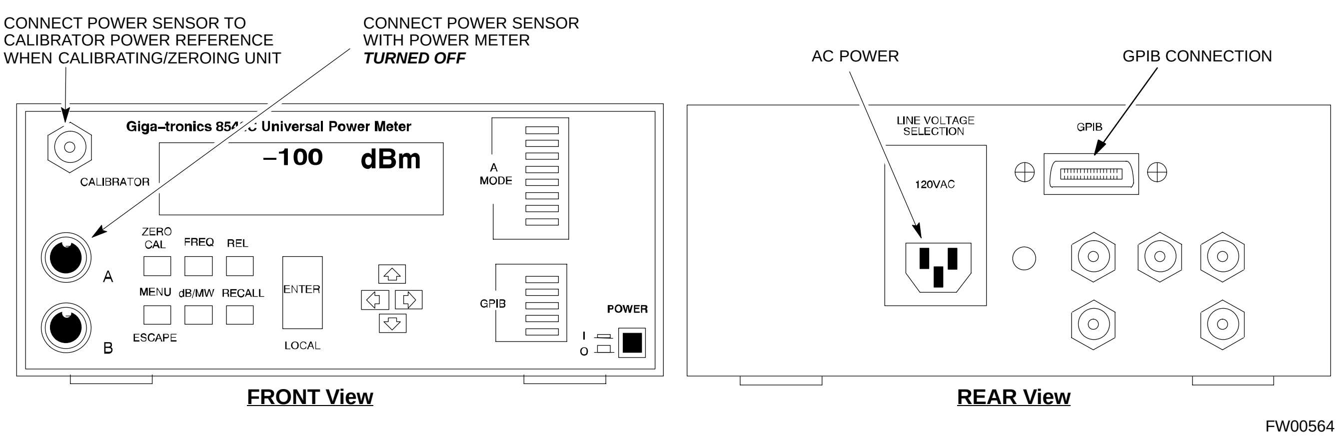
Calibrating the Gigatronics 8541C Power Meter

Precise transmit Output Power Calibration measurements are made using a Bolometer–type Broadband Power Meter with a sensitive Power Sensor. Perform the procedure in Table F-22 to enter information unique to the Power Sensor.

Table F-22: Gigatronics 8541C Power Meter Calibration Procedure

✓	Step	Action
		! CAUTION Do not connect/disconnect the Power Meter Sensor Cable while AC Power is applied to the meter. – Disconnection could result in destruction of the Sensing Element or miscalibration.
	1	Make sure the Power Meter **POWER** Pushbutton is **OFF**.
	3	Connect the Power Sensor Cable to the **SENSOR** Input.
	4	Set the **POWER** Pushbutton to **ON.** **NOTE** Allow the Power Meter and sensor to warm–up and stabilize for a *minimum of 60 minutes* before performing the Calibration Procedure.
	5	Connect the Power Sensor to the **CALIBRATOR** Output Connector.
	6	Press **ZERO**. – Wait for the process to complete. – Sensor Factory Calibration Data is read to Power Meter during this process.
	7	When the Zeroing Process is complete, disconnect the Power Sensor from the **CALIBRATOR** Output.

Figure F-22: Gigatronics 8541C Power Meter Detail



Calibrating the Test Cable Set–up using HP PCS Interface (HP83236)

Table F-23 covers the procedure to calibrate the Test Equipment using the HP8921 Cellular Communications Analyzer equipped with the HP83236 PCS Interface.

NOTE

This calibration method ***must be executed with great care.*** Some Losses are measured close to the minimum limit of the Power Meter Sensor (–30dBm).

Prerequisites

Ensure the following prerequisites have been met before proceeding:

- Test Equipment to be calibrated has been connected correctly for Cable Calibration.
- Test Equipment has been selected and calibrated.

Table F-23: Test Cable Set–up (using the HP PCS Interface) Calibration Procedure

✓	Step	Action
		NOTE Verify that GPIB Controller is turned off.
	1	Insert the HP83236 Manual Control System Card into the Memory Card Slot.
	2	Press the **Preset** Pushbutton.
	3	Under **Screen Controls,** press the **TESTS** Pushbutton to display the **TESTS** (Main Menu) Screen.
	2	Position the cursor on **Select Procedure Location** and select it.
	3	In the Choices Selection Box, select **CARD**.
	4	Position the cursor on **Select Procedure Filename** and select it.
	5	In the Choices Selection Box, select **MANUAL**.
	6	Position the cursor on **RUN TEST** and select it. – The HP Analyzer must be in Control Mode.
	7	Select **YES.**
	8	Proceed based upon the analyzer being used. • If the **HP83236A** is being used, *proceed to Step 9.* • If the **HP83236B** is being used, *proceed to Step 10.*

table continued on next page

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Table F-23: Test Cable Set–up (using the HP PCS Interface) Calibration Procedure		
✓	**Step**	**Action**
	9	Set the Channel Number=<*chan#*> by performing the following actions.
	9a	Position the cursor on **Channel Number** and select it.
	9b	Enter the *chan#* using the Numeric Keypad.
	9c	Press **[Enter]**. – The screen will go blank. – When the screen reappears, the *chan#* will be displayed on the Channel Number Line.
	9d	*Proceed to Step 11*.
	10	Set the Channel Frequency by performing the following actions.
	10a	Position the cursor on **Frequency Band** and press **Enter**.
	10b	Select **User Defined Frequency**.
	10c	Go **Back to Previous Menu**.
	10d	Position the cursor to **83236** Generator Frequency and enter actual RX Frequency.
	10e	Position the cursor to **83236** Analyzer Frequency and enter actual TX Frequency.
	11	Set the RF Generator Level by performing the following actions.
	11a	Position the cursor on **RF Generator Level** and select it.
	11b	Enter **–10** using the Numeric Keypad.
	11c	Press **[Enter]**. – The screen will go blank. – When the screen reappears, the value –10 dBm will be displayed on the RF Generator Level Line.
	12	Set the user–fixed Attenuation Setting to **0 dBm** by performing the following actions.
	12a	Position the cursor on **Analyzer Attenuation** and select it
	12b	Position the cursor on **User Fixed Atten Settings** and select it.
	12c	Enter 0 (zero) using the Numeric Keypad and press [**Enter**].
	13	Select **Back to Previous Menu**.
	14	Record the Generator Frequency Level . • If using the HP83226A, *proceed to Step 15.* • If using the HP83226B, *proceed to Step 16.*

table continued on next page

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Table F-23: Test Cable Set–up (using the HP PCS Interface) Calibration Procedure		
✓	Step	Action
	15	**HP83226A:** Perform the following actions.
	15a	Position the cursor on **Show Frequency and Level Details** and select it.
	15b	Under HP83236 Frequencies and Levels, record the Generator Level.
	15c	Position the cursor on **Prev Menu** and select it.
	15d	*Proceed to Step 17.*
	16	**HP83226B:** Perform the following actions.
	16a	Position the cursor on **Show Frequency and Level Details** and select it.
	16b	Under HP83236**B** Frequencies and Levels, record the Generator Frequency Level (1850 – 1910 MHz).
	16c	Position the cursor on **Prev Menu** and select it.
	17	Click on **Pause for Manual Measurement**.
	18	Connect the Power Sensor directly to the *RF OUT ONLY P*ort of the PCS Interface.
	19	On the HP 8921A, under **To Screen,** select **CDMA GEN**.
	20	Move the cursor to the **Amplitude** field and click on the Amplitude Value.
	21	Increase the Amplitude Value until the Power Meter reads **0 dBm ±0.2 dB**. **NOTE** The Amplitude Value can be increased coarsely until 0 dBM is reached; then fine tune the Amplitude by adjusting the **Increment Set** to 0.1 dBm and targeting in on 0 dBm.
	22	Disconnect the Power Sensor from the *RF OUT ONLY* port of the PCS Interface. **NOTE** The Power Meter Sensor's lower limit is –30dBm. Thus, only components having losses ≤30 dB should be measured using this method. **For further accuracy, always re-zero the Power Meter before connecting the Power Sensor to the component being calibrated.** – **After connecting the Power Sensor to the component, record the calibrated Loss immediately.**
	23	Disconnect all components in the Test Set–up in order to calibrate each component separately.
	23a	Connect each component, one-at-a-time, between the *RF OUT ONLY PORT* and the Power Sensor.
	23b	Record the calibrated Loss Value displayed on the Power Meter. • Example: (A) Test Cable(s) = –1.4 dB (B) 20dB Attenuator = –20.1 dB (B) Directional Coupler = –29.8 dB
	24	After all components have been calibrated, re–assemble all of the components back together.

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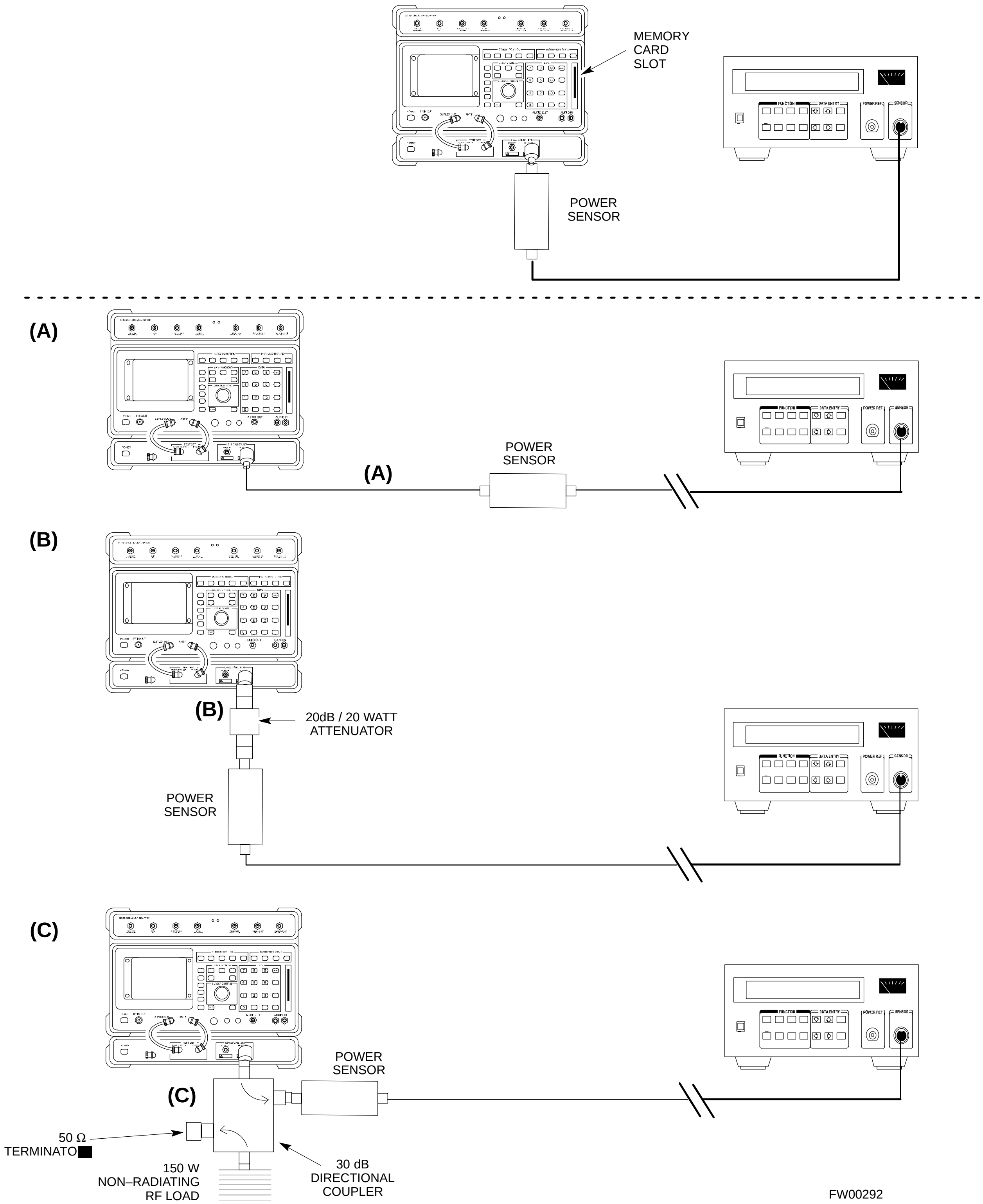
Table F-23: Test Cable Set–up (using the HP PCS Interface) Calibration Procedure		
✓	**Step**	**Action**
	25	Calculate the Total Test Set–up Loss Value by adding up all the individual Loss Values: • Example: Total Test Set–up Loss Value = –1.4 –29.8 –20.1 = –51.3 dB. – This calculated value will be used in the next series of tests.
	26	Under **Screen Controls** press the **TESTS** Button to display the **TESTS** (Main Menu) Screen.
	27	Select **Continue** (K2).
	28	Select **RF Generator Level** and set to –119 dBm.
	29	Click on **Pause for Manual Measurement**.
	30	Verify the **GPIB (HP–IB) Address** (HP 8921A Communication Analyzer/83203A CDMA Interface). – Fields not specifically identified remain at default values.
	30a	Under **To Screen,** select **More**.
	30b	Select **IO CONFIG**.
	30c	Set **HP–IB Adrs** to **18**.
	30d	Set Mode to **Talk&Lstn**.
	31	Verify that the HP 8921A is displaying Frequency instead of RF Channel.
	31a	Press the blue **[SHIFT]** Button, then press the Screen Control **[DUPLEX]** Button; this switches to the **CONFIG** (CONFIGURE) Screen.
	31b	Use the Cursor Control to set RF Display to **Freq.**
	32	Refer to Chapter 3 for assistance in setting the Test Cable Insertion Loss Values into the LMF.

Figure F-23: Cable Calibration using HP8921 with PCS Interface



Calibrating the Test Cable Set–up with the Advantest R3465

IMPORTANT

Ensure that the GPIB Interface is OFF for the duration of this procedure.

Advantest R3465 Manual Test Set–up and Calibration must be performed on both the TX and RX Frequencies.

Table F-24: Test Cable Set–up (using Advantest R3465) Calibration Procedure

✓	Step	Action
		*** IMPORTANT** This procedure can only be performed *after* Test Equipment has been allowed to warm–up and stabilize for a *minimum of 60 minutes*.
	1	Press the **SHIFT** and the **PRESET** Keys located below the display.
	2	Press the **ADVANCE** Key in the MEASUREMENT area of the Control Panel.
	3	Select the **CDMA Sig** CRT Menu Key.
	4	Select the **Set–up** CRT Menu Key.
	5	Use the Vernier Knob and the Cursor Keys to set the following parameters. **Generator Mode:** SIGNAL **Link:** FORWARD **Level Unit:** dBm **CalCorrection:** ON **Level Offset:** OFF **NOTE** Fields not listed remain at default values.
	6	Select the **Return** CRT Menu Key.
	7	Press **FREQ** Key in the ENTRY Area.
	8	Set the Frequency to the desired value by using the Keypad Entry Keys.
	9	Verify that the **Mod** CRT Menu Key highlighting is OFF. • If it ***is highlighting*** OFF, *proceed to Step 10.* • If it ***is not highlighting*** OFF: – Press the **Mod** Key to toggle it OFF. – *Proceed to Step 10.*

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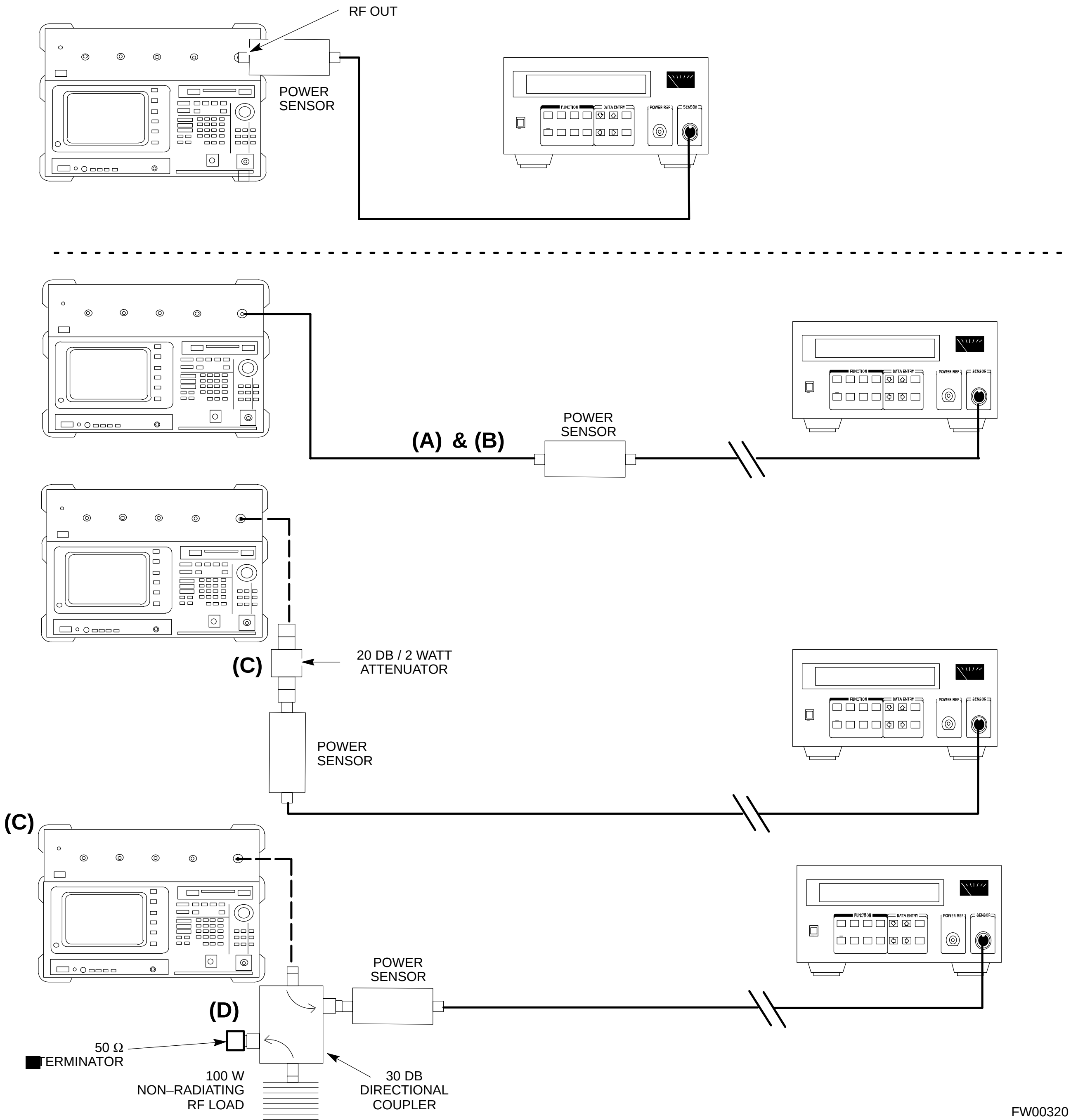
Table F-24: Test Cable Set–up (using Advantest R3465) Calibration Procedure		
✓	**Step**	**Action**
	10	Verify that the **Output** CRT Menu Key highlighting is OFF. • If it ***is highlighting*** OFF, *proceed to Step 11*. • If it ***is not highlighting*** OFF: – Press the **Output** Key to toggle it OFF. – *Proceed to Step 11*.
	11	Press the **LEVEL** Key in the ENTRY Area.
	12	Set the LEVEL to **0 dBm** using the Keypad Entry Keys.
	13	Zero the Power Meter.
	14	Connect the Power Sensor directly to the “RF OUT” Port on the R3561L CDMA Test Source Unit.
	15	Press the **Output** CRT Menu Key to toggle Output to ON.
	16	Record the Power Meter Reading ________________________
	17	Disconnect the Power Meter Sensor from the R3561L RF OUT Jack. *** IMPORTANT** The Power Meter Sensor’s lower limit is –30dBm. Thus, only components having losses ≤ 30 dB should be measured using this method. **For best accuracy, always re–Zero the Power Meter before connecting the Power Sensor to the component being calibrated.** – **Then, after connecting the Power Sensor to the component, record the calibrated Loss immediately.**
	18	Disconnect all components in the the Test Set–up in order to calibrate each one separately.
	18a	Connect each component one–at–a–time between the “RF OUT” Port and the Power Sensor. – Refer to Figure F-24, “Set–ups A, B, and C”.
	18b	Record the calibrated Loss Value displayed on the Power Meter for each connection. Example: (A) 1st Test Cable = –0.5 dB (B) 2nd Test Cable = –1.4 dB (C) 20dB Attenuator = –20.1 dB (D) 30 dB Directional Coupler = –29.8 dB
	19	Press the **Output** CRT Menu Key to toggle Output OFF.
	20	Calculate the total Test Set–up loss by adding up all the individual losses: Example: Total Test Set–up loss = 0.5 + 1.4 + 20.1 + 29.8 = 51.8 dB This calculated value will be used in the next series of tests.
	21	Press the **FREQ** Key in the ENTRY Area.
	22	Using the Keypad Entry Keys, set the test frequency to the RX Frequency.

table continued on next page

F

Table F-24: Test Cable Set–up (using Advantest R3465) Calibration Procedure		
✓	Step	Action
	23	Repeat Steps 9 through 19 for the RX Frequency.
	24	Refer to Chapter 3 for assistance in setting the Test Cable Insertion Loss Values into the LMF.

Figure F-24: Cable Calibration using the Advantest R3465



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Appendix G: Downloading ROM Code

Appendix Content

Downloading ROM Code G-1
Exception Procedure – Downloading ROM Code G-1

G

Notes

Exception Procedure – Downloading ROM Code

This procedure is not part of a normal Optimization.

Perform this procedure only on an exception basis when no alternative exists to load a BTS Device with the correct version of ROM Code.

NOTE

One GLI must be INS_ACTIVE (bright green) before ROM Code can be downloaded to non–GLI Devices.

CAUTION

The correct ROM and RAM Codes for the Software Release used on the BSS must be loaded into BTS Devices. To identify the correct device ROM and RAM Code Loads for the Software Release being used on the BSS, refer to the Version Matrix section of the SC™ CDMA Release Notes (supplied on the tapes or CD–ROMs containing the BSS Software).

All devices in a BTS must be loaded with the ROM and RAM Code specified for the Software Release used on the BSS before any Optimization or Acceptance Test Procedures can be performed.

If a replacement device is loaded with ROM Code that is not compatible with the BSS Software Release being used, the Device ROM Code can be changed using the LMF before performing the BTS Optimization and ATPs. *A device loaded with later release ROM Code can not be converted back to a previous release ROM Code in the field without Motorola assistance.*

If it is necessary to download ROM Code to a device from the LMF, the procedure in Table G-1 includes steps *for both ROM and RAM Code download using the LMF.*

Prerequisites

Prior to performing this procedure, ensure the correct ROM and RAM Code Files exist in the LMF Computer's applicable **<*x*>:\<*lmf home directory*>\cdma\loads**<*codeload#*>**code** Folder for each of the devices to be loaded.

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CAUTION

The Release Level of the ROM Code to be downloaded must be the one specified for the Software Release installed in the BSS. The Release Level of the ROM Code resident in the other devices in the BTS must also be correct for the BSS Software Release being used.

ROM Code must not be downloaded to a frame loaded with code for a BSS Software Release with which it is not compatible.

This procedure should only be used to upgrade replacement devices for a BTS. It should NOT be used to upgrade all devices in a BTS.

If a BTS is to be upgraded from R15.x to R16.0, etc., the upgrade should be done by the OMC–R using the DownLoad Manager.

Table G-1: ROM and RAM Code Download to Devices Procedure

✓	Step	Action
	1	Click on the device to be loaded. **NOTE** More than one device of the *same* type can be selected for download by either clicking on each one to be downloaded or from the BTS Menu Bar **Select** Pull–down Menu, select the *device* item that applies. Where: *device* = the type of device to be loaded (BBX, CSM, GLI, MCC)
	2	From the BTS Menu Bar **Device** Pull–down Menu, select **Status**. – A Status Report Window will appear.
	3	Make a note of the number in the **HW Bin Type** column. **NOTE** “HW Bin Type” is the Hardware Binary Type for the device. This code is used as the last four digits in the filename of a device’s Binary ROM Code File. – By using this part of the filename, the ROM Code File can be matched to the device in which it is to be loaded.
	4	Click **OK** to close the Status Window.
	5	Click on the device to be loaded.
		NOTE ROM Code is automatically selected for download from the `<x>:\<lmf Home Directory>\version folder>\<Code Folder>` specified by the NextLoad property in the `bts-#.CDF File`. To check the value of the NextLoad Property, click on **Util** > **Examine** > **Display** NextLoad. – A Pop–up Message will show the value of the NextLoad.

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Table G-1: ROM and RAM Code Download to Devices Procedure		
✓	**Step**	**Action**
	6	From the BTS Menu Bar **Device** Pull–down Menus, select **Download > ROM**. • If the file matching the Hardware Binary Type of the device is found in the Code Folder, a Status Report shows the result of the download. – *Proceed to Step 11.* • If a file selection Window appears, select the ROM Code File manually. – *Proceed to Step 7.*
	7	Double–click on the Version Folder with the desired Version Number for the ROM Code File (for example: *2.16.0.x*).
	8	Double–click the **Code** Folder. – A list of ROM and RAM Code Files will be displayed.
	9	**! CAUTION** A ROM Code File with the correct HW Bin Type must be chosen. Using a file with the wrong HW Bin Type can result in unpredictable operation and damage to the device. Click on the ROM Code File with the filename that matches the device type and HW Bin Type number noted in Step 3 (for example, file **bbx_rom.bin.0604** is the ROM Code File for a BBX with a HW Bin Type of 0604). – The file should be highlighted.
	10	Click on the **Load** Button. – A Status Report Window is displayed showing the result of the download. **NOTE** If the ROM Load failed for some devices, load them *individually* by clicking on one device, perform Steps 6 through 10 for it, and repeat the process for each remaining device.
	11	Click **OK** to close the Status Window.
	12	From the LMF Window Menu Bar **Tools** Pull–down Menus, select **Update NextLoad** > **CDMA**.
	13	In the left–hand pane of the window that opens, click on the BTS Number for the frame being loaded (for example, *BTS–14*).
	14	On the list of versions displayed in the right–hand pane, click the Button next to the Version Number of the folder that was used for the ROM Code download (for example, *2.16.0.x*) and click **Save**. – A Pop–up Message will appear showing the CDF has been updated.
	15	Click on the **OK** Button to dismiss the Pop–up Message.
	16	Click on the device that was loaded with ROM Code.

table continued on next page

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Table G-1: ROM and RAM Code Download to Devices Procedure		
✓	**Step**	**Action**
	17	**NOTE** RAM Code is automatically selected for download. From the BTS Menu Bar **Device** Pull–down Menus, select **Download > Code/Data** to download RAM Code and DDS File Data. – A Status Report is displayed showing the result of the download.
	18	Click **OK** to close the Status Window.
	19	Observe the downloaded non–GLI Device to ensure it is OOS_RAM (yellow).
	20	Click on the device that was loaded with code.
	21	From the BTS Menu Bar **Device** Pull–down Menu, select **Status**. Verify that the correct ROM and RAM Version Numbers are displayed in the Status Report Window.
	22	Click **OK** to close the Status Window.

Appendix H: In–Service Calibration

Appendix Content

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Notes

Introduction

Purpose

This procedure is a guide to performing Calibration of new BTS expansion carriers while the system remains in service. This procedure also supports BTS Recalibration following replacement of RF Chain components while the remainder of the site stays in service.

Motorola recommends performing this procedure during a Maintenance Window.

This procedure cannot be performed on BTSs with 2–to–1 Combiners. The procedure can only be performed on one carrier of the BTS at a time. That is, LPA Modules 1A, 1B, 1C, and 1D can be calibrated while LPA Modules 3A, 3B, 3C, and 3D remain in service and vice versa.

Equipment STabilization and Calibration

NOTE

Calibration of the Communications Test Set (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 *minimum of 60 minutes*.

CAUTION

If any component of the *Test Equipment Set* (for example, a Test Cable, RF Adapter, Signal Generator) has been replaced, the *Test Equipment Set* must be recalibrated.

Failure to do so could introduce Measurement Errors that ultimately result in degradation of system performance.

1X Test Equipment Requirements

In–Service Calibration (ISC) of 1X carrier functions requires using the following Test Equipment for the purposes indicated:

- An Advantest R3267 Spectrum Analyzer to perform TX Calibration.
- An Advantest R3562 Signal Generator for R3267 Delta Power Calibration.
- An Agilent E4406A Transmitter Test Set to perform TX Calibration
- An Agilent E4432A Signal Generator for E4406A Delta Power Calibration.
- An Agilent 8935 Series E6380A equipped with Option 200 (if purchased new) or option R2K (if retrofitted) to perform TX Calibration.

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The CDMA Communications System Analyzers listed above are capable of calibrating the BTS for both IS–95 A and B Mode Operation as well as CDMA2000 1X Operation.

NOTE

IS–95A/B Communication Test Sets such as the HP 8921A/600 and Advantest R3561L *can not calibrate 1X carrier functions*.

Calibration and Test Set–up for the HP 8921A/600 and Advantest R3561L Test Sets is included only for situations where it is necessary to use them for Calibration of IS–95A/B Mode Operation.

Introduction

The ISC Procedure has several differences from a normal Calibration Procedure. One of these is the use of a Spectrum Analyzer/Communications Test Set instead of a Power Meter to measure power.

- Power Meters are Broadband Measurement Devices and cannot be used to measure power during ISC because other carriers are operating.
- A Spectrum Analyzer can be used because it measures power at a given frequency.

Measuring power using a Spectrum Analyzer is less accurate than using a Power Meter, therefore, compensation is required for the Accuracy Difference (Delta) between the Power Meter and the Spectrum Analyzer.

Agilent E4406A Power Delta Calibration

The Agilent E4406A Transmitter Tester and E4432B Signal Generator Test Equipment combination can be used for ISC of IS–2000 CDMA 1X as well as IS–95A/B Operation Modes. The Power Delta Calibration is performed on the E4406A, but the E4432B is required to generate the Reference Signal used to calculate the Power Delta offset. After the Offset Value has been calculated, add it to the TX Test Cable Insertion Loss Value in the LMF.

Preliminary Agilent Test Equipment Set–up

To provide proper operation during Power Delta Calibration, ensure that the E4406A and E4432B are connected as shown in Figure F-18.

Power Delta Calibration

Perform the procedure in Table H-1 to perform the Agilent E4406A Power Delta Calibration Procedure.

Table H-1: Agilent E4406A Power Delta Calibration Procedure

✓	Step	Action
		NOTE Perform this procedure *after* Test Equipment has been allowed to warm–up and stabilize for a *minimum of 60minutes.* – After it is warmed–up and stabilized, calibrate the Test Equipment as described in the “Test Set Calibration” section of Chapter 3.
	1	Zero the Power Meter prior to connecting the Power Sensor to the RF Cable from the Signal Generator. **NOTE** For best accuracy, always re–Zero the Power Meter before connecting the Power Sensor to the component being calibrated.

