BTS3900 GSM

V300R008

Commissioning Guide

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Part Number

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About This Document

Purpose

This document describes the procedures for commissioning and verifying the BTS3900 GSM after it is installed. The commissioning and verification procedure ensures that the BTS3900 GSM operates as required. The procedures involve the following tasks: starting the Site Maintenance Terminal System, running the BTS3900 GSM software, checking the transmission and networking, commissioning the antenna system, checking the operating status of the BTS3900 GSM, testing the services of the BTS3900 GSM, checking the BTS3900 GSM environment, and typical FAQs for the commissioning.

Product Version

The following table lists the product version related to this document.

Product Name	Product Version
BTS3900 GSM (referred to as BTS3900 in this manual)	V300R008

Intended Audience

This document is intended for:

- Field engineers
- Technical support engineers

Change History

For changes in the document, refer to **Changes in BTS3900 GSM Commissioning Guide**.

Organization

1 Safety Information

2 General Requirements for BTS3900 Commissioning

The general requirements for BTS3900 commissioning are the commissioning prerequisites and commissioning resources.

3 BTS3900 Commissioning Procedure

This describes how to commission the BTS3900.

4 Starting the Site Maintenance Terminal System

Before starting the Site Maintenance Terminal, firstly, set the IP address of the Site Maintenance Terminal PC; secondly, connect the Site Maintenance Terminal PC to the BTS; finally, log in to the Site Maintenance Terminal.

5 Running the BTS3900 Software

This describes how to load the correct software version to the boards or modules in the BTS3900 cabinet and how to activate the board software.

6 Checking the Transmission and Networking

The purpose of checking the transmission and networking is to ensure that the BTS3900 transmission cables and hardware are correctly installed. The items to be checked consist of the transmission between the BBU and the DRFU, the transmission between the BBU and the BSC, and the consistency between the actual networking and the data configuration.

7 Commission the Antenna System

This describes how to commission the antenna system. You must check whether the antenna is connected properly and whether the Voltage Standing-Wave Ratio (VSWR) is normal. If an RET antenna is configured, you must commission the RET antenna.

8 Checking the Operating Status of the BTS3900

To ensure the normal operation of the BTS3900, you need to check the status of the BTS3900 LEDs, check the alarm information displayed on the Site Maintenance Terminal System, and perform loopback tests on the boards.

9 Commissioning the BTS3900 Services

This describes how to test whether the BTS3900 supports CS services and PS services by using an MS.

10 Checking the BTS3900 Environment

This describes the various environment alarms of the BTS3900. It also describes how to perform environment monitoring for the BTS3900.

11 FAQs for BTS Commissioning

This describes the fault symptoms and cause analysis in the BTS commissioning.

12 Data Sheet for Commissioning

The commissioning data sheet is used to record the process and result of the commissioning.

Conventions

1. Symbol Conventions

The following symbols may be found in this document. They are defined as follows

Symbol	Description
DANGER	Indicates a hazard with a high level of risk that, if not avoided, will result in death or serious injury.
WARNING	Indicates a hazard with a medium or low level of risk which, if not avoided, could result in minor or moderate injury.
CAUTION	Indicates a potentially hazardous situation that, if not avoided, could cause equipment damage, data loss, and performance degradation, or unexpected results.
TIP	Indicates a tip that may help you solve a problem or save your time.
NOTE	Provides additional information to emphasize or supplement important points of the main text.

2. General Conventions

Convention	Description
Times New Roman	Normal paragraphs are in Times New Roman.
Boldface	Names of files,directories,folders,and users are in **boldface**. For example,log in as user **root** .
Italic	Book titles are in *italics*.
`Courier New`	Terminal display is in Courier New.

3. Command Conventions

Convention	Description
Boldface	The keywords of a command line are in **boldface**.
Italic	Command arguments are in *italic*.
[ ]	Items (keywords or arguments) in square brackets [ ] are optional.
{x | y | ...}	Alternative items are grouped in braces and separated by vertical bars.One is selected.
[x | y | ...]	Optional alternative items are grouped in square brackets and separated by vertical bars.One or none is selected.
{ x | y | ... } *	Alternative items are grouped in braces and separated by vertical bars.A minimum of one or a maximum of all can be selected.

Convention	Description
[x | y | ...] *	Alternative items are grouped in braces and separated by vertical bars.A minimum of zero or a maximum of all can be selected.

4. GUI Conventions

Convention	Description
Boldface	Buttons,menus,parameters,tabs,window,and dialog titles are in **boldface**. For example,click **OK**.
>	Multi-level menus are in **boldface** and separated by the ">" signs. For example,choose **File** > **Create** > **Folder** .

5. Keyboard Operation

Convention	Description
Key	Press the key.For example,press **Enter** and press **Tab**.
Key1+Key2	Press the keys concurrently.For example,pressing **Ctrl+Alt+A** means the three keys should be pressed concurrently.
Key1,Key2	Press the keys in turn.For example,pressing Alt,A means the two keys should be pressed in turn.

6. Mouse Operation

Action	Description
Click	Select and release the primary mouse button without moving the pointer.
Double-click	Press the primary mouse button twice continuously and quickly without moving the pointer.
Drag	Press and hold the primary mouse button and move the pointer to a certain position.

1 Safety Information

1.1 Safety Precautions

This section describes certain safety precautions and helps to choose the measurement device and testing device. Read and follow these safety precautions before installing, operating, and maintaining Huawei devices.

Following All Safety Precautions

Before any operation, read the instructions and precautions in this document carefully to minimize the possibility of accidents.

The Danger, Caution, and Note items in the package of documents do not cover all the safety precautions that must be followed. They only provide the generic safety precautions for operations.

Symbols

DANGER

This symbol indicates that casualty or serious accident may occur if you ignore the safety instruction.

CAUTION

This symbol indicates that serious or major injury may occur if you ignore the safety instruction.

NOTE

This symbol indicates that the operation may be easier if you pay attention to the safety instruction.

Complying with the Local Safety Regulations

When operating the device, comply with the local safety regulations. The safety precautions provided in the documents are supplementary. You must comply with the local safety regulations.

General Installation Requirements

The personnel in charge of installation and maintenance must be trained and master the correct operating methods and safety precautions before beginning work.

The rules for installing and maintaining the device are as follows:

- Only the trained and qualified personnel can install, operate and maintain the device.
- Only the qualified specialists are allowed to remove the safety facilities, and repair the device.
- Any replacement of the device or part of the device (including the software) or any change made to the device must be performed by qualified or authorized personnel of Huawei.
- Any fault or error that might cause safety problems must be reported immediately to the personnel in charge.

Grounding Requirements

The following requirements are applicable to the device to be grounded:

- Ground the device before installation and remove the ground cable after uninstallation.
- Do not operate the device in the absence of a ground conductor. Do not damage the ground conductor.
- The unit (or system) must be permanently connected to the protection ground before operation. Check the electrical connection of the device before operation and ensure that the device is reliably grounded.

Safety of Personnel

Ensure the following:

- When lightning strikes, do not operate the device and cables.
- When lightning strikes, unplug the AC power connector. Do not use the fixed terminal or touch the terminal or antenna connector.

NOTE

The previous two requirements are suitable for the wireless fixed terminal.

- To prevent electric shock, do not connect safety extra-low voltage (SELV) circuits to telecommunication network voltage (TNV) circuits.
- To prevent laser radiation from injuring your eyes, never look into the optical fiber outlet with unaided eyes.
- To prevent electric shock and burns, wear the electrostatic discharge (ESD) clothing, gloves and wrist strap, and remove conductors such as jewelry and watch before operation.

Device Safety

- Before operation, the device must be secured on the floor or other fixed objects, such as the walls and the mounting racks.
- Do not block ventilation openings while the system is running.
- When installing the panel, tighten the screw with the tool.

1.2 Electricity Safety

High Voltage

DANGER

- The high voltage power supply provides power for running the system. Direct contact with the high voltage power supply or contact through damp objects may result in fatal danger.
- Non-standard and improper high voltage operations may result in fire and electric shock.

- The personnel who install the AC facility must be qualified to perform operations on high voltage and AC power supply facilities.
- When installing the AC power supply facility, follow the local safety regulations.
- When operating the AC power supply facility, follow the local safety regulations.
- When operating the high voltage and AC power supply facilities, use the specific tools instead of common tools.
- When the operation is performed in a damp environment, ensure that water is kept off the device. If the cabinet is damp or wet, shut down the power supply immediately.

Thunderstorm

The following requirements are suitable only for the wireless base station or the device with an antenna or GPS antenna.

DANGER

In a thunderstorm, do not perform operations on high voltage and AC power supply facilities or on a steel tower and mast.

High Electrical Leakage

CAUTION

Ground the device before powering on the device. Otherwise, the personnel and device are in danger.

If the "high electrical leakage" flag is stuck to the power terminal of the device, you must ground the device before powering it on.

Power Cable

CAUTION

Do not install and remove the power cable with a live line. Transient contact between the core of the power cable and the conductor may generate electric arc or spark, which may cause fire or eye injury.

- Before installing or removing the power cable, turn off the power switch.
- Before connecting the power cable, ensure that the power cable and label comply with the requirements of the actual installation.

Fuse

CAUTION

To ensure that the system runs safely, when a fuse blows, replace it with a fuse of the same type and specifications.

Electrostatic Discharge

CAUTION

The static electricity generated by the human body may damage the electrostatic sensitive components on the circuit board, such as the large-scale integrated circuit (LIC).

In the following situations, the human body generates a static electromagnetic field:

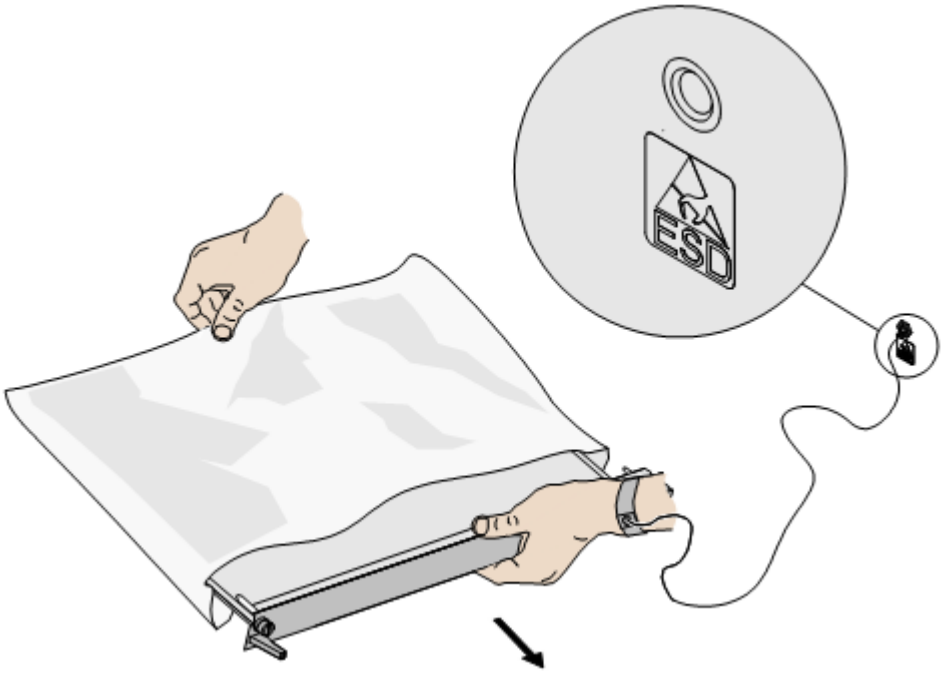
- Movement of body parts
- Clothes friction
- Friction between shoes and the ground
- Holding plastic in hand

The static electromagnetic field will remain within the human body for a long time.

Before contacting the device, plug boards, circuit boards, and application specific integrated circuits (ASICs), wear a grounded ESD wrist strap. It can prevent the sensitive components from being damaged by the static electricity in the human body.

Figure 1-1shows how to wear an ESD wrist strap.

Figure 1-1 Wearing an ESD wrist strap



1.3 Inflammable Environment

DANGER

Do not place the device in the environment that has inflammable and explosive air or fog. Do not perform any operation in this environment.

Any operation of the electrical device in the inflammable environment causes danger.

1.4 Battery

Storage Battery

DANGER

Before handling the storage battery, read the safety precautions for the handling and connection of the storage battery.

Incorrect operation of storage batteries may cause danger. During operation, ensure the following:

- Prevent any short-circuit.

- Prevent the electrolyte from overflowing and leakage.

Electrolyte overflow may damage the device. It will corrode the metal parts and the circuit boards, and ultimately damage the device and cause short-circuit of the circuit boards.

General Operations

Before installing and maintaining the storage battery, ensure the following:

- Use special insulation tools.
- Use eye protection devices and operate with care.
- Wear rubber gloves and an apron in case of an electrolyte overflow.
- Always keep the battery upright when moving. Do not place the battery upside down or tilt it.

Short-Circuit

DANGER

Short-circuit of the battery may cause injury. Although the voltage of a battery is low, high transient current generated by short-circuit will release a surge of power.

Keep metal objects away from the battery to prevent short circuit. If they have to be used, disconnect the battery in use before performing any other operation.

Harmful Gas

CAUTION

- Do not use unsealed lead-acid storage batteries, because the gas emitted from it may result in fire or device corrosion.
- Lay the storage battery horizontally and fix it properly.

The lead-acid storage battery in use will emit flammable gas. Therefore, store it in a place with good ventilation and take precautions against fire.

High Temperature

CAUTION

High temperature may result in distortion, damage, and electrolyte overflow of the battery.

When the temperature of the battery exceeds 60ºC, check whether there is acid overflow. If acid overflow occurs, handle the acid immediately.

Acid

CAUTION

If the acid overflows, it should be absorbed and neutralized immediately.

When handling a leaky battery, protect against the possible damage caused by the acid. Use the following materials to absorb and neutralize acid spills:

- Sodium bicarbonate (baking soda): $NaHCO_3$
- Sodium carbonate (soda): Na_2CO_3

Antacids must be used according to the instructions provided by the battery manufacturer.

