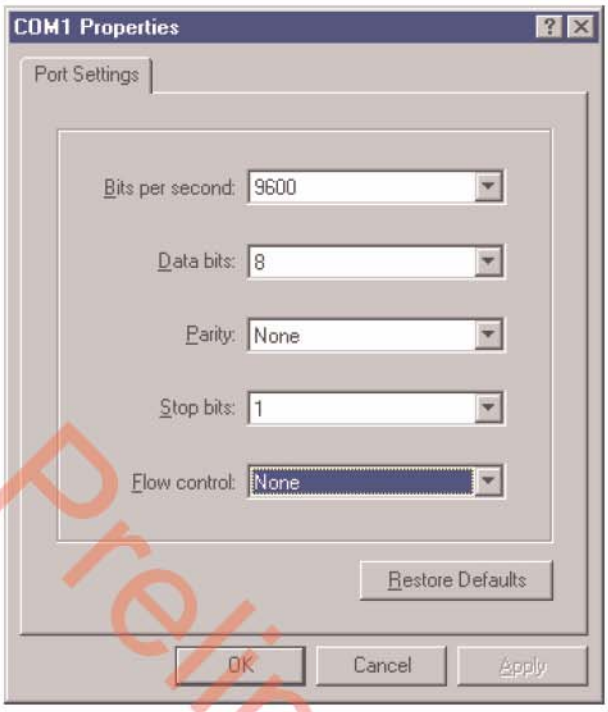

Figure 3-3: Serial Session Properties

E Select **OK** to connect to the processor card. At this time, you will not see a prompt. Proceed to Section 3.2.4 to power on the chassis.

If you do not have the Hyper Terminal application, you can open a serial session in the Craft PC application. In an Xterm window, type:

```
build@craftpc:~> cu -l ttyS0 [ENTER]

Connected.
```

3.2.4 POWER-ON LED TESTS

This section describes how to power-on the Micro BTS and verify that the cards in the system come up properly by viewing the Light Emitting Diodes (LEDs) on the front panel. The purpose of these tests is to verify that the LEDs come up in the correct state, indicating that the system is operating normally.

When you power-on the Micro BTS, it automatically runs its power on self tests (POST), downloads software to the E1 or T1 cards, and then attempts to bring up the cards. While it is bringing up the cards and when it is finished, the LEDs indicate the state of each card.

Use the following procedure to power on the chassis and verify the LEDs:

1 Turn the power to the chassis on by simultaneously switching on two power supplies. The power supply switches are shown in Figure 2-14 and Figure 2-20. This will share the start up load across the power supplies.

2 Verify that the front-panel LEDs flash in the sequence shown in Figure 3-4.

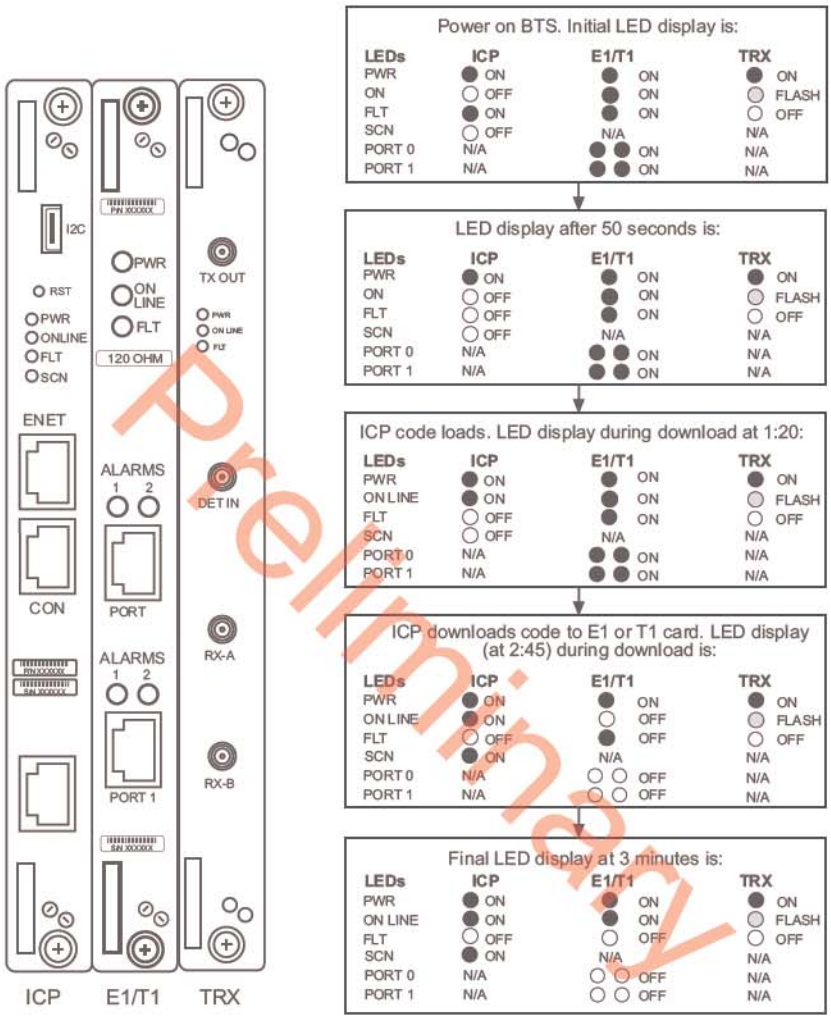

Figure 3-4: LED Sequence During the Boot Process

3 When the sequence is completed, verify that the LEDs appear as shown in Table 3-1.

Table 3-1: Normal LED Indications

LED	DESCRIPTION
SCN	Green LED, lit when processor card is operational.
PWR	Green LED, lit when card has power supplied. The PWR LED of the ICP and E1 or T1 cards will be lit after all cards have completed the boot-up process.
ON LINE	Green LED, lit when card is on-line, and card BOOT process has been performed successfully. The On-LINE LED of the ICP and E1 or T1 cards will be lit after all cards have completed the boot-up process. The TRX cards will not go on-line until they are unlocked by the OMC operator.
FLT	Red LED, lit when card detects a fault or is not downloaded. FLT LEDs will be lit on the TRX cards until their code is downloaded.

4 If your LEDs appear as described above, you have completed the LED power up tests.

5 If your LEDs do not appear as described above, you can either:

- Refer to the GSM Field Maintenance Guide for troubleshooting procedures
- Contact Customer Service

Note: For more information about these unsuccessful power-up cases and corrective actions to be taken upon unsuccessful power up, refer to the GSM Field Maintenance Guide.

6 You can monitor the status of the boot process using the serial session opened in Section 3.2.3.

Once the LEDs on the processor cards have reached their final online status, press the [ENTER] key. The prompt now changes to the following:

```
bts->
```

3.2.5 CONFIGURING BOOT PARAMETERS

In this section, you verify the boot parameters and change them if necessary. There are two reasons to change boot parameters:

- If they are configured incorrectly, you must set them to the values shown here.
- If your system is connected to the Ethernet, you must set the IP address to support the Craft PC IP address 172.16.80.43. To make a connection with the Craft PC, set the processor card IP address to 172.16.80.42:fffff000.

After changing the boot parameters, the Micro BTS must be rebooted before the changes take effect.

1 If not already done, establish serial communications with the Micro BTS as described in Section 3.2.3. If the Micro BTS starts rebooting endlessly, refer to the GSM Craft PC Guide for corrective measures. If the Micro BTS boots normally, type:

```
bts-> bootChange [ENTER]
```

2 A list of boot parameters appears. Edit the parameter values using the commands in Table 3-2.

Table 3-2: Changing Boot Parameters

COMMAND	ACTION
[ENTER]	Accepts the current parameter value and proceeds to the next parameter.
. [ENTER]	Erases the current parameter value and proceeds to the next parameter.
- [ENTER]	Returns to the previous parameter.
[CTRL][d]	Aborts all changes and reverts to the current values.

Figure 3-5 shows the default bootChange parameters for the ICP processor card.

```
'.' = clear field;  '-' = go to previous field;  ^D = quit

boot device          : motfcc
processor number     : 0
host name            : craftpc
file name            : /home/target/vxWorks
inet on ethernet (e) : 172.16.80.42:fffff000
inet on backplane (b):
host inet (h)        : 172.16.80.43
gateway inet (g)     :
user (u)             : target
ftp password (pw) (blank = use rsh):
flags (f)            : 0x0
target name (tn)     : bts
startup script (s)   : /home/target/bsxstart.ppc
other (o)            : motfcc

value = 0 = 0x0
bts->
```

Figure 3-5: Boot Parameters for ICP Processor Card

Note: You must edit the boot parameters to contain EXACT values, or the equipment will not bootup properly.