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Table H-1: Agilent E4406A Power Delta Calibration Procedure		
✓	Step	Action
	2	Ensure that the E4406A and E4432B are connected as shown in Figure F-18.
	3	Connect a short RF Cable from the E4432B **RF OUTPUT** Connector the HP437 Power Meter Power Sensor. – Refer to Figure H-1.
	4	Set the E4432B Signal Generator by performing the following actions.
	4a	Press **Preset** to exit any modes for which the Signal Generator is configured.
	4b	Press **Frequency** and enter the *frequency* of the channel to be calibrated on the Numeric Keypad.
	4c	Using the Softkeys to the right of the screen, select the Frequency Range to be measured; for example: **MHz**.
	4d	Press **Amplitude** and, using the Numeric Keypad, set the Signal Amplitude to **0** (zero).
	4e	Using the Softkeys, set the measurement type to **dBm**.
	5	On the E4432B, press **RF On/Off** to toggle the RF Output to **RF ON**. – Note that the RF On/Off Status in the Screen Display changes.
	6	Measure and record the Value Reading on the HP437 Power Meter as result. **A**____________________
	7	On the E4432B, press **RF On/Off** to toggle the RF Output to **RF OFF**. – Note that the RF On/Off Status in the Screen Display changes.
	8	Disconnect the short RF Cable from the HP437 Power Meter Power Sensor, and connect it to the **RF INPUT** Connector on the E4406A Transmitter Tester. – Refer to Figure H-2.
		*** IMPORTANT** Do not change the Frequency and Amplitude Settings on the E4432B when performing the following actions.
	9	Set the E4406A by performing the following actions.
	9a	Press **Preset** to exit any modes for which the Transmitter Tester is configured.
	9b	Press **MODE** and, using the Softkeys to the right of the screen, select **cdmaOne**.
	9c	Press **MEASURE** and, using the Softkeys, select **spectrum**.
	9d	Press **Frequency** and, using the Softkeys, select **Center Frequency**.
	9e	Enter the *frequency* of the channel to be calibrated using the Numeric Keypad.
	9f	Using the Softkeys, select the Frequency Range to be measured; for example, **MHz**.
	9g	Press Input/Output and, using the Softkeys, select **Input Atten**.
	9h	Using the Numeric Keypad, set **Input Atten** to **0** (zero) and, using the Softkeys, select **dB**.

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Table H-1: Agilent E4406A Power Delta Calibration Procedure		
✓	Step	Action
	9i	Using the Softkeys, select **External Atten** and then select **Mobile**.
	9j	Using the Numeric Keypad, set **Mobile** to **0** (zero) and, using the Softkeys, select **dB**.
	9k	Using the Softkeys, select **Base**.
	9l	Using the Numeric Keypad, set **Base** to **0** (zero) and, using the Softkeys, select **dB**.
	9m	Press **MEASURE** and, using the Softkeys, select **Channel Power**.
	10	On the E4432B Signal Generator, press **RF On/Off** to toggle the RF Output to **RF ON**. – Note that the RF On/Off status in the Screen Display changes.
	11	Read the measured Channel Power from the E4406A Screen Display and record it as Result **B**. **B**____________________.
	12	On the E4432B, press **RF On/Off** to toggle the RF Output to **RF OFF**. – Note that the RF On/Off status in the Screen Display changes.
	13	Calculate the **Power Calibration Delta** Value. – The Delta Value is the Power Meter Measurement minus the Agilent measurement. **Delta = A – B** Example: Delta = –0.70 dBm – (–1.25 dBm) = 0.55 dBm Example: Delta = 0.26 dBm – 0.55 dBm = –0.29 dBm **NOTE** These examples are included to show the mathematics and do not represent actual readings. **NOTE** Add this Delta Value to the **TX Cable Loss Value** during In–Service Calibration. – Refer to Step 4 in Table H-6.

Figure H-1: Delta Calibration Set–up – Agilent E4432B to HP437

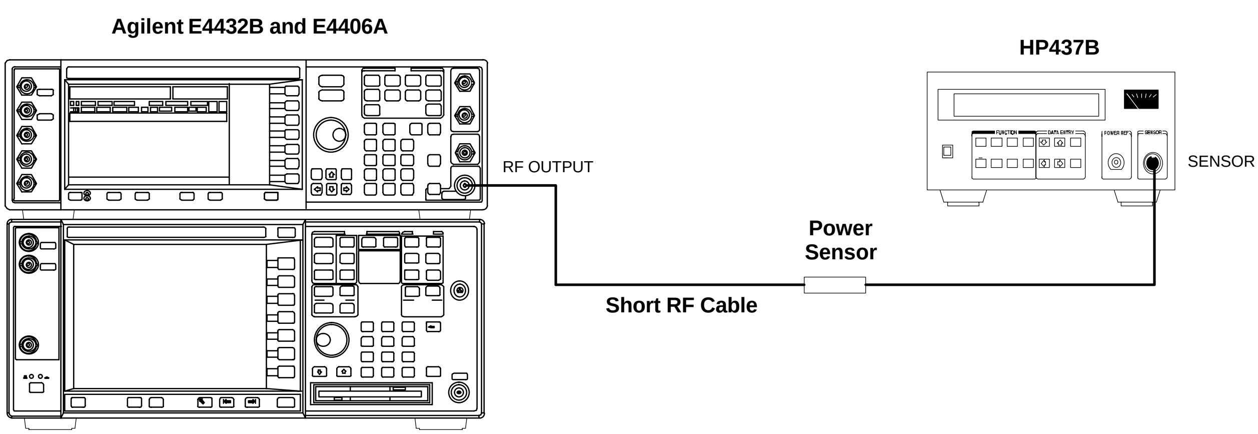

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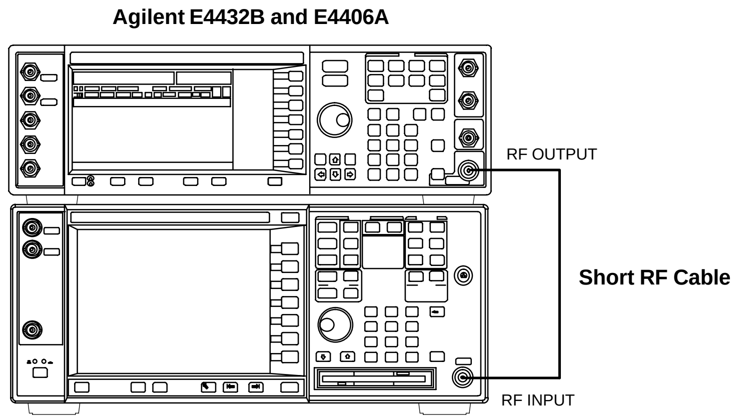
Figure H-2: Delta Calibration Set–up – Agilent E4432B to Agilent E4406A



Advantest R3267 Power Delta Calibration

The Advantest R3267 Spectrum Analyzer and R3562 Signal Generator Test Equipment combination can be used for ISC of IS–2000 CDMA 1X as well as IS–95A/B Operation Modes. The Power Delta Calibration is performed on the R3267. After the Offset Value has been calculated, add it to the TX Test Cable Insertion Loss Value.

Preliminary Advantest Test Equipment Set–up

To provide proper operation during Power Delta Calibration, ensure that the R3267 is connected to the R3562 as shown in Figure F-19.

Power Delta Calibration

Perform the procedure in Table H-2 to perform the Advantest R3267 Power Delta Calibration Procedure.

Table H-2: Advantest R3267 Power Delta Calibration Procedure

✓	Step	Action
		NOTE Warm-up *Test Equipment for a minimum of 60 minutes* prior to this procedure. – After it is warmed–up and stabilized, calibrate the Test Equipment as described in the “Test Set Calibration” section of Chapter 3.
	1	Ensure that the R3267 and R3562 are connected as shown in Figure F-19.
	2	Press the **SHIFT** and the **PRESET** Keys located on the right side of the Control Panel.
	3	Press the **ADVANCE** Key in the MEASUREMENT Area of the Control Panel.
	4	On the CRT, select **RX Control** by pressing ACTIVE Key 1.
	5	On the CRT, select **Frequency Set–up** by pressing ACTIVE Key 3.
	6	On the CRT, highlight **Frequency** by adjusting the **DISPLAY CONTROL** Knob.
	7	Press **FREQ** Key in the ENTRY Section of the Control Panel.
	8	Set the frequency to the desired value using the Keypad ENTRY Section Keys.
	9	Press the **LEVEL** Key in the ENTRY Section of the Control Panel.
	10	Set the level to **0 dBm** using the Keypad ENTRY Section Keys.
	11	On the CRT, verify **OFF** is highlighted in **Modulation**. – If **OFF** is not highlighted, press the ACTIVE Key 5 to toggle it OFF.
	12	On the CRT, verify **OFF** is highlighted in **Output**. – If **OFF** is not highlighted, press the ACTIVE Key 6 to toggle it OFF.

table continued on next page

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Table H-2: Advantest R3267 Power Delta Calibration Procedure		
✓	Step	Action
	13	Zero the Power Meter prior to connecting the Power Sensor to the RF Cable from the Signal Generator. **NOTE** For best accuracy, always re–Zero the Power Meter before connecting the Power Sensor to the component being calibrated.
	14	Connect the RF Cable from the R3562 Signal Generator **RF OUT P**ort to the Power Sensor.
	15	On the R3562 CRT, set the **Output** to **ON** by pressing ACTIVE Key 6.
	16	Record the Power Meter Reading as result **A**. **A**________________________
	17	On the R3562 CRT, set the **Output** to **OFF** by pressing ACTIVE Key 6.
	18	Connect the RF Cable from R3562 Signal Generator **RF OUT P**ort to the R3267 Spectrum Analyzer **INPUT** Port. – Refer to Figure H-4.
	19	On the R3562 CRT, set the **Output** to **ON** by pressing ACTIVE Key 6.
	20	On the R3267, press the **POWER** Key in the MEASUREMENT Area of the Control Panel.
	21	Press the **LEVEL** Key in the ENTRY Section of the Control Panel.
	22	Set the REF LEVEL to **10 dBm** using the Keypad ENTRY Section Keys.
	23	On the CRT, select **dB/div** by pressing ACTIVE Key 1.
	24	On the CRT, select **10 dB/div** by pressing ACTIVE Key 1.
	25	Press the **FREQ** Key in ENTRY Section of the Control Panel.
	26	Set the frequency to the desired value using the Keypad ENTRY Section Keys.
	27	On the CRT, select **more 1/2** by pressing ACTIVE Key 7.
	28	Press the **Preselector** CRT Menu Key to highlight **3.66G**.
	29	Press the **POWER** Key in the MEASUREMENT Area of the Control Panel.
	30	Press the **SPAN** Key in the ENTRY Section of the Control Panel.
	31	On the CRT, select **Zero Span** by pressing ACTIVE Key 2.
	32	Press the **COUPLE** Key in the ENTRY Section of the Control Panel.
	33	On the CRT, select **RBW** and highlight **MNL** by pressing ACTIVE Key 3.
	34	Set RBW to **30 kHz** using Keypad ENTRY Section Keys.
	35	On the CRT, select **VBW** and highlight **MNL** by pressing ACTIVE Key 2.
	36	Set VBW to **1 MHz** using Keypad ENTRY Section Keys.

table continued on next page

Table H-2: Advantest R3267 Power Delta Calibration Procedure		
✓	Step	Action
	37	Press the **MKR** Key in the DISPLAY CONTROL section of the Control Panel.
	38	On the CRT, select **Normal Marker** by pressing ACTIVE Key 1.
	39	Record the Marker Level reading as Result **B**. **B**_____________________
	40	Press **Single** in ENTRY Section of Control Panel.
	41	Calculate the **Power Calibration Delta** Value. – The Delta Value is the Power Meter Measurement minus the Advantest Measurement. **Delta = A – B** Example: Delta = –0.7 dBm – (–1.25 dBm) = 0.55 dBm Example: Delta = 0.26 dBm – 0.55 dBm = –0.29 dBm **NOTE** These examples are included to show the mathematics and do not represent actual readings. **NOTE** Add this Delta Value to the **TX Cable Loss Value** during In–Service Calibration. – Refer to Step 4 in Table H-6.

Figure H-3: Delta Calibration Set–up – Advantest R3562 to HP437

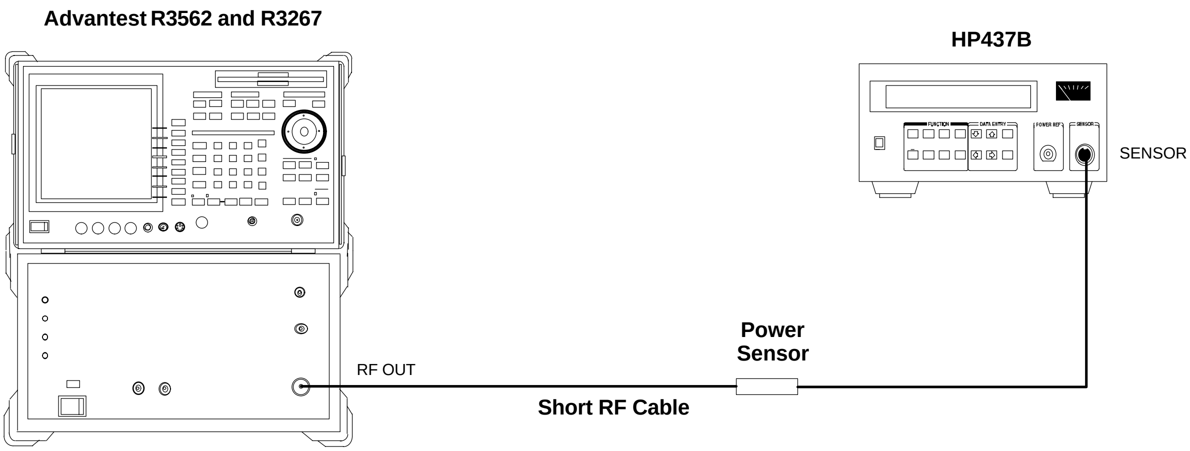
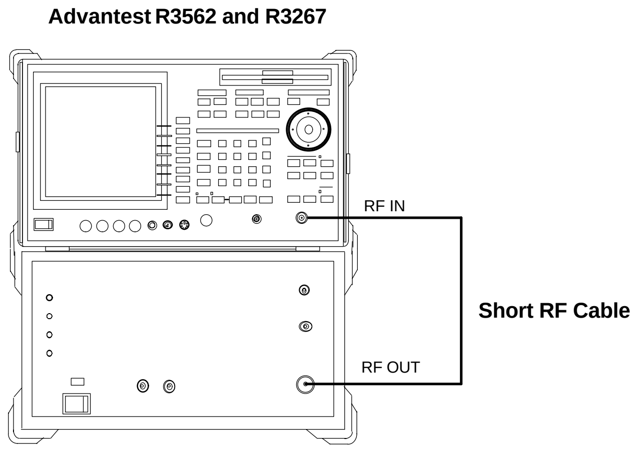


Figure H-4: Delta Calibration Set–up – Advantest R3562 to R3267



Agilent 8935 Series E6380A Power Delta Calibration

The Agilent 8935 (formerly HP 8935) Communications Test Set modified with either Option 200 or R2K and E4432B Signal Generator Test Equipment combination can be used for ISC of IS–2000 CDMA 1X as well as IS–95A/B Operation Modes. The Power Delta Calibration is performed on the Agilent 8935. After the Offset Value has been calculated, add it to the TX Test Cable Insertion Loss Value.

Perform the procedure in Table H-3 to perform the Agilent 8935 Power Delta Calibration Procedure.

Table H-3: Agilent 8935 Power Delta Calibration Procedure

✓	Step	Action
		NOTE Perform this procedure *after* Test Equipment has been allowed to warm–up and stabilize for a *minimum of 60 minutes*. – After it is warmed–up and stabilized, calibrate the Test Equipment as described in the “Test Set Calibration” section of Chapter 3.
	1	Zero the Power Meter prior to connecting the Power Sensor to the RF Cable from the Signal Generator. **NOTE** For best accuracy, always re–Zero the Power Meter before connecting the Power Sensor to the component being calibrated.
	2	Connect a short RF Cable between the Agilent 8935 **Duplex Out** port and the HP437 Power Sensor. – Refer to Figure H-5.
	3	Set the Agilent 8935 Signal Source as follows: – Measure Mode to **CDMA Gen** – Frequency to the CDMA Calibration Target Frequency – CW RF Path to **IQ** – Output Port to **Dupl** – Data Source to **Random** – Amplitude to **0 dBm**
	4	Measure and record the Power Value Reading on the HP437 Power Meter.
	5	Record the Power Meter Reading as Result **A**. **A** ________________________.
	6	Turn off the Agilent 8935 Signal Source Output, and disconnect the HP437. **NOTE** Leave the settings on the Source Agilent 8935 for convenience in the following steps.

table continued on next page

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Table H-3: Agilent 8935 Power Delta Calibration Procedure		
✓	Step	Action
	7	Connect the short RF Cable between the Agilent 8935 **Duplex Out** Port and the **RF–IN/OUT** Port. – Refer to Figure H-6.
	8	Ensure that the Source Agilent 8935 Settings are the same as in Step 3.
	9	Set the Agilent 8935 as follows: – Measure Mode to **CDMA Anl** – Frequency to the CDMA Calibration Target Frequency – Input Attenuation to **0 dB** – Input Port to **RF–IN** – Gain to **Auto** – Anl Dir to **Fwd**
	10	Turn on the Agilent 8935 Signal Output.
	11	Set the **Chn Pwr Cal** to **Calibrate** and select to calibrate.
	12	Measure and record the Channel Power Reading on the measuring Agilent 8935 as Result **B**. **B** ________________________
	13	Turn off the Agilent 8935 Signal Output and disconnect the equipment.
	14	Calculate the **Power Calibration Delta** Value. – The Delta Value is the Power Meter Measurement minus the Advantest Measurement. **Delta = A – B** Example: Delta = –0.70 dBm – (–1.25 dBm) = 0.55 dBm Example: Delta = 0.26 dBm – 0.55 dBm = –0.29 dBm **NOTE** These examples are included to show the mathematics and do not represent actual readings. **NOTE** Add this Delta Value to the **TX Cable Loss Value** during In–Service Calibration. – Refer to Step 4 in Table H-6.

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Figure H-5: Delta Calibration Set–up – Agilent 8935 to HP437

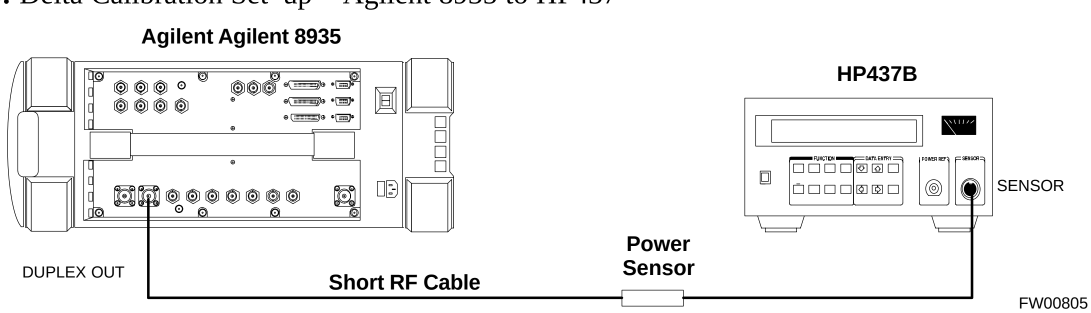
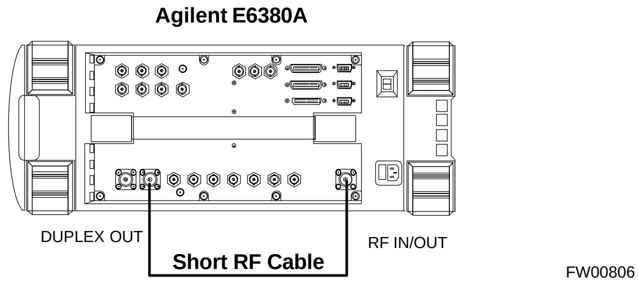


Figure H-6: Delta Calibration Set–up – Agilent 8935 to Agilent 8935



HP 8921A Power Delta Calibration

Use the HP 8921A Communications Test Set to measure power during ISC *only for IS–95A and B Operation* of 800 MHz Systems. After the Offset Value has been calculated, add it to the TX Test Cable Insertion Loss Value.

Perform the procedure in Table H-4 to perform the HP 8921A Power Delta Calibration Procedure.

NOTE

This procedure requires two HP 8921A Communication Test Sets.

Table H-4: HP 8921A Power Delta Calibration Procedure

✓	Step	Action
		NOTE Perform this procedure *after* Test Equipment has been allowed to warm–up and stabilize for a *minimum of 60 minutes*. After it is warmed–up and stabilized, calibrate the Test Equipment as described in the “Test Set Calibration” section of Chapter 3.
	1	Zero the Power Meter prior to connecting the Power Sensor to the RF Cable from the Signal Generator. **NOTE** For best accuracy, always re–Zero the Power Meter before connecting the Power Sensor to the component being calibrated.
	2	Connect a short RF Cable between the HP 8921A **Duplex Out** Port and the HP437 Power Sensor. Refer to Figure H-7.
	3	Set the HP 8921A Signal Source as follows: – Measure Mode to **CDMA Generator** – Frequency to the CDMA Calibration Target Frequency – CW RF Path to **IQ** – Output Port to **Dupl** – Data Source to **Random** – Amplitude to **0 dBm**
	4	Measure and record the Power Value Reading on the HP437 Power Meter.
	5	Record the Power Meter Reading as Result **A**. **A** ________________________.
	6	Turn off the source HP 8921A Signal Output, and disconnect the HP437. **NOTE** Leave the settings on the source HP 8921A for convenience in the following steps.

table continued on next page

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Table H-4: HP 8921A Power Delta Calibration Procedure		
✓	Step	Action
	7	Connect the short RF Cable between the source HP 8921A **Duplex Out** Port and the measuring HP 8921A **RF–IN** Port. – Refer to Figure H-8.
	8	Ensure that the source HP 8921A Settings are the same as in Step 3.
	9	Set the measuring HP 8921A as follows: – Measure Mode to **CDMA Anl** – Frequency to the CDMA Calibration Target Frequency – Input Attenuation to **0 dB** – Input Port to **RF–IN** – Gain to **Auto** – Analyzer Direction to **Fwd**
	10	Turn on the source HP 8921A Signal Output.
	11	Measure and record the Channel Power Reading on the measuring HP 8921A as Result **B**. **B ________________________**
	12	Turn off the source HP 8921A Signal Output and disconnect the equipment.
	13	Compute the Delta between HP437 and HP 8921A using the following formula. **Delta = A – B** Example: Delta = –0.70 dBm – (–1.25 dBm) = 0.55 dBm Example: Delta = 0.26 dBm – 0.55 dBm = –0.29 dBm **NOTE** These examples are included to show the mathematics and do not represent actual readings. **NOTE** Add this Delta Value to the **TX Cable Loss Value** during In–Service Calibration. – Refer to Step 4 in Table H-6.

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Figure H-7: Delta Calibration Set–up – HP 8921A to HP437

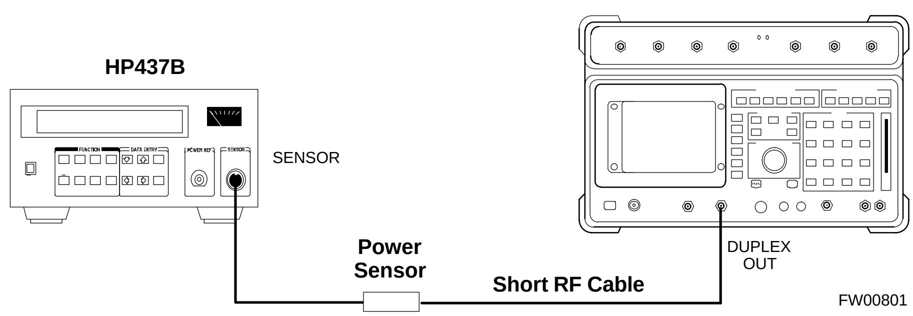
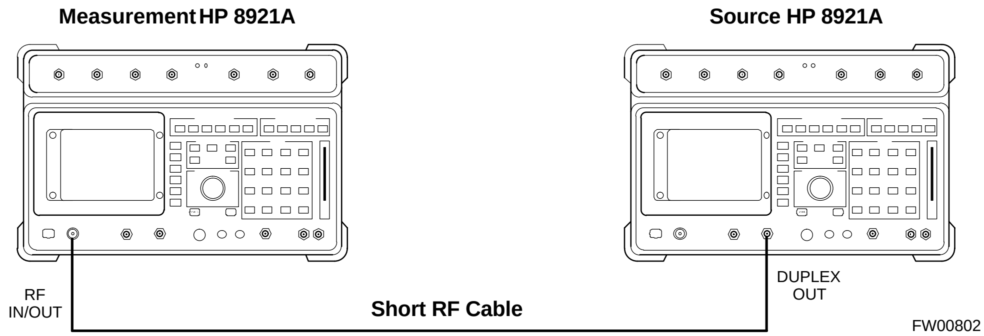


Figure H-8: Delta Calibration Set–up – HP 8921A to HP 8921A



Advantest R3465 Power Delta Calibration

Use the Advantest R3465 Spectrum Analyzer to measure power during ISC *only for IS–95A and B Operation*. After the Offset Value has been calculated, add it to the TX Test Cable Insertion Loss Value.

Perform the procedure in Table H-5 to perform the Advantest 3465 Power Delta Calibration Procedure.

Table H-5: Advantest Power Delta Calibration Procedure

✓	Step	Action
		NOTE Perform this procedure *after* Test Equipment has been allowed to warm–up and stabilize for a *minimum of 60 minutes*. – After it is warmed–up and stabilized, calibrate the Test Equipment as described in the “Test Set Calibration” section of Chapter 3.
	1	Press the **SHIF**T and the **PRESET** Keys located below the CRT Display.
	2	Press the **ADVANCE** Key in the MEASUREMENT Area of the Control Panel.
	3	Press the **CDMA Si**g CRT Menu Key.
	4	Press the **FREQ** Key in the ENTRY Area of the Control Panel.
	5	Set the frequency to the desired value using the Keypad Entry Keys.
	6	Press the **LEVEL** Key in the ENTRY Area of the Control Panel.
	7	Set the **LEVEL** to **0 dBm** using the Keypad Entry Keys.
	8	Verify that the **Mod** CRT Menu Key highlighting is **OFF**. – If it is highlighted, press the **Mod** Key to toggle it **OFF**.
	9	Verify that the **Output** CRT Menu Key highlighting is **OFF**, – If it is highlighted, press the **Output** Key to toggle it **OFF**.
	10	Zero the Power Meter prior to connecting the Power Sensor to the RF Cable from the Signal Generator. **NOTE** For best accuracy, always re–Zero the Power Meter before connecting the Power Sensor to the component being calibrated.
	11	Connect the RF Cable from the R3561L CDMA Signal Generator **RF OUT** Port to the Power Sensor. – Refer to Figure H-9.
	12	Press the **Output** CRT Menu Key to toggle the Output to **ON**.
	13	Record the Power Meter Reading as Result **A**. **A**_________________________.
	14	Press the Output **CRT Menu Key** to toggle the Output to **OFF**.

table continued on next page

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Table H-5: Advantest Power Delta Calibration Procedure		
✓	Step	Action
	15	Connect the RF Cable from the R3561L Signal Generator **RF OUT** Port to the R3465 **INPUT** Port. – Refer to Figure H-10.
	16	Press the **Output** CRT Menu Key to change the Output to **ON**.
	17	Press the **CW** Key in the MEASUREMENT Area of the Control Panel.
	18	Press the **LEVEL** Key in the ENTRY Area of the Control Panel.
	19	Set the REF LEVEL to **10 dBm** using the Keypad Entry Keys.
	20	Press the **dB/div** CRT Menu Key.
	21	Press the **10 dB/div** CRT Menu Key.
	22	Press the **FREQ** Key in ENTRY Area of the Control Panel.
	23	Set the frequency to the desired value using the Keypad Entry Keys.
	24	Press the **more 1/2** CRT Menu Key.
	25	Press the **Preselector** CRT Menu Key to highlight **3.0G**.
	26	Press the **FORMAT** Key in the Display Control area of the Control Panel.
	27	Press the **TRACE** CRT Menu Key.
	28	Press the **AVG A** CRT Menu Key.
	29	Set AVG to **20** using Keypad Entry Keys.
	30	Press the **return** CRT Menu Key.
	31	Press the **SPAN** Key in the ENTRY Area of the Control Panel.
	32	Press the **Zero Span** CRT Menu Key.
	33	Press the **BW** Key in the ENTRY Area of the Control Panel.
	34	Press the **RBW** CRT Menu Key to highlight **MNL**. using Keypad Entry Keys enter **30 kHz**.
	35	Set **RBW** to **30 kHz** using Keypad Entry Keys.
	36	Press the **VBW** CRT Menu Key to highlight **MNL**.
	37	Set **VBW** to **1 MHz** using Keypad Entry Keys.
	38	Press the Marker **ON** Key in the Display Control area of the Control Panel.

table continued on next page

Table H-5: Advantest Power Delta Calibration Procedure		
✓	Step	Action
	39	Record the Marker Level reading as Result **B**. **B**________________________
	40	Calculate the **Power Calibration Delta** Value. – The Delta Value is the Power Meter Measurement minus the Advantest Measurement. Delta = A – B Example: Delta = –0.70 dBm – (–1.25 dBm) = 0.55 dBm Example: Delta = 0.26 dBm – 0.55 dBm = –0.29 dBm **NOTE** These examples are included to show the mathematics and do not represent actual readings. **NOTE** Add this Delta Value to the **TX Cable Loss Value** during In–Service Calibration. Refer to Step 4 in Table H-6.

Figure H-9: Delta Calibration Set–up – R3561L to HP437

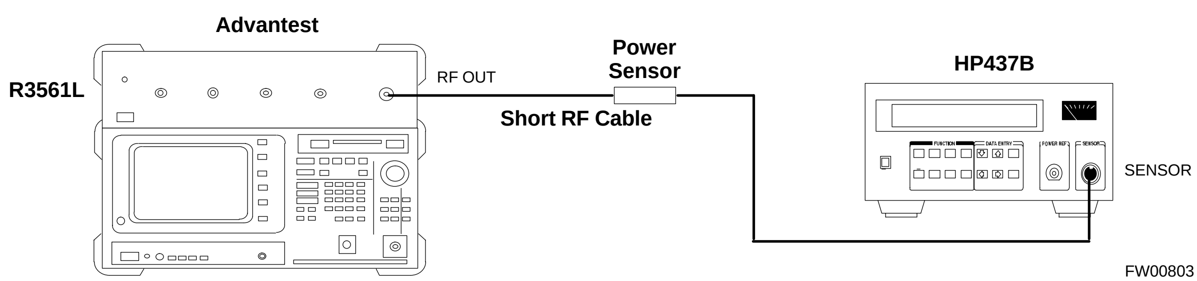
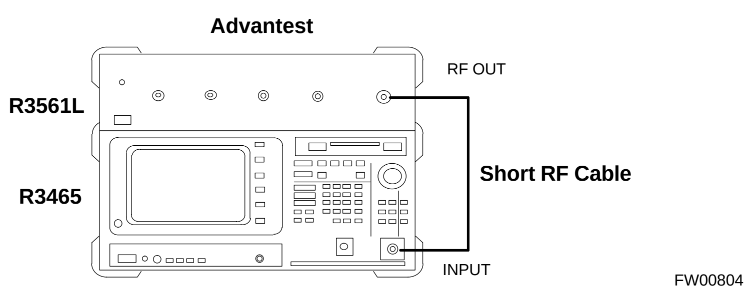


Figure H-10: Delta Calibration Set–up – R3561L to R3465



Notes

In–Service Calibration

CAUTION

This feature does NOT have Fault Tolerance at this time. *The system has no safe–guards to prevent actions that will put the BTS out of service*. If possible, perform this procedure during a Maintenance Window.