Lithium Battery

CAUTION

There is danger of explosion if the battery is incorrectly replaced.

- Replace the lithium battery with the same or equivalent type recommended by the manufacturer.
- Dispose of the used battery according to the instructions provided by the manufacturer.
- Do not dispose of the lithium battery in fire.

1.5 Radiation

Electromagnetic Field Exposure

CAUTION

High power radio-frequency signals are harmful to human body.

Before installing or maintaining an antenna on a steel tower or mast with a large number of transmitter antennas, the operator should coordinate with all parties to ensure that the transmitter antennas are shut down.

The base transceiver station (BTS) has RF radiation (radiation hazard). Suggestions for the installation and operation of BTSs are given in the following section. Operators are also required to comply with the related local regulations on erecting BTSs.

- The antenna should be located in an area that is inaccessible to the public where the RF radiation exceeds the stipulated value.

- If the areas where RF radiation exceeds the stipulated value are accessible to workers, ensure that workers know where these areas are. They can shut down the transmitters before entering these areas. Such areas may not exist; but if they exist, the areas must be within a range of less than 10 m around the antennas.
- Each forbidden zone should be indicated by a physical barrier and striking sign to warn the public or workers.

Laser

CAUTION

When handling optical fibers, do not stand close to, or look into the optical fiber outlet with unaided eyes.

Laser transceivers or transmitters are used in the optical transmission system and associated test tools. Because the laser that is transmitted through the optical fiber produces a small beam of light, it has a very high power density and is invisible to human eyes. If a beam of light enters the eye, the retina may be damaged.

Normally, staring into the end of an unterminated optical fiber or broken optical fiber with the unaided eyes from a distance of more than 150 mm [5.91 in.] will not cause eye injury. Eyes may, however, be damaged if an optical tool such as a microscope, magnifying glass or eye loupe is used to stare into the bare optical fiber end.

Read the following guidelines to prevent laser radiation:

- Only the trained and authorized personnel can perform the operation.
- Wear a pair of eye-protective glasses when you are handling lasers or optical fibers.
- Ensure that the optical source is switched off before disconnecting optical fiber connectors.
- Never look into the end of an exposed optical fiber or an open connector if you cannot ensure that the optical source is switched off.
- To ensure that the optical source is switched off, use an optical power meter.
- Before opening the front door of an optical transmission system, ensure that you are not exposed to laser radiation.
- Never use an optical tool such as a microscope, a magnifying glass, or an eye loupe to look into the optical fiber connector or end.

Read the following instructions before handling optical fibers:

- Only the trained personnel can cut and splice optical fibers.
- Before cutting or splicing an optical fiber, ensure that the optical fiber is disconnected from the optical source. After disconnecting the optical fiber, use protecting caps to protect all the optical connectors.

1.6 Working at Heights

CAUTION

When working at heights, ensure that the objects do not fall.

When working at heights, ensure that the following requirements must be met:

- The personnel who work at heights must be trained.
- The operating machines and tools should be carried and handled safely to prevent them from falling.
- Safety measures, such as wearing a helmet and a safety belt, should be taken.
- In cold regions, warm clothes should be worn before working at heights.
- Ensure that the lifting appliances are well prepared for working at heights.

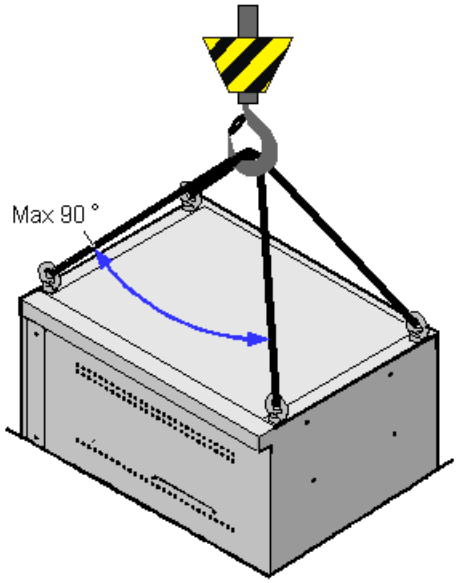
Lifting Weights

CAUTION

Do not access the areas under the arm of the crane and the goods in suspension when lifting weights.

- Ensure that the operators have been trained and qualified.
- Check the weight lifting tools and ensure that they are intact.
- Lift the weight only when the weight lifting tools are firmly mounted onto the weight-bearing object or the wall.
- Use a concise instruction to prevent incorrect operation.
- The angle between the two cables should be less than or equal to 90° in the lifting of weights (See **Figure 1-2**).

Figure 1-2 Lifting a weight



Safety Guide on Ladder Use

Checking the Ladder

- Check the ladder before using it. Check the maximum weight that the ladder can support.
- Never overload the ladder.

Placing the Ladder

- The slant angle is preferred to be 75°. The slant can be measured with the angle square or with arms, as shown in **Figure 1-3**. When using a ladder, place the wider end of the ladder on the ground and take protective measures on the base of the ladder against slippage. Place the ladder on a stable ground.

When climbing the ladder, ensure the following:

- The gravity of the body does not shift from the edge of the ladder.
- Keep balance on the ladder before performing any operation.
- Do not climb higher than the fourth highest step of the ladder.

If you tend to climb to the roof, the length of the ladder should be at least one meter higher than the eave, as shown in **Figure 1-4**.

Figure 1-3 Slant angle

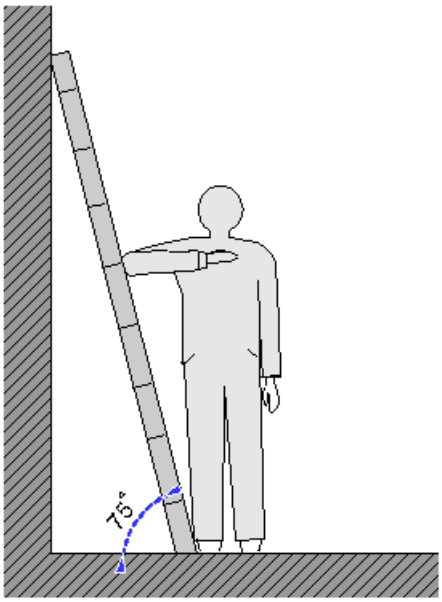
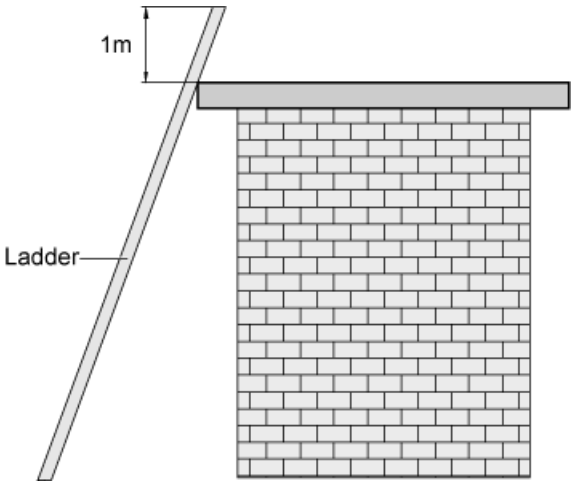


Figure 1-4 One meter higher than the eave



1.7 Mechanical Safety

Drilling

CAUTION

Do not drill on the cabinet without permission. Inappropriate drilling on the cabinet may damage the electromagnetic shielding and internal cables. Metal shavings from the drilling may result in a short-circuit of the circuit board if they get into the cabinet.

- Before drilling a hole on the cabinet, remove the cables from the cabinet.

- During the drilling, wear blinkers to protect your eyes.
- During the drilling, wear the protective gloves.
- Prevent the metal shavings from getting into the cabinet. After drilling, clean the metal shavings in time.

Handling Sharp Objects

CAUTION

When carrying the device by hand, wear the protective gloves to prevent injury by sharp objects.

Handling Fans

- When replacing a component, place the component, screw, and tool at a safe place to prevent them from falling into the running fan.
- When replacing the ambient equipment around the fan, do not place the finger or board into the running fan until the fan is switched off and stops running.

Moving Heavy Objects

Wear the protective gloves when moving heavy objects.

CAUTION

- Be careful when moving heavy objects.
- When moving the chassis outwards, be aware about the unfixed or heavy objects on the chassis to prevent injury.

- Two persons should be available to move a chassis; one person must not move a heavy chassis. When moving a chassis, keep your back straight and move stably to prevent a sprain.
- When moving or lifting a chassis, hold the handle or bottom of the chassis. Do not hold the handle of the installed modules in the chassis, such as the power module, fan module, or board.

1.8 Others

Inserting and Removing a Board

CAUTION

When inserting a board, wear the ESD wrist strap or gloves. Insert the board gently to prevent any bent pins on the backplane.

- Insert the board along the guide rail.
- Avoid contact of one board with another to prevent short-circuit or damage.
- Do not remove the active board before powering off.
- When holding a board in hand, do not touch the board circuit, components, connectors, or connection slots.

Bundling Signal Cables

CAUTION

Bundle the signal cables separately from the strong current cables or high voltage cables.

Cabling Requirements

At a very low temperature, movement of the cable may damage the plastic skin of the cable. To ensure the construction safety, comply with the following requirements:

- When installing cables, ensure that the environment temperature is above 0°C.
- If cables are stored in the place below 0°C, move the cables into a place at a room temperature and store the cables for more than 24 hours before installation.
- Move the cables with care, especially at a low temperature. Do not drop the cables directly from the vehicle.

2 General Requirements for BTS3900 Commissioning

About This Chapter

The general requirements for BTS3900 commissioning are the commissioning prerequisites and commissioning resources.

2.1 BTS3900 Commissioning Prerequisites

Before the commissioning, you must check the operating status of the BTS3900 and that of the BSC.

Hardware Requirements

- The BTS3900 cabinet is installed and the cables are connected.
- The BTS3900 has passed the hardware installation check before it is powered on.
- The BTS3900 is powered on. For details, refer to **Checking the Power-On Status of the BTS3900 Cabinet** and **Checking the Power-On Status of the BTS3900 Components**.
- The BSC is installed. The system commissioning is complete, and the system is running normally.

Software Requirements

- The data of the BTS3900 is configured on the BSC side.

2.2 BTS3900 Commissioning Resources

Before the commissioning, you must arrange for the tools, obtain the information about the BTS3900, and download the correct software for the boards in the BTS3900.

Tool

Table 2-1 lists the tools and instruments required for the commissioning.

Table 2-1 Tools and instruments required for the commissioning

Tool	Quantity	Description
Computer	One	Mandatory. For details on the configuration, refer to **Configuration Requirements for the Site Maintenance Terminal PC**.
		For details on how to install and use the Site Maintenance Terminal application, refer to the **BTS3900 GSM Site Maintenance Terminal User Guide**.
Multimeter	One	Mandatory
Power meter	One	Mandatory. The power meter is used to measure the output power of the TRX.
Site master	One	Mandatory. The site master is used to measure the voltage standing wave ratio (VSWR).
Drive tester (such as TEMS or ANT)	One	Optional. The drive tester is used to measure whether the antenna system is properly connected.

Tool	Quantity	Description
GSM mobile station for test	Two	Mandatory. The mobile station is used to perform the dialing test and to check whether the antenna system is properly connected.
		The requirements for the GSM mobile station for test are as follows: ● Installed with the SIM card ● Registered with the HLR on the network side
Crossover cable	One	Mandatory. The crossover cable is used to connect the maintenance computer to the BBU.
Serial port cable	One	Mandatory. The serial port cable is used when you query the board IP address. The auxiliary cables are listed as follows: ● One debug cable ● One extended serial port cable
Straight screwdriver	One	Mandatory. The straight screwdriver is used to remove the crossover cable. When removing the RJ45 connector of the crossover cable from the ETH port, you must use a straight screwdriver to press the RJ45 connector and then remove the RJ45 connector.
General light emitting diode (LED)	Two	Optional. The general LED is used to determine the RX or TX end of the E1/T1 cable.

Site Information

Before the commissioning, you must obtain the following information on the BTS3900:

- Information on BTS networking and related configuration, including BTS type, transmission mode, networking mode, and cell configuration
- BTS3900 data configured at the BSC

BTS3900 Board Software

Before the commissioning, download the matching software for the boards in the BTS3900 cabinet to the maintenance computer.

The software for the boards in the BTS3900 is as follows:

- DRFU software
- GTMU software
- GATM software
- PMU software

3 BTS3900 Commissioning Procedure

This describes how to commission the BTS3900.

Context

You can troubleshoot the problems that occur during the commissioning by referring to **11 FAQs for BTS Commissioning**.

Procedure

Step 1 Starting the Site Maintenance Terminal System

1. Set the IP Address of the Site Maintenance Terminal PC by referring to **4.1 Setting the IP Address of the Site Maintenance Terminal PC**.
2. Connect the Site Maintenance Terminal PC to the BTS by referring to **4.2 Connecting the Site Maintenance Terminal PC to the BTS**.
3. Log in to the BTS by referring to **4.3 Locally Logging In to the BTS**.

Step 2 Run the BTS3900 software.

1. Obtain the BTS management rights by referring to **5.1 Obtaining the Site Management Rights**.
2. Check the software version by referring to **5.2 Checking the Current Software Versions**.

If...	Then...
The current software version is consistent with the expected software version,	Go to **Step 3**.
The current software version is inconsistent with the expected software version,	Perform the operations described in **Forcibly Loading Software** and in **Activating Board Software**

Step 3 Check the transmission and networking.

1. Check whether the transmission between the BBU and the DRFU is normal by referring to **6.1 Checking the Transmission Between the BBU and the DRFU**.

2. Check whether the transmission between the BBU and the BSC is normal by referring to **6.2 Checking the Transmission Between the BBU and the BSC**.
3. Check the consistency between hardware installation and data configuration by referring to **6.3 Checking the Consistency Between Actual Networking and Data Configuration**.

Step 4 Commission the antenna system.