Note: At times, a flashing cursor will appear rather than the desired `bts->` cursor. Press the enter key and `bts->` will appear.

3 For the new parameters to take effect, reboot the Micro BTS by pressing the key combination `[CTRL][x]`.

3.2.6 SETTING UP AN ETHERNET CONNECTION TO THE ICP PROCESSOR CARD ETHERNET PORT

1 Connect the Ethernet crossover cable to the ICP processor card Ethernet port labeled ENET.

2 Connect the other end of the cable to the Ethernet port on the Craft PC.

Figure 3-6 shows a typical Ethernet port connection between the Craft PC and the ICP processor card.

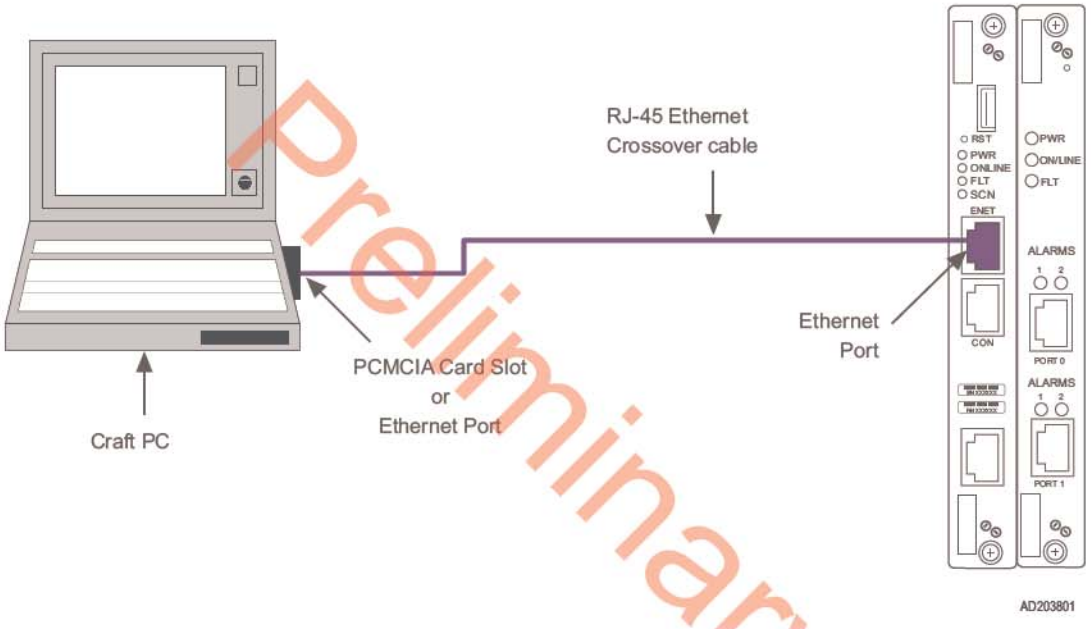

Figure 3-6: Connection to the Craft PC via the ICP Ethernet Port

3.2.7 VERIFYING TELNET COMMUNICATIONS WITH THE MICRO BTS OVER ETHERNET

The Craft PC uses telnet communications across the Ethernet connection for code downloads. Before performing any of the following procedures, ensure that you can establish and terminate a telnet communications session as described in the following procedures.

Note: For more information about the Craft PC, please refer to the GSM Craft PC Guide.

3.2.7.1 Establishing a Telnet Communications Session over Ethernet

1 Start a new Xterm window in the Craft PC environment.

2 Establish a telnet communications session by typing:

```
build@craftpc:-> telnet iwbox [ENTER]
```

Note: If the Craft PC hangs when attempting to establish a telnet session, press the key combination `[CTRL][c]` to abort the failed connection. Check the boot parameters and repeat the connection procedures. Also verify that the Craft PC host table contains the hostname of your equipment in reference to the default IP address.

3 The Craft PC prompt now changes to `bts->`. This prompt verifies that the telnet session can be established. If this is not the case, verify the Ethernet wiring and retry.

3.2.7.2 Terminating a Telnet Communications Session over Ethernet

After verifying that a telnet communications session can be established, terminate the telnet session as follows.

WARNING: Once a telnet session has been established between the Craft PC and the processor card, it must be terminated before the Craft PC is powered off. **Failure to do this will result in a hung connection on the BSS system.**

1 Activate the Xterm window in which the telnet communications session was established.

2 To terminate the telnet session, type in the Xterm window containing the telnet session:

```
bts-> logout [ENTER]
```

3 The return message should read `Connection closed by foreign host` and the prompt changes back to `build@craftpc->`. The telnet session has now been terminated.

3.3 SOFTWARE VERIFICATION USING CRAFT PC

In this section, you use the Craft PC to verify the software configuration and other aspects of the Micro BTS operation. It is assumed that you have:

- Made the physical Craft PC connections to the processor card
- An active serial session

3.3.1 VERIFYING THE CURRENT SOFTWARE VERSION AND PATCH LEVEL

Note: The following section describes procedures performed using the Craft PC. For more information about the Craft PC, refer to the GSM Craft PC Guide.

1 If not already done, establish serial communications with the Micro BTS as described in Section 3.2.3.

2 After the `bts->` prompt appears, verify the current software version and patch level by typing:

```
bts-> iwversion [ENTER]

Processor card type: InterWave ICP

BTS code version: iw07_05.013

Release number: 7.5

ABIS version: 1.1

Build on: 13-Jun-2008

value = 22 = 0x16
```

The current software version is displayed, represented above by the parameter `iw07_05.013`. This number should correspond to the software version detailed in the release notes included with the CD-ROM. Keep this number for your records.

3 Verify under `Patches Installed:` that the most current patch is installed, if applicable. Refer to the GSM Craft PC Guide for procedures to install required patches. If you are unsure if you require software patches, contact your Level 2 support representative for additional assistance.

Note: If the displayed software version number does not coincide with the software version being run on the network for which this Micro BTS is going to be used, refer to Section 3.4 for instructions on how to install a different software version on the processor card.

3.3.2 CHECKING THE FLASH VERSION NUMBER

In order to verify that the correct software build is loaded into flash memory, go to your serial Xterm window and type:

```
bts-> printConfigBlocks [ENTER]
```

The screen displays information relating to the flash images. Figure 3-7 shows Image 0, Image 1 and Image 2 from the ICP card configuration.

```
 #####  Current Image = 1 ####
******** Image 0 *********

Image IW version   : iw07_00.012 BTS
Image creation date: 04/12/06 16:02
Image crc          : bbf7ee19
******** Image 1 *********

Image IW version   : iw07_05.013 BTS
Image creation date: 06/13/08 17:03
Image crc          : 86f17c97

******** Image 2 *********
Image IW version   : iw06_05.020 WXC/BS
Image creation date: 07/15/03 15:05
Image crc          : 1089aafd
```

Figure 3-7: Determining the Flash Version on an ICP Processor Card

The ICP configuration states `Current Image = N` where `N` is either `0` or `1`. The flash version has lines in the format:`iw07_05.013`

where `iw07_05.013` indicates the flash version.

The flash version number should be iw07_00.013 or higher for BTS TRX POST diagnostics to be able to run. If it is not, the flash version number will have to be changed and the Micro BTS rebooted.

Caution: Flash Image 2 is reserved for ADC Customer Service use ONLY.

3.3.3 RUNNING E1 OR T1 POST DIAGNOSTICS

1 Disconnect all E1 and/or T1 lines from the BTS. This ensures that no Abis connection exists. If an Abis connection does exist, the TRX POST might not run properly.

2 Wait until the `bts->` prompt appears, and type:

```
bts-> reboot [ENTER]
```

This action reboots the Micro BTS. The VxWorks kernel is started, several E1 or T1 trunk card tests run sequentially, and the results of each test are listed as PASSED/FAILED. Only if all seven tests passed successfully will the E1 or T1 POST diagnostics be considered successful. The E1 or T1 POST results will be displayed after the boot process has been completed.

Note: The coding for the E1 or T1 trunk card, its modules and scripts generically refer to the E1 or T1 trunk card objects as "E1", whether the corresponding ports are configured as E1 or T1.