Perform the procedures in this section precisely, otherwise the entire BTS will most likely go OUT OF SERVICE.

At the CBSC, only perform operations on expansion hardware when it is in the OOS_MANUAL State.

The operator must be trained in the LMF Operation prior to performing this procedure.

Prerequisites

- Any applicable expansion hardware has been added in the CBSC Database, and a CDF that includes the additions has been generated.
- Any expansion devices have been inserted into the SCCP Cage and are in the OOS_MANUAL State at the CBSC MM.
- The site specific CDF (with any expansion hardware) and CAL Files have been loaded onto the LMF.
- The LMF has the same Device Binary Code and DDS Files as the CBSC.

CAUTION

Do not download code or data to any cards other than those being worked on. Downloading code or data to other cards will take the site OUT OF SERVICE.

The Code File Version Numbers must match the current BSS Software Release Version Numbers required for the equipped devices. If the numbers do not match, the site may go OUT OF SERVICE.

It is *mandatory* that the **`bts–#.cdf`** and **`cbsc–#.CDF`** Files on the LMF Computer for this BTS are copies of the corresponding files created in the CBSC Database. Refer to Table 3-3.

The CAL File loaded on the LMF Computer for this BTS must have come from the CBSC.

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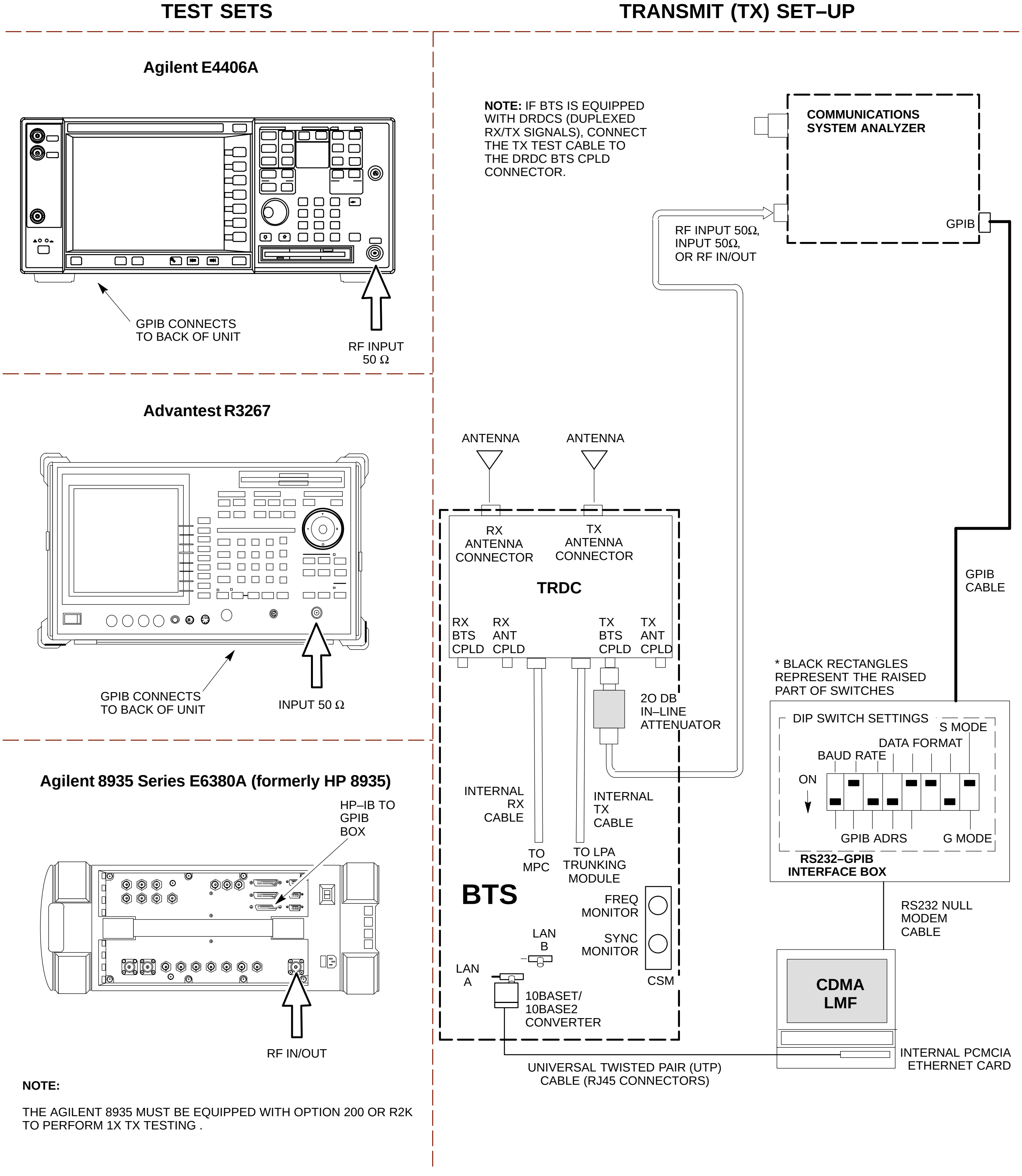
- Test Equipment has been connected as shown in Figure H-11 or Figure H-12.
- An RFDS (or as a minimum, a Directional Coupler), whose Loss is already known, must be in the applicable TX Antenna Path to perform the In–service Calibration.
- Test Equipment has been calibrated after a 60–minute warm–up.
- A short RF Cable and two BNC–N Adapters are available to perform Cable Calibration.
- N–SMA Cable Adapters are available to connect to TRDC or DRDC **BTS CPLD** Connectors, and are included in Test Cable Insertion Loss Measurements.
- The Power Delta Calibration has been performed.
  – Refer to Table H-1, Table H-2, Table H-3, Table H-4, or Table H-5.

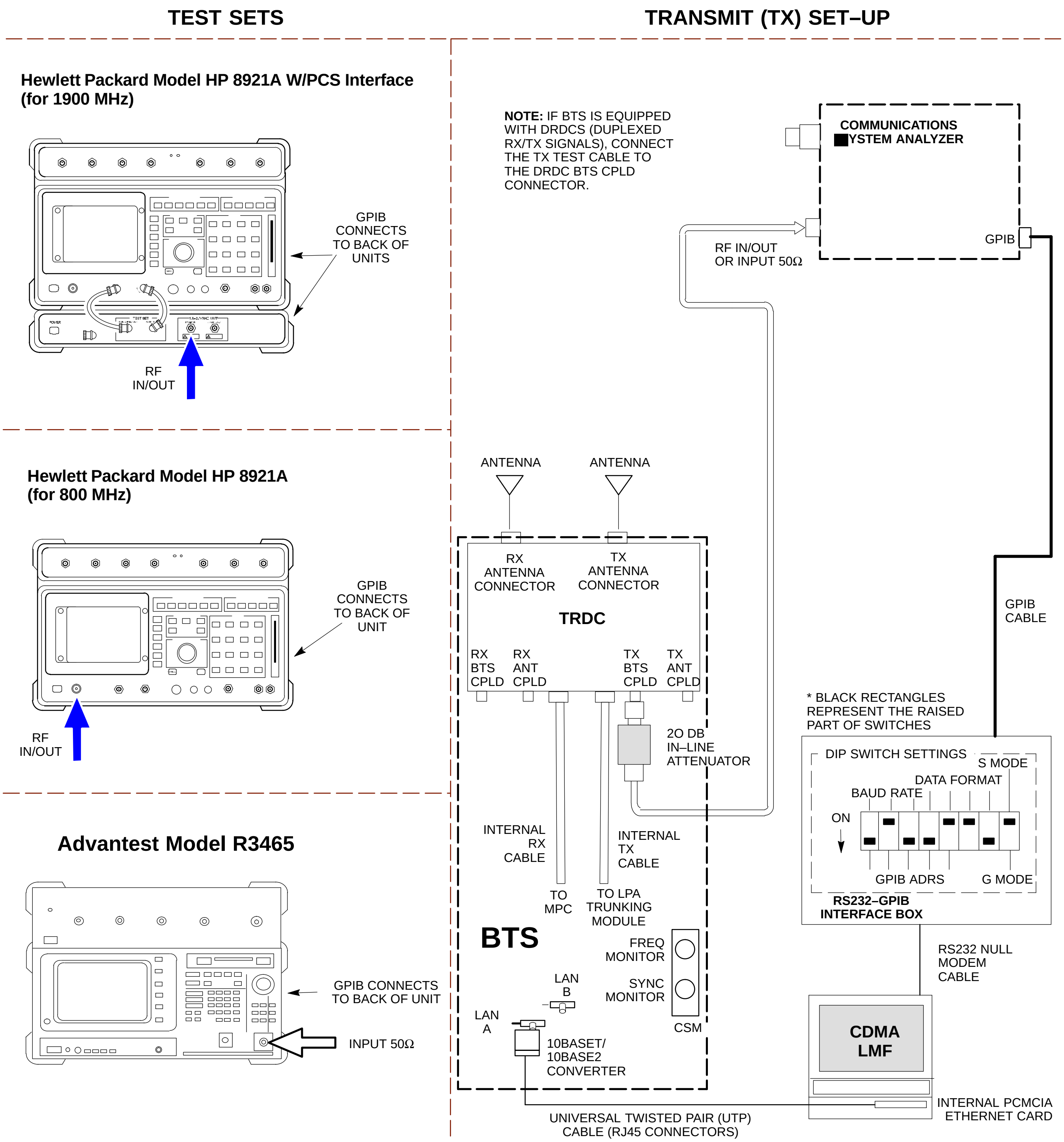
Figure H-11: TX Calibration Test Set–up – Agilent E4406A, Advantest R3267, and Agilent 8935 with Option 200 or R2K (IS–95A/B and 1X CDMA 2000)



NOTE:

THE AGILENT 8935 MUST BE EQUIPPED WITH OPTION 200 OR R2K TO PERFORM 1X TX TESTING .

Figure H-12: TX Calibration Test Set–up – HP 8921A/600 w/PCS Interface (1.9 GHz), HP 8921A/600 (800 MHz), and Advantest R3465 (IS–95A/B only)



Perform the procedure in Table H-6 to perform the In–Service Calibration.

Table H-6: In–Service Calibration Procedure

✓	Step	Action
		NOTE Perform this procedure *after* Test Equipment has been allowed to warm–up and stabilize for a *minimum of 60 minutes*.
	1	Set–up the LMF for In–Service Calibration:
	1a	Start the LMF by double–clicking the LMF Icon on the Windows Desktop.
	1b	Click **Tools** > **Options** from the Menu Bar in the LMF Application Window.
	1c	In the **LMF Options** Window, check only the applicable Communications System Analyzer Check Box on the **Test Equipment** Tab.
	1d	Ensure that the GPIB Address is **18**.
	1e	Uncheck any other other equipment that is selected.
	1f	Click the **Apply** Button.
	1g	Select the **BTS Options** Tab in the **LMF Options** Window.
	1h	Check the **In–Service Calibration** Check Box.
	1i	Click the **Apply** Button.
	1j	Click the **Dismiss** Button to close the **LMF Options** Window.
	2	Log into the target BTS:
	2a	Select the target BTS Icon.
	2b	Click the **Login** Button at the Login Screen.
	3	Measure the Cable Loss using the **Cable Calibration** Function:
	3a	Click **Util** > **Cable Calibration...** in the BTS Menu Bar in the Main Window.
	3b	Set the desired Channel(s) and select **TX and RX CABLE CAL** from the **Cable Calibration** Window Pull–down Menu.
	3c	Click the **OK** Button to perform Cable Calibration.
	3d	Follow the on–screen instructions to complete the Test Cable Insertion Loss Measurement. **NOTE** The measured value is input automatically to the Test Cable Insertion Loss File. To view the Test Cable Insertion Loss File, click **Util** > **Examine** > **Cable Loss** from the BTS Menu Bar.

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Table H-6: In–Service Calibration Procedure

✓	Step	Action
	4	Add the Communications System Analyzer Power Delta to the **TX Cable Loss**.
	4a	In the BTS Menu Bar, click **Util > Edit > Cable Loss... > TX**.
	4b	Add the value computed in Table H-4, Table H-5, or Table H-3 to the TX Cable Loss. **NOTE** Ensure to include the sign of the value. The following examples are included to show the mathematics and do not represent actual readings: – Example: 5.65 dBm + 0.55 dBm = 6.20dBm – Example: 5.65 dBm + (–0.29 dBm) = 5.36 dBm – Example: –5.65 dBm + 0.55 dBm = –5.10 dBm – Example: –5.65 dBm + (–0.29 dBm) = –5.94 dBm
	5	Input the Coupler Loss for the TX Tests:
	5a	In the BTS Menu Bar, click **Util > Edit > Coupler Loss...** from the Menu Bar in the Main Window.
	5b	Select the **TX Coupler Loss** Ta,b if not in the foreground.
	5c	Enter the appropriate Coupler Loss for the target carrier(s) by referring to the information taken at the time of the BTS Installation.
	5d	Click the **Save** Button.
	5e	Click the **Dismiss** Button to close the window.
	5f	To view the Coupler Loss File, click **Util > Examine > Coupler Loss** in the BTS Menu Bar.
	6	Input the Coupler Loss for the RX Tests:
	6a	In the BTS Menu Bar, click **Util > Edit > Coupler Loss...** from the Menu Bar in the Main Window.
	6b	Select the **RX Coupler Loss** Tab, if not in the foreground.
	6c	Enter the appropriate Coupler Loss for the target carrier(s) by referring to the information taken at the time of the BTS Installation.
	6d	Click the **Save** Button.
	6e	Click the **Dismiss** Button to close the window.
	6f	To view the Coupler Loss File, click **Util > Examine > Coupler Loss** in the BTS Menu Bar.

table continued on next page

Table H-6: In–Service Calibration Procedure

✓	Step	Action
	7	If it was not previously done, have the CBSC Operator put the Redundant BBX OOS_MANUAL. **! CAUTION** Be sure to download OOS devices only. – Loading in–service devices takes them OUT OF SERVICE and can result in dropped calls. The Code File Version Numbers must match the Version Numbers on the other cards in the frame. If the numbers do not match, the site may go OUT OF SERVICE.
		NOTE Be sure to include the Redundant BBX in Steps 8, 9, and 10.
	8	Download code and data to the target devices:
	8a	In the LMF Window Menu Bar, click **Tools > Update NextLoad > CDMA** to set the Code Version that will be downloaded.
	8b	Check the appropriate Code Version in the Pop–up Window and click the **Save** Button to close.
	8c	Select the target BBX(s) on the SCCP Cage picture.
	8d	In the BTS Menu Bar, click **Device > Download > Code/Data** to start downloading code and data.
		! CAUTION Perform the All Cal/Audit Procedure on OOS devices only.
	9	Run the **All Cal/Audit Procedure**:
	9a	Select the target BBX(s) on the SCCP Cage picture.
	9b	In the BTS Menu Bar, click **Tests > All Cal/Audit...** from the Menu Bar in the Main Window.
	9c	Select the target carrier and confirm the Channel Number in the Pop–up Window.
	9d	Leave the **Verify BLO** Check Box checked.
	9e	Ensure that the **Test Pattern** Box shows **Pilot**.
	9f	Click the **OK** Button to start Calibration.
	9g	Follow the on–screen instructions, except, *do not connect to the BTS Antenna Port*.
	9h	Connect to the DRDC or TRDC **BTS CPL** Port associated with the on–screen prompted Antenna Port.
	10	Save the result, and download the BLO Data to the target BBX(s): – Click the **Save Result** Button on the result screen. — The window closes automatically.
	11	Logout from the BTS and close the LMF Session:
	11a	In the BTS Menu Bar, click **Select > Logout** to close the BTS Connection.
	11b	Close the LMF Application Program by selecting **File > Exit** from the Window Menu Bar.

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Table H-6: In–Service Calibration Procedure		
✓	Step	Action
	12	Disconnect all Test Cables from the BTS.
	13	reconnect RFDS Cables or Termination Loads, as applicable, to the DRDC or TRDC **BTS CPL** Ports used for the Calibration.
	14	Advise the CBSC to enable the target device(s).
	15	Restore the new "bts–*.cal" file to the CBSC. – Refer to Table 4-12.

Appendix I: Packet Backhaul Configuration

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BTS Router Initial Configuration

Overview

This appendix contains information and operations related to loading an MWR 1941 BTS Router with the minimum standard (*canned*) configuration necessary for network communications. Once the BTS Router is communicating on the network, the full, site-specific, Operational Configuration can be downloaded to the BTS Router over the network. This appendix includes sections on:

- Terminal Set–up
- Downloading the Canned BTS Router Configuration Files
- Verifying the IOS Canned Version of CF Memory Card
- Replacing the installed BTS Router CF Memory Card IOS Version
- Verify and upgrade the ROMMON Version
- Recovery from the BTS Router Boot to ROMMON
- Entering or changing the Router FE Interface IP Address
- Preparation for Site Turn–over

I

General

This section provides the procedures to configure and save a Terminal Session for communicating with the MWR 1941 BTS Router. Terminal Settings are the same as those used for BTS Card/Module Man–Machine Interface (MMI) Communication Sessions. The procedures are for a Pentium® Processor–based Computer operating with either *Windows* 98 Second Edition (SE) or *Windows* 2000..

Using the LMF Computer

LMF Computer Platforms can be used for communicating with the BTS Routers, and the MMI Terminal Connection, created for BTS Card/Module Optimization Actions, will operate with the BTS Routers. See the "Establishing a BTS Router Communication Session" section of this appendix for additional Interface Hardware required for BTS Router Communication..

Terminal Settings

Perform the procedure in Table I-1 to create a named HyperTerminal Connection for BTS Router interface and generate a *Windows* Desktop Shortcut for it.

NOTE

There are differences between *Windows* 2000 and *Windows* 98 in the menus and screens used for creating a HyperTerminal Connection. In the following procedure, items applicable to:

- *Windows* 2000 will be identified with *Win2000*
- *Windows* 98 will be identified with *Win98*

Table I-1: Establish HyperTerminal Connection

✓	Step	Action
	1	From the *Windows* Start Menu, select **Programs > Accessories**
	2	Perform one of the following: • For *Win2000*, select **Hyperterminal** and then click on **HyperTerminal**. • For *Win98*, select **Communications**, double click the **Hyperterminal** Folder, and then double click on the **Hypertrm.exe** icon in the window that opens. **NOTE** • If a **Location Information Window** appears, enter the required information, then click on the **Close** Button. – This is required the first time a HyperTerminal Connection is configured, even if a modem is not to be used. • If a **You need to install a modem.....** message appears, click on **NO**.

table continued on next page

Table I-1: Establish HyperTerminal Connection		
✓	Step	Action
	3	When the **Connection Description** Box opens, perform the following actions.
	3a	Type a name for the connection being defined (for example, BTSRTR Session, MMI) in the **Name:** Window.
	3b	Highlight any icon preferred for the named connection in the **Icon:** Chooser Window.
	3c	Click **OK**.
	4	From the **Connect using:** Pick List in the **Connect To** Box displayed, perform the following actions.
	4a	Select the RS–232 Port to be used for the connection (e.g., **COM1** or **COM2** – *Win2000* or **Direct to Com 1** or **Direct to Com 2** – *Win98*).
	4b	Click **OK**.
	5	In the **Port Settings** Tab of the **COM# Properties** Window displayed, configure the RS–232 Port Settings as follows: • Bits per Second: 9600 • Data Bits: 8 • Parity: None • Stop Bits: 1 • Flow Control: None
	6	Click **OK**.
	7	With the HyperTerminal Window still open and the connection running, select: **File > Properties**
	8	Click the **Settings** Tab, click the arrow in the **Emulation** Window, and select **VT100** from the Pull–down Menu.
	9	Click the **ASCII Set–up** Button, uncheck all boxes in the ASCII Set–up Window that appears, and click **OK**.
	10	Click **OK** for the **Connection Properties** Box.
	11	Save the defined connection by selecting: **File > Save**
	12	Close the HyperTerminal Window by selecting: **File > Exit**
	13	Click the **Yes** Button to disconnect when prompted.

table continued on next page

Table I-1: Establish HyperTerminal Connection		
✓	**Step**	**Action**
	14	Perform one of the following: • If the **Hyperterminal** Folder Window is still open (*Win98*), *proceed to Step 16.* OR • From the Windows Start Menu, select **Programs** > **Accessories**
	15	Perform one of the following: • For *Win2000*, select **Hyperterminal** and release any pressed Mouse Buttons. OR • For *Win98*, select **Communications** and double click the **Hyperterminal** Folder.
	16	Highlight the newly–created Connection Icon by moving the cursor over it (*Win2000*) or clicking on it (*Win98*).
	17	*Right click and drag* the highlighted Connection Icon to the *Windows* Desktop and release the right Mouse Button.
	18	From the Pop–up Menu displayed, select **Create Shortcut(s) Here**.
	19	If desired, reposition the Shortcut Icon for the new connection by dragging it to another location on the *Windows* Desktop. **NOTE** The Shortcut Icon can now be double–clicked to open a BTS Router or BTS Card/Module MMI HyperTerminal Session without the need to negotiate multiple menu levels.

I

BTS Router Serial Communication

For those procedures that require Serial Communication with BTS Routers, perform the procedure in Table I-2 to initiate the Communication Session. This procedure calls out the LMF Computer Platform, but any VT100–equivalent terminal or computer equipped with Terminal Emulation Software and a Hardware Serial Connector may be used.

Required Items

The following items are required to perform the verification:

- LMF Computer Platform or equivalent.
  - Refer to *this manual* for requirements.
- Eight–conductor (four–pair, *un*shielded twisted pair is acceptable) *Rollover* Cable, two 8–contact Modular Plugs.
  - Refer to Figure I-1 for Cable Wiring Requirements.
- Adapter, DB–9 plug–to–8–contact Modular Plug, Global Computer Supplies C4717 or equivalent.
  - Refer to Figure I-2 for Adapter Wiring Requirements.

Figure I-1: Wiring Diagram, BTS Router Communication Rollover Cable

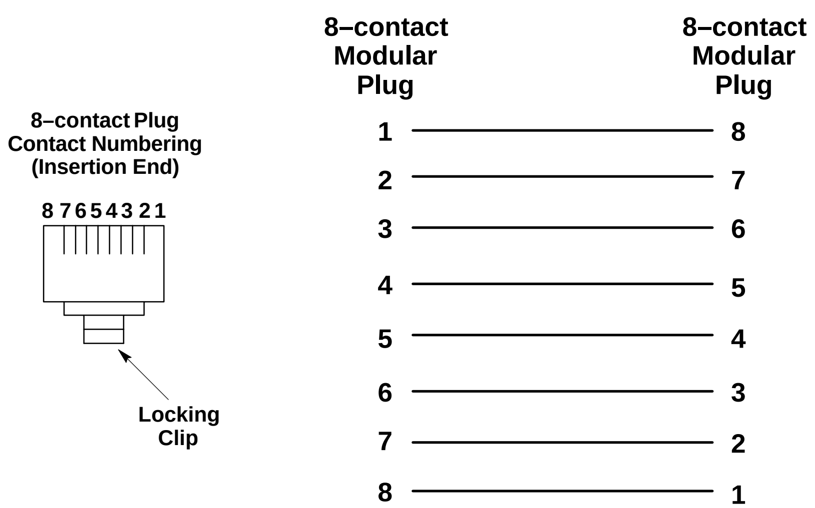


Figure I-2: Wiring Diagram, DB–9 Plug–to–8–Contact Modular Plug Adapter

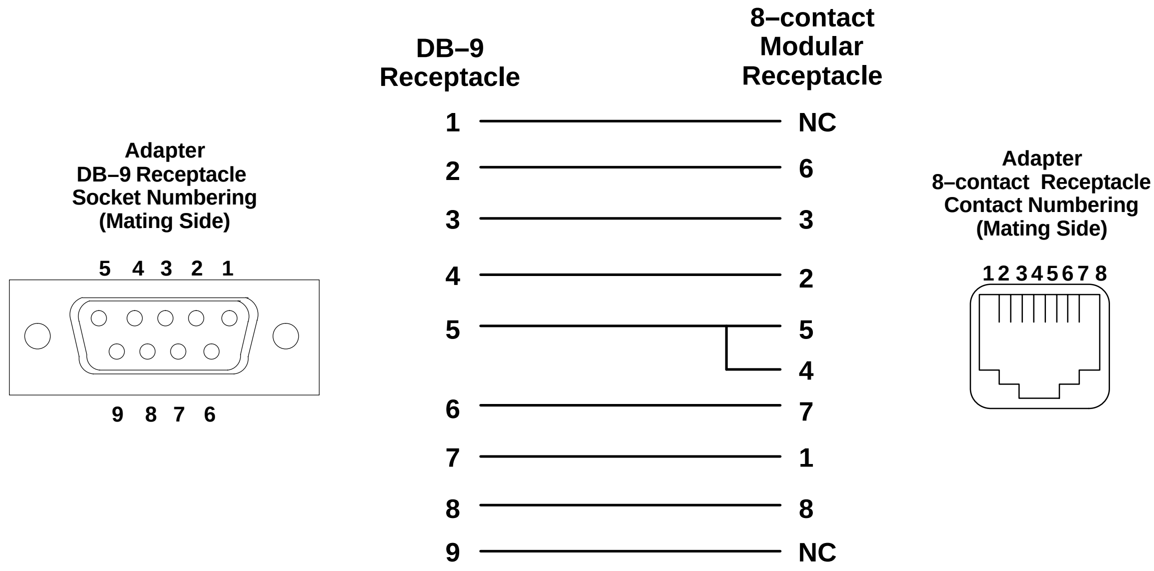
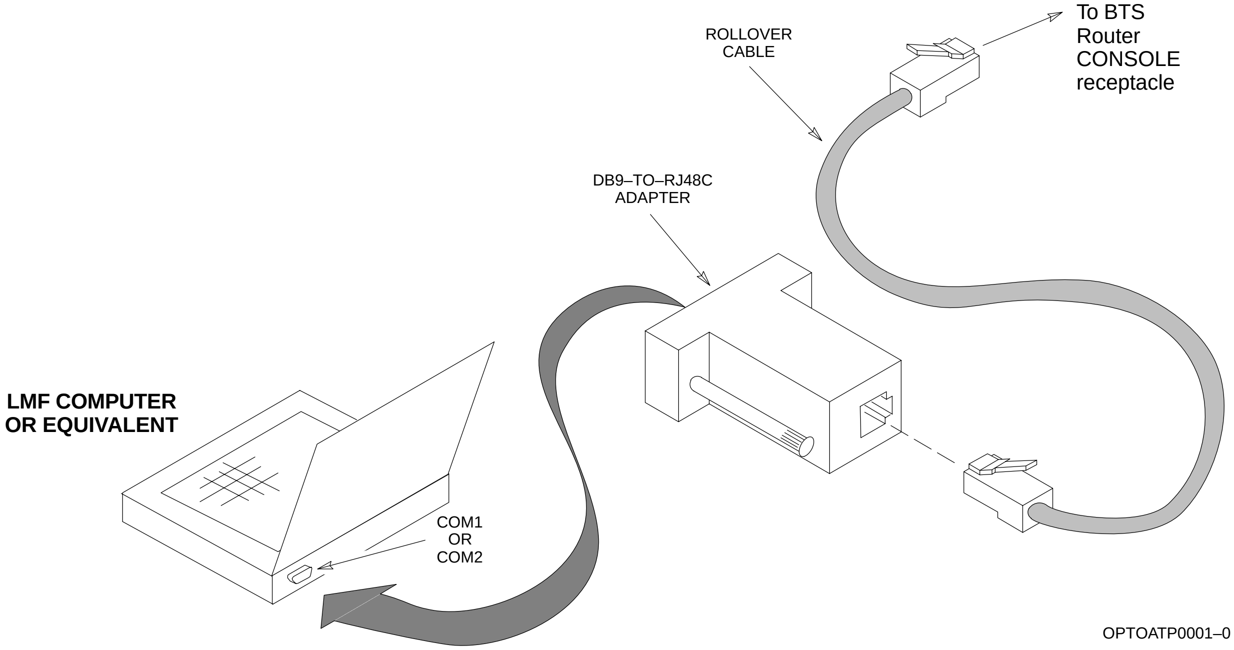


Table I-2: Establishing BTS Router Serial Communication

✓	Step	Action
	1	If it has not been done, start the computer and allow it to complete the Boot Process.
	2	If a named HyperTerminal Connection for BTS Router Serial Communication or BTS Card/Module MMI Communication has not been created on the LMF Computer, create one as described in Table I-1 in the “Terminal Set–up” section of this appendix.
	3	Connect the computer to the BTS Router as shown in Figure I-3.
	4	Start the named HyperTerminal Connection for BTS Router Communication Sessions by double clicking on its *Windows* Desktop Shortcut. **NOTE** If a *Windows* Desktop Shortcut was not created for the Communication Session, access the connection from the *Windows* Start Menu by selecting: **Programs > Accessories > Hyperterminal > HyperTerminal > <*Named HyperTerminal Connection*** *(for example,* ***BTSRTR****)***>**
	5	Once the connection window opens, establish communication with the BTS Router by pressing the computer **Enter** Key until the prompt identified in the applicable procedure is obtained.

Figure I-3: LMF Computer Connections to BTS Router



Downloading Overview

After they are generated on the OMC–R, the BTS Router Canned Configuration Files must be transferred to another computer platform from which they can be installed into the BTS Routers. A number of procedures may be used to move the Canned Configuration Files from the OMC–R to a platform from which they can be loaded into the BTS Routers. Some alternatives are:

1. If a Floppy Diskette drive is available at the OMC–R, such as the one for UNO Workstations, the Configuration Files can be transferred to an LMF Computer or similar machine using the CDF File Transfer Procedure in the Preparing the LMF section of *this manual*. Directories identified in Table I-3 must be used rather than those in the CDF File Transfer Procedure.
2. If a *Windows*–based Server Connection is available in the operator's network and it can provide an FTP or Telnet Connection to the OMC–R, files may be transferred by either the FTP or Telnet methods.
3. If a Dial–up Connection is available for accessing the OMC–R, an FTP or Telnet Session may be possible to transfer files to the computer used to load the CF Memory Cards.