1. Measure the VSWR at the antenna port by referring to **7.1 Measuring the VSWR at the Antenna Port**.
2. Check the antenna connection by referring to **7.2 Checking the Antenna Connection**.
3. Measure the output power of the TRX by referring to **7.3 Measuring the Output Power of the TRX**.

Step 5 Check the operating status of the BTS3900.

1. Check the status of the BTS3900 LEDs by referring to **8.1 Checking the Status of the BTS3900 LEDs**.
2. Check the alarm information of the BTS3900 by referring to **8.2 Checking the Alarm Information of the BTS3900**.
3. Perform the loopback test by referring to **8.3 Performing the Loopback Test**.

Step 6 Commission the BTS3900 services.

1. Perform the loopback test of channels by referring to **9.1 Performing the Loopback Test of a Channel**.
2. Test CS services by referring to **9.2 Testing CS Services**.
3. Test PS services by referring to **9.3 Testing PS Services**.

Step 7 Set the environment parameters by referring to **10.2 Monitoring Environment**.

Step 8 Record the commissioning process and the problems in the **12 Data Sheet for Commissioning**, and export the commissioning report.

CAUTION

After the commissioning, you should release the site management rights on the Site Maintenance Terminal System by referring to **Releasing the Site Management Rights**.

----End

4 Starting the Site Maintenance Terminal System

About This Chapter

Before starting the Site Maintenance Terminal, firstly, set the IP address of the Site Maintenance Terminal PC; secondly, connect the Site Maintenance Terminal PC to the BTS; finally, log in to the Site Maintenance Terminal.

4.1 Setting the IP Address of the Site Maintenance Terminal PC

This describes how to set the IP address of the Site Maintenance Terminal PC to the same network segment as the IP address (192.168.0.72/255.255.255.0) of the BTS.

Prerequisite

The Site Maintenance Terminal PC is configured with the TCP/IP protocol.

Procedure

Step 1 Take the Windows XP operating system as an example. On the Windows XP operating system, choose **Start** > **Control Panel**.

Step 2 Select **Network Connections**. A dialog box is displayed. Right-click the **Local Area Connection** icon.

Step 3 Choose **Properties** on the shortcut menu,. The **Local Area Connection Properties** dialog box is displayed.

Step 4 Select **Internet Protocol (TCP/IP)**.

Step 5 Click **Properties**. The **Internet Protocol (TCP/IP) Properties** dialog box is displayed.

Step 6 Select **Use the following IP address**.

Step 7 Enter the correct IP address, subnet mask, and default gateway. Ensure that the IP address of the Site Maintenance Terminal PC and the IP address (192.168.0.72/255.255.255.0) of the BTS are located in the same network segment, so that a local maintenance path can be set up.

Step 8 Click **OK** to complete the setting.

----End

4.2 Connecting the Site Maintenance Terminal PC to the BTS

To operate and maintain the BTS on the Site Maintenance Terminal, the Site Maintenance Terminal PC should be connected to the ETH port on the main control module of the BTS using the crossover cable.

Prerequisite

The IP address and the subnet mask of the Site Maintenance Terminal PC are set. The IP address of the Site Maintenance Terminal PC and the IP address (192.168.0.72/255.255.255.0) of the BTS are on the same network segment.

Procedure

Step 1 Use the crossover cable to connect the Site Maintenance Terminal PC to the BTS. Connect one end of the cable to the ETH port on the main control module of the main cabinet, and connect the other end of the cable to the Ethernet cable port on the Site Maintenance Terminal PC.

Step 2 Open the command window.

- If the operating system of the Site Maintenance Terminal PC is Windows 98, choose **Start** > **Program** > **MS-DOS Prompt**. The command window is displayed.
- If the operating system of the Site Maintenance Terminal PC is Windows 2000/XP, choose **Start** > **Run**. In the **Run** dialog box, run the **cmd** command. The command window is displayed.

Step 3 Run the **ping target_name** command to verify the network connection between the PC and the BTS.

NOTE

target_name indicates the IP address of the BTS.

If the information similar to that in the following example is returned, the LMT PC and the GBAM can communicate normally. In this example, the IP address of the external network is 192.168.0.72.

```
Pinging 192.168.0.72 with 32 bytes of data: Pinging 192.168.0.72 with 32 bytes of
data: Reply from 192.168.0.72: bytes=32 time=1ms TTL=253 Reply from 192.168.0.72:
bytes=32 time=1ms TTL=253 Reply from 192.168.0.72: bytes=32 time=1ms TTL=253 Reply
from 192.168.0.72: bytes=32 time=1ms TTL=253 Ping statistics for 192.168.0.72:
Packets: Sent = 4, Received = 4, Lost = 0 (0% loss), Approximate round trip times
in milli-seconds: Minimum = 1ms, Maximum = 1ms, Average = 1ms
```

----End

4.3 Locally Logging In to the BTS

You can run the Site Maintenance Terminal to directly log in to the BTS.

Prerequisite

- **The Site Maintenance Terminal PC is connected properly to the BTS.**
- The Site Maintenance Terminal PC is installed with the latest site maintenance terminal software.

Procedure

Step 1 Double-click **btsm.exe** to start the Site Maintenance Terminal System.

- If the communication between the Site Maintenance Terminal PC and the BTS is not set up, the **Communication failed** dialog box is displayed, as shown in **Figure 4-1**. Go to **Step 2**.
- If the communication between the Site Maintenance Terminal PC and the BTS is set up, a window is displayed, as shown in **Figure 4-2**. The Local Maintenance Terminal is successfully started.

Figure 4-1 Communication failed dialog box

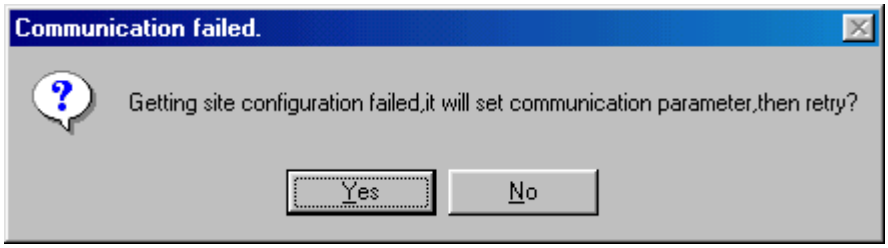
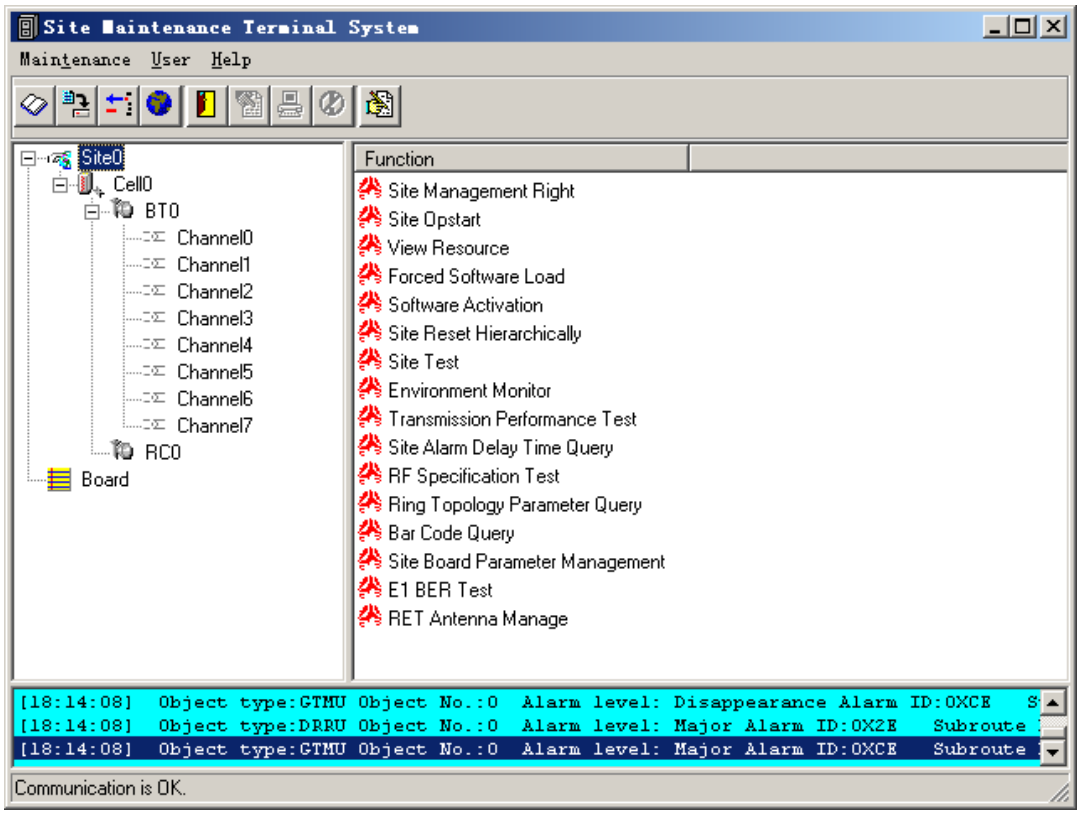


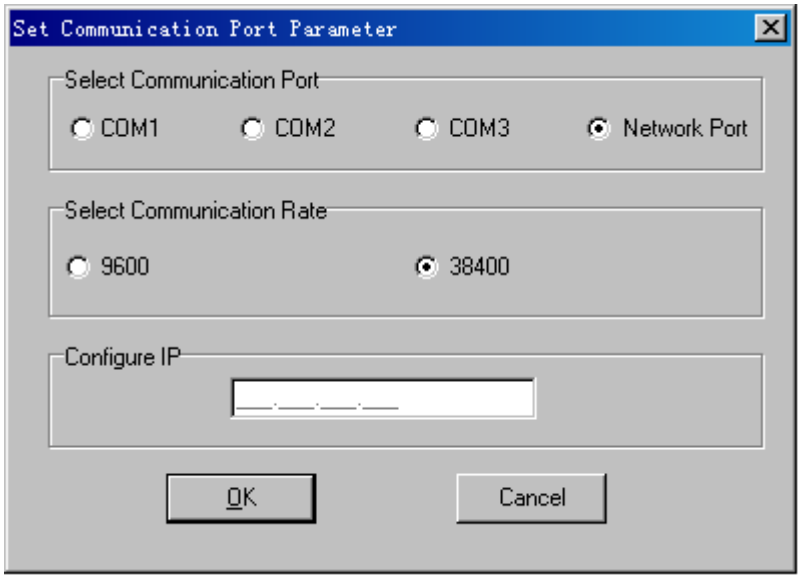
Figure 4-2 Site Maintenance Terminal System window



Step 2 Click **Yes**.

The **Set Communication Port Parameter** dialog box is displayed, as shown in **Figure 4-3**.

Figure 4-3 Set Communication Port Parameter dialog box



Step 3 In the **Select Communication Port** area, click **Network Port**. In the **Configure IP** area, set the IP address to **192.168.0.72**.

Step 4 Click **OK**.

The Site Maintenance Terminal System window is displayed, as shown in **Figure 4-2**.

----End

5 Running the BTS3900 Software

About This Chapter

This describes how to load the correct software version to the boards or modules in the BTS3900 cabinet and how to activate the board software.

Context

To run the BTS3900 software, you must obtain the site management rights and check the current board software version. If the board software version is improper, you must load the proper software version and then activate it.

5.1 Obtaining the Site Management Rights
This function is performed to obtain the rights for setting parameters of the BTS.

5.2 Checking the Current Software Versions
This describes how to check the software versions of the boards and modules in the BTS3900 cabinet.

5.3 Forcibly Loading Software
This function is performed to load software to the main control board.

5.4 Activating Software
This describes how to validate the board software loaded onto the main control board. The board software consists of the main control board software and other board software.

5.1 Obtaining the Site Management Rights

This function is performed to obtain the rights for setting parameters of the BTS.

Prerequisite

You have logged in to the BTS through the Site Maintenance Terminal.

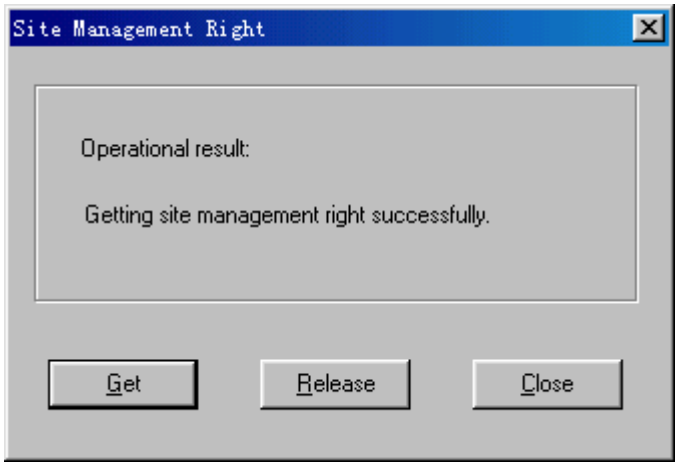
Procedure

Step 1 In the left pane of the **Site Maintenance Terminal System** window, click **Site**. In the right pane of the window, double-click **Site Management Right**.

The **Site Management Right** dialog box is displayed.

Step 2 Click **Get**. The result is displayed in the dialog box, as shown in **Figure 5-1**.