3 Figure 3-8 shows the E1 or T1 POST results that would appear if the E1 or T1 POST diagnostics ran successfully on the E1 or T1 trunk card in slot 1. The format for each diagnostic line is:

```
[line number][action][E1 or T1 number][test number][test
description][test result]
```

In the case of an error, a FAILED message would appear following the test that failed. In addition, the following message would be displayed in Line 8:

```
E1 CARD in SLOT 1: COMPLETED POST/OFFLINE Test: FAILED
```

Note: If an E1 or T1 trunk card fails the POST diagnostics, remove the failed card and return it to ADC along with its test results file. The defective card needs to be replaced with a new one, and POST diagnostics should be run again on the new card.

```
1 (eldiag) E1 CARD in SLOT 1 : STARTING  POST/OFFLINE Test
2 (eldiag) testsPtr 0xffbe7cac testsPtr[0] 0x5
3 (eldiag) testsPtr 0xffbe7cac testsPtr[0] 0x5 result 0x0 i 1
4 (eldiag)   E1(1) TID01:     Initialize Peripheral Registers : PASSED
5 (eldiag) testsPtr 0xffbe7cac testsPtr[0] 0x5 result 0x0 i 2
6 (eldiag)   E1(1) TID02:           Peripheral Register Test : PASSED
7 (eldiag) testsPtr 0xffbe7cac testsPtr[0] 0x5 result 0x0 i 3
8 (eldiag)   E1(1) TID03:               Framer Register Test : PASSED
9 (eldiag) testsPtr 0xffbe7cac testsPtr[0] 0x5 result 0x0 i 4
10 (eldiag)   E1(1) TID04:          VME to CPU FIFO Flag Test : PASSED
11 (eldiag) testsPtr 0xffbe7cac testsPtr[0] 0x5 result 0x0 i 5
12 (eldiag)   E1(1) TID05:       Initialize Time/Space sw Chip : PASSED
13 (eldiag) testsPtr 0xffbe7cac testsPtr[0] 0x5 i 6
14 (eldiag) E1 CARD in SLOT 1 : COMPLETED POST/OFFLINE Test   : PASSED
```

Figure 3-8: E1 or T1 POST Results

3.3.4 RUNNING TRX POST DIAGNOSTICS

This section explains how to use the Craft PC to run the TRX POST diagnostics on the Micro BTS.

1. Verify that you can establish and terminate a telnet communications session as described in Section 3.2.7.
2. Verify that you can establish a serial connection as described in Section 3.2.3.
3. After the Micro BTS has booted up and the E1 or T1 POST has run during the boot process, the TRX POST diagnostics can be initiated. Type:

   ```
   bts-> runtrxpost [ENTER]
   ```

4. A set of TRX POST diagnostic tests run sequentially over the Ethernet connection and the results of each test will be listed as PASSED/FAILED. Only if all tests pass successfully will the TRX POST diagnostics be considered successful. The TRX POST results will be displayed after the boot process has been completed.

Note: The TRX ON LINE LED flashes continuously when TRX POST diagnostics are being run and does not stop flashing until the Micro BTS is rebooted. The flashing LED can be used as a reminder to reboot the system after successfully completing the TRX POST and other diagnostics.

The format for each diagnostic line is:

```
[line number][action][TRX number][test number][test description]
[test result]
```

For example:

```
26 (Diag     ) LCR2(2 ) tf 16  Load DSP (Coder)
..................... PASSED
```

where: Table 3-2 provides a description of the TRX post results.

Table 3-3: Description of the TRX POST Results

LINE ENTRY	DESCRIPTION
14	Line number
Diag	Diagnostic test being run
LCR-2 (2)	LCR-2 TRX 2 is being tested
TF22	Test number
Test Basic op of VME/RTP FIFOs	Test description
PASSED	Indicates that the TRX passed this test

Figure 3-9 shows the TRX POST results for a TRX in slot 2 of the Micro BTS and shows that the TRX POST diagnostics ran successfully on the TRX card.

```
20 (Diag     ) TRX CARD IN SLOT 2 : STARTING  TRX POST OFFLINE Test
21 (Diag     ) LCR2(2 ) tf  1  Reset Card ........................... PASSED
22 (Diag     ) LCR2(2 ) tf  5  Test VME Access ...................... PASSED
23 (Diag     ) LCR2(2 ) tf 12  Load FPGA (TDM) ...................... PASSED
24 (Diag     ) LCR2(2 ) tf 13  Load FPGA (RC) ....................... PASSED
25 (Diag     ) LCR2(2 ) tf 56  AD9857 UPC init first ................ PASSED
26 (Diag     ) LCR2(2 ) tf 16  Load DSP (Coder) ..................... PASSED
27 (Diag     ) LCR2(2 ) tf 19  Ping DSP (Coder) ..................... PASSED
28 (Diag     ) LCR2(2 ) tf 50  RC FPGA to DSP EMIF buffers test ..... PASSED
29 (Diag     ) LCR2(2 ) tf 30  Test TDM Control Store RAM ........... PASSED
30 (Diag     ) LCR2(2 ) tf 34  Test TDM Loop-back ................... PASSED
31 (Diag     ) LCR2(2 ) tf 41  Test Channel Synthesizers ............ PASSED
32 (Diag     ) LCR2(2 ) tf 53  Downlink power output test ........... PASSED
33 (Diag     ) LCR2 CARD IN SLOT 2  : COMPLETED POST OFFLINE Test    : PASSED
```

Figure 3-9: TRX Post Results

3.3.5 REVIEWING POST RESULTS

This section explains how to review E1 or T1 POST and TRX POST diagnostics results after POST has been completed on the Micro BTS.

Note: The following procedure assumes that E1 or T1 and TRX POST have just been completed on the selected Micro BTS and a serial connection is still active between the Craft PC and the Micro BTS. If this is not the case, reboot the Micro BTS and run POST again.

1 Turn on basic logging by typing:

```
bts-> log_none
```

Note: This will result in extra output being displayed in the xterm, subsequent commands entered may run into several lines as a result of the extra logs.

2 To display the most current E1 or T1 and TRX POST results after POST has been completed, type:

```
bts-> postReportE1Trx [ENTER]
```

Figure 3-10 displays a summary of the E1 or T1 and TRX POST results that will be displayed (note that some tests may not run).

```
bts:> postReportE1Trx
****************** E1 DIAGNOSTICS REPORT ******************
************************************************************
Slot:1
E1(1)TID01:  Initialize Peripheral Registers : PASS
E1(1)TID02:       Peripheral Register Test : PASS
E1(1)TID03:           Framer Register Test : PASS
E1(1)TID04:      VME to CPU FIFO Flag Test : PASS
E1(1)TID05:  Initialize Time/Space sw Chip : PASS
E1(1)TID06:         Software Download Test : Not-Run
E1(1)TID07:     Memory Test : Not-Run
E1(1)TID08:              CPM download Test : Not-Run
E1(1)TID09:   TRAU DSP Test : Not-Run
E1(1)TID10:              Cross Connect Test : Not-Run
************************************************************
****************** TRX DIAGNOSTICS REPORT ******************
************************************************************
Slot 2
------------------------------------------------------------
All Tests PASSED
************************************************************
value=58=0x3a=':'
bts:>
```

Figure 3-10: Reviewing TRX Post Results

Note: There are five tests that are not run but show up in the results section when the user manually retrieves the POST results. These tests are not displayed when running POST by rebooting the BTS. They are:

- T1(1) TID06: Software Download Test : Not-Run
- T1(1) TID07: Memory Test : Not-Run
- T1(1) TID08: CPM Download Test : Not-Run
- T1(1) TID09: TRAU DSP Test : Not-Run
- T1(1) TID10: Cross Connect Test : Not-Run

3.3.6 REBOOTING THE MICRO BTS AFTER RUNNING POST

1 In the serial communications window, type:

```
bts-> reboot [ENTER]
```

This action places the TRX in an on-line and operational state.

2 Reconnect all E1 or T1 lines to the Micro BTS.

3.3.7 TERMINATING SERIAL COMMUNICATIONS WITH THE MICRO BTS

Note: If you are going to perform the Racal tests described in the GSM Radio Test Procedures at this time, ensure that you have rebooted the chassis. Also, leave the Craft PC connected to the ICP card and a serial communications session active.

1 To terminate the serial communications between the Craft PC and the BTS in an xterm, type:

```
bts-> ~.
```

2 After a few seconds the returned message should read `Disconnected`, and the display will revert back to `build@craftpc:->` prompt.