The procedure provided in this section covers FTP Transfer using a *Windows*–based Server in the operator's network. Coordinate with the Local Network Administrator to determine the method and procedure to use on a specific network.

Prerequisites

The following must be obtained from the Local Network Administrator before performing the Canned Configuration File FTP Procedure in Table I-3:

- User ID and Password to log onto the OMC–R
- Name of the subdirectory where the specific BTS Router Group Canned Configuration Files to be downloaded were created.

FTP File Transfer from the OMC–R

This procedure uses the *Windows*–based LMF Computer Platform to download BTS Router Canned Configuration Files from the OMC–R. Perform the procedure in Table I-3.

Table I-3: BTS Router Canned Configuration File FTP Transfer from the OMC–R

✓	Step	Action
	1	If it has not been done, create a directory on the LMF Computer where the BTS Router Canned Configuration Files will be stored.
	2	If it has not been done, obtain the OMC–R Logon User ID and Password from the Local Network Administrator.

table continued on next page

Table I-3: BTS Router Canned Configuration File FTP Transfer from the OMC–R

✓	Step	Action
	3	Connect the LMF Computer to the local network and log on. **NOTE** This procedure uses the Command Line FTP Client supplied with *Windows* 98, Second Edition (*Win98 SE*) and *Windows* 2000 (*Win2K*); however, any commercially available FTP Client Application can be used. – Follow the manufacturer's instructions for operation of an alternative application.
	4	Open a Command Line (MS DOS) Window by clicking on **Start > Programs > Command Prompt**.
	5	When the Command Line Window opens, change to the directory where the Canned Configuration Files will be stored on the LMF Computer by entering: **cd** *pathname* – Where *pathname* = the path to the required directory. – A response similar to the following will be displayed: `C:\> cd Can_Cfg` `C:\Can_Cfg>`
	6	Check the contents of the directory by entering the following command. **dir** – A response similar to the following will be displayed: `C:\Can_Cfg>dir` ` Volume in drive C is MAIN` ` Volume Serial Number is F2AA-1721` ` Directory of C:\Can_Cfg>` `08/22/2002  03:46p      <DIR>          .` `08/22/2002  03:46p      <DIR>          ..` `08/22/2002  03:46p               2,223 btsrtr_canned.blue` `08/22/2002  03:47p               2,223 btsrtr_canned.red` `               2 File(s)          4,644 bytes` `               2 Dir(s)   2,556,045,312 bytes free` `C:\Can_Cfg>`
	7	If either or both of the following files are found in the directory, delete them or move them to another directory: – `btsrtr_config.blue` – `btsrtr_config.red`

table continued on next page

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Table I-3: BTS Router Canned Configuration File FTP Transfer from the OMC–R		
✓	Step	Action
	8	Begin the FTP Session by entering the following command. **FTP** *hostname* – Where *hostname* = the OMC–R hostname or IP Address. – A response similar to the following will be displayed: `C:\Can_Cfg> FTP OMC-R-1` `C:\Can_Cfg>` `Connected to OMC-R-1.` `220 OMC-R-1 FTP Server (SunOS 5.6) ready.` `User (OMC-R-1:(none)):`
	9	Enter the User ID and Password when prompted, pressing the **Enter** Key after each. – A response similar to the following will be displayed: `User (OMC-R-1:(none)): scadm` `331 Password required for scadm.` `Password:` `230 User scadm logged in.` `FTP>`
	10	Change to the directory where the BTS Router Canned Configuration File Subdirectories are created.
	11	Verify that the present Working Directory by entering the following commands, pressing the **Enter** Key after each: **cd /home/scadm/btsrtr_canned_configs** **pwd** – A response similar to the following will be displayed: `FTP> cd /home/scadm/btsrtr_canned_configs` `240 CWD command successful.` `FTP> pwd` `245 "/home/scadm/btsrtr_canned_configs" is current directory.`

table continued on next page

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Table I-3: BTS Router Canned Configuration File FTP Transfer from the OMC–R

✓	Step	Action
	12	Enter the **ls** Command to list the contents of the directory and ensure that the specific Canned Configuration Directory Name provided by the administrator exists. – A response similar to the following will be displayed: `FTP> ls` `200 PORT command successful.` `150 ASCII data connection for /bin/ls (10.182.29.117,80) (0 bytes).` `Mon_Jul_2_01:55:07_CDT_2002` `Wed_Jul_24_09:35:41_CDT_2002` `Tue_Aug_04_10:35:22_CDT_2002` `226 ASCII Transfer complete.` `FTP: 30 bytes received in 0.02Seconds 1.50Kbytes/sec.` `FTP>` **NOTE** Directory Names where Canned Configuration Files are located will consist of the *weekday_month_day_time_year* when the Canned Configuration Files were created on the OMC–R.
	13	Change to the directory specified for the BTS Router Group to be configured and list the directory contents by entering the following, pressing the **Enter** Key after each command: **cd** *weekday_month_day_time_year* **ls** – A response similar to the following will be displayed: `FTP> cd Wed_Jul_24_09:35:41_CDT_2002` `250 CWD command successful.` `FTP> ls` `200 PORT command successful.` `150 ASCII data connection for /bin/ls (10.182.29.117,80) (0 bytes).` `btsrtr_canned.blue` `btsrtr_canned.red` `226 ASCII Transfer complete.` `FTP: 39 bytes received in 0.05Seconds 0.78Kbytes/sec.` `FTP>`

table continued on next page

Table I-3: BTS Router Canned Configuration File FTP Transfer from the OMC–R		
✓	Step	Action
	14	Change to the Binary Transfer Mode and, if desired, turn on Hash Mark Printing for transfer progress by entering the following, pressing the **Enter** Key after each command: **bin** **hash** – A response similar to the following will be displayed: `FTP> bin` `200 Type set to I.` `FTP> hash` `Hash mark printing On  FTP: (2048 bytes/hash mark).` `FTP>` **NOTE** With *Win98 SE*, turning on Hash Mark Printing can slow down File Transfer in certain circumstances, but the Canned Configuration Files are quite small (approximately 2.5 KB) so there should be little noticeable effect.
	15	Download the BTS Router Canned Configuration Files to the LMF Computer by performing the following actions.
	15a	Enter the following to download the first Canned Configuration File: **get btsrtr_canned.blue** – A response similar to the following will be displayed: `FTP> get btsrtr_canned.blue` `200 PORT command successful.` `150 Binary data connection for btsrtr_canned.blue (10.182.29.117,80) (2223 bytes).` `#` `226 Binary Transfer complete.` `FTP: 2223 bytes received in 0.59Seconds 3.76Kbytes/sec.` `FTP>`
	15b	Enter the following to download the second BTS Router Canned Configuration File: **get btsrtr_canned.red** – A response similar to the following will be displayed: `FTP> get btsrtr_canned.red` `200 PORT command successful.` `150 Binary data connection for btsrtr_canned.red (10.182.29.117,80) (2223 bytes).` `#` `226 Binary Transfer complete.` `FTP: 2223 bytes received in 0.59Seconds 3.76Kbytes/sec.` `FTP>`

table continued on next page

Table I-3: BTS Router Canned Configuration File FTP Transfer from the OMC–R		
✓	Step	Action
	16	Before terminating the FTP Session, open *Windows* Explorer and view the contents of the directory where the Canned Configuration Files are to be stored to ensure that the files are present. Perform the following actions.
	16a	Click **Start > Programs > Windows Explorer**.
	16b	In the left–hand pane of *Windows* Explorer, perform one of the following depending on the LMF Computer Operating System: – *Win98 SE*: If necessary, expand the Directory Display for the drive where the Canned Configuration File Storage Directory is located by clicking on the + next to the Drive Icon. – *Win2K*: Expand the User Profile and Directory Display for the drive where the Canned Configuration File Storage Directory is located by clicking on the + next to each icon, respectively.
	16c	Expand any subdirectories as required to display the directory folder where the Canned Configuration Files are to be stored.
	16d	Click on the Directory Folder Icon where the Canned Configuration Files are to be stored.
	16e	In the *right*–hand pane, verify that the files `btsrtr_canned.blue` and `btsrtr_canned.red` appear.
	16f	If the files appear, proceed to Step 17.
	16g	If the files do not appear, repeat Step 15, its substeps, Step 16, and its substeps.
	17	Close *Windows* Explorer.
	18	In the Command Line Window, enter the **bye** Command to terminate the FTP Session. – A response similar to the following will be displayed: `FTP> bye` `221 Goodbye.` `C:\Can_Cfg>`
	19	Close the Command Line Window by entering the **exit** Command.
	20	BTS Router Canned Configuration Files are now ready for transfer to a BTS Router.

I

Verifying IOS Canned Version of the CF Memory Card

Overview

This section covers the procedures and commands required to verify that the IOS Version loaded on BTS Router CF Memory Cards and copy standard Canned Configuration Files to the BTS Routers. Because of the set–up required and the length of some of the procedures, Motorola recommends performing the actions covered in this section at a central location to prepare the BTS Routers for installation prior to the site visit.

IOS Version Verification and File Sequence Position

Version Verification

The IOS Version loaded on the BTS Router CF Memory Card should be verified as the version required for operation on the network where the BTS Routers will be installed. If the loaded IOS Version is not correct, it can be replaced with a different version.

There are several methods available to accomplish Version Verification. These depend on the equipment and Software Applications the user selects to use in installing the Canned Configuration Files in the BTS Routers. Appropriate Verification Procedures are included in each of the two Canned Configuration Installation Methods covered in this section. Methods to change the loaded IOS Version are provided in the Change BTS Router IOS Version section of this appendix and are referenced at the appropriate places in the Canned Configuration Installation Methods..

File Sequence Position

During Initialization, the MWR 1941 Router will first search the `startup–config` File for a Boot System Command Line telling it in what directory and file to find the Boot Loader. If this line is not found, the BTS Router will default to attempting to boot from the first file in its Flash Memory.

Flash Memory for the MWR 1941 is the CF Memory Card (Software Identifier **slot0:**). The Canned Configuration Files used for BTS Router installation do not contain a Boot System Command Line because of the need to maintain flexibility for IOS Version changes. Because of this, it is critical that *the IOS File is the first file listed on the CF Memory Card*.

The Canned Configuration Installation Procedures contain Steps to assure that this is the case, and, if it is not, provide guidance to correct the condition. It is important to remember that, if the BTS Router boots and displays a `rommon 1 >` Prompt, the IOS File is missing, out of sequence, has a corrupted Flash Memory Image, or the `startup–config` File contains a Boot System Line that specifies a missing or incorrect IOS Pathname/Filename..

Canned Configuration File Installation

Filename and Installation Location Requirements

The Canned Configuration Files for the BTS Routers must be copied to the CF Memory Card. The filename of the file on the CF Memory Card *must* be `canned-config`.

Canned Configuration File Location and Filename Requirements are a result of Mobile Wireless Center (MWC) Actions during the process of switching a BTS from Packet to Circuit Mode. In this process, the MWC will query the BTS Routers' **slot0:** Directory for a file named `canned-config`. A missing or misnamed file will cause problems with execution of the Mode–switching Process..

Installation Methods

The `startup-config` Configuration File used by the BTS Router during Initialization is stored in NVRAM. This is a memory device internal to the BTS Router and is separate from the CF Memory Card. To install the Canned Configuration File so the BTS Router will use it during Boot–up, the file must be copied into the `startup-config` File in NVRAM.

There are two methods available to accomplish this.:

1. Using a TFTP Server Application to copy the Canned Configuration File from the *Windows*–based LMF Computer to the CF Memory Card installed in a BTS Router, and then copying it to the `startup-config` File in the BTS Router's NVRAM.
2. Using a CF Memory Card Reader to copy the Canned Configuration File to a CF Memory Card, and then, once the CF Memory Card is installed in the BTS Router, using a HyperTerminal Communication Session to copy the file from the CF Memory Card to the `startup-config` File in the BTS Router's NVRAM.

Comparison of Methods

Preparation for using the TFTP Server Application Method is extensive and requires setting up simultaneous Serial and FE Communication Sessions with the BTS Router. This method offers the advantage of being able to verify IOS File Sequence Position immediately, and supporting Direct File Transfers between the BTS Router and LMF Computer without removing the CF Memory Card.

As an alternative, using a CF Memory Card Reader to copy the Canned Configuration File to a CF Memory Card, and from there to the `startup-config` File requires very little set–up. With this method, the IOS File Sequence Position can only be verified once the CF Memory Card is installed in the BTS Router, and any file transfers between the BTS Router and LMF Computer require physically moving the CF Memory Card between the BTS Router and Card Reader..

Procedures to use Each Method

Using the TFTP Server Application to copy the Canned Configuration File to a CF Memory Card is covered in the Method 1 subsection. Performing the Transfer Process with a Card Reader is covered in the Method 2 subsection. The applicable procedures for verifying the loaded IOS Version and File Sequence Position are included in each method..

File Operations using a CF Memory Card Reader

File Transfers should only be performed using the CF Memory Card Reader. CF Memory Card Formatting *should be performed in a BTS Router* using a HyperTerminal Connection. Attempting to format a CF Memory Card from a *Windows*–based computer using a Card Reader could result in unpredictable BTS Router Operation..

CAUTION

Do not format BTS Router CF Memory Cards using a *Windows*–based computer. Format CF Memory Cards only in a BTS Router.

Method 1: Using a TFTP Server to Load to CF Memory Card

Required Equipment and Software

The following items are required to perform this procedure:

- A *Windows*–based computer that meets the requirements of the LMF Computer Platform as specified in *this manual*.
- One of the following Operating Systems for the *Windows*–based computer:
  - *Windows* 2000
  - *Windows* 98 Second Edition (SE) using the *FAT32* File System

CAUTION

BTS Router CF Memory Cards loaded using computers equipped with *Windows* 98 Versions earlier than *Windows* 98 SE and using the FAT16 File System will not operate properly, resulting in a complete site outage.

- One of the following for the *Windows*–based computer:
  - Internal 10/100baseT Network Interface Card (NIC)
  - PCMCIA 10/100baseT NIC

- Cable, Ethernet *Crossover*, Category 5E or better, unshielded twisted pair, two 8–contact Modular Plugs, in one of the following lengths, as determined necessary:
  - 0.3 m (11.8 in) (Motorola Part Number 3088643C07)
  - 0.6 m (23.6 in) (Motorola Part Number 3088643C13)
  - 1.0 m (39.4 in) (Motorola Part Number 3088643C15)
  - 2.1 m (84 in) (Motorola Part Number 3088643C08)
  - 3.0 m (120 in) (Motorola Part Number 3088643C09)
- Cable, *Rollover*, as described in the Establishing a BTS Router Communication Session section of this appendix
- DB–9 plug–to–8–contact Modular Plug Adapter as described in the Establishing a BTS Router Communication Session section of this appendix
- A TFTP Server Software Application (refer to the Setting Up the TFTP Server – Procedure in *Cellular System Administration – CDMA OnLine Documentation*) such as:
  - Cisco TFTP Server
  - PumpKIN TFTP Server
  - Any other equivalent TFTP Server Application
- A copy of the MWR 1941 Router IOS Version required for the network in which the BTS Routers are to be installed. (Contact the Network Administrator or the Motorola Account Team for information on obtaining the required MWR 1941 IOS Version.)
- A +27V DC Power Supply Module to power the BTS Router during Configuration File Operations

Required Materials

The following material is required to perform this method:

- Marking material to identify the BTS Router and CF Memory Card with the installed configuration (blue or red)

Required Publications

The following publications are required to perform procedures in this section:

- *this manual*: *1X SC4812T Lite BTS Optimization/ATP* manual (68P09262A58)
- *Cellular System Administration – CDMA OnLine Documentation*
- *MWR1941 Wireless Mobile Edge Router Software Configuration Guide; part number 78–13983–01*

Preparation for Canned Configuration File TFTP Transfer to CF Memory Card

Preparation for a Canned Configuration File TFTP Transfer consists of the following activities:

1. Setting the LMF Computer NIC IP Address
2. Creating a directory (folder) on the LMF Computer to be used for all TFTP File Transfers
3. Installing the TFTP Server Application on the LMF Computer, and setting the TFTP Server Application Root Directory to the directory created in 2, above
4. Connecting the LMF Computer to the BTS Router for both HyperTerminal (serial) and Ethernet Communication
5. BTS Router Power–up and Initial Configuration for Ethernet Communication

The following procedures are used to accomplish all of these preparatory actions.

Set LMF Computer NIC TCP/IP Address and Create the Default TFTP Directory

Perform the procedure in Table I-4 to set the NIC IP Address..

IMPORTANT

If the IP Address for the LAN Connection on an LMF Computer is being changed to support TFTP Downloads to a BTS Router, the BTS 10base–2 LAN IP Address and Subnet Mask for the NIC must be restored before the LMF can log into a BTS to perform an Optimization or ATP.

NOTE

There are differences between *Windows* 2000 and *Windows* 98 in the menus and screens used for setting or changing a NIC Connection. In the following procedure, items applicable to:*Windows* 2000 will be identified with *Win2000Windows* 98 will be identified with *Win98*

Table I-4: Set LMF Computer NIC IP Address and Create a Default TFTP Directory

✓	Step	Action
	1	Start the computer.
	2	Login and allow the computer to boot to the Desktop.

table continued on next page

Table I-4: Set LMF Computer NIC IP Address and Create a Default TFTP Directory		
✓	Step	Action
	3	Depending on the installed Operating System, from the *Windows* Start Menu, select one of the following: • *Win2000*: **Settings > Network and Dial–up Connections** • *Win98*: **Settings > Control Panel** and double–click **Network**.
	4	Perform one of the following as applicable for the installed Operating System: • For *Win2000*, in the list of displayed connections, locate the Local Area Network Connection for the NIC to be used for BTS Router Ethernet Communication. • For *Win98*, in the **Configuration** Tab of the **Network** Dialog Box, locate the TCP/IP Connection for the installed NIC. – If **TCP/IP** does not appear in the displayed list of installed network components, refer to the Operating System Documentation and install TCP/IP.
	5	Perform one of the following as applicable for the installed Operating System: • For *Win2000*: – Highlight the connection for the NIC. – Right–click the highlighted connection. – Select **Properties** from the Pop–up Menu. • For *Win98*: – Highlight the TCP/IP NIC Connection in the displayed list of installed network components. – Click the **Properties** Button. – Skip to Step 8.
	6	For *Win2000* , in the **Local Area Connection Properties** Dialog Box that appears: • if Internet Protocol (TCP/IP) ***is showing*** in the **Components checked are used by this connection***:* List Box, *proceed to Step 7.* • if Internet Protocol (TCP/IP) ***is not showing*** in the **Components checked are used by this connection***:* List Box, refer to the Operating System Documentation and install TCP/IP.
	7	For *Win2000*, if the Check Box next to the Internet Protocol (TCP/IP) Entry is not checked, click in the box to check it.
	8	Perform one of the following: • *Win2000*: – Highlight the Internet Protocol (TCP/IP) Entry. – Click on the **Properties** Button below the **Components checked are used by this connection***:* List Box. • *Win98*: – From the Tabs displayed in the **TCP/IP Properties** Dialog Box that opens, select the **IP Address** Tab if it is not at the front.

table continued on next page

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Table I-4: Set LMF Computer NIC IP Address and Create a Default TFTP Directory		
✓	Step	Action
	9	In the **Internet Protocol (TCP/IP) Properties** Dialog Box that appears (*Win2000*) or the **IP Address** Tab of the **TCP/IP Properties** Dialog Box (*Win98*), perform the following actions.
	9a	If a black dot is not showing in the the Radio Button Circle next to **Use the following IP Address:** (*Win2000*) or **Specify an IP Address** (*Win98*), click on the Radio Button. – A black dot will appear in the circle.
	9b	If using an LMF Computer, record the IP Address and Subnet Mask used for LMF–BTS Communication so they can be re–entered when TFTP Transfer Activities for the BTS Router are completed.
	9c	Enter **100.100.100.1** in the **IP Address:** Box.
	9d	Enter **255.255.255.252** in the **Subnet Mask:** Box.
	10	Click the **OK** Button for the **Internet Protocol (TCP/IP) Properties** Dialog Box (*Win2000*) or the **TCP/IP Properties** Box (*Win98*).
	11	Click the **OK** Button for the **Local Area Connection Properties** Box (*Win2000*) or the **Network** Box (*Win98*).
	12	In *Win98*, click **File > Close** to close the **Control Panel** Window.
	13	Click **Start > Programs > Windows Explorer** to open *Windows* Explorer.
	14	If the Default TFTP Directory is to be the same directory in which the files downloaded from the OMC–R are stored, proceed to Step 22.
	15	In the *left*–hand pane of *Windows* Explorer, locate the icon for the drive where the Default TFTP Directory is to be created.
	16	Highlight the Drive Icon and click **Files > New >** Folder.
	17	While observing the new folder icon in the *right*–hand pane, type the name for the folder (for example, *TFTP_files*), and press the **Enter** Key.
	18	In *Windows* Explorer, locate the directory where the Canned Configuration Files that were downloaded from the OMC–R are stored.
	19	In the *left*–hand pane, highlight the directory where the files are stored.
	20	Scroll the *left*–hand pane until the newly–created Default TFTP Directory is visible.
	21	In the *right*–hand pane, highlight the Canned Configuration Files and drag them to the Default TFTP Directory.
	22	In the *left*–hand pane, click on the Default TFTP Directory, and verify that the Canned Configuration Files appear in the *right*–hand pane.
	23	Load a copy of the required BTS Router IOS Version into the Default TFTP Directory using FTP, Internet Download, or media such as a Zip Disk (file size is over 7 MB).
	24	Click **Files > Close** to close *Windows* Explorer.

Install and Configure TFTP Server Application

To obtain, install, and configure the Cisco or PumpKIN TFTP Software Applications, refer to the Setting Up the TFTP Server – Procedure in *Cellular System Administration – CDMA OnLine Documentation* For other TFTP Server Applications, install and configure the application according to the manufacturer's instructions..

IMPORTANT

When entering the name of the TFTP Server Root Directory while configuring the TFTP Server Application, be sure to use the name of the directory identified in Table I-4, Step 14, or created in Table I-4, Step 17, above.

Connect the LMF Computer to the BTS Router

Connect the LMF Computer to the BTS Router by performing the procedure in Table I-5 and referring to Figure I-4..

Table I-5: Connecting the LMF Computer to the BTS Router for TFTP File Transfer

✓	Step	Action
	1	If the BTS Router has not been connected to a Power Source, perform the following actions.
	1a	Ensure that the +27V DC Power Source is not ON.
	1b	Connect the BTS Router to the +27V DC Power Source.
	2	Connect the LMF Computer to the BTS Router as shown in Figure I-4, referring to the list of required equipment in this section as required.
	3	If the LMF Computer has not been started, turn it on, Login, and allow it to boot to the Desktop.
	4	Start a HyperTerminal Communication Session for the BTS Router. – Refer to the procedure in Table I-2 of this appendix.
	5	Start the TFTP Server Application as specified for the software. – Refer to the Setting Up the TFTP Server – Procedure in *Cellular System Administration – CDMA OnLine Documentation* or the manufacturer's instructions.

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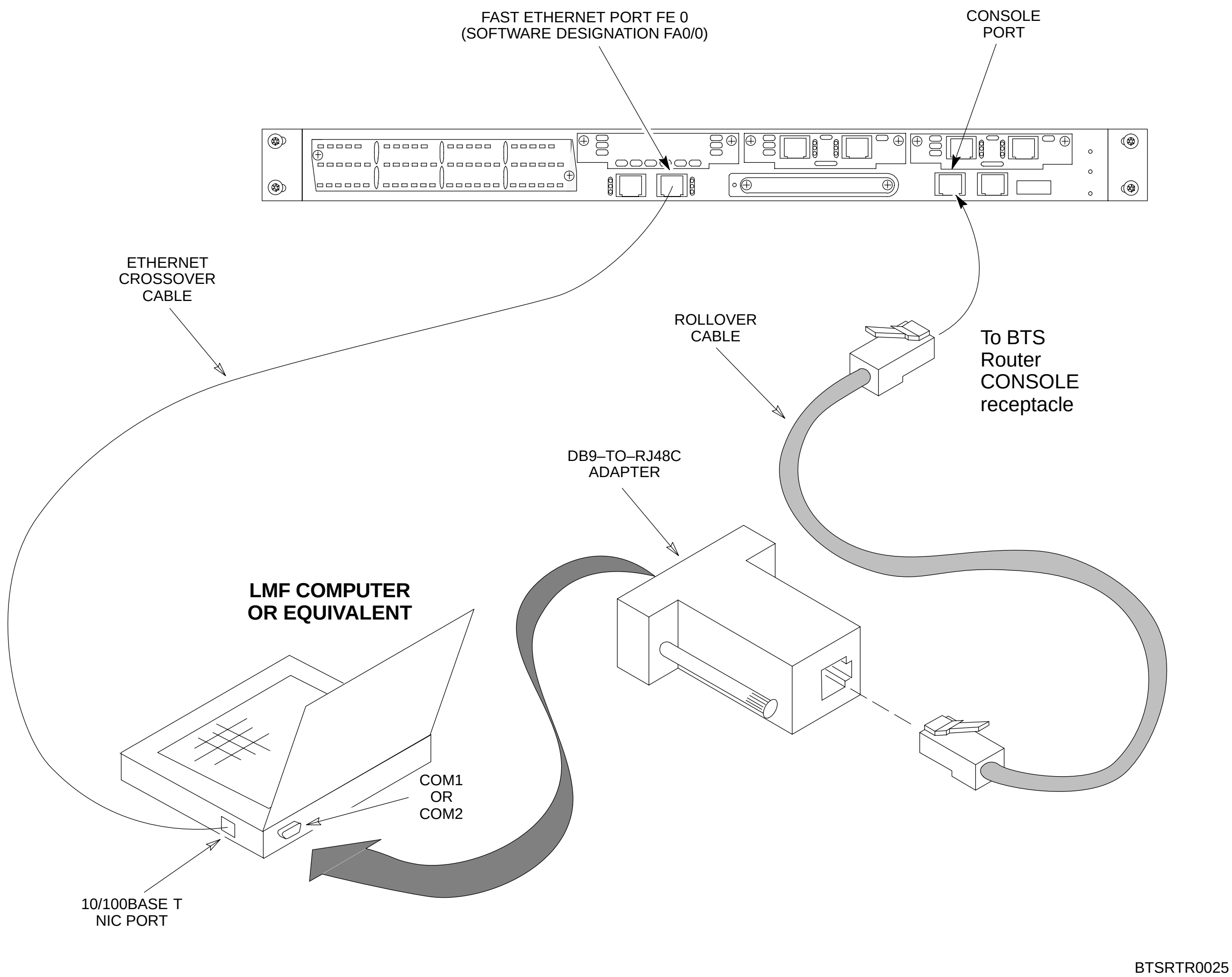
Figure I-4: LMF Computer TFTP Connections to BTS Router



BTS Router Power–up and Initial Configuration for Ethernet Communication

Perform the procedure in Table I-6 to apply power to the BTS Router and set an Initial Configuration for Ethernet Communication.

- Ensure that the required version of the IOS is loaded on the CF Memory Card.
- Ensure that the CF Memory Card is installed in the BTS Router.

Table I-6: BTS Router Power–up and Initial Ethernet Configuration Procedure

✓	Step	Action
		*** IMPORTANT** This procedure does not cover all aspects of BTS Router Operation and programming. Before performing this procedure, review BTS Router initialization, operation, and programming information and procedures in *MWR1941 Wireless Mobile Edge Router Software Configuration Guide; part number 78–13983–01*. – Have this publication available for reference while performing this procedure.
	1	Ensure that a CF Memory Card loaded with the Cisco IOS is installed in the BTS Router. – Refer to the BTS Router Card and Module Replacement section of the *1X SC4812T Lite BTS FRU* manual (68P09262A60) for instructions to access the CF Memory Card Slot.
		*** IMPORTANT** In Step 2, *do not touch the computer keyboard until the BTS Router completes the Boot Process*. The BTS Router buffers any keystrokes made during the Boot Process and interprets them as commands to be executed immediately following completion of the Boot Process.
	2	Apply power to the BTS Router and allow it to complete the Boot Process. • If a message similar to the following, is displayed, press the **Enter** Key and *proceed to Step 3*. `Press RETURN to get started!` • If a message similar to the following, is displayed type **no** and press the **Enter** Key: `Basic management set-up configures only enough connectivity` `for management of the system, extended set-up will ask you` `to configure each interface on the system` `Would you like to enter basic management set-up? [yes/no]:` A response similar to the following will be displayed: `Would you like to enter basic management set-up? [yes/no]: no` `Cisco Internetwork Operating System Software` `IOS (tm) 1941 Software (MWR1941-I-M), Version 12.2(20020127:101239` `Copyright (c) 1986-2002 by cisco Systems, Inc.` `Compiled Sun 27-Jan-02 06:08 by walrobin` `Router>`

table continued on next page

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Table I-6: BTS Router Power–up and Initial Ethernet Configuration Procedure		
✓	Step	Action
	3	At the `Router>` *User* EXEC Mode Prompt, enter the following to access the *Privileged* EXEC Mode: **enable** – A response similar to the following will be displayed: `Router>enable` `Router#`
	4	At the `Router#` *Privileged* EXEC Mode Prompt, enter the following to access the *Configure Submode*: **conf**igure **t**erminal – A response similar to the following will be displayed: `Router#conf t` `Enter configuration commands, one per line. End with CNTL/Z.` `Router(config)#` – The BTS Router is now in the *Global Configuration* Mode and ready to accept configuration changes entered from the keyboard.
	5	At the Global Configuration Mode Prompt, type each of the following commands, pressing the **Enter** Key after each command: **hostname btsrtr1** **interface fa0/0** **ip address 100.100.100.2 255.255.255.252** **speed 100** **duplex full** **no shutdown** **line con 0** **exec–timeout 0 0** **no Login** **line vty 0 4** **no Login** – Responses similar to the following will be displayed: `Router(config)#hostname BTSRTR1` `BTSRTR1(config)#interface fa0/0` `BTSRTR1(config-if)#ip address 100.100.100.2 255.255.255.252` `BTSRTR1(config-if)#speed 100` `BTSRTR1(config-if)#duplex full` `BTSRTR1(config-if)#no shutdown` `BTSRTR1(config-if)#line con 0` `BTSRTR1(config-line)#exec-timeout 0 0` `BTSRTR1(config-line)#no Login` `BTSRTR1(config-line)#line vty 0 4` `BTSRTR1(config-line)#no Login` `BTSRTR1(config-line)#`

table continued on next page

Table I-6: BTS Router Power–up and Initial Ethernet Configuration Procedure

✓	Step	Action
	6	Once the correct parameters have been set, return to the Privileged EXEC Mode Prompt by holding down the **Ctrl** Key and pressing **z** (**Ctrl+z**). – A response similar to the following will be displayed. `BTSRTR1(config-line)#  ^z` `01:11:27: %SYS-5-CONFIG_I: Configured from console by console` `BTSRTR1#` **NOTE** Entering **exit** twice and pressing the **Enter** Key after each entry, will also complete the Configuration Process and return the BTS Router to the Privileged EXEC Mode.
	7	Verify that Port FE 0 (fa0/0) is configured with the correct IP Address by entering the following command. **sh**ow **ip int**erface **br**ief – A response similar to the following will be displayed. `BTSRTR1#sh ip int br` `Interface        IP Address      OK?  Method  Status                  Protocol` `FastEthernet0/0  100.100.100.2 YES  manual  up                      up` `Serial0:0        unassigned      YES  unset   administratively down   down` `FastEthernet0/1  unassigned      YES  unset   administratively down   down` `Serial1:0        unassigned      YES  unset   administratively down   down` `BTSRTR1#`
	8	The BTS Router is now configured for Ethernet Communication on FE 0, and the Canned Configuration File can be transferred by TFTP. – Proceed to Table I-7.