Figure 5-1 Site Management Right dialog box



----End

5.2 Checking the Current Software Versions

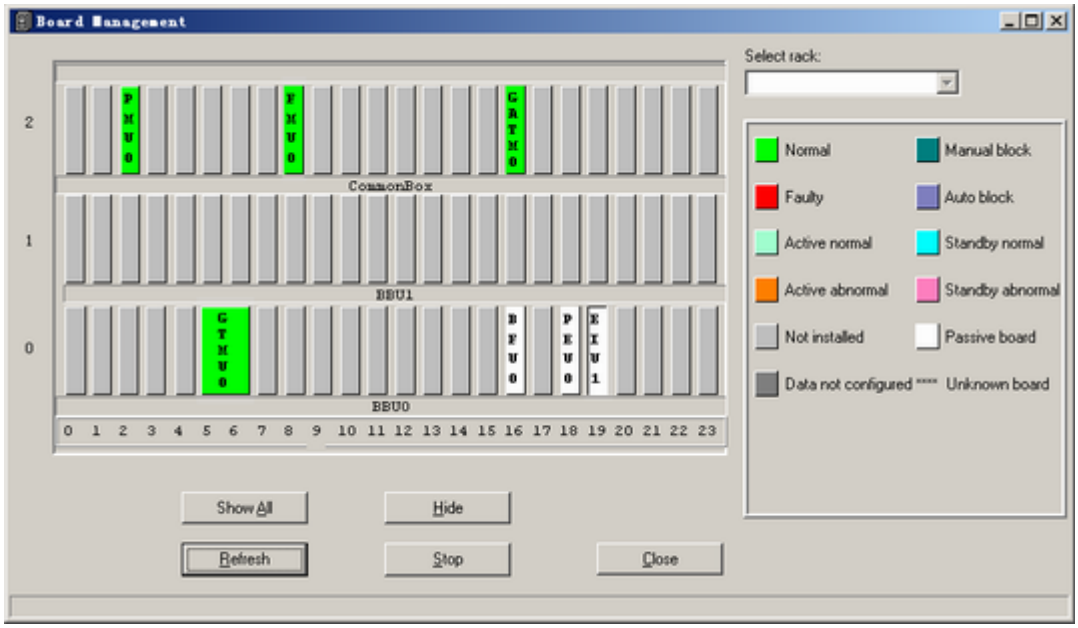
This describes how to check the software versions of the boards and modules in the BTS3900 cabinet.

Procedure

Step 1 In the left pane of the **Site Maintenance Terminal System** window, select **Board**. In the right pane of the window, double-click **Board Management**.

The **Board Management** window is displayed, as shown in **Figure 5-2**.

Figure 5-2 Board Management window



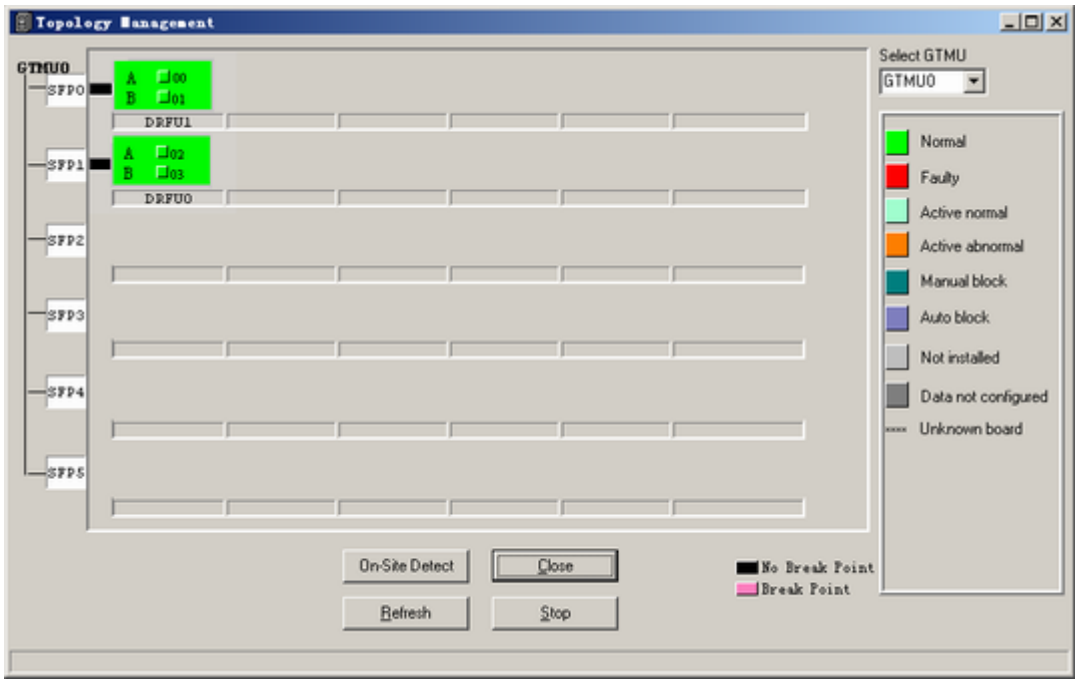
Step 2 Select the target board.

If...	Then...
The DRFU is to be viewed,	Go to **Step 3**.
The GTMU, GATM, or PMU is to be viewed,	Go to **Step 4**.

Step 3 Double-click the GTMU in the **Board Management** window.

The **Topology Management** window is displayed, as shown in **Figure 5-3**.

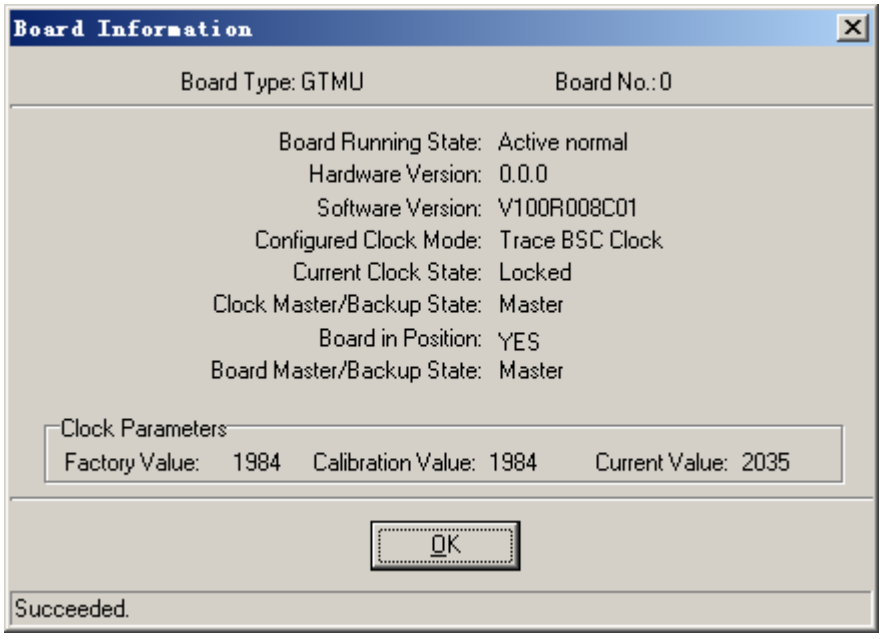
Figure 5-3 Topology Management window



Step 4 Right-click the board, and then select **Board Information** from the shortcut menu.

The result is displayed in the **Board Information** dialog box, as shown in **Figure 5-4** (the GTMU is taken as an example).

Figure 5-4 Board Information dialog box



----End

5.3 Forcibly Loading Software

This function is performed to load software to the main control board.

Prerequisite

You have logged in to the BTS through the Site Maintenance Terminal.

Context

- The main control board of the base station is the GTMU.
- You need to load the software of the main control board prior to loading the software of other boards. There are no strict requirements for the sequence of loading the software of other boards.

Table 5-1 describes the parameters.

Table 5-1 Parameters available in the Software Download dialog box

Parameter	Meaning	Value Range
File Name	File name of the software to be downloaded, that is, the path in which the software is saved	Use the actual file name. Note that the file name is case sensitive.
Send Window Size	Size of the data packet when the software is loaded	1–49 (49 is recommended)
Version	Version of the software to be downloaded. It should be the same as the version of the downloaded file.	-
File ID	Type of a board whose software is to be loaded. It should be consistent with the type of the downloaded file.	-

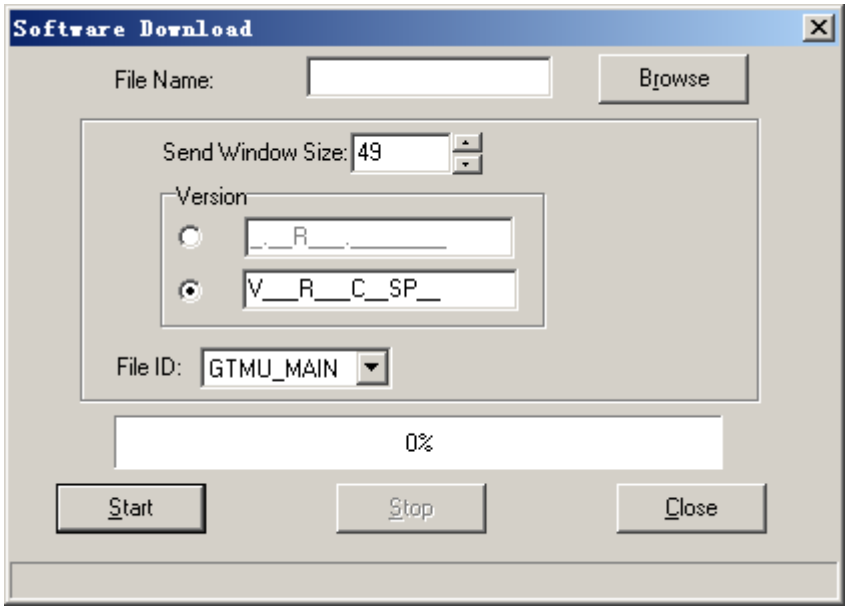
Procedure

Step 1 In the left pane of the **Site Maintenance Terminal System** window, click **Site**. In the right pane of the window, double-click **Forced Software Load**.

The **Software Download** dialog box is displayed.

Step 2 Set **File Name**. In the **Send Window Size** spin box, specify a size. In the **Version** area, enter a version number. In the **File ID** drop-down list box, select *DTMU_MAIN*, as shown in **Figure 5-5**.

Figure 5-5 Software Download dialog box



Step 3 Click **Start**.

You can view the loading progress in the Site Maintenance Terminal System. If the software is loaded successfully, the **Loading software successfully** message is displayed on the status bar.

Step 4 Repeat **steps 2 through 3** to load the software of other boards.

----End

5.4 Activating Software

This describes how to validate the board software loaded onto the main control board. The board software consists of the main control board software and other board software.

Prerequisite

- You have logged in to the BTS through the Site Maintenance Terminal.
- The board software to be activated is loaded.

Context

- The main control board of the BTS is the GTMU.
- You need to activate the main control board software before activating the software of the other boards. There are no specified sequence for activating the software of the other boards.
- The loading of software does not affect the services. The activation of software validates the new version software on boards and affects the services. Therefore, Huawei recommends you load the software in the day and activate it at night.

Table 5-2 lists the descriptions of the parameters.

Table 5-2 Parameters in the Software Activation dialog box

Parameter Name	Meaning	Value Range
Version	Version of the downloaded software	Set this parameter based on the actual requirement.
Board No.	Number of the board to be activated	Enter an integer that indicates a board number. You can also use – between two integers to activate more than one board. For example, you enter 0-5 to activate boards 0-5. If you do not enter a board number, all the boards of this type in the BTS will be activated.
File ID	Type of the board whose software is to be upgraded	Set this parameter based on the actual situation.

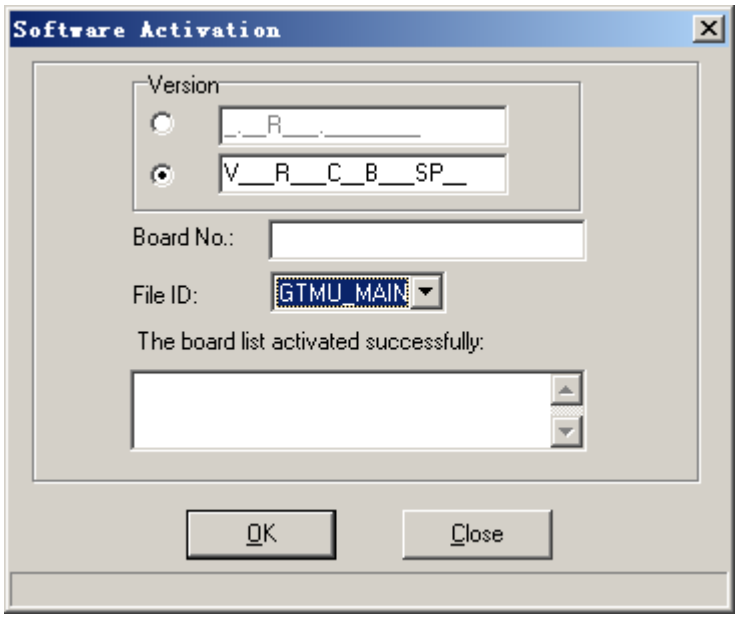
Procedure

Step 1 In the left pane of the **Site Maintenance Terminal System** window, choose **Site**. In the right pane of the window, double-click **Software Activation**.

The **Software Activation** dialog box is displayed.

Step 2 In the **Version** area, enter the version number of the main control board software. In the **File ID** drop-down list, select the file ID, as shown in **Figure 5-6**.

Figure 5-6 Software Activation dialog box

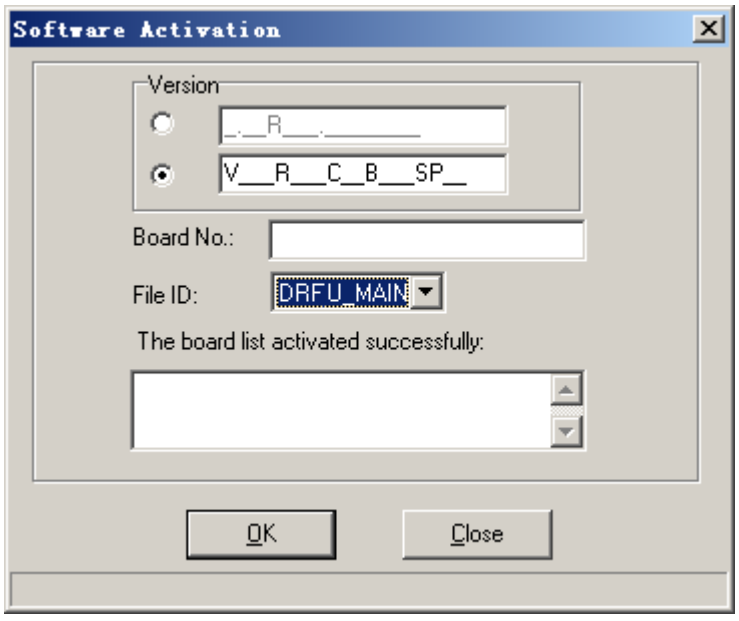


Step 3 Click **OK**.