3 Close the Hyper Terminal window if you are using Hyper Terminal for serial communications.

3.3.8 EXITING XWINDOWS ON THE CRAFT PC

This section explains how to close XWindows running the Windows 2000/XP operating system on the Craft PC.

- Left click the X in the upper right hand corner of your XWindows window.

3.4 UPGRADING THE MICRO BTS SOFTWARE VERSION (FLASH)

Use this procedure if the procedures in Section 3.3.1 indicate that you need to update your software version.

The Micro BTS stores its release software in Flash RAM. This section explains how to upgrade the Micro BTS Flash boot image locally using the Craft PC.

Note: In order to update the BTS Flash boot image locally using the Craft PC, the Craft PC hard drive must contain the software version (Flash boot image) to be installed.

If the required release is not installed on your Craft PC, use the procedures in the GSM Craft PC Guide to install it.

1 Power up the Craft PC and start the XWindows environment. For Craft PC power-up procedures, refer to Section 3.2.2. For XWindows start-up procedures, refer to Section 3.2.1.

2 Verify that a telnet session can be established with the Micro BTS. In an Xterm window, type:

```
build@craftpc:~> telnet iwbox [ENTER]
```

3 If the Ethernet connection is setup correctly, then the Craft PC returns the vxWorks `bts->` prompt. If this is not the case, refer to Section 3.2.7 for setup procedures.

4 Once the Ethernet connection has been tested, terminate the telnet session by typing:

```
bts-> logout [ENTER]
```

The Craft PC returns the `build@craftpc:~>` prompt.

5 Establish a serial session with the Micro BTS. Refer to Section 3.2.3.

6 Change the working directory to the directory containing the new software version you wish to upgrade to the Micro BTS, type:

```
cd "/home/build/iw07_05.ZZZ/iwlib/platform/bspppc" [ENTER]
```

The `iw07_05.ZZZ` parameter represents the new software version you wish to load on the Micro BTS.

7 To find out which Flash image in which the current software version resides, type:

```
bts-> getCurrentImage [ENTER]
value = 0 = 0x0
```

Make a note of the returned value, which might be either 0 or 1. This is the active image in which the current Flash resides. The binary opposite of this value will be used to load the new Flash in the following steps:

3.4.0.1 If Current Image Value is 0 (value = 0 = 0x0)

8 Load the new Flash in the inactive image. At the `bts->` prompt, type:

```
bts-> writeFlashImage "btsflash.bin", 1 [ENTER]
```

9 This takes about one minute. When the `bts->` prompt returns, set the inactive image containing the new Flash as the active or current image, type:

```
bts-> setImageCurrent 1 [ENTER]
```

10 Reboot the Micro BTS for the new Flash image to take effect by pressing the key combination `[CTRL][x]`.

3.4.0.2 If Current Image Value is 1 (value = 1 = 0x1)

11 Load the new Flash in the inactive image. At the `bts->` prompt, type:

```
bts-> writeFlashImage "btsflash.bin", 0 [ENTER]
```

12 This takes about one minute. When the `bts->` prompt returns, set the inactive image containing the new Flash as the active or current image, type:

```
bts-> setImageCurrent 0 [ENTER]
```

13 Reboot the Micro BTS for the new Flash image to take effect by pressing the key combination `[CTRL][x]`.

The Flash boot image has been upgraded to the new software version and set as the default.

Caution: Flash Image 2 is reserved for ADC Customer Service use ONLY.

3.5 POST OFF-LINE COMMISSIONING

The following post off-line commissioning procedures are necessary to ensure that the Micro BTS is ready for on-line commissioning. In the case of off-line commissioning at a staging area, these procedures ensure that the Micro BTS is ready for installation. In the case of off-line commissioning after on-site installation, these procedures ensure that the Micro BTS is ready for on-line commissioning.

3.5.1 POST OFF-LINE COMMISSIONING PROCEDURES AT THE STAGING AREA

1 Repack the Micro BTS in its original shipping containers and make sure that it is shipped to the site where it will be installed.

2 Once the Micro BTS is installed at its final site as described in Chapter 2 - Installation, continue with the next section.

3.5.2 POST OFF-LINE COMMISSIONING PROCEDURES ON-SITE

1 Reconnect the E1 or T1 cables to the digital distribution frame.

2 Power on the Micro BTS if it is not already on. Verify that all PWR and ON LINE LEDs are green.

3 Inform the OMC operator that the Micro BTS is ready for network configuration.

4 After the OMC operator has configured the Micro BTS, continue with on-line commissioning tests in the next chapter.

CHAPTER 4 - OFF-LINE COMMISSIONING OF A DAISY CHAIN

Content Page

Up to five external Micro BTSs can be incorporated into a daisy chain connected to a BSC. If this configuration is used, each Micro BTS must be installed separately, and must have off-line commissioning procedures independently performed. Once each Micro BTS is installed and commissioned, the Micro BTSs can be daisy chained together.

Note: If the power fails to one of the units or one of the units in a daisy chain is rebooted, communication with the downstream units will not be lost.

4.1 PREREQUISITES TO DAISY CHAINING

1 Ensure that all Micro BTSs comprising the daisy chain are installed and off-line commissioned.

Refer to Chapter 2 - Installation and Chapter 3 - Off-Line Commissioning for instructions on how to install and off-line commission the Micro BTSs that are part of the daisy chain.

2 Ensure that the Abis Manager timeslot has been set for each Micro BTS in the daisy chain as described in Section 4.2. Each Abis link within this daisy chain MUST be allocated a unique Abis timeslot number.

3 Turn the power to all units off.

4 Using the instructions in Section 2.6.3, verify that all E1 and/or T1 lines are in place and commissioned by the operator from the BSC to the first Micro BTS, and between all successive Micro BTSs comprising the daisy chain.

4.2 SETTING THE ABIS LAPD SIGNALING TIMESLOT

This procedure sets the Abis LAPD timeslot between the MSC and each Micro BTS. If the Abis timeslot is not set, it automatically defaults to 16.

This procedure is optional for a star configured Micro BTS, but is required for all BTSs which will be used in a daisy chain. In this case, each Micro BTS must have its Abis timeslot set to a unique number in the chain. This information will be used by the OMC operator to configure the daisy chain.

Caution: This procedure must be performed after the Micro BTS is tested using a Racal test set. Refer to the GSM Field Maintenance Guide for further instructions.

1 Ensure that the Craft PC is connected to the Micro BTS over a serial line, and that a serial connection is established. Refer to Chapter 3 - Off-Line Commissioning for instructions on how to do this.

2 In an Xterm window, type:

```
bts-> getFlashE1Chan [ENTER]
```

This displays the timeslot reserved for the Abis LAPD signalling timeslot, which is by default set to 16. To change this value, type:

```
bts-> setFlashE1Chan <number> [ENTER]
```

where **<number>** is the Abis LAPD signaling timeslot assigned to an unassigned T1 channel between 1 and 24 or to an unassigned E1 channel between 1 and 31.

Note: The Abis signaling timeslot for each Micro BTS in the daisy chain must be set to a different number. For example:

- Micro BTS 1 in the chain = Set timeslot 16 as the Abis timeslot
- Micro BTS 2 in the chain = Set timeslot 17 as the Abis timeslot
- Micro BTS 3 in the chain = Set timeslot 18 as the Abis timeslot
- Micro BTS 4 in the chain = Set timeslot 19 as the Abis timeslot

Make sure that this information is communicated to the OMC operator.

3 To double-check that the timeslot was changed, type again:

```
bts-> getFlashE1Chan [ENTER]
```

The new Abis signaling timeslot number should be displayed.

4 If the Abis signaling timeslot was changed, the Micro BTS must be rebooted. Type:

```
bts-> reboot [ENTER]
```

Blank

CHAPTER 5 - ON-LINE COMMISSIONING

On-line commissioning takes place on-site after installation and off-line commissioning. Its purpose is to verify that the equipment is operational and can be integrated into the telecommunications network.

On-line commissioning requires the participation of two people; a field technician who operates and tests the Micro BTS on-site and an OMC operator who remains at the OMC console. These two must work together, performing the procedures in this chapter in conjunction with the procedures in the UltraVIEW OMC Configuration Guide.