Verifying IOS Version and Canned Configuration File TFTP Transfer to the BTS Router

Prerequisites – The following is required prior to performing this procedure.:

- A copy of the required MWR 1941 Router IOS Version file is installed in the Default TFTP Directory. Transfer the file to the LMF Computer using FTP, Internet Download, or media such as a Zip Disk; file size is approximately 7–8 MB.

IOS Verification and Canned Configuration File Transfer – Perform the procedure in Table I-7 to verify that the loaded IOS Version and transfer the Canned Configuration Files from the LMF Computer to the BTS Router CF Memory Card..

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IMPORTANT

MWR 1941 Routers must be loaded with IOS Version mwr1900–i–mz.122–8.MC2d.bin or later. This Router model will not function properly with earlier IOS Versions.

NOTE

This procedure does not cover all aspects of BTS Router Operation and programming.

Before performing this procedure, review BTS Router initialization, operation, and programming information and procedures in *MWR1941 Wireless Mobile Edge Router Software Configuration Guide; part number 78–13983–01*.

Have this publication available for reference while performing this procedure.

Table I-7: Transfer Canned Configuration Files to the BTS Router Using a TFTP Server

✓	Step	Action
		! CAUTION If Personal Firewall and/or Intrusion Detection Software such as Black ICE is running on the LMF Computer, shut it down before performing this procedure. – If this is not done, the TFTP Transfer Process will not operate.
	1	On the LMF Computer, if it has not been done, start the TFTP Server according to the manufacturer's directions. – Refer to the Setting Up the TFTP Server – Procedure in the *Cellular System Administration – CDMA OnLine Documentation*. *** IMPORTANT** MWR 1941 Routers must be loaded with IOS Version mwr1900–i–mz.122–8.MC2d.bin or later. – This Router model will not function properly with earlier IOS Versions.
	2	If a HyperTerminal Communication Session with the BTS Router is not running, start one by performing the procedure in Table I-2.
	3	In the HyperTerminal Window, the BTS Router must be in the *Privileged* EXEC Mode, as indicated by a number sign at the end of the prompt: `BTSRTR1#`
	4	Ensure that the Ethernet Crossover Cable is connected between the LMF Computer NIC Port and the BTS Router FE 0 Port. – Refer to Figure I-4.

table continued on next page

Table I-7: Transfer Canned Configuration Files to the BTS Router Using a TFTP Server		
✓	Step	Action
	5	Begin verification that the CF Memory Card contains the correct version of the Cisco IOS by entering the following command. **dir** slot0: – A response similar to the following will be displayed: `BTSRTR1#dir slot0:` `Directory of slot0:/` `1  -rw-  7051976   Mar 01 1993 00:11:34  mwr1941-i-mz.122-8.MC2a.bin` `31932416 bytes total (24879104 bytes free)` `BTSRTR1#`
	6	Identify the present Working Directory by entering **pwd**. – The IOS defaults to the CF Memory Card (slot0:) Directory unless the present Working Directory has been changed by using the **cd** Command.
	7	If the present Working Directory has been changed, enter the command **cd slot0:** to return to the default setting. – If slot0: is included in the command, be sure to include the colon (**:**) after **slot0** when typing the command. – The IOS Filename will be similar to the following example. **mwr1941–i–mz.122–8.MC2a.bin**

table continued on next page

Table I-7: Transfer Canned Configuration Files to the BTS Router Using a TFTP Server

<table>
<tr><th>✓</th><th>Step</th><th>Action</th></tr>
<tr><td></td><td>8</td><td>Direct the BTS Router to show the Version Information by entering the following command.
show version
– A response similar to the following will be displayed:
<pre>
BTSRTR1#sh ver
Cisco Internetwork Operating System Software
IOS (tm) 1941 Software (MWR1941-I-M), Version 12.2(8)MC2a, EARLY DEPLOYMENT RE-
LEASE SOFTWARE (fc1)
TAC Support: http://www.cisco.com/tac
Copyright (c) 1986-2002 by cisco Systems, Inc.
Compiled Mon 05-Aug-02 11:07 by nmasa
Image text-base: 0x60008940, data-base: 0x60B54000

ROM: System Bootstrap, Version 12.2(20020113:235343) [sbose-wilma 109], DEVELOP-
MENT SOFTWARE
ROM: 1941 Software (MWR1941-I-M), Version 12.2(8)MC2a, EARLY DEPLOYMENT RELEASE
SOFTWARE (fc1)

Router uptime is 1 minute
System returned to ROM by power-on
System image file is "slot0:mwr1941-i-mz.122-8.MC2a.bin"

cisco mwr1941 (R7000) processor (revision 0.1) with 121856K/18432K bytes of
memory.
Processor board ID JMX0611K5TS
R7000 CPU at 240Mhz, Implementation 39, Rev 3.3, 256KB L2 Cache
Bridging software.
X.25 software, Version 3.0.0.
Primary Rate ISDN software, Version 1.1.
Toaster processor tmc is running.
2 FastEthernet/IEEE 802.3 interface(s)
2 Serial network interface(s)
2 Channelized T1/PRI port(s)
DRAM configuration is 64 bits wide with parity disabled.
55K bytes of non-volatile configuration memory.
31360K bytes of ATA Slot0 CompactFlash (Read/Write)

Configuration register is 0x101

BTSRTR1#
</pre></td></tr>
<tr><td></td><td>9</td><td>Compare the IOS Filename returned in Step 5 and the second line of the Version Information in Step 8.
– Note the correspondence between the filename and IOS Version information.
• If the IOS Filename from the CF Memory Card returned in Step 5 is not different than the filename of the required IOS Version loaded in the LMF Computer Default TFTP Directory, proceed to Step 11.
• If the IOS Filename from the CF Memory Card returned in Step 5 is different than the filename of the required IOS Version loaded in the LMF Computer Default TFTP Directory, proceed to Step 10.</td></tr>
<tr><td></td><td>10</td><td>Perform the procedure in Table I-13 to load the required version, then proceed to Step 11.</td></tr>
</table>

table continued on next page

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Table I-7: Transfer Canned Configuration Files to the BTS Router Using a TFTP Server

✓	Step	Action
		! CAUTION The File Sequence on the CF Memory Card can not be verified with Application Programs that place the listed file names in alphabetical order (for example, certain UNIX Telnet Applications, UNIX Directory Listing Commands, and *Windows* File Managers such as *Windows* Explorer). This portion of the procedure is intended for use only with applications, such as HyperTerminal, that do not list directory contents alphabetically.
	11	Verify that the IOS Version is correct. • If the IOS Version ***is correct*** and there is more than one file loaded on the CF Memory Card, ensure that the *IOS File is the first file listed* in the Directory Content Display. • If it ***is not correct***, *proceed to Step 12.*
	12	Prepare the LMF for the correct IOS Version.
	12a	Backup all files on the CF Memory Card to the LMF Computer Default TFTP Directory by performing Step 3 through Step 6 of Table I-13.
	12b	Perform Step 25 through Step 30 of Table I-13, as applicable.
	12c	Type the following to delete a possible Boot System Line in the `startup-config` File, pressing the **Enter** Key after the command and at each prompt to confirm the filename and deletion operation. **del nvram:startup–config** – A response similar to the following will be displayed: `BTSRTR1#del nvram:startup-config` `Delete filename [startup-config]?` `Delete nvram:startup-config? [confirm]` `[OK]` `BTSRTR1#` **NOTE** Ensure to include the colon (**:**) after **nvram** when typing the command.
	12d	Verify that the `startup-config` File size has been reduced to a minimum by entering the following command. **dir nvram:** – A response similar to the following will be displayed: `Router#dir nvram:` `Directory of nvram:/` `53  -rw-   5   <no date>  startup-config` `54  ----   5   <no date>  private-config` `57336 bytes total (57274 bytes free)` `BTSRTR1#`

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Table I-7: Transfer Canned Configuration Files to the BTS Router Using a TFTP Server		
✓	Step	Action
	13	At the *Privileged* EXEC Mode Prompt, enter the following command. **copy TFTP:btsrtr_canned.***color* **slot0:canned–config** – Where *color* = **blue** or **red**, as applicable. – A response similar to the following will be displayed: `BTSRTR1#copy TFTP:btsrtr_canned.blue slot0:canned-config` `Address or name of remote host []?`
	14	At the prompt for the Remote Host Address or Name, enter the IP Address of the LMF Computer NIC: **100.100.100.1** – A response similar to the following will be displayed: `BTSRTR1#copy TFTP:btsrtr_canned.blue slot0:canned-config` `Address or name of remote host []? 100.100.100.1` `Destination filename [canned-config]?`
	15	At the prompt for the Destination Filename, press the **Enter** Key. – A response similar to the following will be displayed: `BTSRTR1#copy TFTP:btsrtr_canned.blue slot0:canned-config` `Address or name of remote host []? 100.100.100.1` `Destination filename [canned-config]?` `Loading btsrtr_canned.blue from 100.100.100.1 (via Ethernet0/0): !` `[OK - 2457/4096 bytes]` `2457 bytes copied in 84.724 secs (29 bytes/sec)` `BTSRTR1#`
	16	Verify that the Canned Configuration File is saved on the CF Memory Card by entering the **dir** Command. – A response similar to the following will be displayed: `Directory of slot0:/` `  1  -rw-  7051976   Mar 01 1993 00:11:34  mwr1941-i-mz.122-8.MC2a.bin` `  2  -rw-     2457   Mar 01 1993 00:14:48  canned-config` `31932416 bytes total (24877983 bytes free)` `BTSRTR1#`
	17	To allow the BTS Router to boot using the Canned Configuration, enter the following command. **copy canned–config start**up–config – A response similar to the following will be displayed: `BTSRTR1#copy canned-config start` `Destination filename [startup-config]?`

table continued on next page

Table I-7: Transfer Canned Configuration Files to the BTS Router Using a TFTP Server

✓	Step	Action
	18	When prompted for the Destination File Name, press the **Enter** Key. – A response similar to the following will be displayed: `BTSRTR1#copy canned-config start` `Destination filename [startup-config]?` `2457 bytes copied in 3.52 secs` `BTSRTR1#`
	19	Display and note the file size of the `startup-config` File by entering the following command. **dir nvram:** – A response similar to the following will be displayed: `Directory of nvram:/` `26  -rw-        2457         <no date>  startup-config` `27  ----           5         <no date>  private-config` `29688 bytes total (24774 bytes free)` `BTSRTR1#`
	20	Scroll the HyperTerminal Window back to the slot0: Directory Display obtained in Step 16, above.
	21	Compare the file size of the `startup-config` File to the Canned Configuration File to verify the Copy Operation. – The file sizes should be the same.
	22	If desired, the contents of the `startup-config` File may be verified against the file listings at the end of this appendix for the blue or red Canned Configuration, as applicable, by entering the following command. **sh**ow **start**up–config **NOTE** Pressing the Space Bar at the `MORE` prompt will scroll another full screen of data. Pressing the Enter Key will scroll the screen one line at a time.
	23	Verify that the BTS Router will boot properly on the IOS and revised `Start-up Configuration Files` by entering the following command. **reload** – A response similar to the following will be displayed: `BTSRTR1#reload` `System configuration has been modified. Save? [yes/no]: n` `Proceed with reload? [confirm]`
	24	If prompted to save a modified configuration, enter **n** for “no,” and press the **Enter** Key.
	25	When prompted to proceed with Reload, press the **Enter** Key to continue the Reload Operation.

table continued on next page

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Table I-7: Transfer Canned Configuration Files to the BTS Router Using a TFTP Server		
✓	**Step**	**Action**
	26	Verify that the BTS Router reboots without displaying the `rommon 1 >` Prompt or Error Messages related to Port Configurations. • If the BTS Router boots to the ROMMON Prompt, proceed to the Recovery from BTS Router Boot to ROMMON section of this appendix.
	27	Using the tagging materials, tag the BTS Router to clearly identify the installed configuration [blue (BTSRTR1) or red (BTSRTR2)].
	28	Remove the CF Memory from the BTS Router by performing the procedure in the *1X SC4812T Lite BTS FRU* manual (68P09262A60) Manual.
	29	Mark the installed configuration (blue or red) on the Card Label.
	30	Install the card in the BTS Router by performing the procedure in the *1X SC4812T Lite BTS FRU* manual (68P09262A60)
	31	If an additional BTS Router needs have the Canned Configuration installed, perform the following actions.
	31a	Disconnect the cabling from the BTS Router.
	31b	Remove power from the BTS Router and disconnect it from the Power Supply Module.
	31c	Repeat the procedures in Table I-5, Table I-6, and this table (Table I-7) using the additional BTS Router.
	32	If no additional BTS Routers must be configured, perform Steps 31a and 31b, then proceed to Step 33.
	33	On the LMF Computer, shut down the TFTP Server Application and exit the HyperTerminal Session.
	34	If no additional TFTP Transfer activities are to be performed, change the NIC IP Address and Subnet Mask back to those for LMF–BTS Communication recorded in Table I-4, Step 9b. **! CAUTION** If the BTS 10base–2 LAN IP Address and Subnet Mask for the LMF Computer's NIC are not restored, the LMF can not log into a BTS when attempting to perform a BTS Optimization or ATP.

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Method 2: Using a CF Memory Card Reader to Load CF Memory Card

Required Equipment and Software

The following items are required to perform this procedure:

- A *Windows*–based computer that meets the requirements of the LMF Computer Platform as specified in *this manual*.
- One of the following Operating Systems for the *Windows*–based computer:
  – *Windows* 2000
  – *Windows* 98 Second Edition (SE) using the *FAT32* File System

CAUTION

BTS Router CF Memory Cards loaded using computers equipped with *Windows* 98 Versions earlier than *Windows* 98 SE and using the FAT16 File System will not operate properly, resulting in a complete site outage.

- Compact Flash Memory Card *Reader* Device and Software Driver for the Operating System installed on the LMF Computer

CAUTION

Card Readers for other non–volatile, solid–state memory devices such as Smart Media Cards will not work with the CF Memory Cards used in the MWR 1941 Routers. Do not attempt to use a Card Reader intended for another type of memory device.

- Cable, *Rollover*, as described in the Establishing a BTS Router Communication Session section of this appendix
- DB–9 plug–to–8–contact Modular Plug Adapter as described in the Establishing a BTS Router Communication Session section of this appendix
- A copy of the MWR 1941 Router IOS Version required for the network where the BTS Routers are to be installed (Contact the Network Administrator and the Motorola Account Team for information on obtaining the required MWR 1941 IOS Version.)
- A +27V DC Power Supply Module to power the BTS Router during Configuration File Operations.

Required Materials

The following material is required to perform this method:

- Tagging and marking material to identify the BTS Router and CF Memory Card with the installed configuration (blue or red).

Required Publications

The following publications are required to perform procedures in this section:

- *Cellular System Administration – CDMA OnLine Documentation*
- *MWR1941 Wireless Mobile Edge Router Software Configuration Guide; part number 78–13983–01*

File Operations Using a CF Memory Card Reader

Only File Transfers should be performed using the CF Memory Card Reader. CF Memory Card *Formatting should be performed in a BTS Router* using a HyperTerminal Connection. Attempting to format a CF Memory Card from a *Windows*–based computer using a Card Reader could result in unpredictable BTS Router Operation.

CAUTION

Do not format BTS Router CF Memory Cards using a *Windows*–based computer. Only format CF Memory Cards in a BTS Router.

Verifying IOS Version and Loading BTS Router Canned Configuration File to CF Memory Card Using a CF Memory Card Reader

The process of transferring a Canned Configuration File to a BTS Router using a CF Memory Card Reader consists of the following activities:

1. Transfer the Canned Configuration File to the BTS Router's CF Memory Card using a CF Memory Card Reader.
2. Copy the file from the CF Memory Card to the BTS Router's `startup–config` File.

The following procedures are used to accomplish these actions.

Prerequisites

The following is required prior to performing this procedure.:

- A copy of the required MWR 1941 Router IOS Version file is installed in the Default TFTP Directory (transfer the file to the LMF Computer using FTP, Internet Download, or media such as a Zip Disk; file size is approximately 7–8 MB).

Verifying IOS Version and transferring Canned Configuration File to the BTS Router's CF Memory Card

IMPORTANT

MWR 1941 Routers must be loaded with IOS Version mwr1900–i–mz.122–8.MC2d.bin or later. This Router model will not function properly with earlier IOS Versions.

Transfer the Canned Configuration Files from the LMF Computer to a BTS Router CF Memory Card by performing the procedure in Table I-8.

Table I-8: Transfer Canned Configuration File to CF Memory Card with CF Memory Card Reader

✓	Step	Action
		*** IMPORTANT** This procedure does not cover all aspects of BTS Router Operation and programming. Before performing this procedure, review BTS Router initialization, operation, and programming information and procedures in *MWR1941 Wireless Mobile Edge Router Software Configuration Guide; part number 78–13983–01*. – Have this publication available for reference while performing this procedure.
	1	If it has not been done, install a CF Memory Card loaded with the IOS in the BTS Router by performing the procedure in the *1X SC4812T Lite BTS FRU* manual (68P09262A60). *** IMPORTANT** MWR 1941 Routers must be loaded with IOS Version mwr1900–i–mz.122–8.MC2d.bin or later. This Router model will not function properly with earlier IOS Versions.
	2	Connect the LMF Computer to the BTS Router and start a HyperTerminal Communication Session with the BTS Router by performing the procedure in Table I-2.
	3	If it has not been done, connect the BTS Router to the +27V DC Power Supply Module. – Make sure that the +27V DC Power Supply Module Output is **OFF**.
		*** IMPORTANT** In Step 4, *do not touch the computer keyboard until the BTS Router completes the Boot Process.* The BTS Router buffers any keystrokes made during the Boot Process and interprets them as commands to be executed immediately following Boot Process completion.
	4	Apply power to the BTS Router and allow it to complete the Boot Process. • If a message similar to the following, is displayed, press the **Enter** Key and *proceed to Step 5:* `Press RETURN to get started!`
	5	If a message similar to the following, is displayed type **no** and press the **Enter** Key: `Basic management set-up configures only enough connectivity` `for management of the system, extended set-up will ask you` `to configure each interface on the system` `Would you like to enter basic management set-up? [yes/no]:` A response similar to the following will be displayed: `Would you like to enter basic management set-up? [yes/no]: no` `Cisco Internetwork Operating System Software` `IOS (tm) 1941 Software (MWR1941-I-M), Version 12.2(20020127:101239` `Copyright (c) 1986-2002 by cisco Systems, Inc.` `Compiled Sun 27-Jan-02 06:08 by walrobin` `Router>`

table continued on next page

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Table I-8: Transfer Canned Configuration File to CF Memory Card with CF Memory Card Reader

✓	Step	Action
		! CAUTION Use only a Card Reader specifically designed for CF Memory Cards to perform this procedure. Card Readers for other non–volatile, solid–state memory devices such as Smart Media Cards will not work with the CF Memory Cards used in the MWR 1941 Routers.
	6	If it has not been done, follow the CF Memory Card Reader manufacturer's instructions to load the CF Memory Card Driver Application for the Operating System being used onto the LMF Computer.
	7	Connect the CF Memory Card Reader to the LMF Computer following the Card Reader manufacturer's instructions.
	8	Remove the CF Memory Card from the BTS Router by performing the procedure in the *1X SC4812T Lite BTS FRU* manual (68P09262A60).
	9	Insert the CF Memory Card into the Card Reader as specified by the Card Reader manufacturer's instructions.
	10	On the LMF Computer, click **Start > Programs > Windows Explorer** to open *Windows* Explorer.
		NOTE The CF Memory Card Reader will appear as a Disk Drive in *Windows* Explorer with a Disk Drive Letter and Icon.
	11	Scroll the *left*–hand pane of *Windows* Explorer to locate the icon for the CF Memory Card.
	12	Verify that the CF Memory Card contains the required version of the IOS by performing the following actions.
	12a	In the left–hand pane of *Windows*Explorer, highlight the CF Memory Card Icon.
	12b	In the right–hand pane, note the IOS Filename loaded on the card, and record it. **NOTE** The IOS Filename will be similar to **mwr1941–i–mz.122–8.MC2a.bin**.
	13	Scroll the *left*–hand pane of *Windows* Explorer to locate the icon for the directory where the Canned Configuration Files that were downloaded from the OMC–R and where the required IOS Version are stored.
	14	In the *left*–hand pane, highlight the directory where the files are stored.
	15	In the the *right*–hand pane, locate the filename of the required IOS Version and compare it to the filename recorded in Step 12b, above. • If the filenames are different: – Proceed to Table I-11 to replace the IOS on the CF Memory Card. – Then, proceed to Step 16, below.
	16	In the *right*–hand pane, highlight the Canned Configuration File to be transferred to the CF Memory Card and drag it to the CF Memory Card Disk Drive Icon.

table continued on next page

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Table I-8: Transfer Canned Configuration File to CF Memory Card with CF Memory Card Reader		
✓	**Step**	**Action**
	17	Verify that the Canned Configuration File has been copied to the CF Memory Card by clicking on the CF Memory Card Disk Drive Icon in the *left*–hand pane. – Verify that the Canned Configuration File appears in the in the *right*–hand pane. **NOTE** Do not be concerned if the Canned Configuration File appears before the IOS File in the File Sequence displayed by *Windows* Explorer. – The position of the IOS File in the sequence of files on the CF Memory Card can not be verified until the CF Memory Card is installed in the BTS Router.
	18	With the CF Memory Card Disk Drive Icon still selected, change the name of the Canned Configuration File on the card to **canned–config** by performing the following actions.
	18a	In the *right*–hand pane of *Windows* Explorer, click on the Canned Configuration Filename. – The filename will be highlighted.
	18b	Wait approximately two seconds, and then click on the Canned Configuration File Filename again. – A hair–line rectangle will appear around the highlighted filename.
	18c	After the rectangle appears around the highlighted filename, type the following: **canned–config**
	18d	Press the **Enter** Key or click on the Canned Configuration File *icon*. – The rectangle around the Canned Configuration Filename will disappear and the filename will remain highlighted.
	19	Click **Files** > **Close** to close *Windows* Explorer.
	20	Remove the CF Memory Card with the IOS Version and Canned Configuration File from the Card Reader, and mark the Card Label with the Canned Configuration (blue or red) copied to it.
	21	Install the CF Memory Card in the BTS Router by performing the procedure in the *1X SC4812T Lite BTS FRU* manual (68P09262A60).
	22	Proceed to Table I-9 to copy the Canned Configuration from the CF Memory Card to the BTS Router's `startup-config` File.

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Copy Canned Configuration File from the CF Memory Card to the BTS Router's Start–up Configuration and Verify the IOS File Sequence

To allow the BTS Router to automatically boot using the Canned Configuration, the configuration must be copied to the the BTS Router's `startup–config` File in NVRAM. Perform the procedure in Table I-9 to accomplish this..

Table I-9: Copy Canned Configuration File to BTS Router Start–up Configuration and Verify IOS File Position

✓	Step	Action
		*** IMPORTANT** This procedure does not cover all aspects of BTS Router Operation and Programming. Before performing this procedure, review BTS Router Initialization, Operation, Programming Information, and Procedures in *MWR1941 Wireless Mobile Edge Router Software Configuration Guide; part number 78–13983–01*. – Have this publication available for reference while performing this procedure.
	1	If it has not been done, install the CF Memory Card with the Canned Configuration and required IOS Version in the BTS Router by performing the procedure in the *1X SC4812T Lite BTS FRU* manual (68P09262A60).
	2	At this point, the BTS Router should be powered up and displaying the `router>` Prompt in the HyperTerminal Window of the LMF Computer Communication Session. If it is not, perform Step 1 through Step 5 of Table I-8.
	3	At the `Router>` *User* EXEC Mode Prompt, enter the following to access the *Privileged* EXEC Mode: **enable** – A response similar to the following will be displayed: `Router>enable` `Router#`
		NOTE The IOS defaults to the CF Memory Card (slot0:) Directory unless the present Working Directory has been changed by using the **cd** Command. Identify the present Working Directory by entering **pwd**. – If the present Working Directory has been changed, enter the command **cd slot0:** to return to the default setting.

table continued on next page

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Table I-9: Copy Canned Configuration File to BTS Router Start–up Configuration and Verify IOS File Position

<table>
<tr><th>✓</th><th>Step</th><th>Action</th></tr>
<tr><td></td><td>4</td><td>Display the Directory Listing of the CF Memory Card by entering the following command.
dir
– A response similar to the following will be displayed:<pre>
Router#dir slot0:
Directory of slot0:/

    1 -rw-   7051976   Sep 23 2002 07:24:18 mwr1941-i-mz.122-8.MC2a.bin
    2 -rw-   2212   Mar 01 1993 00:14:48 canned-config

31932416 bytes total (24885606 bytes free)
Router#
</pre></td></tr>
<tr><td></td><td>5</td><td>Ensure that the IOS File is the first file listed in the Directory Content Display.
• If it is not, perform the procedure in Table I-12, and then return to Step 6, below.</td></tr>
<tr><td></td><td>6</td><td>Copy the Canned Configuration to the BTS Router’s Start–up Configuration File by entering the following command.
copy slot0:canned–config startup–config
– A response similar to the following will be displayed:<pre>
Router#copy slot0:canned-config start
Destination filename [startup-config]?
</pre></td></tr>
<tr><td></td><td>7</td><td>When prompted for the Destination File Name, press the Enter Key.
– A response similar to the following will be displayed:<pre>
Router#copy slot0:canned-config start
Destination filename [startup-config]?
2218 bytes copied in 3.52 secs
Router1#
</pre></td></tr>
<tr><td></td><td>8</td><td>Check the file size of the <code>startup–config</code> File to verify the copy operation by entering the following command.
dir nvram:
– A response similar to the following will be displayed:<pre>
Directory of nvram:/

   26 -rw-   2218   <no date> startup-config
   27 ----   5   <no date> private-config

29688 bytes total (25247 bytes free)
Router#
</pre>* IMPORTANT
Be sure to include the colon (:) after nvram when typing the command.</td></tr>
</table>

table continued on next page

Table I-9: Copy Canned Configuration File to BTS Router Start–up Configuration and Verify IOS File Position

✓	Step	Action
	9	If desired, the contents of the `startup-config` File may be verified against the file listings at the end of this appendix for the blue or red Canned Configuration, as applicable, by entering the following command. **show start**up–config **NOTE** Pressing the Space Bar at the `MORE` Prompt will scroll to another full screen of data. Pressing the Enter Key will scroll the screen one line at a time.
	10	Verify that the BTS Router will boot properly on the IOS and revised Start–up Configuration Files by entering the following command. **reload** – A response similar to the following will be displayed: `Router#reload` `System configuration has been modified. Save? [yes/no]: n` `Proceed with reload? [confirm]`
	11	If prompted to save a modified configuration: – Enter **n** for “no”. – Press the **Enter** Key.
	12	When prompted to proceed with reload: – Press the **Enter** Key to continue the Reload Operation.
	13	Verify that the BTS Router reboots without displaying the `rommon 1 >` Prompt or Error Messages related to Port Configurations. • If the BTS Router ***does boot*** to the ROMMON Prompt, proceed to the Recovery from BTS Router Boot to ROMMON section of this appendix. • If the BTS Router ***does not boot*** to the ROMMON Prompt, *proceed to Step 14.*
	14	Using the tagging materials, tag the BTS Router to clearly identify the installed configuration [blue (BTSRTR1) or red (BTSRTR2)].
	15	Determine if additional BTS Routers need to be configured. • If **no** additional BTS Routers need to be configured, perform Step 16, Step 17, and Step 19 **only**. – **Do not perform Step 18.** • If **any** additional BTS Router need to be configured, perform Step 16, Step 17, Step 18, and Step 19.
	16	Disconnect the cabling for the HyperTerminal Communications Session from the BTS Router, and minimize the HyperTerminal Window on the LMF Computer.
	17	Remove power from the BTS Router and disconnect it from the Power Supply Module.

table continued on next page

Table I-9: Copy Canned Configuration File to BTS Router Start–up Configuration and Verify IOS File Position		
✓	**Step**	**Action**
	18	Repeat the procedures in Table I-8 and this table (Table I-9) using the additional BTS Router.
	19	On the LMF Computer, exit the HyperTerminal Session.

Background

BTS Routers are supplied with CF Memory Cards pre–loaded with a version of the IOS. Prior to installing the BTS Routers in a BTS, the loaded IOS Version should be verified as being the one required for the network.

It is critical to also verify that the IOS File is the *first file on the CF Memory Card*. If another file precedes the IOS File, the BTS Router will not boot properly and will not function in the network.

Equipment and Software Required for Verification Methods

The following items are required to perform this procedure:

- A *Windows*–based computer that meets the requirements of the LMF Computer Platform as specified in Chapter 3 of this manual:
- One of the following Operating Systems for the *Windows*–based computer:
  – *Windows* 2000
  – *Windows* 98 Second Edition (SE) using the *FAT32* File System

CAUTION

BTS Router CF Memory Cards loaded using computers equipped with *Windows* 98 Versions earlier than *Windows* 98 SE and using the FAT16 File System will not operate properly, resulting in a complete site outage.

- Cable, *Rollover*, as described in the Establishing a BTS Router Communication Session section of this appendix
- DB–9 plug–to–8–contact Modular Plug Adapter as described in the Establishing a BTS Router Communication Session section of this appendix
- A copy of the MWR 1941 Router IOS Version required for the network where the BTS Routers are to be installed.

NOTE

Contact the Network Administrator or the Motorola Account Team for assistance in determining and obtaining a copy of the required IOS Version.

- The MWR 1941 will accept a voltage from –60V DC to + 60V DC during Configuration and File Operations.