The number of the board that is successfully activated is displayed in the **The board list activated successfully:** area. The **Software activation successfully** message is displayed on the status bar at the bottom of the dialog box.

Step 4 After that, activate the software of the other boards. In the **Version** area, enter the version number of the software to be activated. In the **Board No.** area, enter the number of the board to be activated. In the **File ID** drop-down list, select the board software to be activated, as shown in Figure 5-7.

Figure 5-7 Software Activation dialog box



Step 5 Click **OK**.

The number of the board that is successfully activated is displayed in the **The board list activated successfully:** area. The **Software activation successfully** message is displayed on the status bar at the bottom of the dialog box.

NOTE

During the activation of the DRFU board software, if the Site Maintenance Terminal prompts that the software activation failed, check the communication between the BBU and the DRFU. If there is a communication problem between the BBU and the DRFU, rectify the fault by referring to **6.1 Checking the Transmission Between the BBU and the DRFU**.

----End

6 Checking the Transmission and Networking

About This Chapter

The purpose of checking the transmission and networking is to ensure that the BTS3900 transmission cables and hardware are correctly installed. The items to be checked consist of the transmission between the BBU and the DRFU, the transmission between the BBU and the BSC, and the consistency between the actual networking and the data configuration.

6.1 Checking the Transmission Between the BBU and the DRFU

By checking the link status, you can rectify the fault caused by abnormal connection, thus ensuring normal communication between the BBU and the DRFU.

Procedure

Step 1 Check the status of the **CPRI0** LED on the GTMU panel and the status of the **CPRI0** and **CPRI1** LEDs on the DRFU panel.

If...	Then...
All the LEDs are in normal states (the green LEDs are on),	The communication between the **CPRI0** port on the BBU and the DRFU is normal. Go to **Step 4**.
Some LEDs are not in normal states. The normal state is green LED on,	The communication between the **CPRI0** port on the BBU and the DRFU is not normal. Go to **Step 2**.

NOTE

The status of the LED corresponding to the **CPRI** port that is not in use should be **Off**.

Step 2 Check the connection between the cascaded DRFUs.

1. Check that the signal cables between cascaded DRFUs are securely connected to the **CPRI0** and **CPRI1** ports.
2. Check the SFP male connectors at both ends of the signal cable between cascaded DRFUs. If any connector is damaged, replace it.

Step 3 Check the connection between the DRFU and the BBU.

1. Check that one end of the CPRI signal cable is securely connected to the **CPRI0** port on the DRFU, and the other end is securely connected to the **CPRI** port on the BBU.
2. Check the SFP male connectors at both ends of the CPRI signal cable. If any connector is damaged, replace it.

Step 4 Repeat **Step 1** through **Step 3** to check the transmission between other **CPRI** ports on the GTMU panel and other DRFUs.

----End

6.2 Checking the Transmission Between the BBU and the BSC

This describes how to check the status of the LEDs on the GTMU panel, how to check the connection of the E1 cable and E1 surge protection transfer cable, and how to rectify the fault caused by improper connections.

Prerequisite

- The BBU is connected to the BSC through an E1/T1 cable.
- The BBU and the BSC are powered on.

Procedure

Step 1 Check the settings of the **DIP switches on the GTMU**. Ensure that the settings of DIP switches are consistent with the on-site requirements.

Step 2 Check the operating status of the **LIU0-LIU3** LEDs on the GTMU panel.

If...	Then...
All the LEDs are Off,	The communication between the BBU and the BSC is normal. The checking is complete.
Some LEDs are ON or blink at 4 Hz,	The corresponding E1/T1 links are not normal. Go to **Step 3**.

NOTE

You need to check the status of only the **LIU** LED corresponding to the E1/T1 cable in use. The state of the **LIU** LED corresponding to the unused E1/T1 cable is **Off**.

Step 3 Check the connection and connectors at both ends of the cable. If any connector is damaged or does not work properly, replace it with a new connector.

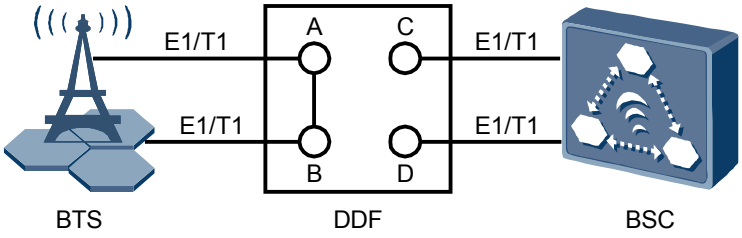
If...	Then...
The UELP is configured,	• Check the connection between the E1/T1 cable and the **OUTSIDE** port on the UELP. • Check the connection between the E1 surge protection transfer cable and the **INSIDE** port on the UELP. • Check the connection between the E1 surge protection transfer cable and the **E1/T1** port on the GTMU.
The UELP is not configured,	Check the connection between the E1/T1 cable and the **E1/T1** port on the GTMU.

Step 4 At the DDF on the BTS side, check the soldering conditions of the connectors for the E1/T1 cable where communication is not normal. Ensure that the E1/T1 connectors are in good soldering conditions.

Step 5 Perform a physical loopback test of the E1/T1 line where the communication is not normal. On the BTS side, check whether the communication of the E1/T1 line is normal.

1. On the BTS side, disconnect A from C, disconnect B from D, and then connect A to B on the DDF, as shown in **Figure 6-1**. Thus, a physical loopback on the BTS side is formed. The normal E1/T1 connection between the BTS and the BSC consists of the connection between A and C and connection between B and D.

Figure 6-1 Physical loopback of E1/T1 at the DDF



2. Check the status of the **LIU** LED on the GTMU panel again.

If...	Then...
The LED is **OFF**,	The E1 link on the BTS side is normal. The connection between the BTS and the BSC is abnormal or the E1 link on the BSC side is abnormal. End the testing task. Contact Huawei BSC technical support engineers to rectify the fault.
The LED is **ON** or blinks at **4 Hz**,	The E1 link on the BTS side is abnormal. Rectify the fault on the BTS side.

3. Restore the normal E1/T1 connection at the DDF on the BTS side and ensure that the connection is proper.

Step 6 Check the E1/T1 connection at the DDF. Ensure that the TX and RX ends of the E1/T1 cables are connected properly.

NOTE

You can determine the TX or RX end of the E1 cable in the following manner:

Connect one pin of a common LED to the E1/T1 wire, and connect the other pin of the LED to the shielding layer of the E1/T1 cable. If the LED is ON, the port is a TX port. If the LED is OFF, the port is an RX port.

----End

6.3 Checking the Consistency Between Actual Networking and Data Configuration

The items to be checked consist of the BTS3900 network topologies, the configurations of the boards and modules, RF cable connections of the DRFUs, and the data configuration of the RF signal RX/TX mode.

Prerequisite

- The Site Maintenance Terminal System is started.
- The board software is loaded and activated.
- The transmission between the BBU and the DRFU and the transmission between the BBU and the BSC are normal.

- The BTS3900 data configuration on the BSC side is obtained.

Background Introduction

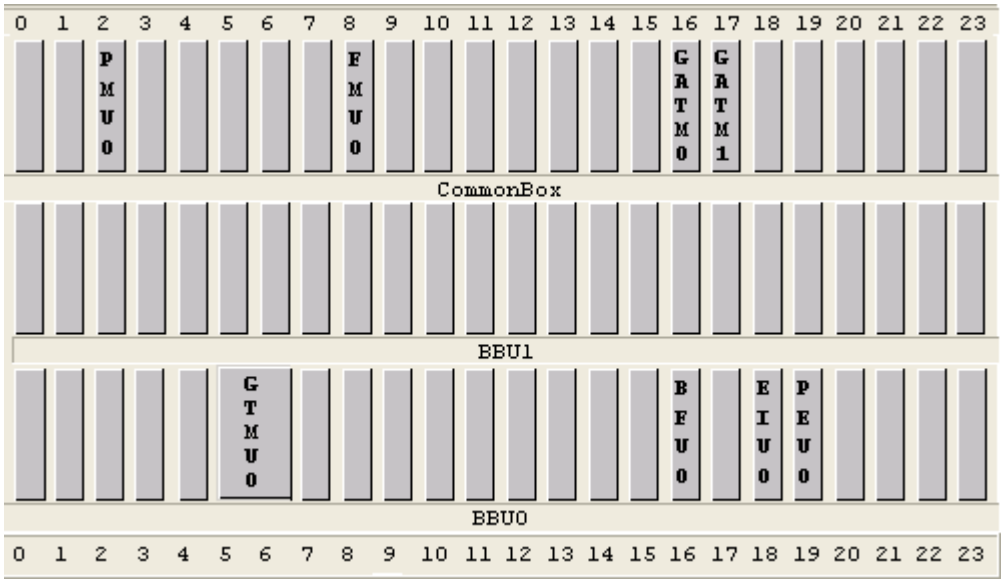
- The BTS supports the star, chain, tree, and ring topologies. The network topology between the BBU and the DRFUs may be star, chain, or ring topology.
- In the data configuration, SFP numbers **SFP0**–**SFP5** in the **Topology Management** window of the Site Maintenance Terminal System correspond to the **CPRI0**–**CPRI5** ports on the BBU panel.

Procedure

Step 1 Check that the network topology of the DRFUs is consistent with the settings of the SFP numbers and level numbers shown in the **Topology Management** window of the Site Maintenance Terminal System. For details on network topologies, refer to **Topology of DRFUs Connected by CPRI Cables**.

Step 2 Check that the boards and modules installed in the BTS3900 cabinet correspond to the boards and modules configured in the **Board Management** window. As shown in **Figure 6-2**, the **Board Management** window shows the slots for boards and modules in full configuration. **Table 6-1** lists the mapping between the names of the boards or modules shown in the window and the actual names of the boards or modules.

Figure 6-2 Slots for boards or modules in the Board Management window



NOTE

- The **PMU** can be configured in any one of slots 2-5 in the **CommonBox** subrack.
- The **FMU** can be configured in any one of slots 8-15 in the **CommonBox** subrack.
- The **EIU** can be configured in slot 18 or slot 19 in the **BBU0** subrack.
- The **PEU** can be configured in slot 18 or slot 19 in the **BBU0** subrack.
- The GTMU is fixedly configured in slot 6 and occupies slots 5 and 6 on the front panel. Therefore, the **GTMU** is configured in slots 5 and 6 in the Board Management window.

Table 6-1 Mapping between the board/module name shown in the window and the actual board/module name

Board/Module Name Shown in the Window	Actual Board/Module Name
PMU	PMU
FMU	FAN
GATM	GATM
GTMU	GTMU
BFU	UBFA
EIU	UEIU
PEU	UPEU

Step 3 Check whether the RF cable connections of the DRFUs are consistent with the data configuration of the RF signal RX/TX mode. For details on the RF cable connections of the DRFUs, refer to **RF Signal Cable Connections of the DRFU**.

Step 4 Record the inconsistencies between data configuration and hardware installation in **12 Data Sheet for Commissioning**. Then, check whether the data configuration or the hardware installation is incorrect by confirming it with Huawei BSC technical support engineers and BTS technical support engineers.

If...	Then...
The data configuration is incorrect,	Modify the data configuration. For details, refer to the *BSC Initial Configuration Guide*.
The hardware installation is incorrect,	Reinstall the hardware. For details, refer to the related hardware installation guide.

----End

Example: Hardware installation and data configuration in the S4 configuration in star topology

1. **Figure 6-3** shows the hardware installation in star topology. One end of the CPRI signal cable is connected to the **CPRI0** port on the DRFU, and the other end of the CPRI signal cable is connected to the **CPRI** port on the BBU.

Figure 6-3 Star topology between the DRFUs and the BBU

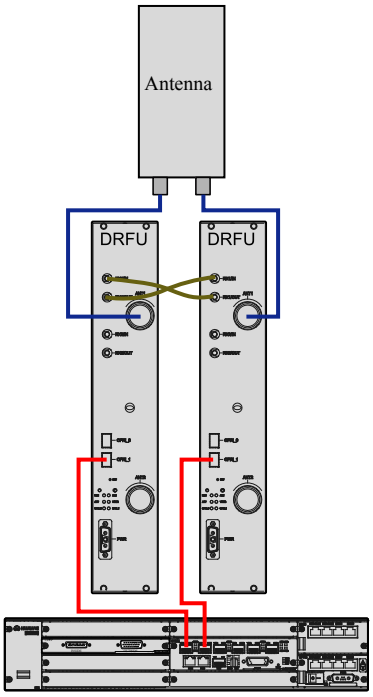
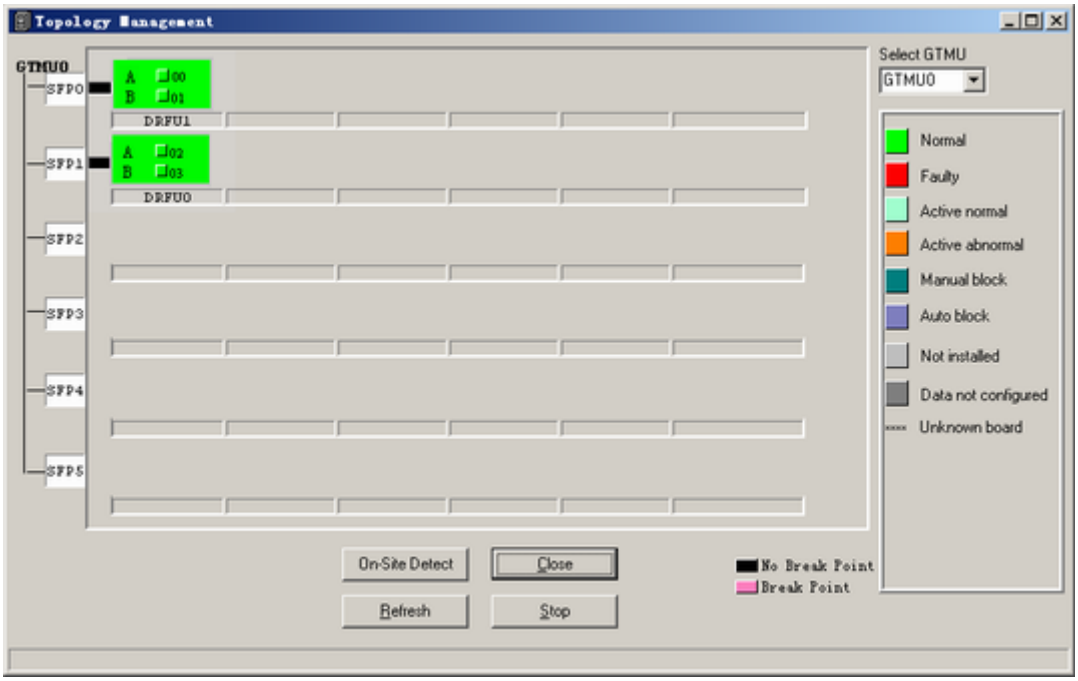


Figure 6-4 shows the settings of the SFP numbers and level numbers in the **Topology Management** window.