Radio Frequency Radiation Warning

Under normal operating conditions, ADC radio equipment complies with the limits for human exposure to radio frequency (RF) fields adopted by the Federal Communications Commission (FCC). All ADC Telecommunications, Inc. radio equipment is designed so that under normal working conditions RF radiation directly from the radio is negligible when compared with the permissible limit of continuous daily exposure recommended in the United States of America by ANSI/IEEE C95.1-19991 (R1997), Safety Levels with Respect to Human Exposure to Radio Frequency Electromagnetic Fields, 3 kHz to 300 GHz.

RF signal levels that give rise to hazardous radiation levels can exist within the transmitter, power amplifiers, associated RF multiplexers and antenna systems.

Do not disconnect RF coaxial connectors on the ADC equipment or antenna systems while the radio equipment is operating. **Never** place any body part over, or look into any RF connector while the radio equipment is transmitting.

5.1 PRE ON-LINE COMMISSIONING REQUIREMENTS

Before on-line commissioning begins, the field technician or the OMC operator must verify that:

- The BSC, or Micro BTS, and the MSC are fully commissioned, in service and connected to each other.
- The OMC is in service and connected to the Micro BTS via the MSC.
- A database questionnaire is completed, with all necessary Micro BTS parameters listed.
- The OMC operator has successfully created and configured the Micro BTS object on the OMC and downloaded this information to the Micro BTS. Refer to the procedures described in the UltraVIEW OMC Configuration Guide.
- The RF frequencies are cleared to transmit.

Caution: Once the E1 or T1 link has been properly connected to the Micro BTS E1 or T1 trunk card, both port alarm LEDs for the connected port should turn off. If one or both LEDs remain illuminated, an E1 or T1 link problem exists related to either a faulty connector or the E1 or T1 link itself. Refer to the GSM Field Maintenance Guide for additional information.

- The MSC-Micro BTS E1 or T1 link is properly certified. Note that the certification should state length of testing and BER results.

Note: It is the operator's responsibility to verify that all Micro BTS E1 or T1 Abis links are ordered, installed and certified by the local telephone provider. Certification should include a bit error ratio/rate test of at least 20 minutes on the Abis interface, with a BER of 10^{-8} or better.

- The HLR subscriber data has been entered into the HLR using the Subscriber Management GUI, as described in the GSM Subscriber Management User Guide. In particular, the HLR must be configured to support the SIM cards of the mobiles used by the field technician.

5.2 ON-LINE COMMISSIONING

The network commissioning procedures must be performed at the OMC and at the Micro BTS. This requires two persons working from two different documentation sets:

- A field technician who remains on-site. They must have a filled out copy of Checklist 2 - Installation Checklist and a copy of this manual.
- An OMC operator who remains at the OMC. They must have a copy of the UltraVIEW OMC Configuration Guide.

The flow chart shown in Figure 5-1 provides a high-level view of the procedures. The procedures in the following sections provide detailed, numbered steps.

Note: Checklist 3 - Commissioning Checklist summarizes the steps for on-line commissioning.

Note: Before starting any of the following procedures, the field technician needs to ensure that anti-static precautions are taken. Refer to Section 1.2.

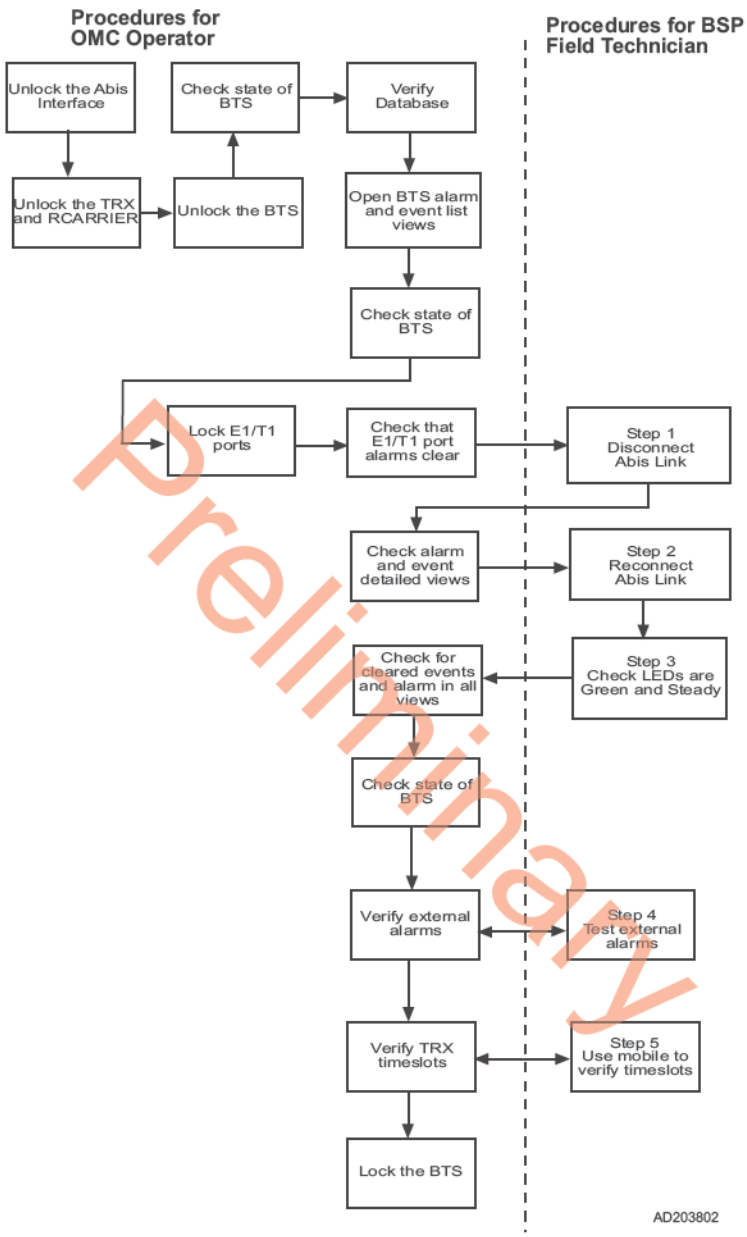

Figure 5-1: On-Line Commissioning Procedures

5.2.1 UNLOCKING THE ABIS INTERFACE

The Abis interface between the BSC and BTS is established via a PPP link over E1 or T1 lines. Make the E1 or T1 connections to the provider and set up the Abis signaling link to the OMC as described in Chapter 4 - Off-Line Commissioning of a Daisy Chain. Once the Abis link is established it must be unlocked at the OMC to allow the BSC to download the TRX code to the BTS. Refer to the UltraVIEW OMC Configuration Guide for procedures to unlock the Abis. As the code downloads, the TRXs run POST to verify their operation. This takes up to fifteen minutes depending the number of TRXs in the system.

Note: For systems equipped with multiple TRXs, the TRXs download their code and run POST simultaneously. If viewing the output in a serial window, the POST messages will be mixed among different TRXs while in progress.

Figure 5-2 illustrates the LED display during the POST process and Figure 5-3 illustrates the final LED display.

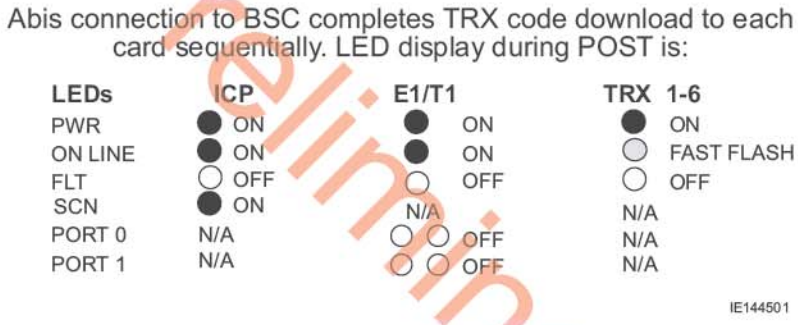

Figure 5-2: LED Display During POST

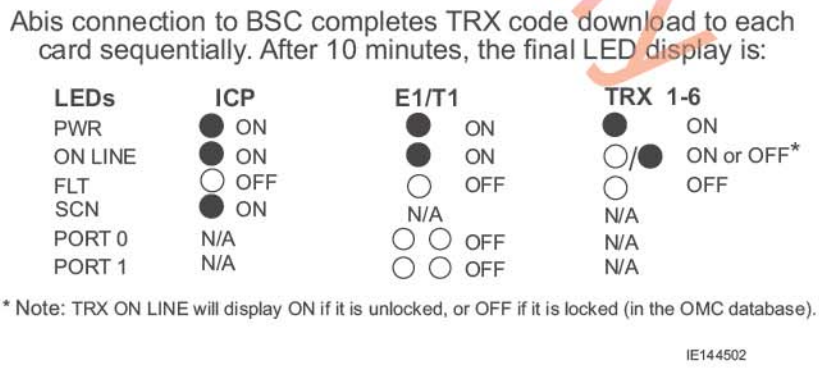

Figure 5-3: Final LED Display

5.2.2 COMMISSIONING THE MICRO BTS

Before disconnecting the E1 or T1 cables, the field technician must make sure that the cable is labeled in a way that clearly identifies its origin (a particular E1 or T1 port on the Micro BTS, or a particular port of an E1 or T1 panel, etc.) and destination (a particular E1 or T1 slot and port on the Micro BTS).