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Required Publications

The following publication is required to perform procedures in this section:

- *MWR1941 Wireless Mobile Edge Router Software Configuration Guide; part number 78–13983–01*

Method 1: Replacement of Installed Router CF Card IOS Data

Description

This procedure covers using an LMF Computer equipped with a TFTP Server Application to perform the following activities::

1. Verify that the IOS Version is loaded on a CF Memory Card and running on a BTS Router.
2. Replace the IOS Version installed in a BTS Router.
3. Ensure the IOS File *is the first file on the CF Memory Card*

Additional Required Equipment/Software

For this method, the following Software Application is required in addition to the common items required for both methods.:

- Cable, Ethernet *Crossover*, Category 5E or better, unshielded twisted pair, two 8–contact Modular Plugs, in one of the following lengths, as determined necessary:
  – 0.3 m (11.8 in) (Motorola Part Number 3088643C07)
  – 0.6 m (23.6 in)(Motorola Part Number 3088643C13)
  – 1.0 m (39.4 in) (Motorola Part Number 3088643C15)
  – 2.1 m (84 in) (Motorola Part Number 3088643C08)
  – 3.0 m (120 in) (Motorola Part Number 3088643C09)
- A TFTP Server Software Application (refer to the Setting Up the TFTP Server – Procedure in *Cellular System Administration – CDMA OnLine Documentation* such as:
  – Cisco TFTP Server
  – PumpKIN TFTP Server
  – Any other equivalent TFTP Server Application

Prerequisites

The following are required prior to performing this procedure::

- The LMF Computer and BTS Router have been prepared for TFTP File Transfer and are operating as they would be after performing the procedures in Table I-4, Table I-5, Table I-6, and Steps 1 through 10 of Table I-7.
- A copy of the required IOS Version is loaded into the TFTP Default Directory of the LMF Computer

Replacing Installed IOS Version and Verifying File Sequence Position

Perform the procedure in Table I-10 to replace the installed IOS Version using the TFTP Server Application, and ensure the IOS File is first in the stored File Sequence on the CF Memory Card..

Table I-10: Using a TFTP Server Application for Replacing Loaded IOS Version and Verifying File Sequence Position

✓	Step	Action
		*** IMPORTANT** This procedure does not cover all aspects of BTS Router Operation and programming. Before performing this procedure, review BTS Router initialization, operation, and programming information and procedures in *MWR1941 Wireless Mobile Edge Router Software Configuration Guide; part number 78–13983–01*. – Have this publication available for reference while performing this procedure.
	1	This procedure assumes the LMF Computer and BTS Router are configured, connected, and operating as they would be after performing the procedures in Table I-4, Table I-5, Table I-6, and Steps 1 through 10 of Table I-7. – If necessary, perform these procedures now.
		NOTE The present IOS Working Directory defaults to the CF Memory Card (slot0:) Directory unless the present Working Directory has been changed by using the **cd** Command.
	2	Identify the present Working Directory by entering **pwd**. • If the present Working Directory has been changed, enter the command **cd slot0:** to return to the default setting.
	3	Identify the filename of the currently loaded IOS that must be replaced by entering **dir** command. – A response similar to the following will be displayed: `BTSRTR1#dir` `Directory of slot0:/` `    1  -rw-     7051844   Sep 23 2002 07:15:08  mwr1941-i-mz.07022002.bin` `    2  -rw-        2212   Mar 01 1993 00:11:00  canned-config` `31932416 bytes total (24878360 bytes free)` `BTSRTR1#`
	4	Begin to back–up the currently installed version of the BTS Router's IOS to the LMF Computer's Default TFTP Directory by entering the following command. **copy** *old_IOS_filename* **TFTP:** – Where *old_IOS_filename* = the filename of the IOS currently loaded on the BTS Router CF Memory Card. – A response similar to the following will be displayed: `BTSRTR1#copy mwr1941-i-mz.07022002.bin TFTP:` `Address or name of remote host []?`

table continued on next page

Table I-10: Using a TFTP Server Application for Replacing Loaded IOS Version and Verifying File Sequence Position

✓	Step	Action
	5	At the Remote Host Prompt, enter the following: **100.100.100.1** – A response similar to the following will be displayed: `Address or name of remote host []? 100.100.100.1` `Destination filename [mwr1941-i-mz.07022002.bin]?`
	6	If the Default Filename displayed in the prompt is correct, press the **Enter** Key to accept it. • If it is missing or not correct, enter the correct filename. – A response similar to the following will be displayed if the Default Filename is selected: `Address or name of remote host []? 100.100.100.1` `Destination filename [mwr1941-i-mz.07022002.bin]?` `!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!` `!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!` `!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!` `!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!` `!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!` `!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!` `!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!` `!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!` `!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!` `!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!` `!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!` `!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!` `!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!` `!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!` `!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!` `!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!` `!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!` `7051844 bytes copied in 109.92 secs (64697 bytes/sec)` `BTSRTR1#`
	7	If additional files are stored on the CF Memory Card, begin backing them up to the LMF Computer's Default TFTP Directory by entering the following command. **copy** *additional_filename* **TFTP:** – Where *additional_filename* = the filename of an additional file loaded on the BTS Router CF Memory Card. – A response similar to the following will be displayed: `BTSRTR1#copy canned-config TFTP:` `Address or name of remote host [100.100.100.1]?`
	8	If the Default IP Address displayed in the prompt is correct, press the **Enter** Key to accept it. • If it is missing or not correct, enter the correct IP Address for the LMF Computer. – A response similar to the following will be displayed if the Default Filename is selected: `Address or name of remote host [100.100.100.1]?` `Source filename [canned-config]?`

table continued on next page

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Table I-10: Using a TFTP Server Application for Replacing Loaded IOS Version and Verifying File Sequence Position

✓	Step	Action
	9	If the Default Filename displayed in the prompt is correct, press the **Enter** Key to accept it. • If it is missing or not correct, enter the correct filename. – A response similar to the following will be displayed if the Default Filename is selected: `Source filename [canned-config]?` `Destination filename [canned-config]?`
	10	If the Default Filename displayed in the prompt is correct, press the **Enter** Key to accept it. • If it is missing or not correct, enter the correct filename. – A response similar to the following will be displayed: `Destination filename [canned-config]?` `!` `[OK - 2212/4096 bytes]` `2212 bytes copied in 0.152 secs` `BTSRTR1#`
	11	If more files are stored on the CF Memory Card, repeat Steps 7 through 10 until all files have been backed up to the LMF Computer.
	12	Delete *all* files from the CF Memory Card by entering the following command: **format slot0:** – A response similar to the following will be displayed: `BTSRTR1#format slot0:` `Format operation may take a while. Continue? [confirm]`
	13	Press the **Enter** Key to continue the Format Operation. – A response similar to the following will be displayed: `Format operation may take a while. Continue? [confirm]` `Format operation will destroy all data in "slot0:".  Continue? [confirm]`

table continued on next page

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Table I-10: Using a TFTP Server Application for Replacing Loaded IOS Version and Verifying File Sequence Position

✓	Step	Action
	14	Press the **Enter** Key to continue the Format Operation. – A response similar to the following will be displayed: `Format operation will destroy all data in ”slot0:”.  Continue? [confirm]` `Format: Drive communication & 1st Sector Write OK...` `Writing Monlib` `sectors...............................................................` `................` `Monlib write complete` `.` `Format: All system sectors written. OK...` `Format: Total sectors in formatted partition: 62560` `Format: Total bytes in formatted partition: 32030720` `Format: Operation completed successfully.` `Format of slot0 complete` `BTSRTR1#`
	15	Verify that all files have been deleted from the CF Memory Card by entering the **dir** Command. – A response similar to the following will be displayed: `Directory of slot0:/` `No files in directory` `31932416 bytes total (31932416 bytes free)` `BTSRTR1#`
	16	Begin to copy the required version of the IOS from the LMF Computer to the BTS Router by entering the following command. **copy TFTP:***new_IOS_filename* **slot0:** – Where *new_IOS_filename* = the filename of the required IOS for the BTS Router. – A response similar to the following will be displayed: `BTSRTR1#copy TFTP:mwr1941-i-mz.122-8.MC2a.bin slot0:` `Address or name of remote host [100.100.100.1]?`
	17	If the Default IP Address displayed in the prompt is correct, press the **Enter** Key to accept it. • If it is missing or not correct, enter the correct IP Address for the LMF Computer. – A response similar to the following will be displayed if the Default Filename is selected: `Address or name of remote host [100.100.100.1]?` `Source filename [mwr1941-i-mz.122-8.MC2a.bin]?`

table continued on next page

Table I-10: Using a TFTP Server Application for Replacing Loaded IOS Version and Verifying File Sequence Position

✓	Step	Action
	18	If the Default Filename displayed in the prompt is correct, press the **Enter** Key to accept it. • If it is missing or not correct, enter the correct filename. – A response similar to the following will be displayed if the Default Filename is selected: `Source filename [mwr1941-i-mz.122-8.MC2a.bin]?` `Destination filename [mwr1941-i-mz.122-8.MC2a.bin]?`
	19	If the Default Filename displayed in the prompt is correct, press the **Enter** Key to accept it. • If it is not correct, enter the correct filename. – A response similar to the following will be displayed if the Default Filename is selected: `Destination filename [mwr1941-i-mz.122-8.MC2a.bin]?` `Accessing TFTP://100.100.100.1/mwr1941-i-mz.122-8.MC2a.bin...` `Loading mwr1941-i-mz.122-8.MC2a.bin from 100.100.100.1 (via FastEthernet0/0): !!!!` `Loading mwr1941-i-mz.122-8.MC2a.bin from 100.100.100.1 (via FastEthernet0/0):` `!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!` `!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!` `!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!` `!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!` `!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!` `!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!` `!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!` `!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!` `!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!` `!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!` `!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!` `!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!` `!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!` `!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!` `!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!` `!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!` `!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!` `[OK - 7051976/14103552 bytes]` `7051976 bytes copied in 145.108 secs (48634 bytes/sec)` `BTSRTR1#`
	20	Display the CF Memory Card Directory to verify that the new IOS File is there by entering the **dir** command. – A response similar to the following will be displayed: `BTSRTR1#dir` `Directory of slot0:/` `    1  -rw-     7051976   Sep 23 2002 07:25:36  mwr1941-i-mz.122-8.MC2a.bin` `31932416 bytes total (24880440 bytes free)` `BTSRTR1#`

table continued on next page

Table I-10: Using a TFTP Server Application for Replacing Loaded IOS Version and Verifying File Sequence Position

✓	Step	Action
	21	If any additional files previously stored on the CF Memory Card are to be copied to the card, enter the following command. **copy TFTP:***filename* **slot0:** – Where *filename* = the filename of the file to be copied to the CF Memory Card – A response similar to the following will be displayed: `BTSRTR1#copy TFTP:canned-config slot0:` `Address or name of remote host [100.100.100.1]?`
	22	If the Default IP Address displayed in the prompt is correct, press the **Enter** Key to accept it. • If it is missing or not correct, enter the correct IP Address for the LMF Computer. – A response similar to the following will be displayed if the Default IP Address is selected: `Address or name of remote host [100.100.100.1]?` `Destination filename [canned-config]?`
	23	If the Default Filename displayed in the prompt is correct, press the **Enter** Key to accept it. • If it is missing or not correct, enter the correct filename. – A response similar to the following will be displayed if the Default Filename is selected: `Destination filename [canned-config]?` `Accessing TFTP://100.100.100.1/canned-config...` `Loading basic_config from 100.100.100.1 (via FastEthernet0/0): !` `[OK - 2212/4096 bytes]` `2212 bytes copied in 0.152 secs` `BTSRTR1#`
	24	After the additional file is copied to the CF Memory Card, display the CF Memory Card Directory by entering the **dir** Command. – A response similar to the following will be displayed: `BTSRTR1#dir` `Directory of slot0:/` `1  -rw-   7051976   Sep 23 2002 07:24:18  mwr1941-i-mz.122-8.MC2a.bin` `2  -rw-      2212   Mar 01 1993 00:09:06  canned-config`
	25	The IOS File *must be the first file listed* for the BTS Router to boot properly. • If it ***is***, *proceed to Step 30.* • If it ***is not***, *proceed to Step 26.*

table continued on next page

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Table I-10: Using a TFTP Server Application for Replacing Loaded IOS Version and Verifying File Sequence Position

✓	Step	Action
		! CAUTION The File Sequence on the CF Memory Card can not be verified with application programs that place the listed file names in alphabetical order (for example, certain UNIX Telnet Applications, UNIX Directory Listing Commands, and *Windows* File Managers such as *Windows* Explorer). This portion of the procedure is intended for use only with applications, such as HyperTerminal, that do not list directory contents alphabetically.
	26	If another file is listed before the IOS File, delete the file by performing Step 12 through Step 14 and display the directory of the CF Memory Card as described in Step 24 to ensure that the file is deleted.
	27	Copy the file from the LMF Computer to the CF Memory Card again by performing Step 21 through Step 24.
	28	If the file is again listed before the IOS File in the CF Memory Card Directory Display, format the CF Memory Card by performing Step 12 through Step 15 of this table.
	29	Copy the IOS File and any other required file to the formatted CF Memory Card by performing Step 16 through Step 25.
	30	If additional files are to be transferred to the CF Memory Card, perform Step 21 through Step 25 for each file.
	31	After making sure that the IOS File *is the first file on the CF Memory Card*, restart the BTS Router with the new IOS Version by entering the following command. **reload** – A response similar to the following will be displayed: `BTSRTR1#reload` `System configuration has been modified. Save? [yes/no]: n` `Proceed with reload? [confirm]`
	32	If prompted to save a modified configuration: – Enter **n** for “no”. – Press the **Enter** Key.
	33	When prompted to proceed with reload, press the **Enter** Key to continue the Reload Operation.

table continued on next page

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Table I-10: Using a TFTP Server Application for Replacing Loaded IOS Version and Verifying File Sequence Position

✓	Step	Action
	34	Once the BTS Router has completed rebooting, change to the Privileged EXEC Mode and confirm that the booted IOS Version is correct by entering the following command. **sh**ow **ver**sion – A response similar to the following partial example will be displayed: `BTSRTR1#sh ver` `Cisco Internetwork Operating System Software` `IOS (tm) 1941 Software (MWR1941-I-M), Version 12.2(8)MC2a, EARLY DEPLOYMENT RE-LEASE SOFTWARE (fc1)` `.` `.` `.` `BTSRTR1#`
	35	Verify that the Version Number displayed in the second line of the Version Information is the correct IOS Version.
	36	If this procedure was entered from Step 10 of Table I-7, return to Table I-7, Step 11.
	37	If no other BTS Router File Operations or Configuration Actions are required, perform the following actions.
	37a	Remove power from the BTS Router and disconnect it from the Power Supply Module.
	37b	Disconnect all other cabling from the BTS Router.
	37c	On the LMF Computer, exit the HyperTerminal Communications Session.
	38	If no additional TFTP Transfer activities are to be performed, change the NIC IP Address and Subnet Mask back to those for LMF–BTS Communication recorded in Table I-4, Step 9b. **! CAUTION** If the BTS 10base–2 LAN IP Address and Subnet Mask for the LMF Computer's NIC are not restored, the LMF can not log into a BTS when attempting to perform a BTS Optimization or ATP.

Method 2: Using a CF Memory Card Reader for Replacement of Installed IOS Version and Changing File Sequence Position

This subsection contains the File Replacement and File Sequence Manipulation Procedures to use when transferring files with a CF Memory Card Reader.

Replace IOS Version Installed on the CF Memory Card

Description – This procedure covers using an LMF Computer equipped with a CF Memory Card Reader to perform the following activities.:

1. Verify that the IOS Version is loaded on a CF Memory Card and running on a BTS Router.
2. Replace the IOS Version installed in a BTS Router.
3. Ensure that the IOS File *is the first file on the CF Memory Card*.

Additional Required Equipment/Software – For this method, the following equipment item and associated software is required in addition to the common items required for both methods.:

- Compact Flash Memory Card *Reader* Device and Software Driver for the Operating System are installed on the LMF Computer.

CAUTION

Card Readers for other non–volatile, solid–state memory devices such as Smart Media Cards will not work with the CF Memory Cards used in the MWR 1941 Routers. Do not attempt to use a Card Reader intended for another type of memory device.

Prerequisites – The following items are required prior to performing this procedure.:

- The LMF Computer and BTS Router have been prepared for CF Memory Card Reader File Transfer and are operating as they would be after performing the procedures in Steps 1 through 10 of Table I-8.
- A copy of the required IOS Version is loaded into the desired directory of the LMF Computer.

File Operations using a CF Memory Card Reader – Only File Transfers should be performed using the CF Memory Card Reader. CF Memory Card *Formatting should be performed in a BTS Router* using a HyperTerminal Connection. Attempting to format a CF Memory Card from a *Windows*–based computer using a Card Reader could result in unpredictable BTS Router Operation.

CAUTION

Do not format BTS Router CF Memory Cards using a *Windows*–based computer.

– Only format CF Memory Cards in a BTS Router.

Replacing installed IOS Version – Perform the procedure in Table I-11 to replace the installed IOS Version using a CF Memory Card Reader and to ensure the IOS File is first in the stored File Sequence on the CF Memory Card.

Table I-11: Using a CF Memory Card Reader for Replacing Loaded IOS Version and Verifying File Sequence Position

✓	Step	Action
		*** IMPORTANT** This procedure does not cover all aspects of BTS Router Operation and programming. Before performing this procedure, review BTS Router initialization, operation, and programming information and procedures in *MWR1941 Wireless Mobile Edge Router Software Configuration Guide; part number 78–13983–01*. – Have this publication available for reference while performing this procedure.
	1	This procedure assumes the LMF Computer and BTS Router are configured, connected, and operating as they would be after performing the procedures in Step 1 through Step 15 of Table I-8. – If necessary, perform these procedures now.
	2	With the CF Memory Card in the CF Memory Card Reader and the Card Reader Icon highlighted in the left–hand pane of *Windows* Explorer, perform the following actions to delete the IOS File from the card:
	2a	In the right–hand pane of *Windows* Explorer, highlight the IOS File to be removed.
	2b	Right–click and select **Delete** from the Pop–up Menu.
		! CAUTION When performing Step 3 and its associated Substeps, files should be moved to and from the CF Memory Card one by one to reduce the potential for disrupting the the CF Memory Card File Sequence. **Do not attempt** to move multiple files by highlighting, dragging, and dropping all of them at one time.
	3	If there are more files on the CF Memory Card that must be retained, perform the following actions.
	3a	Scroll the left–hand pane of *Windows* Explorer to locate the LMF Computer Directory where the required IOS Version and Canned Configuration Files are stored.
	3b	In the right–hand pane, highlight the additional file on the CF Memory Card that is to be retained.
	3c	While holding down the **Ctrl** Key on the LMF Computer, drag and drop the highlighted file into the directory in the left–hand pane where the required IOS and canned config files are stored.
	3d	If additional files loaded on the CF Memory Card must be retained, repeat Step 3b and Step 3c for each file until all files have been moved from the CF Memory Card to the directory on the LMF Computer.
	4	When all files on the CF Memory Card have been deleted or moved, as applicable, highlight the directory in the left–hand pane where the required IOS Version and Canned Configuration Files are stored.
	5	Verify that all files from the CF Memory Card that must be retained were moved to the directory by checking the filenames in the right–hand pane.
	6	Scroll the left–hand pane of *Windows* Explorer to locate the CF Memory Card Reader Icon.

table continued on next page

Table I-11: Using a CF Memory Card Reader for Replacing Loaded IOS Version and Verifying File Sequence Position

✓	Step	Action
	7	In the right–hand pane, highlight the icon for the required version of the IOS.
	8	Drag and drop the IOS Icon to the CF Memory Card Reader Icon to copy it to the CF Memory Card.
	9	If an additional file in the LMF Computer Directory must be *moved* to the CF Memory Card, perform the following:
	9a	In the right–hand pane, highlight *one* additional file that is to be *moved* to the CF Memory Card.
	9b	While holding down the **Ctrl** Key on the LMF Computer, drag and drop the highlighted file into the CF Memory Card Reader directory in the left–hand pane.
	9c	If additional files in the directory must be placed on the CF Memory Card, repeat Step 9a and Step 9b for each file until all files have been moved *one at a time* from the LMF Computer to the CF Memory Card.
	10	In the left–hand pane, highlight the CF Memory Card Reader Icon.
	11	Verify that all required files were moved to the CF Memory Card by checking the filenames in the right–hand pane.
	12	Scroll the left–hand pane of *Windows* Explorer to locate the LMF Computer Directory where the required IOS Version and Canned Configuration Files are stored.
	13	Highlight the directory in the left–hand pane.
	14	If this procedure was entered from Step 15 of Table I-8, return to Table I-8, Step 16.
	15	If no other File Transfer Activities between the LMF Computer and CF Memory Card are required at this time, click **Files > Close** to close *Windows* Explorer.
	16	Remove the CF Memory Card from the Card Reader and install it in the BTS Router by performing the procedure in the *1X SC4812T Lite BTS FRU* manual (68P09262A60).
	17	At this point, the BTS Router should be powered up and displaying the User EXEC Prompt in the HyperTerminal Window of the LMF Computer Communication Session. • If it is not, perform Step 1 through Step 5 of Table I-8.
	18	At the `Router>` *User* EXEC Mode Prompt, enter the following command to access the *Privileged* EXEC Mode. **enable** – A response similar to the following will be displayed: `Router>enable` `Router#`

table continued on next page

Table I-11: Using a CF Memory Card Reader for Replacing Loaded IOS Version and Verifying File Sequence Position

✓	Step	Action
		NOTE The current IOS Working Directory defaults to the CF Memory Card (slot0:) Directory unless the present Working Directory has been changed by using the **cd** Command. – Identify the present Working Directory by entering **pwd**. • If the present Working Directory has been changed, enter the **cd slot0:** Command to return to the default setting.
	19	Display the Directory Listing of the CF Memory Card by entering the following command. **dir** – A response similar to the following will be displayed: `Router#dir slot0:` `Directory of slot0:/` `1  -rw-    7051976   Sep 23 2002 07:24:18  mwr1941-i-mz.122-8.MC2a.bin` `2  -rw-       2212   Mar 01 1993 00:14:48  canned-config` `31932416 bytes total (24885606 bytes free)` `Router#`
		! CAUTION The File Sequence on the CF Memory Card can not be verified with Application Programs that place the listed file names in alphabetical order (for example, certain UNIX Telnet Applications, UNIX Directory Listing Commands, and *Windows* File Managers such as *Windows* Explorer). This portion of the procedure is intended for use only with applications, such as HyperTerminal, that do not list directory contents alphabetically.
	20	Ensure that the *IOS File is the first file listed* in the Directory Content Display. • If it ***is***, *proceed to Step 21.* • If it ***is not***, – Perform the procedure in Table I-12. – Then, return to Step 21, below.
	21	Verify that the BTS Router will boot properly on the IOS and revised Start–up Configuration Files by entering the following command. **reload** – A response similar to the following will be displayed: `Router#reload` `System configuration has been modified. Save? [yes/no]: n` `Proceed with reload? [confirm]`
	22	If prompted to save a modified configuration, enter **n** for “no,” and press the **Enter** Key.
	23	When prompted to proceed with reload, press the **Enter** Key to continue the Reload Operation.

table continued on next page

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Table I-11: Using a CF Memory Card Reader for Replacing Loaded IOS Version and Verifying File Sequence Position

✓	Step	Action
	24	Verify that the BTS Router reboots without displaying the `rommon 1 >` Prompt or Error Messages related to Port Configurations.
	25	If no other BTS Router File Operations or Configuration Actions are required, perform the following actions.
	25a	Remove power from the BTS Router and disconnect it from the Power Supply Module.
	25b	Disconnect all cabling from the BTS Router.
	25c	On the LMF Computer, exit the HyperTerminal Communications Session.

Change CF Memory Card File Sequence to Place IOS File First on the Card

This procedure covers using an LMF Computer equipped with a CF Memory Card Reader to perform the following activities.:

1. Change the sequence of files on a CF Memory Card to place the IOS Version file first.
2. Formatting the CF Memory Card, if necessary, to achieve the required File Sequence Positioning of the IOS Version File.

Prerequisites

The following are required prior to performing this procedure.:

- The LMF Computer and BTS Router have been prepared for CF Memory Card Reader File Transfer and are operating as they would be after performing the procedures in Table I-8 and Step 1 through Step 5 of Table I-9.
- Copies of the required IOS Version and Canned Configuration Files are loaded into the desired directory of the LMF Computer.

Optional equipment/software

If they are available, the following items may be used to change the CF Memory Card File Sequence once the card is installed in the BTS Router.:

- Cable, Ethernet *Crossover*, Category 5E or better, unshielded twisted pair, two 8–contact Modular Plugs, in one of the following lengths, as determined necessary:
  - 0.3 m (11.8 in) (Motorola Part Number 3088643C07)
  - 0.6 m (23.6 in)(Motorola Part Number 3088643C13)
  - 1.0 m (39.4 in) (Motorola Part Number 3088643C15)
  - 2.1 m (84 in) (Motorola Part Number 3088643C08)

– 3.0 m (120 in) (Motorola Part Number 3088643C09)

- A TFTP Server Software Application (refer to the Setting Up the TFTP Server – Procedure in *Cellular System Administration – CDMA OnLine Documentation*) such as:
  - Cisco TFTP Server
  - PumpKIN TFTP Server
  - Any other equivalent TFTP Server Application

Changing CF Memory Card File Sequence

Perform the procedure in Table I-12 to place the installed IOS Version file first in the stored File Sequence on the CF Memory Card..

Table I-12: Use CF Memory Card Reader to Place IOS File First in CF Memory Card File Sequence

✓	Step	Action
		! CAUTION The File Sequence on the CF Memory Card can not be verified with Application Programs that place the listed file names in alphabetical order (for example, certain UNIX Telnet Applications, UNIX Directory Listing Commands, and *Windows* File Managers such as *Windows* Explorer). This procedure is intended for use only with applications, such as HyperTerminal, that do not list directory contents alphabetically.
	1	This procedure assumes that the LMF Computer and BTS Router have been prepared for CF Memory Card Reader File Transfer and are operating as they would be after performing the procedures in Table I-8 and Steps 1 through 5 of Table I-9. – If necessary, perform these procedures now.
		NOTE The IOS present Working Directory defaults to the CF Memory Card (slot0:) Directory unless the present Working Directory has been changed by using the **cd** Command. Identify the present Working Directory by entering **pwd**. If the present Working Directory has been changed, enter the command **cd slot0:** to return to the default setting.
	2	With the CF Memory Card still installed in the BTS Router, display a CF Memory Card Directory Listing if one is not showing by entering the **dir** command. – A response similar to the following will be displayed: `Router#dir slot0:` `Directory of slot0:/` `2  -rw-       2212   Mar 01 1993 00:14:48  canned-config` `1  -rw-    7051976   Sep 23 2002 07:24:18  mwr1941-i-mz.122-8.MC2a.bin` `31932416 bytes total (24878228 bytes free)` `Router#`
	3	Verify that the IOS File is *not* the first file on the CF Memory Card.

table continued on next page

Table I-12: Use CF Memory Card Reader to Place IOS File First in CF Memory Card File Sequence

<table>
<tr><th>✓</th><th>Step</th><th>Action</th></tr>
<tr><td></td><td>4</td><td>Check if a TFTP Server Application is available on the LMF Computer.
• If a TFTP Server Application is not available, skip to Step 22.
• If a TFTP Server Application is available, connect the Ethernet Crossover Cable as shown in Figure I-4.</td></tr>
<tr><td></td><td>5</td><td>If it has not been done, configure the LMF Computer NIC as directed in Table I-4.</td></tr>
<tr><td></td><td>6</td><td>Configure FE Port FE 0 (fa0/0) by performing the following actions.</td></tr>
<tr><td></td><td>6a</td><td>At the <code>Router></code> User EXEC Mode Prompt, enter the following to access the Privileged EXEC Mode:
enable
– A response similar to the following will be displayed:
<code>Router>enable</code>
<code>Router#</code></td></tr>
<tr><td></td><td>6b</td><td>At the <code>Router#</code> Privileged EXEC Mode Prompt, enter the following to access the Configure Submode:
configure terminal
– A response similar to the following will be displayed:
<code>Router#conf t</code>
<code>Enter configuration commands, one per line. End with CNTL/Z.</code>
<code>Router(config)#</code></td></tr>
</table>

table continued on next page

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Table I-12: Use CF Memory Card Reader to Place IOS File First in CF Memory Card File Sequence

✓	Step	Action
	6c	At the Global Configuration Mode Prompt, type each of the following commands, pressing the **Enter** Key after each command: **hostname btsrtr1** **int**erface **fa0/0** **ip address 100.100.100.2 255.255.255.252** **speed 100** **duplex full** **no shutdown** **line con 0** **exec–timeout 0 0** **no Login** **line vty 0 4** **no Login** – Responses similar to the following will be displayed: `Router(config)#hostname BTSRTR1` `BTSRTR1(config)#interface fa0/0` `BTSRTR1(config-if)#ip address 100.100.100.2 255.255.255.252` `BTSRTR1(config-if)#speed 100` `BTSRTR1(config-if)#duplex full` `BTSRTR1(config-if)#no shutdown` `BTSRTR1(config-if)#line con 0` `BTSRTR1(config-line)#exec-timeout 0 0` `BTSRTR1(config-line)#no Login` `BTSRTR1(config-line)#line vty 0 4` `BTSRTR1(config-line)#no Login` `BTSRTR1(config-line)#`
	6d	Once the correct parameters have been set, return to the Privileged EXEC Mode Prompt by holding down the **Ctrl** Key and pressing **z** (**Ctrl+z**). – A response similar to the following will be displayed: `BTSRTR1(config-line)# ^z` `01:11:27: %SYS-5-CONFIG_I: Configured from console by console` `BTSRTR1#`
	6e	Verify Port FE 0 (fa0/0) is configured with the correct IP Address by entering the following command. **sh**ow **ip int**erface **br**ief – A response similar to the following will be displayed: `BTSRTR1#sh ip int br` `Interface        IP Address     OK?  Method  Status                 Protocol` `FastEthernet0/0  100.100.100.2  YES  manual  up                     up` `Serial0:0        unassigned     YES  unset   administratively down  down` `FastEthernet0/1  unassigned     YES  unset   administratively down  down` `Serial1:0        unassigned     YES  unset   administratively down  down` `BTSRTR1#`

table continued on next page

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Table I-12: Use CF Memory Card Reader to Place IOS File First in CF Memory Card File Sequence

✓	Step	Action
	7	Ensure that the required IOS File and Canned Configuration File for the BTS Router are located in the TFTP Server Root Directory. – Refer to Table I-4, Step 14 or Step 17, as applicable.
	8	Delete files from the CF Memory Card by entering the **del** *filename* command. – A response similar to the following will be displayed: – `Router#del canned-config` `Delete filename [canned-config]?`
	9	If the Default Filename displayed in the prompt is correct, press the **Enter** Key to accept it. • If it is missing or not correct, enter the correct filename. – A response similar to the following will be displayed if the Default Filename is selected: `Delete filename [canned-config]?` `Delete slot0:canned-config? [confirm]`
	10	Press the **Enter** Key to confirm the deletion. – A response similar to the following will be displayed if the Default Filename is selected: `Delete filename [canned-config]?` `Delete slot0:canned-config? [confirm]` `Router#`
	11	Confirm the file deletion by entering the **dir** command. – A response similar to the following will be displayed: `Router#dir` `Directory of slot0:/` `1  -rw-  7051976  Sep 23 2002 07:24:18  mwr1941-i-mz.122-8.MC2a.bin` `31932416 bytes total (24887818 bytes free)` `Router#`
	12	Repeat Step 8 through Step 11 for each file until *all* files have been deleted from the CF Memory Card.
	13	Use the TFTP Server to copy the IOS File from the LMF Computer to the CF Memory Card by entering the following command. **copy TFTP:***IOS_filename* **slot0:** – Where *IOS_filename* = required IOS Version filename in the LMF Computer TFTP Server Root Directory. – A response similar to the following will be displayed: `BTSRTR1#copy TFTP:mwr1941-i-mz.122-8.MC2a.bin slot0:` `Address or name of remote host []?`

table continued on next page

<table>
<tr><th colspan="3">Table I-12: Use CF Memory Card Reader to Place IOS File
First in CF Memory Card File Sequence</th></tr>
<tr><th>✓</th><th>Step</th><th>Action</th></tr>
<tr><td></td><td>14</td><td>At the prompt for the Remote Host Address or Name, enter the IP Address of the LMF Computer NIC:

100.100.100.1

– A response similar to the following will be displayed:
<pre>
BTSRTR1#copy TFTP:mwr1941-i-mz.122-8.MC2a.bin slot0:
Address or name of remote host []? 100.100.100.1
Destination filename [mwr1941-i-mz.122-8.MC2a.bin]?
</pre></td></tr>
<tr><td></td><td>15</td><td>At the prompt for the Destination Filename, press the Enter Key.