Figure 6-4 Topology Management window (star topology)

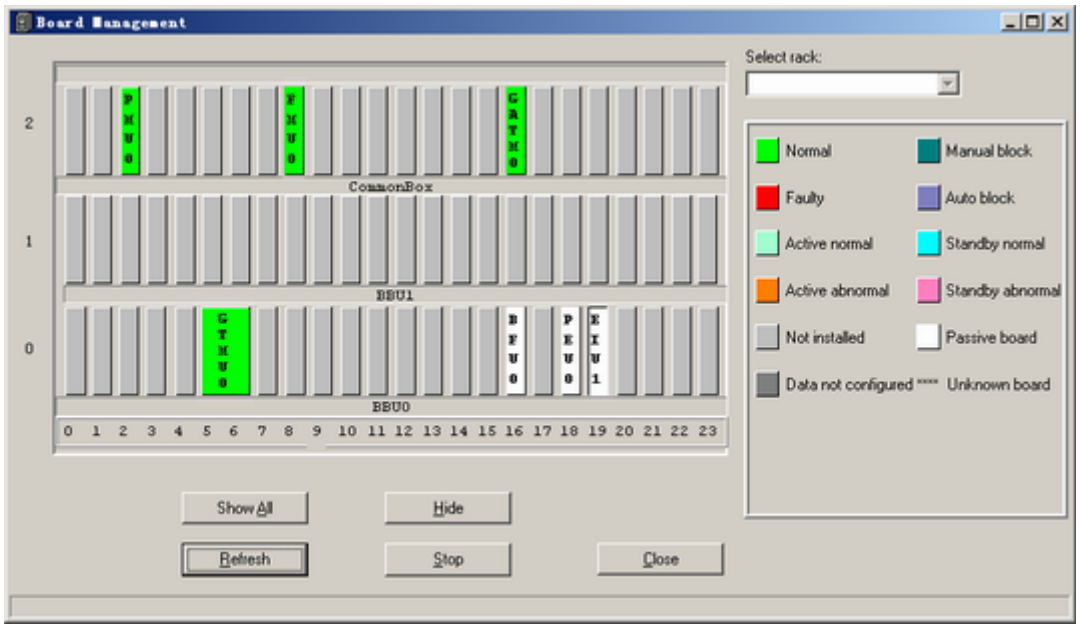


NOTE

In hardware installation, one CPRI port can support a maximum of three layers of cascading DRFUs. **Figure 6-4** As shown in **Figure 6-4**, each SFP number can be configured with a maximum of three DRFUs in chain topology.

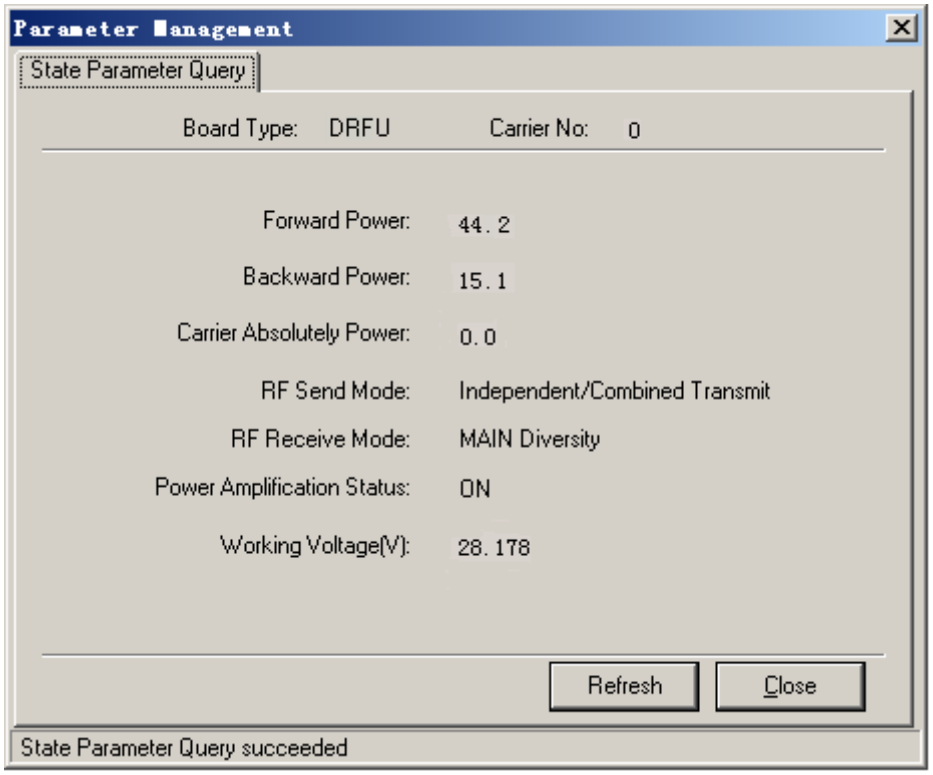
2. Check that the configurations of the boards or modules of the BBU in the **Board Management** window shown in **Figure 6-5** are correct.

Figure 6-5 Board Management window



3. **Figure 6-3** shows the RF cable connections of S4. The receive mode is **MAIN Diversity**, and the transmit mode is **Independent/Combined Transmit**. Check the RF RX/TX mode displayed in the **Parameter Management** dialog box related to path A or path B of the DRFUs, as shown in **Figure 6-6**.

Figure 6-6 Parameter Management dialog box



7 Commission the Antenna System

About This Chapter

This describes how to commission the antenna system. You must check whether the antenna is connected properly and whether the Voltage Standing-Wave Ratio (VSWR) is normal. If an RET antenna is configured, you must commission the RET antenna.

7.1 Measuring the VSWR at the Antenna Port

This describes how to check the VSWR at the antenna port. If the VSWR at the antenna port is less than or equal to 1.5, you can infer that the transmission of the antenna system is normal. The Site Master is taken as an example to describe the procedure for measuring the VSWR.

Prerequisite

The BTS is powered off.

NOTE

If you have checked the VSWR before powering on the BTS, you do not need to perform this task.

Procedure

Step 1 Measure the VSWR at the antenna port by using the Site Master.

If...	Then...
The VSWR is less than or equal to 1.5,	You can infer that the transmission of the antenna system is normal. Record the measured value in the **Data Sheet for Commissioning**.
The VSWR is greater than 1.5,	You can infer that the transmission of the antenna system is not normal. Go to **Step 2**.

Step 2 Locate the fault on the jumper or feeder where the VSWR is not normal by using the Site Master. Check whether the jumper or feeder is securely connected and whether the connectors are in good condition. If any connector is damaged, replace it.

NOTE

The fault often occurs on the connectors between the jumper and the feeder or the connectors between the jumper and the antenna.

----End

7.2 Checking the Antenna Connection

This describes how to check whether the feeders are misconnected by using a drive tester or through a dialing test. If an RET antenna is configured, check whether the cables of the RET antenna are connected properly.

in the configuration data are consistent with the actual frequencies and whether the test level is normal.

7.2.1 Checking the Antenna Connection with an MS

This describes how to check the antenna connections with an MS. You can lock the MS on a cell frequency and perform the dialing test. Then, you can determine the antenna connection conditions by checking whether the dialing test is successful.

Prerequisite

- The BTS is powered on and is working normally.
- The antenna system is connected to the BTS cabinet.
- The test MS is registered with the HLR.

Procedure

Step 1 Power on the test MS and check the process of the MS in searching the GSM network.

If...	Then...
The test MS fails to find the network,	• Check whether the test MS has a SIM card. If the test MS does not have a SIM card, insert the SIM card in the MS. • Check whether the SIM card supports authentication and encryption. If the SIM card does not support authentication and encryption, replace the SIM card. • Check whether the test MS is functional. If the test MS is faulty, replace it.
The test MS finds the network,	Go to **Step 2**.

Step 2 Lock the test MS to a frequency of a logical cell covered by the BTS.

Step 3 Perform the dialing test using the test MS. Then, check whether the antenna corresponding to the frequency is connected properly according to the test results.

If...	Then...
The dialing test succeeds,	You can infer that the feeder corresponding to the frequency is connected properly. Go to **Step 4**.
The dialing test fails,	You can infer that the feeder corresponding to the frequency may be connected improperly. Check the connections of the feeder and make adjustment accordingly..

NOTE

To ensure the accuracy of test results, do as follows:

- Make test calls within the power range of less than –30 dBm to -70 dBm under the tower.
- Perform the dialing test for more than five times.

Step 4 Repeat **Step 2** through **Step 3** to check the antennas on all the frequencies of the BTS are connected properly.

----End

7.2.2 Checking the Antenna Connection by Using a Drive Tester

This describes how to check the antenna connections by using a drive tester. You can determine the antenna connection conditions by checking whether the frequencies of the BCCH and BSIC in the configuration data are consistent with the actual frequencies and whether the test level is normal.

Prerequisite

A drive tester and a test MS are available.

Procedure

Step 1 Record the longitude and latitude of the BTS in the drive test map.

Step 2 Start the drive test in the direction of the main lobe of the antenna in the target cell.

Step 3 Record the actual frequencies of the BCCH and BSIC in the cell. Compare the records with those in configuration data of the BTS to ensure consistency.

Step 4 Check whether the test level is normal. The normal test level ranges from –48 dBm to –96 dBm.

CAUTION

After the drive test is complete, back up the BTS data configuration file.

----End

7.3 Measuring the Output Power of the TRX

This describes how to obtain the output power of the TRX, which indicates the operating status of the BTS3900. You need to check the output power of only the TRX that transmits power on all timeslots.

Procedure

Step 1 Measure the output power of the TRX on the ANT port of the DRFU by using a power meter.

Step 2 Check whether the output power of the TRX is within the normal range.

NOTE

For example, in 900 MHz no combination mode, if the normal power is set to 45 W (46.5 dBm), the normal range of the output power on the ANT port of the DRFU is 46.5 ± 1 dBm.

If...	Then...
The output power is within the normal range,	Record the value of the power in the **Data Sheet for Commissioning**.
The output power is beyond the normal range,	1. Check whether the cable of the power meter is connected securely. 2. Check whether the parameters of the power meter are correctly set and whether the power meter is calibrated. 3. Check whether the DRFU is correctly configured and can transmit power. 4. Replace the DRFU in which the TRX does not transmit power normally.

Step 3 Repeat **Step 1** through **Step 2** to check the output power of all the TRXs.

----End

8 Checking the Operating Status of the BTS3900

About This Chapter

To ensure the normal operation of the BTS3900, you need to check the status of the BTS3900 LEDs, check the alarm information displayed on the Site Maintenance Terminal System, and perform loopback tests on the boards.

Prerequisite

- The transmission between the BBU and the DRFU and the transmission between the BBU and the BSC are normal.
- The actual networking is consistent with the data configuration.
- The antenna system is commissioned, and each parameter is configured in accordance with the actual requirements.

8.1 Checking the Status of the BTS3900 LEDs

To check whether the boards and modules of the BTS3900 run normally, you need to check the status of the LEDs on the following boards and modules: GTMU, UBFA, UPEU, DRFU, GATM, Fan Unit, PMU, PSU (AC/DC), and PSU (DC/DC).

Prerequisite

The output power of the TRXs is within the normal range, and the DRFU is running normally.

Context

- The PSU (AC/DC) is used to convert 220 V AC power into -48 V DC power. If the BTS3900 uses the external 220 V AC power input, the PSU (AC/DC) is configured.
- The PSU (DC/DC) is used to convert +24 V DC power into -48 V DC power. If the BTS3900 uses the external +24 V DC power input, the PSU (DC/DC) is configured.

Procedure

Step 1 Check whether the states of the LEDs on the boards and modules in the BBU are normal. **Table 8-1** lists the normal states of the LEDs on the boards and modules.

Table 8-1 Normal states of the LEDs on the boards and modules in the BBU

Board/ Module	LED	Color	Normal State
GTMU	RUN	Green	Blinking (on for 1s and off for 1s)
	ALM	Red	Off
	ACT	Green	ON
	LIU0–LIU3	Green	Off
	CPRI0-CPRI5	Green	ON
UBFA	STATE	Green	Blinking (on for 1s and off for 1s)
UPEA	RUN	Green	ON

Step 2 Check whether the status of the LEDs on the DRFU panel is normal. **Table 8-2** lists the normal states of the LEDs.