- Provide the OMC operator with all part, revision and serial numbers for the Micro BTS cards and modules. This information was gathered during the physical installation and is available in Checklist 2 - Installation Checklist.

5.2.3 RECOVERY TESTS

You should have the OMC operator lock the E1 or T1 ports and verify that the port status changes to Locked, Enabled, Online. Then perform the following steps:

1 At the Micro BTS, disconnect the physical OAM link cable. Monitor the LED sequence of the Micro BTS as described in Chapter 3 - Off-Line Commissioning.

2 Coordinate with the OMC operator to ensure the proper alarms have appeared on the OMC. Reconnect the physical OAM link cable to the Micro BTS E1 or T1 trunk card.

3 Monitor the LED sequence of the Micro BTS as described in Chapter 3 - Off-Line Commissioning.

4 Test external alarms. See Section 5.2.4.

5.2.4 EXTERNAL ALARM TESTS

1 Test external alarms using the following procedures:

   A Open the door of the Micro BTS.

   B After a delay, the OMC operator must observe an alarm event.

   C Close the door.

   D After a delay, the alarm state displayed at the OMC changes from open to closed.

2 For each external alarm that you connected in Section 2.8, verify that it is propagated to the OMC.

   A Close the alarm relay (i.e. trigger the first customer-defined alarm).

   B After a delay, the OMC operator must observe an alarm event.

   C Close the alarm relay by opening the alarm contact.

   D After a delay, the alarm state displayed at the OMC changes from open to closed.

5.2.5 TCH TIMESLOT TESTS

- In this test, the OMC operator unlocks individual TCH timeslots and the field technician places a mobile-to-mobile call over each timeslot using a mobile handset in debug mode. Refer to the documentation provided by the module handset manufacturer for the proper procedures.

  For each timeslot, the commissioner should verify that:

  - The timeslot displayed on the handset corresponds to the timeslot unlocked by the OMC operator.
  - A two-way call is completed successfully.
  - The call has good audio quality and power, and low interference.

  The number of timeslots to be tested differs depending on whether you have one, two or three TRXs. Table 5-1 provides the sequence for one TRX. Table 5-2 provides the sequence for two or more TRXs.

Table 5-1: Timeslots Needing Testing in a One-TRX BTS

TRX NUMBER	TIMESLOT NUMBER	CHANNEL TYPE	TESTING NECESSARY
First TRX	0	BCCH Combined	No
	1	TCH	Yes
	2	TCH	Yes
	3	TCH	Yes
	4	TCH	Yes
	5	TCH	Yes
	6	TCH	Yes
	7	TCH	Yes
Note: To run an abbreviated version of this test, test any one of timeslots 0-3 and of timeslots 4-7 on each TRX.			

Table 5-2: Timeslots Needing Testing in BTS with More Than One TRX

TRX NUMBER	TIMESLOT NUMBER	CHANNEL TYPE	TESTING NECESSARY
First TRX (Note)	0	BCCH	No
	1	SDCCH	No
	2	TCH	Yes
	3	TCH	Yes
	4	TCH	Yes
	5	TCH	Yes
	6	TCH	Yes
	7	TCH	Yes
Second through Sixth TRX (Note)	0	TCH	Yes
	1	TCH	Yes
	2	TCH	Yes
	3	TCH	Yes
	4	TCH	Yes
	5	TCH	Yes
	6	TCH	Yes
	7	TCH	Yes

Note: The BCCH can be assigned to any TRX within the BTS. The label "First TRX" applies to the TRX to which is assigned the BCCH. The OMC operator may determine which physical TRX is the "First" or beacon TRX. All TCH timeslots on the second through sixth TRX must be tested.

5.3 ANTENNA CABLING AND POWER VERIFICATION

Use the procedures in this section to verify the output power and antenna cabling. After the hardware installation is complete, forward and reverse power needs verification.

5.3.1 SETTING UP POWER MEASUREMENTS

After performing the BTS commissioning as described in the previous section, use the following procedure to check the performance of an on-line Micro BTS without using a Racal test procedure.

Caution: This procedure is NOT a substitute for the Racal tests. Please refer to the GSM Radio Test Procedures to test the output power of the BTS.

5.3.1.1 Required Test Equipment

- Thruline RF Watt Meter (by Bird Electronics) or equivalent
- Appropriate power sensors for watt meter according to frequency and output power of the BTS under test
- Calibrated RF cable for connection between equipment and watt meter
- 100 Watt, 30 dBm attenuator, if required
- Two mobile telephones

5.3.1.2 Required Network Configuration

To perform satisfactory RF performance tests, the Micro BTS must be connected to an operational BSC/MSC and OMC to enable call processing, as the SS7 must be enabled for the BTS to transmit. Make sure you commission the Micro BTS as described in the previous section before performing this procedure.

5.3.2 VERIFYING TRX OUTPUT POWER

Starting with the first TRX, this procedure must be completed for each TRX in the Micro BTS. The OMC operator will need to know what TRX is under test to enable the BCCH on that specific TRX and lock all other TRXs.

Caution: You must be an experienced RF field technician to perform these procedures. **Do not** disconnect RF coaxial connectors on the equipment or antenna systems while the radio equipment is operating. **Never** place any body part over, or look into any RF connector while the radio equipment is transmitting.

Use the following procedure:

1 At the OMC, make sure that the Micro BTS is in a locked state. Refer to the UltraVIEW OMC Configuration Guide.

At the Micro BTS, check the TRX ONLINE LEDs are OFF. Do not disconnect the RF connectors if the TRX is ONLINE!

2 Determine the appropriate power sensor for your test. Power sensors are specific for frequency (850 MHz, 900 MHz, 1800 MHz or 1900 MHz) and power range.

For the forward power measurement, you should be using a 100 Watt, 50 Watt or 25 Watt power sensor depending on the output power of equipment that you are testing. The sensor rating must have a higher Watt rating than the RF power output than you are testing, or an inline attenuator must be used to bring the output power down to the range acceptable to your power sensor.

For the reflected power measurement, you should be using a 10 Watt or 5 Watt power sensor.

3 Disconnect the appropriate antenna cable from the equipment. This cable will correspond to the TRX which you are testing. See Section 2.7 for additional RF cabling information.

4 Connect the antenna cable from the TRX port that you are testing to the "out" port of the RF watt meter. See Figure 5-4.

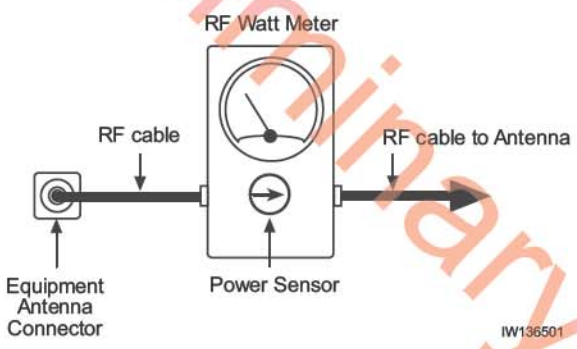

Figure 5-4: Direct RF Connection

5 Connect the RF cable between the Micro BTS RF output port (antenna connector) and the RF watt meter, as shown in Figure 5-4. This is the recommended method of testing forward and reflected power. Typical test cable loss is listed in Table 5-3.

Table 5-3: Typical Test Cable Loss

CABLE TYPE	DESCRIPTION	LOSS (900 MHZ)	LOSS (1800 MHZ)
LMR195 or RG142	Outer diameter: 0.2 inch Length: four feet	0.7 dB; add 0.1 dB per foot if longer than four feet	1.0 dB; add 0.17 dB per foot if longer than four feet
RG214 or RG8	Outer diameter: 0.4 inch Length: four feet	0.5 dB	0.7 dB
LMR400	Outer diameter: 0.4 inch Length: four feet	0.4 dB	0.5 dB
0.5 inch Heliax Jumper	Hard corrugated copper outer conductor; Outer diameter: 0.6 inch; Length: six feet	0.3 dB	0.4 dB
Note: It is strongly recommended NOT to use RG-58/U cable as a test cable because of its poor RF performance.			