– A response similar to the following will be displayed:
<pre>
BTSRTR1#copy TFTP:mwr1941-i-mz.122-8.MC2a.bin slot0:
Address or name of remote host []? 100.100.100.1
Destination filename [mwr1941-i-mz.122-8.MC2a.bin]?
Accessing TFTP://100.100.100.1/mwr1941-i-mz.122-8.MC2a.bin...
Loading mwr1941-i-mz.122-8.MC2a.bin from 100.100.100.1 (via FastEthernet0/0): !!!!
Loading mwr1941-i-mz.122-8.MC2a.bin from 100.100.100.1 (via FastEthernet0/0):
!!!
!!!
!!!
!!!
!!!
!!!
!!!
!!!
!!!
!!!
!!!
!!!
!!!
!!!
!!!
!!!
!!!
[OK - 7051976/14103552 bytes]

7051976 bytes copied in 145.108 secs (48634 bytes/sec)
</pre></td></tr>
<tr><td></td><td>16</td><td>Display the directory of the CF Memory Card to confirm the IOS File Transfer by entering the dir Command.

– A response similar to the following will be displayed:
<pre>
Router#dir
Directory of slot0:/

    1 -rw-   7051976   Sep 23 2002 07:24:18 mwr1941-i-mz.122-8.MC2a.bin

31932416 bytes total (248880440 bytes free)
Router#
</pre></td></tr>
</table>

table continued on next page

Table I-12: Use CF Memory Card Reader to Place IOS File First in CF Memory Card File Sequence

✓	Step	Action
	17	Copy the Canned Configuration File to the CF Memory Card by entering the following command. **copy TFTP:btsrtr_canned.***color* **slot0:canned–config** – Where *color* = **blue** or **red**, as applicable. – A response similar to the following will be displayed: `BTSRTR1#copy TFTP:btsrtr_canned.blue slot0:canned-config` `Address or name of remote host [100.100.100.1]?`
	18	If the Default IP Address for the LMF Computer displayed in the prompt is correct, press the **Enter** Key to accept it. • If it is missing or not correct, enter the correct IP Address. – A response similar to the following will be displayed if the Default Filename is accepted: `Destination filename [canned-config]?` `2212 bytes copied in 0.208 secs` `Router#`
	19	At the prompt for the Destination Filename, press the **Enter** Key. – A response similar to the following will be displayed: `BTSRTR1#copy TFTP:btsrtr_canned.blue slot0:canned-config` `Address or name of remote host []? 100.100.100.1` `Destination filename [canned-config]?` `Loading btsrtr_canned.blue from 100.100.100.1 (via Ethernet0/0): !` `[OK - 2457/4096 bytes]` `2457 bytes copied in 84.724 secs (29 bytes/sec)` `BTSRTR1#`
	20	Determine if the IOS File is now the first file displayed in the Directory Listing by entering the **dir** Command. – A response similar to the following will be displayed: `Router#dir` `Directory of slot0:/` `1  -rw-   7051976   Mar 01 1993 00:14:48  mwr1941-i-mz.122-8.MC2a.bin` `2  -rw-      2212   Sep 23 2002 07:24:18  canned-config` `31932416 bytes total (24878228 bytes free)` `Router#`
	21	Identify if the IOS File is the first file displayed, as shown in Step 20, above. • If it ***is*** the the first file displayed, *proceed to Step 29.* • If it ***is not*** the the first file displayed, *proceed to Step 22.*

table continued on next page

Table I-12: Use CF Memory Card Reader to Place IOS File First in CF Memory Card File Sequence

✓	Step	Action
	22	Format the CF Memory Card by entering the following command. **format slot0:** – A response similar to the following will be displayed: `BTSRTR1#format slot0:` `Format operation may take a while. Continue? [confirm]`
	23	Press the **Enter** Key to continue the Format Operation. – A response similar to the following will be displayed: `Format operation may take a while. Continue? [confirm]` `Format operation will destroy all data in ”slot0:”.  Continue? [confirm]`
	24	Press the **Enter** Key to continue the Format Operation. – A response similar to the following will be displayed: `Format operation will destroy all data in ”slot0:”.  Continue? [confirm]` `Format: Drive communication & 1st Sector Write OK...` `Writing Monlib` `sectors..........................................................................` `................` `Monlib write complete` `.` `Format: All system sectors written. OK...` `Format: Total sectors in formatted partition: 62560` `Format: Total bytes in formatted partition: 32030720` `Format: Operation completed successfully.` `Format of slot0 complete` `BTSRTR1#`
	25	If a TFTP Server *is* available on the LMF Computer, repeat Steps 13 through 21 to transfer the IOS and Canned Configuration Files to the CF Memory Card.
	26	Once the Format Operation is completed, perform the following actions.
	26a	Remove the CF Memory Card from the BTS Router by performing the procedure in the *1X SC4812T Lite BTS FRU* manual (68P09262A60).
	26b	Insert the CF Memory Card in the Card Reader connected to the LMF Computer.
	26c	Copy the IOS File to the card by performing Step 4, and Step 6 through Step 11 of Table I-11, as required.
	27	Remove the CF Memory Card from the Card Reader and install it in the BTS Router by performing the procedure in the *1X SC4812T Lite BTS FRU* manual (68P09262A60).

table continued on next page

Table I-12: Use CF Memory Card Reader to Place IOS File First in CF Memory Card File Sequence

✓	Step	Action
	28	Verify that the IOS File is now the first file displayed in the Directory Listing by entering the **dir** Command. – A response similar to the following will be displayed: `Router#dir` `Directory of slot0:/` `1  -rw-     7051976   Sep 23 2002 07:24:18  mwr1941-i-mz.122-8.MC2a.bin` `2  -rw-        2212   Mar 01 1993 00:14:48  canned-config` `31932416 bytes total (24885606 bytes free)` `Router#`
	29	If this procedure was entered from Step 5 of Table I-9, return to Table I-9, Step 6.
	30	If this procedure was entered from Step 20 of Table I-11, return to Table I-11, Step 21.
	31	If no other BTS Router File Operations or Configuration Actions are required, perform the following actions.
	31a	Remove power from the BTS Router and disconnect it from the Power Supply Module.
	31b	Disconnect all cabling from the BTS Router.
	31c	On the LMF Computer, exit the HyperTerminal Communications Session.
	32	If a TFTP Server was used in this procedure and no additional TFTP Transfer activities are to be performed, change the NIC IP Address and Subnet Mask back to those for LMF–BTS Communication recorded in Table I-4, Step 9b. **! CAUTION** If the BTS 10base–2 LAN IP Address and Subnet Mask for the LMF Computer's NIC are not restored, the LMF can not log into a BTS when attempting to perform a BTS Optimization or ATP.

Verify and Upgrade ROMMON Version

Introduction

BTS Routers are supplied pre–loaded with a version of the ROM Monitor (ROMMON) Low–level Operating System. Along with the IOS Version, the loaded ROMMON Version should be verified as being the one required for the network.

Procedures in this section are used to verify the loaded ROMMON Version, and, if necessary, change it to the required version. Methods are provided for using either a TFTP Server or CF Memory Card Reader to transfer the required ROMMON Version to a BTS Router's CF Memory Card.

Equipment and Software Required for Verification

The following items are required to perform ROMMON Verification:

- A *Windows*–based computer that meets the requirements of the LMF Computer Platform as specified in *this manual*: *1X SC4812T Lite BTS Optimization/ATP* manual (68P09262A58).
- One of the following Operating Systems for the *Windows*–based computer:
  – *Windows* 2000
  – *Windows* 98 Second Edition (SE) using the *FAT32* File System

CAUTION

BTS Router CF Memory Cards loaded using computers equipped with *Windows* 98 Versions earlier than *Windows* 98 SE and using the FAT16 File System will not operate properly, resulting in a complete site outage.

- Cable, *Rollover,* as described in the Establishing a BTS Router Communication Session section of this appendix.
- DB–9 plug–to–8–contact Modular Plug Adapter as described in the Establishing a BTS Router Communication Session section of this appendix.
- A copy of the MWR 1941 Router ROMMON Version required for the network where the BTS Routers are to be installed.

NOTE

Contact the Network Administrator or the Motorola Account Team for assistance in determining and obtaining a copy of the required ROMMON Version.

- A +27V DC Power Supply Module to power the BTS Router during Configuration File Operations.

Required Publications

The following publication is required to perform procedures in this section:

- *MWR1941 Wireless Mobile Edge Router Software Configuration Guide; part number 78–13983–01*

Method 1: In–Router Verification and Replacement of Installed ROMMON Version

Description

This procedure covers using an LMF Computer equipped with a TFTP Server Application to perform the following activities.:

1. Verify that the ROMMON Version loaded and running on a BTS Router
2. Replace the ROMMON Version installed in a BTS Router

Additional Required Equipment/Software

For this method, the following equipment and Software Application is required in addition to the common items required for both methods.:

- Cable, Ethernet *Crossover*, Category 5E or better, unshielded twisted pair, two 8–contact Modular Plugs, in one of the following lengths, as determined necessary:
  - 0.3 m (11.8 in) (Motorola Part Number 3088643C07)
  - 0.6 m (23.6 in)(Motorola Part Number 3088643C13)
  - 1.0 m (39.4 in) (Motorola Part Number 3088643C15)
  - 2.1 m (84 in) (Motorola Part Number 3088643C08)
  - 3.0 m (120 in) (Motorola Part Number 3088643C09)
- A TFTP Server Software Application; refer to the Setting Up the TFTP Server – Procedure in *Cellular System Administration – CDMA OnLine Documentation* such as:
  - Cisco TFTP Server
  - PumpKIN TFTP Server
  - Any other equivalent TFTP Server Application

Prerequisites

The following items are required prior to performing this procedure.:

- The LMF Computer and BTS Router have been prepared for TFTP File Transfer and are operating as they would be after performing the procedures in Table I-4, Table I-5, Table I-6, and Steps 1 through 10 of Table I-7.
- A copy of the required ROMMON Version is loaded into the TFTP Default Directory of the LMF Computer.

Verifying and replacing installed ROMMON Version

Perform the procedure in Table I-13 to verify and, if necessary, replace the installed ROMMON Version using the TFTP Server Application..

Table I-13: Verify and Replace the Installed ROMMON Version using a TFTP Server		
✓	Step	Action
		*** IMPORTANT** This procedure does not cover all aspects of BTS Router Operation and programming. Before performing this procedure, review BTS Router initialization, operation, and programming information and procedures in *MWR1941 Wireless Mobile Edge Router Software Configuration Guide; part number 78–13983–01*. – Have this publication available for reference while performing this procedure.
	1	This procedure assumes the LMF Computer and BTS Router are configured, connected, and operating as they would be after performing the procedures in Table I-4, Table I-5, Table I-6, and Steps 1 through 4 of Table I-7. – If necessary, perform these procedures now.
	2	Identify the installed ROMMON Version from the BTS Router *Privileged* EXEC Mode Prompt: **sh**ow **ver**sion – A response similar to the following will be displayed: `BTSRTR1#sh ver` `Cisco Internetwork Operating System Software` `IOS (tm) 1941 Software (MWR1941-I-M), Version 12.2(8)MC2b, EARLY DEPLOYMENT RE-LEASE SOFTWARE (fc3)` `TAC Support: http://www.cisco.com/tac` `Copyright (c) 1986-2002 by cisco Systems, Inc.` `Compiled Mon 05-Aug-02 11:07 by nmasa` `Image text-base: 0x60008940, data-base: 0x60B54000` `ROM: System Bootstrap, Version 12.2(20020113:235343) [sbose-wilma 109], DEVELOP-MENT SOFTWARE` `ROM: 1941 Software (MWR1941-I-M), Version 12.2(8)MC2b, EARLY DEPLOYMENT RELEASE SOFTWARE (fc3)` `Router uptime is 1 minute` `System returned to ROM by power-on` `System image file is ”slot0:mwr1941-i-mz.122-8.MC2b.bin”` `cisco mwr1941 (R7000) processor (revision 0.1) with 121856K/18432K bytes of memory.` `Processor board ID JMX0611K5TS` `R7000 CPU at 240Mhz, Implementation 39, Rev 3.3, 256KB L2 Cache` `Bridging software.` `X.25 software, Version 3.0.0.` `Primary Rate ISDN software, Version 1.1.` `Toaster processor tmc is running.` `2 FastEthernet/IEEE 802.3 interface(s)` `2 Serial network interface(s)` `2 Channelized T1/PRI port(s)` `DRAM configuration is 64 bits wide with parity disabled.` `55K bytes of non-volatile configuration memory.` `31360K bytes of ATA Slot0 CompactFlash (Read/Write)` `Configuration register is 0x101` `BTSRTR1#`

table continued on next page

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Table I-13: Verify and Replace the Installed ROMMON Version using a TFTP Server		
✓	Step	Action
	3	To identify the currently installed ROMMON Version, examine the `ROM: system bootstrap` Line in the response.
	4	Compare the installed ROMMON Version information with the Filename of the ROMMON Version required for the network. **NOTE** 1. The ROMMON Filename Format is similar to the following: **MWR1941_RM2.srec.122–8r.MC3.bin** 2. The ROMMON Filename reflects the Version Number of the software (122–8r.MC3).
	5	If the installed version is the one required for the network, *skip to Step 26.*
	6	If the installed ROMMON Version is not the one required for the network, back–up the current BTS Router Configuration to the LMF Computer by entering the following command. **copy nvram:start**up–config **TFTP** – A response similar to the following will be displayed: `BTSRTR1#copy nvram:start TFTP` `Address or name of remote host []?` **NOTE** Ensure to include the colon (**:**) after **nvram** when typing the command.
	7	At the prompt for the Remote Host Address or Name, enter the IP Address of the LMF Computer NIC: **100.100.100.1** – A response similar to the following will be displayed: `BTSRTR1#copy copy nvram:start TFTP` `Address or name of remote host []? 100.100.100.1` `Source filename [startup-config]?`
	8	If the Default Filename displayed in the prompt is correct, press the **Enter** Key to accept it. • If it is missing or not correct, enter the correct filename. – A response similar to the following will be displayed if the Default Filename is selected: `Source filename [startup-config]?` `Destination filename [startup-config]?`

table continued on next page

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Table I-13: Verify and Replace the Installed ROMMON Version using a TFTP Server		
✓	Step	Action
	9	If the Default Filename displayed in the prompt is correct, press the **Enter** Key to accept it. • If it is missing or not correct, enter the correct filename. – A response similar to the following will be displayed: `Destination filename [startup-config]?` `!` `[OK - 2212/4096 bytes]` `2212 bytes copied in 0.152 secs` `BTSRTR1#`
		NOTE The IOS defaults to the CF Memory Card (slot0:) Directory unless the present Working Directory has been changed by using the **cd** Command. – Identify the present Working Directory by entering **pwd**. – If the present Working Directory has been changed, enter the command **cd slot0:** to return to the default setting.
	10	Determine the amount of memory available (bytes free) on the CF Memory Card by entering the **dir** command. – A response similar to the following will be displayed: `BTSRTR1#dir` `Directory of slot0:/` `1  -rw-  7051976  Sep 23 2002 07:24:18  mwr1941-i-mz.122-8.MC2b.bin` `2  -rw-  2212  Mar 01 1993 00:14:48  canned-config` `31932416 bytes total (24885606 bytes free)` `Router#`
	11	Verify that there is at least 1 MB (1048580) of free memory. **NOTE** A ROMMON Version File requires approximately 0.7 MB.
	12	Begin to copy the required version of the ROMMON File from the LMF Computer to the BTS Router by entering the following command. **copy TFTP:***new_rommon_filename* **slot0:** – Where *new_rommon_filename* = the filename of the required ROMMON Version for the BTS Router. – A response similar to the following will be displayed: `BTSRTR1#copy TFTP:MWR1941_RM2.srec.122-8r.MC3.bin slot0:` `Address or name of remote host [100.100.100.1]?`

table continued on next page

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Table I-13: Verify and Replace the Installed ROMMON Version using a TFTP Server

✓	Step	Action
	13	If the Default IP Address displayed in the prompt is correct, press the **Enter** Key to accept it. • If it is missing or not correct, enter the correct IP Address for the LMF Computer. – A response similar to the following will be displayed if the Default Filename is selected: `Address or name of remote host [100.100.100.1]?` `Source filename [MWR1941_RM2.srec.122-8r.MC3.bin]?`
	14	If the Default Filename displayed in the prompt is correct, press the **Enter** Key to accept it. • If it is missing or not correct, enter the correct filename. – A response similar to the following will be displayed if the Default Filename is selected: `Source filename [MWR1941_RM2.srec.122-8r.MC3.bin]?` `Destination filename [MWR1941_RM2.srec.122-8r.MC3.bin]?`
	15	If the Default Filename displayed in the prompt is correct, press the **Enter** Key to accept it. • If it is not correct, enter the correct filename. – A response similar to the following will be displayed if the Default Filename is selected: `Destination filename [MWR1941_RM2.srec.122-8r.MC3.bin]?` `Accessing TFTP://100.100.100.1/MWR1941_RM2.srec.122-8r.MC3.bin...` `Loading MWR1941_RM2.srec.122-8r.MC3.bin from 100.100.100.1 (via FastEthernet0/0):` `!!!!` `Loading MWR1941_RM2.srec.122-8r.MC3.bin from 100.100.100.1 (via FastEthernet0/0):` `!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!` `!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!` `[OK - 614306/14103552 bytes]` `614306 bytes copied in 13.059 secs (48634 bytes/sec)` `BTSRTR1#`
	16	Display the CF Memory Card Directory to verify that the new ROMMON Version File is there by entering the **dir** Command. – A response similar to the following will be displayed: `BTSRTR1#dir` `Directory of slot0:/` `1 -rw- 7051976 Sep 23 2002 07:25:36 mwr1941-i-mz.122-8.MC2b.bin` `2 -rw- 2212 Mar 01 1993 00:09:06 canned-config` `3 -rw- 614306 Dec 13 2002 14:59:36 MWR1941_RM2.srec.122-8r.MC3.bin` `31932416 bytes total (24263922 bytes free)` `BTSRTR1#`
	17	Replace the existing ROMMON Version with the new one copied to the CF Memory Card by entering the following command. **upgrade rom–monitor file slot0:MWR1941_RM2.srec.122–8r.MC3** – A response similar to the following will be displayed: `BTSRTR1#This command will reload the BTS Router. Continue?[yes/no]`

table continued on next page

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Table I-13: Verify and Replace the Installed ROMMON Version using a TFTP Server

✓	Step	Action
	18	When prompted to continue, enter **yes** and press the **Enter** Key. – A response similar to the following will be displayed: `BTSRTR1#This command will reload the BTS Router. Continue?[yes/no] yes` `ROMMON image upgrade in progress` `Erasing boot flash` `eeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeee` `Programming boot flash pppp` `Now reloading`
	19	When the BTS Router has completed Initialization, change to the BTS Router *Privileged* EXEC Mode by entering the following command. **enable** – A response similar to the following will be displayed: `BTSRTR1>enable` `BTSRTR1#`
	20	Verify that the BTS Router has initialized with the new ROMMON Version by entering the following command. **sh**ow **ver**sion – A response similar to the following partial response will be displayed: `BTSRTR1#sh ver` `Cisco Internetwork Operating System Software` `IOS (tm) 1941 Software (MWR1941-I-M), Version 12.2(8)MC2b, EARLY DEPLOYMENT RE-` `LEASE SOFTWARE (fc3)` `TAC Support: http://www.cisco.com/tac` `Copyright (c) 1986-2002 by cisco Systems, Inc.` `Compiled Mon 05-Aug-02 11:07 by nmasa` `Image text-base: 0x60008940, data-base: 0x60B54000` `ROM: System Bootstrap, Version 12.2(8r)MC3 RELEASE SOFTWARE (fc1)`
	21	Compare the version displayed in the response `ROM: System Bootstrap` Line to the filename of the new ROMMON Version File copied to the CF Memory Card.
	22	If the BTS Router successfully rebooted with the new ROMMON Version, the ROMMON File can be deleted from the CF Memory Card by entering the following command. **del**ete **slot0:***new_rommon_filename* – Where *new_rommon_filename* = the filename of the required ROMMON Version copied to the CF Memory Card in Steps 12 through 15, above. – A response similar to the following will be displayed: `BTSRTR1#del slot0:MWR1941_RM2.srec.122-8r.MC3.bin` `Delete filename [MWR1941_RM2.srec.122-8r.MC3.bin]?`

table continued on next page

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Table I-13: Verify and Replace the Installed ROMMON Version using a TFTP Server		
✓	**Step**	**Action**
	23	If the Default Filename displayed in the prompt is correct, press the **Enter** Key to accept it. • If it is missing or not correct, enter the correct filename. – A response similar to the following will be displayed if the Default Filename is selected: `Delete filename [MWR1941_RM2.srec.122-8r.MC3.bin]?` `Delete slot0:MWR1941_RM2.srec.122-8r.MC3.bin? [confirm]`
	24	Press the **Enter** Key to confirm the deletion. – A response similar to the following will be displayed if the Default Filename is selected: `Delete filename [MWR1941_RM2.srec.122-8r.MC3.bin]?` `Delete slot0:MWR1941_RM2.srec.122-8r.MC3.bin? [confirm]` `BTSRTR1#`
		! CAUTION In Step 25, *do not delete the IOS and* `canned-config` *files* from the CF Memory Card. – The BTS Router must have these files on the card to properly boot or switch between Packet and Circuit Mode.
	25	If additional unnecessary files, such as a back–up of the `startup-config` File, are also on the CF Memory Card, delete them by repeating Step 22 through Step 24 for each file.
	26	If no other BTS Router File Operations or Configuration Actions are required, perform the following actions.
	26a	Remove power from the BTS Router and disconnect it from the Power Supply Module.
	26b	Disconnect all cabling from the BTS Router.
	26c	On the LMF Computer, exit the HyperTerminal Communications Session.
	27	If no additional TFTP Transfer activities will be performed, change the NIC IP Address and Subnet Mask back to those for LMF–BTS Communication recorded in Table I-4, Step 9b. **! CAUTION** If the BTS 10base–2 LAN IP Address and Subnet Mask for the LMF Computer's NIC are not restored, the LMF can not log into a BTS when attempting to perform a BTS Optimization or ATP.

Method 2: Verification and Replacement of Installed ROMMON Version Using a CF Memory Card Reader

Description

This procedure covers using an LMF Computer equipped with a CF Memory Card Reader to perform the following activities.:

1. Verify the ROMMON Version loaded and running on a BTS Router.
2. Replace the ROMMON Version installed in a BTS Router.

Additional Required Equipment/Software

For this method, the following equipment item and associated software is required in addition to the common items required for both methods.:

- CF Memory Card *Reader* Device and Software Driver for the Operating System installed on the LMF Computer.

CAUTION

Card Readers for other non–volatile, solid–state memory devices such as Smart Media Cards will not work with the CF Memory Cards used in the MWR 1941 Routers. Do not attempt to use a Card Reader intended for another type of memory device.

Prerequisites

The following items are required prior to performing this procedure.:

- The LMF Computer and BTS Router have been prepared for CF Memory Card Reader File Transfer and are operating as they would be after performing the procedures in Step 1 through Step 10 of Table I-8.
- A copy of the required ROMMON Version is loaded into the desired directory of the LMF Computer.

File Operations using a CF Memory Card Reader

Only File Transfers should be performed using the CF Memory Card Reader. CF Memory Card *Formatting should be performed in a BTS Router* using a HyperTerminal Connection. Attempting to format a CF Memory Card from a *Windows*–based computer using a Card Reader could result in unpredictable BTS Router Operation..

CAUTION

Do not format BTS Router CF Memory Cards using a *Windows*–based computer. Only format CF Memory Cards in a BTS Router.

Verifying and replacing installed ROMMON Version

Perform the procedure in Table I-14 to verify and, if necessary replace the installed ROMMON Version using a CF Memory Card Reader..

Table I-14: Verify and Replace the Installed ROMMON Version using a CF Memory Card Reader		
✓	**Step**	**Action**
		*** IMPORTANT** This procedure does not cover all aspects of BTS Router Operation and programming. Before performing this procedure, review BTS Router initialization, operation, and programming information and procedures in *MWR1941 Wireless Mobile Edge Router Software Configuration Guide; part number 78–13983–01*. – Have this publication available for reference while performing this procedure.
	1	This procedure assumes the LMF Computer and BTS Router are configured, connected, and operating as they would be after performing the procedures in Step 1 through Step 10 of Table I-8. – If necessary, perform these procedures now.
	2	Determine the currently installed ROMMON Version by entering the following at the BTS Router *Privileged* EXEC Mode Prompt: **sh**ow **ver**sion – A response similar to the following will be displayed: `BTSRTR1#sh ver` `Cisco Internetwork Operating System Software` `IOS (tm) 1941 Software (MWR1941–I–M), Version 12.2(8)MC2b, EARLY DEPLOYMENT RE-` `LEASE SOFTWARE (fc3)` `TAC Support: http://www.cisco.com/tac` `Copyright (c) 1986-2002 by cisco Systems, Inc.` `Compiled Mon 05–Aug–02 11:07 by nmasa` `Image text–base: 0x60008940, data–base: 0x60B54000` `ROM: System Bootstrap, Version 12.2(20020113:235343) [sbose–wilma 109], DEVELOP-` `MENT SOFTWARE` `ROM: 1941 Software (MWR1941–I–M), Version 12.2(8)MC2b, EARLY DEPLOYMENT RELEASE` `SOFTWARE (fc3)` `Router uptime is 1 minute` `System returned to ROM by power–on` `System image file is ”slot0:mwr1941–i–mz.122–8.MC2b.bin”` `cisco mwr1941 (R7000) processor (revision 0.1) with 121856K/18432K bytes of` `memory.` `Processor board ID JMX0611K5TS` `R7000 CPU at 240Mhz, Implementation 39, Rev 3.3, 256KB L2 Cache` `Bridging software.` `X.25 software, Version 3.0.0.` `Primary Rate ISDN software, Version 1.1.` `Toaster processor tmc is running.` `2 FastEthernet/IEEE 802.3 interface(s)` `2 Serial network interface(s)` `2 Channelized T1/PRI port(s)` `DRAM configuration is 64 bits wide with parity disabled.` `55K bytes of non–volatile configuration memory.` `31360K bytes of ATA Slot0 CompactFlash (Read/Write)` `Configuration register is 0x101` `BTSRTR1#`

table continued on next page

Table I-14: Verify and Replace the Installed ROMMON Version using a CF Memory Card Reader		
✓	Step	Action
	3	To determine the currently installed ROMMON Version, examine the `ROM: System Bootstrap` Line in the response.
	4	Compare the installed ROMMON Version Information with the Filename of the ROMMON Version required for the network. **NOTE** 1. The ROMMON Filename Format is similar to the following: **MWR1941_RM2.srec.122–8r.MC3.bin** 2. The ROMMON Filename reflects the Version Number of the software (122–8r.MC3).
	5	If the installed version is the one required for the network, skip to Step 26.
	6	**NOTE** The IOS defaults to the CF Memory Card (slot0:) directory unless the present Working Directory has been changed by using the **cd** Command. – Identify the present Working Directory by entering **pwd**. • If the present Working Directory has been changed, enter the command **cd slot0:** to return to the default setting.
	7	If the installed ROMMON Version is not the one required for the network, determine the amount of memory available (bytes free) on the CF Memory Card by entering the following command. **dir** – A response similar to the following will be displayed: `BTSRTR1#dir` `Directory of slot0:/` `1  -rw-  7051976  Sep 23 2002 07:24:18  mwr1941-i-mz.122-8.MC2b.bin` `2  -rw-  2212  Mar 01 1993 00:14:48  canned-config` `31932416 bytes total (24885606 bytes free)` `Router#`
	8	Ensure that there is at least 1 MB (1048580) of free memory. **NOTE** A ROMMON Version File requires approximately 0.7 MB, and space must also be available for a back–up of the BTS Router's `startup-config` File.
	9	Create a back–up of the current BTS Router Configuration on the CF Memory Card by entering the following command. **copy nvram:start**up–config **slot:0** – A response similar to the following will be displayed: `BTSRTR1#copy nvram:startup-config slot0:` `Destination filename [startup-config]?`

table continued on next page

Table I-14: Verify and Replace the Installed ROMMON Version using a CF Memory Card Reader		
✓	Step	Action
	10	If the Default Filename displayed in the prompt is correct, press the **Enter** Key to accept it. • If it is missing or not correct, enter the correct filename. – A response similar to the following will be displayed: `Destination filename [startup-config]?` `2212 bytes copied in 4.96 secs (553 bytes/sec)` `BTSRTR1#`
	11	Remove the CF Memory Card from the BTS Router by performing the procedure in the *1X SC4812T Lite BTS FRU* manual (68P09262A60).
	12	Insert the CF Memory Card into the Card Reader as specified by the Card Reader manufacturer's instructions.
	13	On the LMF Computer, click **Start > Programs > Windows Explorer** to open *Windows* Explorer.
		NOTE The CF Memory Card Reader will appear as a Disk Drive in *Windows* Explorer with a Disk Drive letter and icon.
	14	Scroll the *left*–hand pane of *Windows* Explorer to locate the icon for the CF Memory Card.
	15	In the *left*–hand pane of *Windows*Explorer, highlight the CF Memory Card Icon.
	16	In the *right*–hand pane, verify that the files displayed in Step 6, above, appear.
	17	Scroll the *left*–hand pane of *Windows* Explorer to locate the icon for the directory where the required ROMMON Version File is stored.
	18	In the *right*–hand pane, perform the following actions.
	18a	Highlight the `startup-config` File on the CF Memory Card. **NOTE** After highlighting the `startup-config` File in the right–hand pane, it may be necessary to scroll the *left*–hand pane to see the Directory Icon where the required ROMMON Version File is stored before dragging the file.
	18b	Note its file size.
	18c	Drag it to the icon for the directory where the required ROMMON Version File is stored.
	19	In the *left*–hand pane, highlight the directory where the required ROMMON Version File is stored.
	20	In the *right*–hand pane, verify that the `startup-config` File is in the directory, and the file size is the same as the original on the CF Memory Card.