Table 8-2 Normal states of the LEDs on the DRFU

LED	Color	Normal State
RUN	-	Blinking (on for 1s and off for 1s)
ALM	-	Off

LED	Color	Normal State
ACT	-	Steady on. The DRFU runs normally.
	-	Blinking (on for 1s and off for 1s). The DRFU is in test.
VSWR	Red	Off
CPRI0	Green	ON
CPRI1	Green	ON

Step 3 Check whether the states of the LEDs on the GATM panel are normal. **Table 8-3** lists the normal states of the LEDs.

Table 8-3 Normal states of the LEDs on the GATM

LED	Color	Normal State
RUN	Green	Blinking (on for 1s and off for 1s)
ACT	Green	Steady on. The AISG link is normal.
	Green	Blinking quickly. The AISG is in transmission state.
ALM	Red	Off

Step 4 Check whether the states of the LEDs on the Fan Unit panel are normal. **Table 8-4** lists the normal states of the LEDs.

Table 8-4 Normal states of the LEDs on the Fan Unit

LED	Color	Normal State
RUN	Green	Blinking (on for 1s and off for 1s)
ALM	Red	Off

Step 5 Check whether the states of the LEDs on the PMU panel are normal. **Table 8-5** lists the normal states of the LEDs.

Table 8-5 Normal states of the LEDs on the PMU

LED	Color	Normal State
RUN	Green	Blinking (on for 1s and off for 1s)
ALM	Red	Off

Step 6 Check whether the states of the LEDs on the PSU (AC/DC) or PSU (DC/DC) panel are normal. Table 8-6 lists the normal states of the LEDs.

Table 8-6 Normal states of the LEDs on the PSU

PSU	LED	Color	Normal State
PSU (AC/DC)	Power input LED (top)	Green	ON
	Power protection LED (middle)	Yellow	Off
	Power failure LED (bottom)	Red	Off
PSU (DC/DC)	Power input LED (left)	Green	ON
	Power protection LED (middle)	Yellow	Off
	Fault LED (right)	Red	Off

Step 7 Refer to **8.2 Checking the Alarm Information of the BTS3900** if the states of the LEDs on the boards or modules are not normal. Then, check the alarm information on the Site Maintenance Terminal System, and rectify the fault according to the suggestions displayed.

----End

8.2 Checking the Alarm Information of the BTS3900

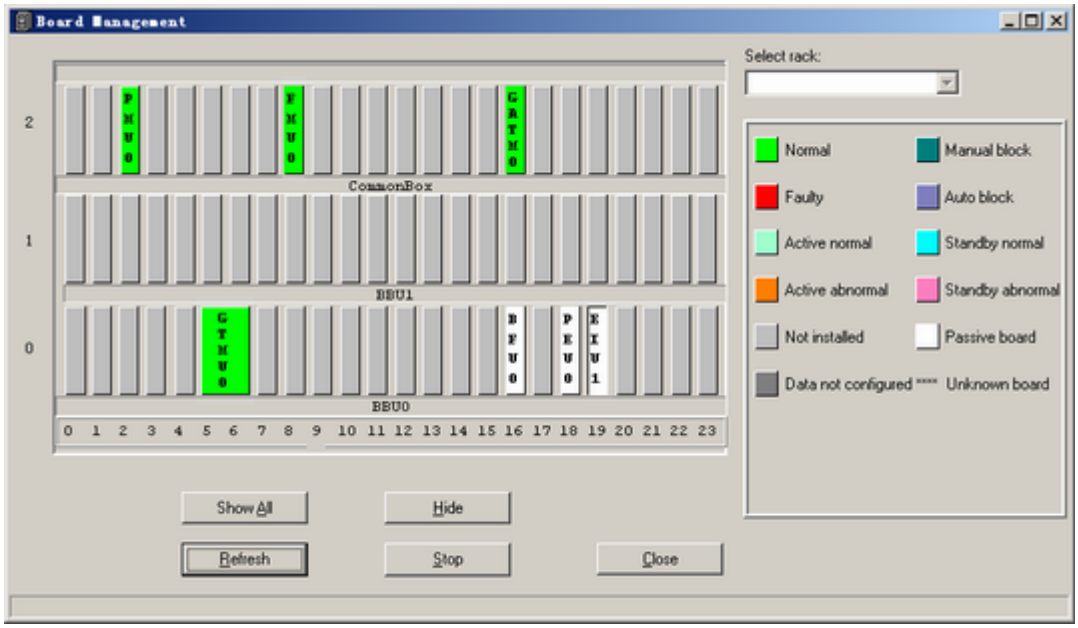
This describes how to check the alarm information of the BTS3900 on the Site Maintenance Terminal System. If the alarm information of the BTS3900 exists, rectify the fault according to the suggestions displayed on the Site Maintenance Terminal System.

Procedure

Step 1 Select **Board** in the left pane of the **Site Maintenance Terminal System** window, and then double-click **Board Management** in the right pane of the window.

The **Board Management** window is displayed, as shown in **Figure 8-1**.

Figure 8-1 Board Management window



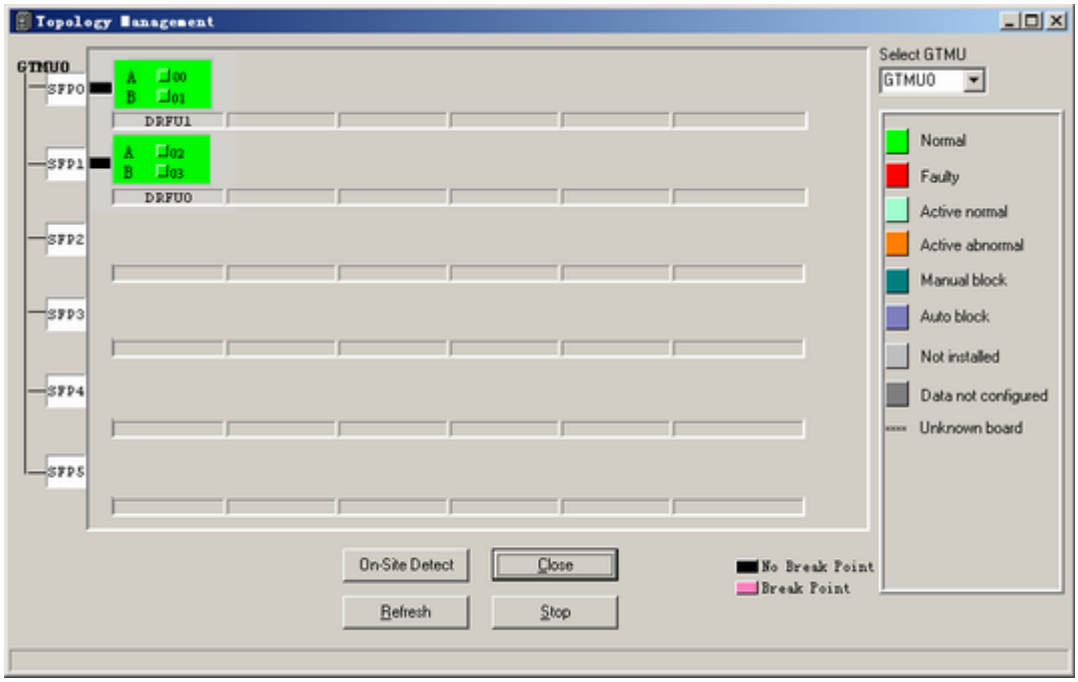
Step 2 Confirm the type of the board or module where the alarm information needs to be checked.

If...	Then...
The board or module is DRFU,	Go to **Step 3**, and check the alarm information.
The board or module is GTMU, UBFA, UPEU, UEIU, GATM, or PMU,	Go to **Step 4**, and check the alarm information.

Step 3 Double-click **GTMU** in the **Board Management** window.

The **Topology Management** window is displayed, as shown in **Figure 8-2**.

Figure 8-2 Topology Management window



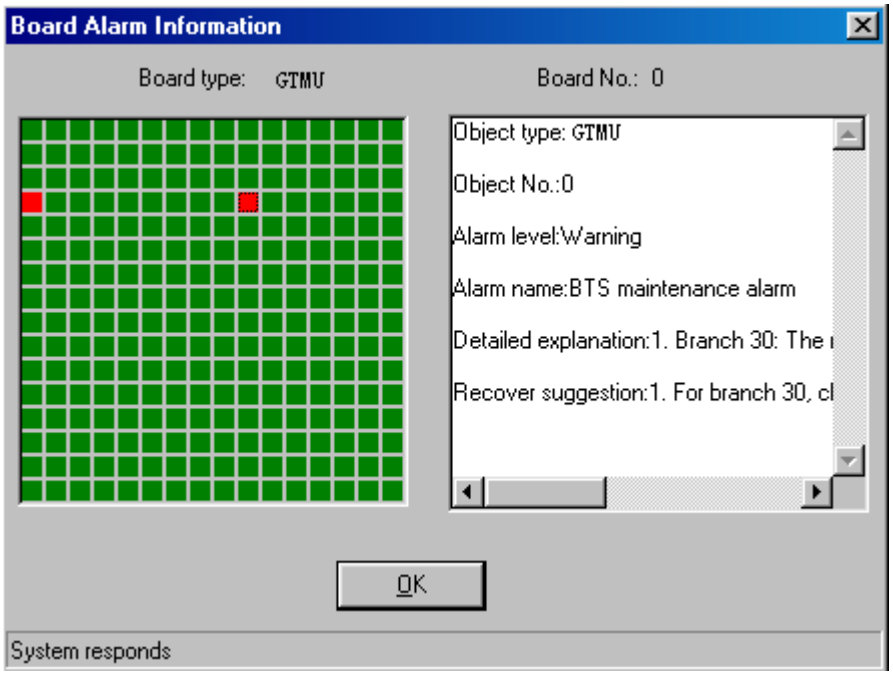
Step 4 Right-click the target board or module, and then choose **Board Alarm Information** from the shortcut menu.

The **Board Alarm Information** dialog box is displayed.

Step 5 Click a red grid.

The description of a specific alarm is displayed in the right pane, as shown in **Figure 8-3**.

Figure 8-3 Board Alarm Informationdialog box



NOTE

Each red grid represents an alarm.

Step 6 Perform operations according to the result displayed in the **Board Alarm Information** dialog box.

If...	Then...
No alarm is generated,	Close the **Board Alarm Information** dialog box. Then, repeat **Step 2** through **Step 6** to check the alarm information of other boards or modules.
An alarm is generated,	Clear the alarm according to the suggestions provided.

----End

8.3 Performing the Loopback Test

The GTMU loopback test is performed to check the link between the Site Maintenance Terminal System and the GTMU. The DRFU loopback test is performed to check logical path A or logical path B of the DRFU.

Context

Only the GTMU and DRFU support the loopback test. **Table 8-7** describes the parameters shown in the Loopback Test dialog box.

Table 8-7 Description of the parameters shown in the Loopback Test dialog box

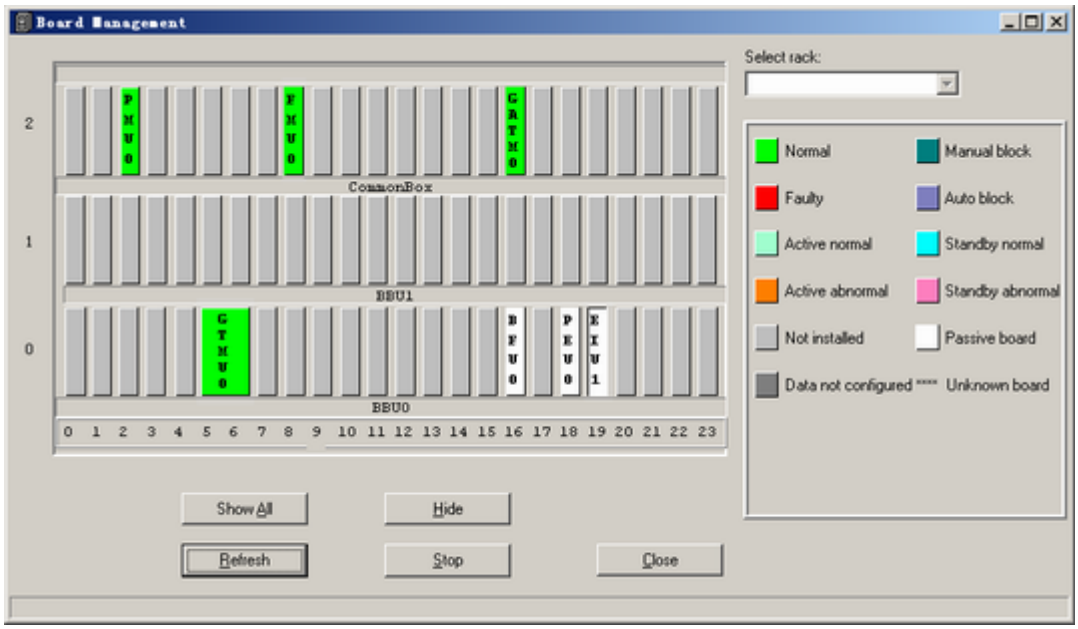
Parameter	Meaning	Value Range
Data length	Length of the valid data of a single frame in the loopback test command sent from the GTMU or DRFU to the board.	1-220
Initial data	Initial value of the valid data in the loopback test command sent from the GTMU or DRFU to the board.	0-255
Data step length	Incremental step length of the valid data in the loopback test command sent from the GTMU or DRFU to the board.	0-255

Procedure

Step 1 Select **Board** in the left pane of the **Site Maintenance Terminal System** window, and then double-click **Board Management** in the right pane of the window.

The **Board Management** window is displayed, as shown in **Figure 8-4**.