If you do not have a high power sensor, you need to reduce the output power for the forward power measurement. Connect the appropriate attenuator (50 Watt or more, 10-20 dB) inline between the Micro BTS RF output port and the "in" port of the RF watt meter, as shown in Figure 5-5. You must figure the power loss of both cables and the attenuator in this scenario. You cannot measure the reflected power using this test setup. You must use the setup without the attenuator, as shown in Figure 5-4, making sure the power sensor direction arrow points toward the Micro BTS.

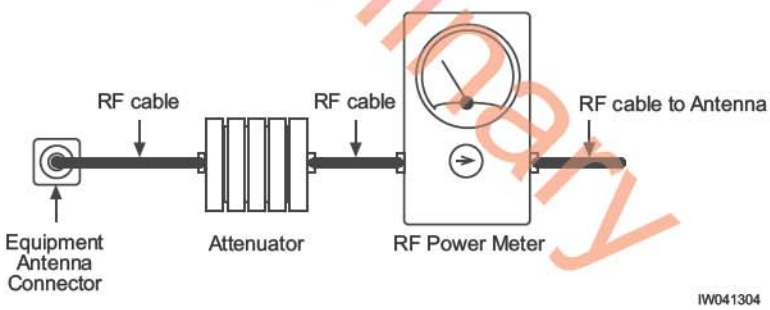

Figure 5-5: Attenuated Power Connection

6 Work with the OMC operator to ensure that the OMC is configured so that the BCCH is on the TRX you are testing.

Note: The procedure for BCCH configuration can be found in the Network Configuration section of the UltraVIEW OMC Configuration Guide.

7 To measure forward (output) power, the arrow on the power sensor should point toward the antenna, as shown in Figure 5-4.

8 At the OMC, change the TRX state to unlocked. The operator should be sure that the output power for the TRX under test is set to "Static Power Control Level 0" (full power). Note the ONLINE LED for the TRX under test turns green at the Micro BTS site.

9 In the serial session at the Micro BTS site, enter the following commands to display the power control status for each TRX.

```
bts-> log_none

bts-> isr_debug_calb=1
```

Information regarding TRX output power will be displayed as follows:

```
802 (trx   ) trx 2's lcr2PerformAdcCalb: adcVal = 804, arfcn = 885,
PwrLevel =0,

lcr2PwrReq = 460, lcr2PwrAct = 461, lcr2DiffPwr = -1

803 (trx   ) lcr2GetExpecteddBm(): bts partNum is 330251, trx 2's
combiner loss

is 0 db
```

The display shows the TRX has an expected RF power output level of 46.0 dB (`lcr2 PwrReq = 460`), and an actual level of 46.1 dB (`lcr2PwrAct = 461`).

To exit the power control monitor enter the following command:

10 Record the output power of the TRX on the power meter. This will be displayed in either watts or dBm. Your final reading should account for losses at the cables and connectors, and if used the loss through the attenuator. Table 5-4 provides the allowable readings given a Thruline Watt Meter and the cable losses referenced in Step 5.

Table 5-4: Allowable Power Meter Reading Range (watts)

NOMINAL OUTPUT POWER	READING RANGE	0.3 DB CABLE LOSS	0.4 DB CABLE LOSS	0.5 DB CABLE LOSS	0.7 DB CABLE LOSS	1.0 DB CABLE LOSS
15 Watt	Maximum	18	17	17	16	15
	Minimum	11	11	11	10	9
25 Watt	Maximum	29	29	28	27	25
	Minimum	19	18	18	17	16
40 Watt	Maximum	47	46	45	43	40
	Minimum	30	29	28	27	25

Table 5-4: Allowable Power Meter Reading Range (watts)

NOMINAL OUTPUT POWER	READING RANGE	0.3 DB CABLE LOSS	0.4 DB CABLE LOSS	0.5 DB CABLE LOSS	0.7 DB CABLE LOSS	1.0 DB CABLE LOSS
50 Watt	Maximum	59	57	56	54	50
	Minimum	37	36	35	34	32

11 To test the reflected power, remove the power sensor from the watt meter, and put the 10 Watt or 5 Watt sensor into the meter with the arrow pointing toward the equipment. It is not necessary to disconnect the meter or turn off the Micro BTS power. You only need to exchange the power sensor and point it in the direction of the Micro BTS.

If the measured reflected power is equal or less than 4% of the forward power measured in the previous step, the installation is acceptable. If the measurement is more than 4%, contact the responsible party for the antenna and feeder installation. Section 5.3.3 provides more detail about the Voltage Standing Wave Radio.

12 Complete these steps for each TRX in the Micro BTS.

If a TRX falls out of the above guideline margins, it is still within the operable tolerance based on the GSM standard or 11.21 test requirement as long as the power does not go beyond 25% of the maximum value or 20% less than the minimum value.

For example, if the cable loss is 0.4 dB, the nominal power is 25 watts and the measured power is 16 watts. It is out of the range of Table 5-4, but still operable because it is above the 14.4 watts which is the absolute minimum to operate a Micro BTS according to the GSM standard. If a TRX falls below this range, contact Customer Service.

5.3.3 VOLTAGE STANDING WAVE RATIO (VSWR) CHECK

The antenna and feeder cable VSWR measurement should be performed before the Micro BTS installation and commissioning by the team responsible for the antenna installation using a VSWR meter. The required VSWR is 1.5 or less. It is very important to confirm the antenna and feeder installation to ensure the Micro BTS transmits its signal power to the air effectively.

The purpose of this check is to ensure the integrity of the antenna and the antenna connection under the actual full power condition by determining whether the reflected power reading is lower than the required value. The reflected power is derived from the antenna and feeder VSWR. Table 5-5 shows the direct relationship between VSWR and reflected power.

Table 5-5: VSWR and Reflected Power

VSWR	REFLECTED POWER (% OF THE OUTPUT POWER)
1.2	0.8%
1.3	1.7%
1.4	2.8%
1.5	4.0%
1.6	5.3%
1.7	6.7%
2.0	11.1%
3.0	25.0%
4.0	36.0%

The recommended test approach is to use an in-line, forward/reflected power meter (for example, Thruline Watt Meter by Bird Electronics or the NAS model by Rohde and Scorers) inserted between the Micro BTS chassis and the antenna cable. This approach validates that the antenna and cable are good. It also verifies that the transmit power from the chassis is within tolerance limits. Record the reflected power which should be less than 4% of the output power as measured in Step 10.

If the measured reflected power is more than 4% of the forward power, it indicates power installation of the antenna or a bad feeder cable. Contact the responsible party for the antenna and feeder cable installation to have the problem fixed.

5.3.4 RX SIGNAL QUALITY MEASUREMENTS

The objectives of this test are to verify the performance of the Receive path of the BTS and the operation of the RX module in the TRX. Before these tests can take place, the BTS must be returned to its original "on air" working state with call processing possible.

1 Open a serial session with the BTS as described in chapter 3, section 3.2

2 From the BTS prompt type the following to activate the RX RSSI and quality data logging:

```
bts-> log_none [ENTER]
bts-> ho_log_on_bts [ENTER]
```

3 Place a mobile to mobile call through the Micro BTS. The RSSI and Quality for the call will be displayed, as illustrated in Figure 5-6.

```
210 (bts ) (4  0xe)UL:63/63 0/0 F AVG 63 0 DL:63/63 0/0 F AVG 63 0 NBR
211 (bts ) (4  0xe)UL:63/63 0/0 F AVG 63 0 DL:63/63 0/0 F AVG 63 0 NBR
212 (bts ) (4  0xe)UL:63/63 0/0 F AVG 63 0 DL:63/63 0/0 F AVG 63 0 NBR
213 (bts ) (4  0xe)UL:63/63 0/0 F AVG 63 0 DL:63/63 0/0 F AVG 63 0 NBR
214 (bts ) (4  0xe)UL:63/63 0/0 F AVG 63 0 DL:63/63 0/0 F AVG 63 0 NBR
215 (bts ) (4  0xa)UL:63/63 0/0 F AVG 61 0 DL:63/63 0/0 F AVG 63 0 NBR
216 (bts ) (4  0xe)UL:63/63 0/0 F AVG 63 0 DL:63/63 0/0 F AVG 63 0 NBR
217 (bts ) (4  0xa)UL:59/60 0/0 F AVG 62 0 DL:63/63 0/0 F AVG 63 0 NBR
218 (bts ) (4   0xe)UL:63/63 0/0 F AVG 63 0 DL:63/63 0/0 F AVG 63 0 NBR
                    Uplink RSSI/Quality     Downlink RSSI/Quality
```

Figure 5-6: RSSI and Quality Log

The sample log shows typical results for strong signals on both the uplink and downlink where RSSI of 63 is the highest number. The quality should generally be 0 when the RSSI is above 40 (strong signal). If you have any 2 or higher numbers in RX quality, you have some receiver problems and should contact Customer Service.