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Table I-14: Verify and Replace the Installed ROMMON Version using a CF Memory Card Reader		
✓	Step	Action
	21	In the *right*–hand pane, highlight the required ROMMON Version File to be transferred to the CF Memory Card and drag it to the CF Memory Card Disk Drive Icon. **NOTE** After highlighting the ROMMON Version File in the right–hand pane, it may be necessary to scroll the *left*–hand pane to see the CF Memory Card Disk Drive Icon before dragging the file.
	22	Verify that the ROMMON Version File has been copied to the CF Memory Card by clicking on the CF Memory Card Disk Drive Icon in the *left*–hand pane, and being sure that the ROMMON Version File appears in the in the *right*–hand pane.
	23	Click **Files** > **Close** to close *Windows* Explorer.
	24	Remove the CF Memory Card with the ROMMON Version File from the Card Reader.
	25	Install the CF Memory Card in the BTS Router by performing the procedure in the *1X SC4812T Lite BTS FRU* manual (68P09262A60).
	26	Proceed to **Replace Installed ROMMON Version**, below.

I

Introduction

ROM Monitor Boot Conditions

Under certain circumstances the BTS Router will initialize with the ROM Monitor (ROMMON) Operating System rather than the IOS. These circumstances include:

- IOS File is missing from the CF Memory Card
- IOS File is not the first file on the CF Memory Card
- IOS File image on the CF Memory Card is corrupt
- Start–up–config File contains an outdated Boot System Line specifying an IOS File that has been replaced with an updated version
- Start–up–config file contains Boot System Line with typographical error(s) in the IOS Filename

Description

Router Operation on ROMMON is signalled by the display of the `rommon # >` Prompt, where # is a number that increments each time a command is issued. ROMMON is a low–level Operating System that provides limited capabilities for Router testing and troubleshooting operations, but does not support any operations on files beyond viewing directory contents or booting from a specified file. As a result, files can not be copied or deleted when the BTS Router is operating on ROMMON.

Recovery Methods

Two recovery methods are included in this section.

1. The first is the simplest and requires that a valid, uncorrupted IOS Version is installed on the CF Memory Card.
2. The second method requires additional equipment and must be used in instances such as when an IOS File is not installed on the CF Memory Card or the installed IOS Image is corrupted..

Simple Recovery from Boot to ROMMON

Requirements

Unless it is certain, that the IOS Image on the CF Memory Card is corrupted, this method should always be the first attempted to recover the BTS Router from a ROMMON Initialization.

– This method does not require any additional equipment beyond the items necessary to load Canned Configuration Files into the BTS Router.

– To be effective, this method does require that a valid, uncorrupted IOS Image file is installed on the BTS Router's CF Memory Card..

Recovery

Perform the procedure in Table I-15 to attempt a simple recovery from a BTS Router ROMMON Initialization..

Table I-15: Simple Recovery from BTS Router ROMMON Boot

✓	Step	Action
		*** IMPORTANT** This procedure does not cover all aspects of BTS Router Operation and programming. Before performing this procedure, review BTS Router initialization, operation, and programming information and procedures in *MWR1941 Wireless Mobile Edge Router Software Configuration Guide; part number 78–13983–01*. – Have this publication available for reference while performing this procedure.
	1	This procedure assumes the LMF Computer is set–up and connected to the BTS Router with an active HyperTerminal Communication Session. – If it is not, perform the procedure in Table I-2 to establish a HyperTerminal Communication Session.
	2	With the `rommon 1 >` Prompt displayed in the HyperTerminal Window, enter the following command to identify the IOS File on the CF Memory Card: **dir slot0:** – A response similar to the following will be displayed: `rommon 1 > dir slot0:` `program load complete, entry point: 0x80008000, size: 0xb2a0` `Directory of slot0:` `2      2212      -rw-     canned-config` `3      7051976   -rw-     mwr1941-i-mz.122-8.MC2a.bin` `rommon 2 >`

table continued on next page

Table I-15: Simple Recovery from BTS Router ROMMON Boot		
✓	Step	Action
	3	Note the IOS Filename, and enter the following command to begin recovery to an IOS Boot: **boot slot0:***IOS_filename* – Where *IOS_filename* = the filename of the IOS noted in Step 2, above. – A successful IOS re–boot operation will result in display of a response that begins and ends similar to the following: `rommon 2 > boot slot0:mwr1941-i-mz.122-8.MC2a.bin` `program load complete, entry point: 0x80008000, size: 0xb2a0` `program load complete, entry point: 0x80008000, size: 0x6b99ac` `Self decompressing the image :` `##################################################################### [OK]` `Smart Init is enabled` `smart init is sizing iomem` `  ID            MEMORY_REQ                TYPE` `00031A          0X005F3C00 MWR1941 Mainboard` `                0X000F3BB0 public buffer pools` `                0X00211000 public particle pools` `TOTAL:          0X008F87B0` `.` `.` `.` `Press RETURN to get started!` • If the BTS Router successfully reboots with the IOS, *proceed to Step 7.* • If the BTS Router does not reboot with the IOS, *proceed to Step 4*
	4	Scroll the HyperTerminal Display down until the Directory Display from Step 2, above, is visible.
	5	Compare the IOS Filename from the Directory Display with the filename entered in performing Step 3, above. • If the filename was typed incorrectly, repeat Step 3, using care to type the filename correctly.
	6	If the BTS Router does not reboot with the IOS after typing the filename correctly, proceed to Table I-16 and perform the Extended Recovery Procedure.

table continued on next page

Table I-15: Simple Recovery from BTS Router ROMMON Boot		
✓	Step	Action
		! CAUTION The File Sequence on the CF Memory Card can not be verified with Application Programs that place the listed file names in alphabetical order (for example, certain UNIX Telnet Applications, UNIX Directory Listing Commands, and *Windows* File Managers such as *Windows* Explorer). This portion of the procedure is intended for use only with applications, such as HyperTerminal, that do not list directory contents alphabetically.
	7	After a successful reboot with IOS, perform the following actions to correct the cause of the boot to ROMMON:
	7a	Enter the **dir slot0:** Command to display the CF Memory Card Directory, and, if the IOS File *is not* the first file listed, perform the procedure in Table I-10, Steps 26 through 33, or Table I-12, as applicable, to correct the situation.
	7b	If the IOS File *is* the first file, enter the following Command to display the contents of the `startup-config` File: **sh**ow **start**up–config A response that begins similar to the following will be displayed: `BTSRTR1#sh start` `Using 1589 out of 57336 bytes` `!` `version 12.2` `service timestamps debug uptime` `service timestamps log uptime` `no service password-encryption` `!` `hostname BTSRTR1` `!` `boot system slot0:mwr1941-i-mz.07132002.bin` `no logging console` `!` `username cisco password 0 cisco` `!` `Redundancy` `  mode y-cable` `   standalone` `!`
	7c	If the file listing contains a “Boot System” Line, examine it for the correct IOS Filename.
	7d	If the Boot System slot0: Filename is incorrect, enter the following, using care to type the filename correctly: **boot system slot0:***IOS_filename* – Where *IOS_filename* = the filename of the IOS noted in Step 2, above.
	7e	Replace the Boot System Line in the `startup-config` File with the line entered in Step 7d, above, by entering the following command. **copy run**ing–config **start**up–config

table continued on next page

Table I-15: Simple Recovery from BTS Router ROMMON Boot		
✓	Step	Action
	7f	Verify that the correct IOS Filename is now included in the listing by entering the following command. **sh**ow **start**up–config – A response that begins similar to the following will be displayed: `BTSRTR1#sh start` `Using 1589 out of 57336 bytes` `!` `version 12.2` `service timestamps debug uptime` `service timestamps log uptime` `no service password-encryption` `!` `hostname BTSRTR1` `!` `boot system slot0:mwr1941-i-mz.122-8.MC2a.bin` `no logging console` `!` `username cisco password 0 cisco` `!` `Redundancy` `  mode y-cable` `   standalone` `!`
	7g	If the filename is correctly written, enter the following to determine if the BTS Router will reboot to IOS: **reload** – A response similar to the following will be displayed: `BTSRTR1#reload` `System configuration has been modified. Save? [yes/no]: n` `Proceed with reload? [confirm]`
	8	If prompted to save a modified configuration, enter **n** for “no,” and press the **Enter** Key.
	9	When prompted to proceed with reload, press the **Enter** Key to continue the Reload Operation.
	10	After a successful reboot with IOS, proceed with other BTS Router activities or remove power from the BTS Router and disconnect it.
	11	If the BTS Router still will not successfully boot with IOS, proceed to Table I-16 and perform the Extended Recovery Procedure.

Extended Recovery from Boot to ROMMON

Requirements

If ROMMON Boot Recovery Attempts fail using the simple recovery method, this method must be used to reboot a BTS Router that has initialized with ROMMON. This method requires additional equipment beyond the items necessary to load Canned Configuration Files into the BTS Router. Extended recovery requires formatting the CF Memory Card from the ROMMON–initialized Router and reloading the reformatted CF Memory Card with the required IOS Version..

Additional Equipment Required

An additional, formatted, 32 MB CF Memory Card with the required version of the IOS installed is required in addition to the equipment and software required for BTS Router Canned Configuration Installation. This Card may be::

- A *spare* CF Memory Card that is loaded with the required IOS Version.
- A CF Memory Card from an additional BTS Router that is loaded with the required IOS Version.

Recovery

Perform the procedure in Table I-15 to perform an Extended Recovery from a BTS Router ROMMON Initialization..

Table I-16: Extended Recovery from BTS Router ROMMON Boot

✓	Step	Action
	1	This procedure assumes the BTS Router is powered and operating on ROMMON with the LMF Computer Set–up and connected to the BTS Router with an active HyperTerminal Communication Session. • If it is not, perform the procedure in Table I-2 to establish a HyperTerminal Communication Session.
	2	Remove the CF Memory Card from the BTS Router by performing the procedure in the *1X SC4812T Lite BTS FRU* manual (68P09262A60).
	3	Install the additional CF Memory Card in the BTS Router by performing the procedure in the *1X SC4812T Lite BTS FRU* manual (68P09262A60).

table continued on next page

Table I-16: Extended Recovery from BTS Router ROMMON Boot		
✓	Step	Action
	4	Enter the following to obtain the filename of the IOS Version loaded on the CF Memory Card: **dir slot0:** – A response similar to the following will be displayed: `rommon 1 > dir slot0:` `program load complete, entry point: 0x80008000, size: 0xb2a0` `Directory of slot0:` `1      7051976   -rw-     mwr1941-i-mz.122-8.MC2a.bin` `rommon 2 >`
	5	Note the exact filename displayed for the IOS Version.

table continued on next page

Table I-16: Extended Recovery from BTS Router ROMMON Boot

<table>
<tr><th>✓</th><th>Step</th><th>Action</th></tr>
<tr><td></td><td>6</td><td>Enter the following command to initialize the BTS Router with the IOS on the additional CF Memory Card.
boot slot0:IOS_filename
– Where IOS_filename = the filename of the IOS noted in Step 5, above.
– A successful IOS re–boot operation will result in display of a response that begins and ends similar to the following:
<pre>rommon 2 > boot slot0:mwr1941-i-mz.122-8.MC2a.bin

program load complete, entry point: 0x80008000, size: 0xb2a0

program load complete, entry point: 0x80008000, size: 0x6b99ac

Self decompressing the image :
[OK]

Smart Init is enabled

smart init is sizing iomem

  ID   MEMORY_REQ   TYPE

00031A   0X005F3C00 MWR1941 Mainboard

                0X000F3BB0 public buffer pools

                0X00211000 public particle pools

TOTAL: 0X008F87B0
.
.
.

         --- System Configuration Dialog ---

Would you like to enter the Initial Configuration dialog? [yes/no]: n</pre>• If the BTS Router Prompts with a question to enter the initial dialog as shown in Step 6, above, type no and press the Enter Key to obtain the User EXEC Mode Prompt.
• If the BTS Router Prompts with <code>Press RETURN to get started!</code>, press the Enter Key to obtain the User EXEC Mode Prompt.</td></tr>
<tr><td></td><td>7</td><td>At the User EXEC Mode Prompt, enter the following to access the Privileged EXEC Mode:
enable
A response similar to the following will be displayed:
<pre>Router> enable
Router#</pre></td></tr>
</table>

table continued on next page

I

Table I-16: Extended Recovery from BTS Router ROMMON Boot		
✓	Step	Action
	8	Remove the additional CF Memory Card from the BTS Router by performing the procedure in the *1X SC4812T Lite BTS FRU* manual (68P09262A60).
	9	Install the *original* CF Memory Card in the BTS Router by performing the procedure in the *1X SC4812T Lite BTS FRU* manual (68P09262A60).
	10	Format the *original* CF Memory Card by entering the following command. **format slot0:** A response similar to the following will be displayed: `Router#format slot0:` `Format operation may take a while. Continue? [confirm]`
	11	Press the **Enter** Key to continue the Format Operation. A response similar to the following will be displayed: `Format operation may take a while. Continue? [confirm]` `Format operation will destroy all data in "slot0:".  Continue? [confirm]`
	12	Press the **Enter** Key to continue the Format Operation. A response similar to the following will be displayed: `Format operation will destroy all data in "slot0:".  Continue? [confirm]` `Format: Drive communication & 1st Sector Write OK...` `Writing Monlib` `sectors...................................................................` `................` `Monlib write complete` `.` `Format: All system sectors written. OK...` `Format: Total sectors in formatted partition: 62560` `Format: Total bytes in formatted partition: 32030720` `Format: Operation completed successfully.` `Format of slot0 complete` `Router#`
	13	Copy the required IOS Version to the formatted original CF Memory Card by performing *one* of the following: • Use the LMF Computer and a TFTP Server performing the procedure in Table I-10 • Use the LMF Computer and a CF Memory Card Reader performing the procedure in Table I-11
	14	If applicable, perform IOS initialization troubleshooting as described in Table I-15, Steps 7 through 10.

I

Entering or Changing Router FE Interface IP Address

It may be necessary to enter or change the IP Addresses and/or operating parameters for BTS Router FE Interfaces FE 0 and FE1 without making other changes in the BTS Router Configuration Files. Procedures in this section cover these operations.

Prerequisites

The following must be accomplished before entering or changing BTS Router FE port IP Addresses and/or operating parameters:

- The user has read and understands the content of *MWR1941 Wireless Mobile Edge Router Software Configuration Guide; part number 78–13983–01*.
- BTS Routers must have the required version of the IOS saved on their installed CF Memory Card.
- BTS Routers must have power applied, be operating without alarms other than Span Alarms, and have completed Boot–up to the User EXEC Mode Prompt (`BTSRTR–`*bts#*`–1–1>`).
- The BTS Router Privileged EXEC Mode Password has been obtained from the Network Administrator.

Entering or Changing FE Interface IP Addresses

To enter or change FE Interface IP Addresses, perform the procedure in Table I-17.

Table I-17: Enter/Change BTS Router FE Interface IP Addresses and Operating Parameters

✓	Step	Action
		*** IMPORTANT** This procedure does not cover all aspects of BTS Router Operation and programming. Before performing this procedure, review BTS Router initialization, operation, and programming information and procedures in *MWR1941 Wireless Mobile Edge Router Software Configuration Guide; part number 78–13983–01*. – Have this publication available for reference while performing this procedure.
	1	Obtain the correct IP Addresses and Subnet Masks for the BTS Router FE Interfaces from the Network Administrator.
	2	If a HyperTerminal Connection for BTS Card/Module MMI or BTS Router (BTSRTR) communication has not been created, create one as described in Table I-1 of this appendix.
	3	Connect the LMF Computer to the BTS Router, and start a Communication Session as described in Table I-2 in this appendix.

table continued on next page

I

Table I-17: Enter/Change BTS Router FE Interface IP Addresses and Operating Parameters		
✓	Step	Action
		NOTE Examples in this procedure show Prompts for BTSRTR–*bts#*–1–1 and BTSRTR–*bts#*–1–2, but the procedure can be used for any Router in any BTS Router Group or a BTS Router running the Canned Configuration File (BTSRTR1 or BTSRTR2).
	4	At the `BTSRTR-`*bts#*`-1-1>` User EXEC Mode Prompt, enter the following to access the Privileged EXEC Mode: **enable** – A response similar to the following will be displayed: `BTSRTR-`*bts#*`-1-1> enable` `Password:`
	5	Enter the Privileged EXEC Mode Password. – A response similar to the following will be displayed: `BTSRTR-`*bts#*`-1-1> enable` `Password:` `BTSRTR-`*bts#*`-1-1#`
	6	At the `BTSRTR-`*bts#*`-1-1#` Privileged EXEC Mode Prompt, display the FE Interface IP Addresses by typing: **sh**ow **ip int**erface **brief** – A response similar to the following will be displayed: `BTSRTR-`*bts#*`-1-1#  show ip interface brief` `Interface     IP Address    OK?           Method` `Status        Protocol` `FastEthernet0/0             192.168.146.1 YES` `NVRAM         up            up` `Serial0:0     unassigned    YES           unset` `administratively down       down` `FastEthernet0/1             unassigned    YES` `unset         administratively down       down` `Serial1:0     unassigned    YES           unset` `administratively down       down` `BTSRTR-`*bts#*`-1-1#`
	7	For a FastEthernet0/0 (fa0/0) or FastEthernet0/1(fa0/1) Interface that does not have a correct IP Address, or does not have an assigned IP Address, enter the following at the BTS Router Prompt to access the Global Configuration Mode: **conf**igure **t**erminal – A response similar to the following will be displayed: `BTSRTR-`*bts#*`-1-1#  conf t` `Enter configuration commands, one per line. End with CNTL/Z.` `BTSRTR-`*bts#*`-1-1(config)#`

table continued on next page

Table I-17: Enter/Change BTS Router FE Interface IP Addresses and Operating Parameters

✓	Step	Action
	8	At the Global Configure Mode Prompt, enter the following command to access the Configure Interface Submode for the interface requiring IP Address assignment/change: **int**erface **fa**stethernet*interface#* – Where *interface#* = 0/0 or 0/1, as applicable. – A response similar to the following will be displayed: `BTSRTR-`*bts#*`-1-1(config)# int fa0/1` `BTSRTR-`*bts#*`-1-1(config-if)#`
	9	At the Configure Interface Submode Prompt, assign or change the interface IP Address by entering the following command. **ip address** *IP_addr Subnet_mask* – Where: *IP_addr* = the required IP Address for the interface; for example, 192.168.147.1 *Subnet_mask* = the required Subnet Mask for the interface; for example, 255.255.255.0 – A response similar to the following will be displayed: `BTSRTR-`*bts#*`-1-1(config-if)# ip address 192.168.147.1 255.255.255.0` `BTSRTR-`*bts#*`-1-1(config-if)#`
	10	To complete configuration of the interface, enter the following Parameter Settings, one at a time, pressing **Enter** after each: **duplex full** **speed 100** **keepalive 1** **no shutdown**
	11	Return to the Global Configuration Mode by entering the **exit** Command. – A response similar to the following will be displayed: `BTSRTR-`*bts#*`-1-1(config-if)# exit` `BTSRTR-`*bts#*`-1-1(config)#`
	12	If the IP Address and/or Parameters for the *other* FE Interface on the BTS Router need to be assigned or changed at this time, repeat Step 8 through Step 11 for the other FE Interface.

table continued on next page

	Step	Action
	13	Once the correct parameters have been set for all FE Interfaces, return to the Privileged EXEC Mode Prompt by holding down the **Ctrl** Key and pressing **z** (**Ctrl +z**). – A response similar to the following will be displayed: `BTSRTR-`*bts#*`-1-1(config-if)#  ^z` `01:11:27: %SYS-5-CONFIG_I: Configured from console by console` `BTSRTR-`*bts#*`-1-1#` **NOTE** Entering **exit** twice, pressing the **Enter** Key after each entry, will also complete the Interface Configuration and return the BTS Router to the Privileged EXEC Mode.
	14	Save the Interface Configuration changes to the Start–up Configuration File on the CF Memory Card by entering the following command. **copy run**ning–config **start**up–config – A response similar to the following will be displayed: `BTSRTR-`*bts#*`-1-1#  copy run start` `BTSRTR-`*bts#*`-1-1#  Destination filename [startup-config]?`
	15	Press **Enter**. – A response similar to the following will be displayed: `BTSRTR-`*bts#*`-1-1#  copy run start` `BTSRTR-`*bts#*`-1-1#  Destination filename [startup-config]?` `Building configuration...` `!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!` `[OK]` `BTSRTR-`*bts#*`-1-1#`
	16	If all FE IP Address Entries/Changes for the BTS Router are complete, enter the following to return the BTS Router to user EXEC Mode: **disable** – A response similar to the following will be displayed: `BTSRTR-`*bts#*`-1-1#  disable` `BTSRTR-`*bts#*`-1-1>`
	17	Determine if any other Router requires the FE Interfaces to be assigned/changed. • If no other Router requires the FE Interfaces to be assigned/changed, *proceed to Step 20.* If FE Interfaces on another Router must be assigned/changed, *proceed to Step 18.*
	18	Disconnect the 8–contact Modular Plug from the current Router CONSOLE Port and connect it to the CONSOLE Port of the other Router.

Table I-17: Enter/Change BTS Router FE Interface IP Addresses and Operating Parameters

table continued on next page

Table I-17: Enter/Change BTS Router FE Interface IP Addresses and Operating Parameters

✓	Step	Action
	19	Press the **Enter** Key, and when the BTS Router User EXEC Mode Prompt appears, repeat Step 3 through Step 16 for the other Router.
	20	When the BTS Router is in User EXEC Mode, close the HyperTerminal Session and disconnect the LMF Computer and additional components from the BTS Router.

BTS Router Canned Configuration File

This section presents listings of the *blue* and *red* Router Canned Configuration File contents for the MWR 1941 BTS Routers. The *blue* Router is the primary Router on the BTS LAN Subnet 192.168.146.0, and the *red* Router is the primary on BTS LAN Subnet 192.168.147.0.

The Canned Configuration Files allow communication with the BTS Routers for both on–site FE Cabling Connectivity Verification and for downloading the BTS Routers from the network with the full, site–specific Operational Configuration.

Obtaining the Latest Configuration File Content

The files included here are *for example only.* The correct Canned Configuration File Content for each BTS Router should be generated at the OMC–R by using the */screl/active/bin/gen_btsrtr_canned_config.ksh* Script.

Configuration File Examples

Examples of both Configuration Files are provided in the following subsections.

“Blue” BTS Router Canned Configuration

```
! Canned Config file for BTSRTR1

version 12.2
service timestamps debug uptime
service timestamps log uptime
no service password-encryption
!
hostname BTSRTR1
!
no logging console
!
!
ip Subnet-zero
ip classless
ip pim bidir-enable
!
```

```
disable-eadi

!
Redundancy
  mode y-cable
    standby use-interface Loopback101 health
    standby use-interface Loopback102 revertive
    standby use-interface Multilink1 backhaul

interface loopback 101
  description  BTSRTR health loopback
  no ip address

interface loopback 102
  description  BTSRTR revertive loopback
  no ip address
!
! configure 1 DS0 for BTSRTRLINK
!
controller T1 0/0
  description  1st Span on BTSRTR
  framing esf
  linecode b8zs
  cablelength short 133
  Clock Source line
  channel-group 0 Timeslots 1-24 speed 64

! MLPPP bundle with BTSRTRLINK.
! This performs IPCP with RPM when BTSRTR is rebooted
interface Multilink 1
  ip address negotiated
  no ip route-cache
  no cdp enable
  ppp multilink
  multilink-group 1
  no shutdown
!
! Set-up Serial Interface for PPP and IPCP, no MLPPP at this time
!
interface Serial0/0:0
  no ip address
  encapsulation ppp
  keepalive 1
  ppp multilink
  multilink-group 1
  no shutdown

!
! Set-up Ethernet Interfaces and HSRP between them
!
interface FastEthernet0/0
  ip address 192.168.146.1 255.255.255.0
  keepalive 1
  speed 100
  full-duplex
  standby 1 timers 1 3
  standby 1 preempt
  standby 1 priority 100
  standby 1 ip 192.168.146.3
  standby 1 name one
  standby 1 track Fa0/1 10
  standby 1 track Multilink1 10
  ! Track the MWR 1941 health interface
```

```
  standby 1 track Loopback101 10
  ! Track the MWR 1941 revertive (compensation) interface
  standby 1 track Loopback102 5
  no shutdown
!
interface FastEthernet0/1
  ip address 192.168.147.1 255.255.255.0
  keepalive 1
  speed 100
  full-duplex
  standby 2 timers 1 3
  standby 2 preempt
  standby 2 priority 100
  standby 2 ip 192.168.147.3
  standby 2 name two
  standby 2 track Fa0/0 10
  standby 2 track Multilink1 10
  ! Track the MWR 1941 health interface
  standby 2 track Loopback101 10
  ! Track the MWR 1941 revertive (compensation) interface
  standby 2 track Loopback102 5
  no shutdown

!
! Set a default route to RPM thru BTSRTRLINK
!
ip route 0.0.0.0 0.0.0.0 Multilink 1
!


line con 0
 exec-timeout 15 0
 password cisco
line aux 0
 Login
 password cisco
line vty 0 4
 Login
 password cisco

end
```

“Red” BTS Router Canned Configuration

```
! Canned Config file for BTSRTR2

version 12.2
service timestamps debug uptime
service timestamps log uptime
no service password-encryption
!
hostname BTSRTR2
!
no logging console
!
!
ip Subnet-zero
ip classless
ip pim bidir-enable
!
disable-eadi
```

I

```
!
Redundancy
  mode y-cable
    standby use-interface Loopback101 health
    standby use-interface Loopback102 revertive
    standby use-interface Multilink1 backhaul

interface loopback 101
  description  BTSRTR health loopback
  no ip address

interface loopback 102
  description  BTSRTR revertive loopback
  no ip address
!
! configure 1 DS0 for BTSRTRLINK
!
controller T1 0/0
  description  1st Span on BTSRTR
  framing esf
  linecode b8zs
  cablelength short 133
  Clock Source line
  channel-group 0 Timeslots 1-24 speed 64

! MLPPP bundle with BTSRTRLINK.
! This performs IPCP with RPM when BTSRTR is rebooted
interface Multilink 1
  ip address negotiated
  no ip route-cache
  no cdp enable
  ppp multilink
  multilink-group 1
  no shutdown
!
! Set-up Serial Interface for PPP and IPCP, no MLPPP at this time
!
interface Serial0/0:0
  no ip address
  encapsulation ppp
  keepalive 1
  ppp multilink
  multilink-group 1
  no shutdown

!
! Set-up Ethernet Interfaces and HSRP between them
!
interface FastEthernet0/0
  ip address 192.168.146.2 255.255.255.0
  keepalive 1
  speed 100
  full-duplex
  standby 1 timers 1 3
  standby 1 preempt
  standby 1 priority 100
  standby 1 ip 192.168.146.3
  standby 1 name one
  standby 1 track Fa0/1 10
  standby 1 track Multilink1 10
  ! Track the MWR 1941 health interface
  standby 1 track Loopback101 10
```

I

```
  ! Track the MWR 1941 revertive (compensation) interface
  standby 1 track Loopback102 5
  no shutdown
!
interface FastEthernet0/1
  ip address 192.168.147.2 255.255.255.0
  keepalive 1
  speed 100
  full-duplex
  standby 2 timers 1 3
  standby 2 preempt
  standby 2 priority 100
  standby 2 ip 192.168.147.3
  standby 2 name two
  standby 2 track Fa0/0 10
  standby 2 track Multilink1 10
  ! Track the MWR 1941 health interface
  standby 2 track Loopback101 10
  ! Track the MWR 1941 revertive (compensation) interface
  standby 2 track Loopback102 5
  no shutdown

!
! Set a default route to RPM thru BTSRTRLINK
!
ip route 0.0.0.0 0.0.0.0 Multilink 1
!


line con 0
 exec-timeout 15 0
 password cisco
line aux 0
 Login
 password cisco
line vty 0 4
 Login
 password cisco

end
```

I

Preparation for Site Turn–over

Prepare the BTS Site for turn–over to the control of the OMC–R by performing the procedures in Table I-18 and Table I-19.

Table I-18: Prepare for Site Turn–over		
✓	**Step**	**Action**
	1	After disconnecting it from the BTS Router, shut down the LMF Computer.
	2	If any additional external support equipment was used during the Installation Process, shut it down and disconnect it from the frame.
	3	Account for all tools used and parts removed from the frame during the installation, being sure none were left inside the frame.
	4	Visually inspect the frame for any foreign objects left inside, and remove any discovered.
	5	Visually inspect all Cable Connections, ensuring they are connected as required for normal BTS Operation.
	6	Ensure all Internal Frame Cables are routed and secured to prevent damage to them when the Cabinet Doors are closed.
	7	Ensure all External Frame and BTS Router Cables are routed and secured so they will not interfere with normal Maintenance and Operational Activities at the site.
	8	Ensure that the BTS Routers are powered up and not reporting alarms other than Span Alarms.

Returning the Site to OMC–R Control

Perform the procedure in Table I-19 to return the site to OMC–R Control.

Table I-19: Returning the Site to Operational Control		
✓	**Step**	**Action**
	1	Contact the OMC–R, and notify the operator that the installation is complete.
	2	Request notification from the operator when the BTS Routers have been downloaded with the full site–specific Configurations and are verified as functioning normally.
	3	When notified that Router operation has been verified and the OMC–R can assume control of the site, perform the following actions.
	3a	On any frames that were opened, close and secure the Cabinet Doors.
	3b	Verify that no Alarm Conditions are being reported to the OMC–R with the Cabinet Doors closed.
	3c	Prepare all equipment, tools, and parts removed from the frame for transport from the site.

What to Do Next

The installation of the Packet Backhaul Option is complete. When the site is secured, there are no further actions to perform at the BTS Site.

I

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68P09262A58–C

Technical Information

1X SC 4812T LITE BTS OPTIMIZATION/ATP

Software Release R2.16.5.x

SC4812T LITE

CDMA2000 1X

PRELIMINARY

ENGLISH
FEB 2005
68P09262A58–C

1X SC 4812T LITE BTS OPTIMIZATION/ATP

SOFTWARE RELEASE 2.16.5.X

SC4812T LITE

CDMA2000 1X

1 of 1

PRELIMINARY

ENGLISH

FEB 2005

68P09262A58–C

STANDARD MANUAL PRINTING INSTRUCTIONS

Part Number: 68P09262A58–C Filename: 68P09262A58–C APC: 379

Title: 1X SC 4812T Lite BTS Optimization/ATP Software Release 2.16.5.x

Volume 1 of 1 Print Vendor: eDOC Date FEB 2005

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