5.4 POST ON-LINE COMMISSIONING PROCEDURES

1 Leave the power to the OMC and Micro BTS on.

2 Check that all E1, T1 and power cable connections between the MSC and Micro BTS are tight.

3 Close and lock the Micro BTS door.

4 Inform the OMC operator that the Micro BTS is ready for integration testing and connections to external BTSs.

5 Ensure that the Micro BTS site is left in a tidy state.

Blank

CHECKLIST 1 - SITE READINESS CHECKLIST

Table C1-1: Site Details

SITE NAME	
IP ADDRESS	
MICRO BTS NAME	
MSC NAME	
SITE/ACCESS PHONE NUMBER	

ENVIRONMENTAL REQUIREMENTS

1 __ Ground and soil resistance measured
2 __ Air conditioning available

ELECTRICAL REQUIREMENTS

1 __ Site ground plate/ring installed and grounding rods connected
2 __ Grounding bar installed on shelter/cabinet and bonded to site ground plate/ring
3 __ Main feeder bend radius verified
4 __ Power cable entry supports/conduits installed
5 __ Main power cable installed and ready for connection
6 __ Power utility meter installed and connected
7 __ Main power supply available
8 __ MCC & MNC frequencies assigned and confirmed
9 __ Local electrician/power provider available

CHASSIS REQUIREMENTS

1 __ Shelter/Cabinet anchored in position
2 __ Foundation pad for shelter/cabinet constructed
3 __ Backbone trunking equipment and installation material on site
4 __ Shelter/Cabinet waterproofed
5 __ PLMN/PSTN/E1/T1 lines installed (BER link measurements)

Blank

CHECKLIST 2 - INSTALLATION CHECKLIST

Table C2-1: Site Details

SITE NAME	
IP ADDRESS	
IP NAME (OPTIONAL)	
BSC NAME	
MSC NAME	
SITE/ACCESS PHONE NUMBER	

Table C2-2: Site Equipment

BASEBAND SUBRACK	SLOT NUMBER	PART NUMBER	REVISION NUMBER	SERIAL NUMBER
Processor card	0			
E1 or T1 Trunk card	1			
TRX card	2			
TRX card	3			
TRX card	4			
TRX card	5			
TRX card	6			
TRX card	7			
TRX card	8			
TRX card	9			
TRX card	10			
TRX card	11			
TRX card	12			
TRX card	13			
Clock module	16			

Table C2-3: RF Module

RF SUBRACK	SLOT NUMBER	PART NUMBER	REVISION NUMBER	SERIAL NUMBER
RF Module	0			
RF Module	1			
RF Module	2			
RF Module	3			
RF Module	4			
RF Module	5			

Table C2-4: Power Supply

POWER SUPPLY SUBRACK	NUMBER	PART NUMBER	REVISION NUMBER	SERIAL NUMBER
PS module	1			
PS module	2			
PS module	3			

UNPACKING THE BTS

Contact ADC Customer Service if any visible damage is found.

1 __ No visible damage to shipping materials
2 __ Remove cabinet from shipping container
3 __ All parts included per shipping invoice
4 __ Cross check with site specific data to ensure BTS is correctly configured with all cards
5 __ Insert power supplies into power supply subrack assembly

MOUNTING

1 __ Move cabinet into final location
2 __ Remove casters and lower cabinet into final position
3 __ Attach mounting brackets to chassis, if necessary
4 __ Ground chassis
5 __ Connect power supply: -48 VDC

CONNECTING THE BTS

1 __ Connect “Abis Interface” E1 and/or T1 trunk cables to local telephone provider demarcation point
2 __ Configure E1 or T1 trunk card DIP switch settings
3 __ Ensure power to BTS is **off**

VERIFYING THE BTS-BSC LINK

It is the operator’s responsibility to verify that all BTS-BSC E1 and/or T1 links are ordered, installed and certified by the local telephone provider.

Verify bit error rates on a nominal 20 minute soak test on the E1 and/or T1 Abis-interface (end-to-end BER test to include E1 and/or T1 trunk cables)

CHECKLIST 3 - COMMISSIONING CHECKLIST

Table C3-1: Site Details

Site Name	
IP Address	
IP Name (optional)	
MSC Name	
Micro BTS Name	
Site/Access Phone Number	

PRE-COMMISSIONING VISUAL CHECKS

1 __ Installation secure
2 __ Power to the chassis is off
3 __ The chassis is connected to a power source
4 __ The chassis is grounded
5 __ Equipment cables are labeled and secured
6 __ Cards are seated securely
7 __ Transmission cables are available and labeled

COMPLIANCE CHECKS

1 __ Cross check with site-specific data to ensure the Micro BTS is correctly configured with all cards
2 __ Serial number of all cards are recorded
3 __ Verify correct operating voltage supplied: AC (110 V to 220 V, 30 A, 50-60 Hz) or DC (-40 V to -60 V, 40 A)

POWERING ON THE MICRO BTS

1 __ Disconnect all E1 and/or T1 cables from Micro BTS (if connected)
2 __ Turn power to the chassis on
3 __ Verify all card power LEDs and processor and on-line LEDs are green

MICRO BTS OFF-LINE COMMISSIONING

1 __ Connect the Craft PC to the processor card using a serial and ethernet cable
2 __ Establish a serial connection
3 __ Check software version
4 __ Start NMI
5 __ Check the Micro BTS configuration database (refer to Steps 6 through 9 below)
6 __ Delete existing database files
7 __ Verify that all E1 or T1 trunk cards are logically represented
8 __ Check the serial numbers, revision numbers and part numbers of all E1 or T1 trunk cards
9 __ Verify that DSP daughtercards are logically represented and tested

POST TESTS

1 __ Verify POST tests successfully passed
2 __ Exit NMI. Disconnect Craft PC from the Micro BTS

CONNECTING THE BTS

1 __ Connect all E1 or T1 cables to the telephone provider demarcation at the MSC
2 __ Connect all E1 or T1 cables to the telephone provider demarcation at the Micro BTSs
3 __ Inform Micro BTS operator (ready for on-line tests)
4 __ Leave power to Micro BTS on

ON-LINE COMMISSIONING

1 __ Micro BTS in service and connected to external Micro BTSs (if applicable)
2 __ BSC in service and connected to Micro BTS
3 __ Micro BTS connected to MSC
4 __ Database questionnaire completed with Micro BTS parameters defined
5 __ OMC downloaded Micro BTS configuration with correct operational parameters
6 __ Operator's responsibility to verify all E1 or T1 links properly installed and certified by local telephone provider. Certification must rate Length of Testing and BER results

VERIFYING E1 OR T1 OPERATION

1 __ Verify bit error rates on a nominal 20-minute soak test on the Abis interface to remote Micro BTS(s) if applicable
2 __ Verify bit error rates on a nominal 20-minute soak test on the A-interface

VERIFYING RECOVERY

1 __ Unlock A-interface, A-Links and Micro BTS objects from Micro BTS
2 __ Confirm A-interface re-establishes communications to MSC after E1 or T1 disconnects
3 __ Confirm Abis interface re-establishes communications to remote Micro BTS(s) after E1 or T1 disconnects

CHECKING CLOCK SYNCHRONIZATION

1 __ Verify Micro BTS clock is free of error

VERIFYING THE DATABASE

1 __ Verify Micro BTS database matches Micro BTS physical configuration

FINAL COMMISSIONING AND ON-LINE TESTS

1 __ Reconnect all E1 or T1 cables to telephone provider demarcation
2 __ Power off and then on the BTS locally. Verify that all LEDs are green
3 __ Inform Micro BTS operator that Micro BTS is ready for integration tests
4 __ Leave power to Micro BTS on

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