Figure 8-4 Board Management window



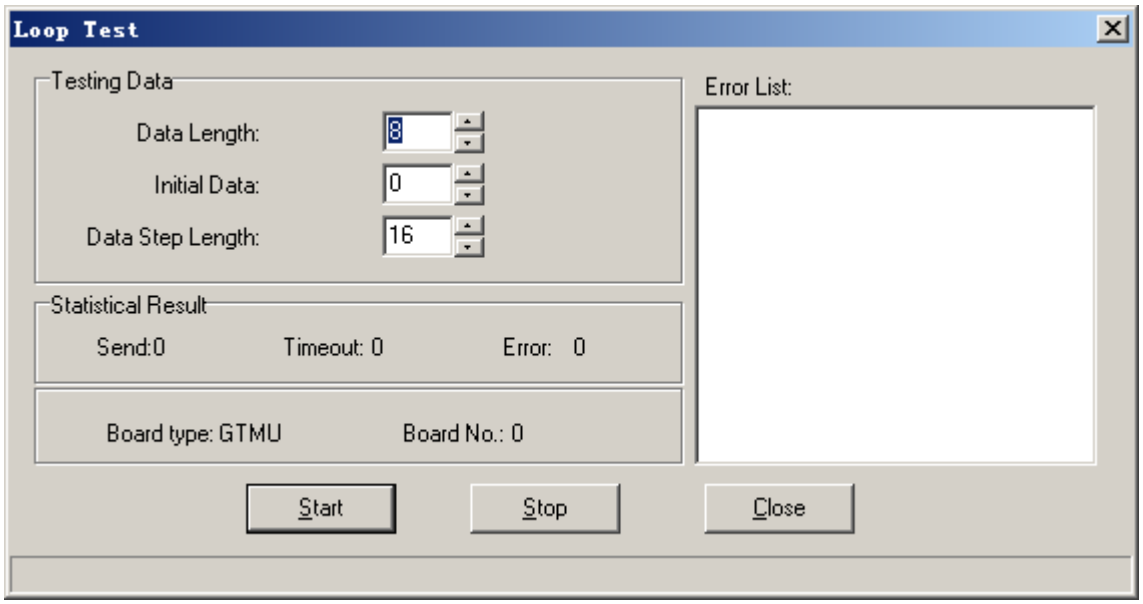
Step 2 Right-click the GTMU.

A shortcut menu is displayed.

Step 3 Choose **Loop Test** from the shortcut menu.

The **Loop Test** dialog box is displayed, as shown in **Figure 8-5**.

Figure 8-5 Loop Test dialog box



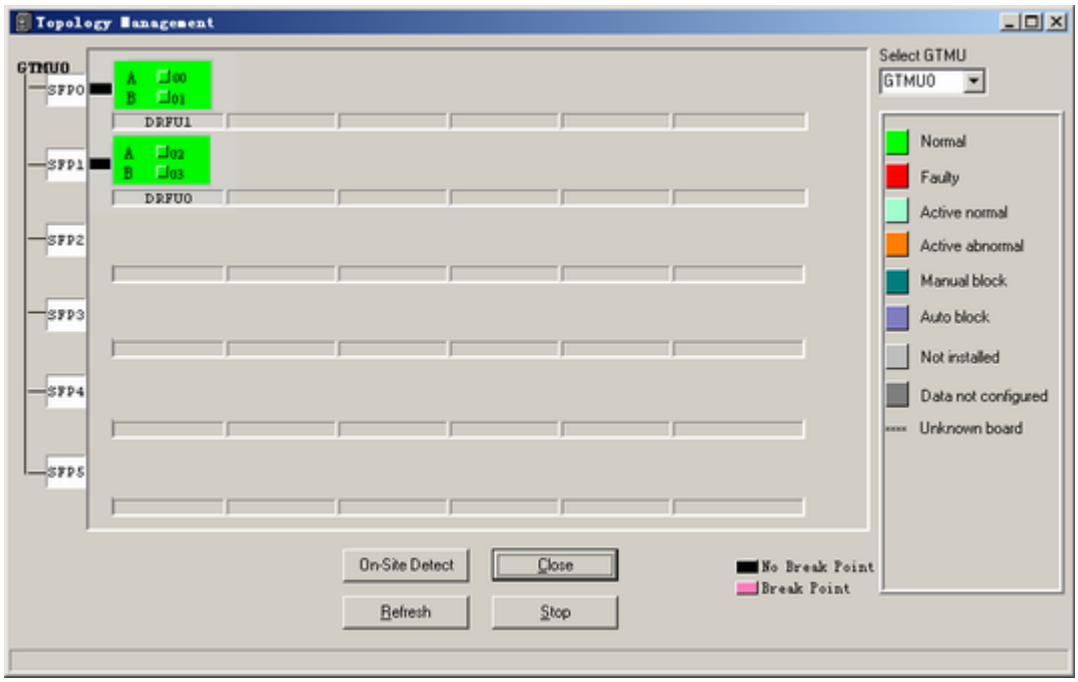
Step 4 Click **Start**.

After the test is complete, the result is displayed on the status bar at the bottom of the dialog box.

Step 5 Close the **Loop Test** dialog box, and then double-click the GTMU on the **Board Management** window.

The **Topology Management** window is displayed, as shown in **Figure 8-6**.

Figure 8-6 Topology Management window



Step 6 Right-click a DRFU.

A shortcut menu is displayed.

Step 7 Choose **Loop Test** from the shortcut menu.

The sub-menu is displayed.

Step 8 Choose **Path A** or **Path B**.

The **Loop Test** dialog box is displayed.

Step 9 Click **Start**.

After the test is complete, the result is displayed on the status bar at the bottom of the dialog box.

Step 10 Repeat **Step 5** through **Step 9** to perform the loopback test of all the DRFUs.

----End

9 Commissioning the BTS3900 Services

About This Chapter

This describes how to test whether the BTS3900 supports CS services and PS services by using an MS.

Prerequisite

The BTS3900 is running normally.

9.1 Performing the Loopback Test of a Channel
This describes how to perform the loopback test of a channel. Before testing the CS and PS services, you must check whether the transmission links of the signaling channel and traffic channel are normal. The loopback test of a channel consists of the loopback test of a signaling channel and the loopback test of a traffic channel.

9.2 Testing CS Services
This describes how to test CS services by making test calls between MSs or between an MS and a PSTN user.

9.3 Testing PS Services
This describes how to test PS services by browsing websites and downloading files through an MS. You need to test only the BTS that is configured with the GPRS or EGPRS services.

9.1 Performing the Loopback Test of a Channel

This describes how to perform the loopback test of a channel. Before testing the CS and PS services, you must check whether the transmission links of the signaling channel and traffic channel are normal. The loopback test of a channel consists of the loopback test of a signaling channel and the loopback test of a traffic channel.

9.1.1 Performing the Loopback Test of a Signaling Channel

This describes how to perform the loopback test of a signaling channel. Before testing the CS and PS services, you must check whether the transmission links of the signaling channel are normal through the baseband test on the Site Maintenance Terminal System. The baseband test consists of the BIU loopback test and the TRX self-test.

Background Introduction

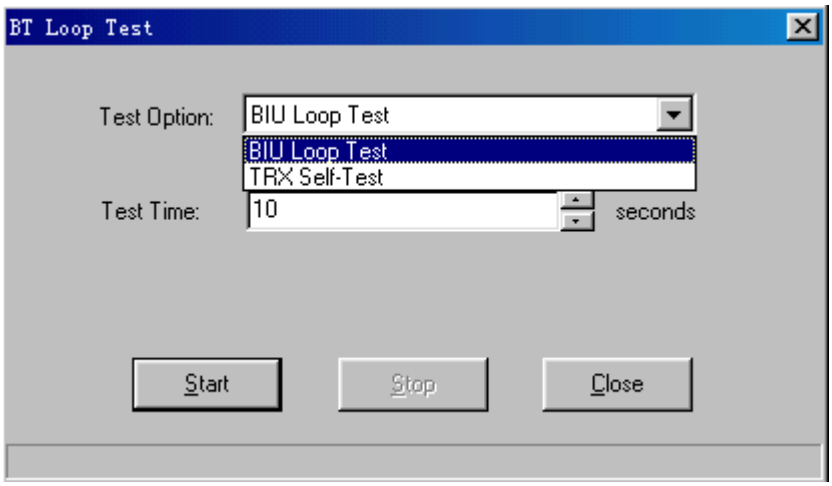
- The BIU loopback test is performed to test the link transmission of the TRX timeslots on the DBUS.
- The TRX self-test is performed to check whether the logical channel from the BBU to the DSP in the RRU/DRFU is functional.

Procedure

Step 1 In the left pane of the **Site Maintenance Terminal System** window, select **BT**. In the right pane of the window, double-click **BT Loop Test**.

The **BT Loop Test** dialog box is displayed, as shown in **Figure 9-1**.

Figure 9-1 BT Loop Test dialog box



Step 2 Specify the test option and the test time.

NOTE

The test time is related to the test option. Generally, a long-duration test produces a stable test result.

Step 3 Click **Start**.

The test result is displayed on the status bar at the bottom of the **BT Loop Test** dialog box.

NOTE

During the test, you can click **Stop** to stop the test. In this case, the **Stopping test successfully.** message is displayed on the status bar at the bottom of the **BT Loop Test** dialog box.

Step 4 Repeat **Step 1** through **Step 3** to perform the baseband test on other **BTs** on site.

----End

9.1.2 Performing the Loopback Test of a Traffic Channel

This describes how to perform the loopback test of a traffic channel. Before testing the circuit switched (CS) and packet switched (PS) services, you need to perform the loopback test on the Site Maintenance Terminal System to check the transmission link of traffic channels of the BTS. The loopback test of a traffic channel involves the BIU loopback test and the TRX RF self-test.

Background Introduction

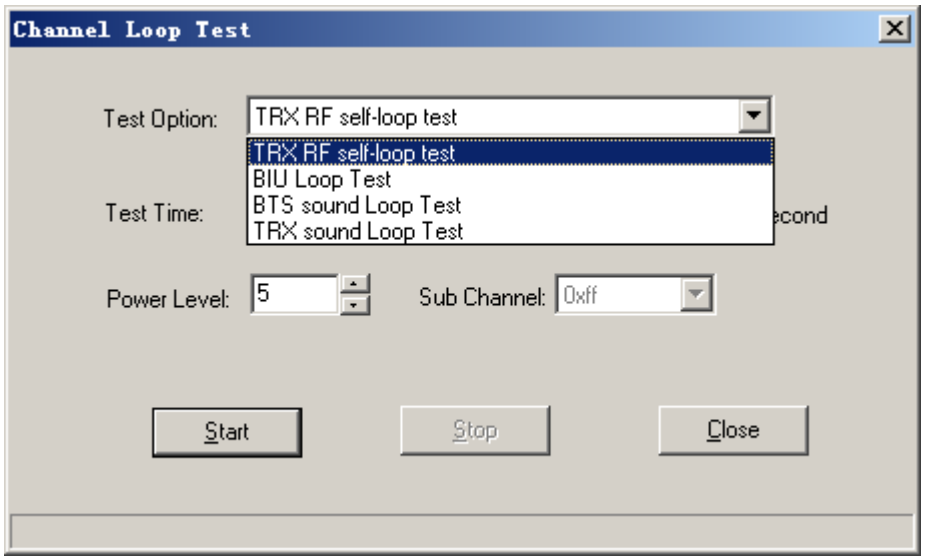
- The BIU loopback test is performed to test the timeslot transmission of the TRX traffic channel on the BTS DBUS.
- The TRX RF self-loop test is performed to test the quality of the RX and TX channels.

Procedure

Step 1 In the left pane of the **Site Maintenance Terminal System** window, select **Channel**. In the right pane of the window, double-click **Channel Loop Test**.

The **Channel Loop Test** dialog box is displayed, as shown in **Figure 9-2**.

Figure 9-2 Channel Loop Test dialog box



Step 2 Specify the test option, test time, and power level.

NOTE

- The test time is related to the test option. Generally, the longer the duration of the test, the more stable the test result.
- The value range of the power level is from 0 to 31. The power level is unavailable when you select the BIU loopback test.

Step 3 Click **Start**.

The result is displayed on the status bar at the bottom of the **Channel Loop Test** dialog box.

NOTE

During the test, you can click **Stop** to stop the test. In addition, the **Stopping test successfully.** message is displayed on the status bar of the **Channel Loop Test** dialog box.

Step 4 Repeat **Step 1** through **Step 3** to perform the baseband test on other **Channel**s on site.

----End

9.2 Testing CS Services

This describes how to test CS services by making test calls between MSs or between an MS and a PSTN user.

Prerequisite

- Two test MSs, which support GSM and are registered with the HLR, are available.
- The logical cell to be tested is activated.
- The BSC is in normal operation.
- The signaling channel loopback test and traffic channel loopback test are conducted. The test results are normal.

Procedure

Step 1 Power on the test MS and check the process of the MS in searching the GSM network.

If...	Then...
The test MS fails to find the network,	Check whether the test MS is faulty. For example, the test MS does not have a SIM card, or the SIM card does not support authentication and encryption. After rectifying the faults, use the test MS to search the network again.
The test MS finds the network,	Go to **Step 2**.

Step 2 Lock the test MS to a frequency of a logical cell covered by the BTS.

Step 3 Make test calls.

1. Use one MS to call the other MS, and hold the call for a while.
2. Use one MS to originate a call to a PSTN user, and hold the call for a while.
3. Use a PSTN phone to originate a call to one MS, and hold the call for a while.

NOTE

To ensure the accuracy of test results, make each type of test call more than five times.

Step 4 Verify that all test calls are successful and the voice is clear.

If...	Then...
Mobile-originated call fails,	1. Check the LED status of the BTS and the alarm information, locate the faults occurring on the BTS side, and rectify the faults. 2. Request BSC technical engineers to rectify the BSC faults.
Mobile-originated call succeeds, and mobile-terminated call fails,	You can infer that the data configuration of the BSC is improper. Request BSC technical engineers to rectify the fault.

Step 5 Repeat **Step 2** through **Step 4** to test CS services in the other logical cells covered by the BTS.

----End

9.3 Testing PS Services

This describes how to test PS services by browsing websites and downloading files through an MS. You need to test only the BTS that is configured with the GPRS or EGPRS services.

Prerequisite

- One test MS, which supports GSM and is registered with the HLR, is available. This MS is GPRS-capable.
- The BTS is configured with the GPRS or EGPRS services.
- The logical cell to be tested is activated.
- The computer and BSC are operating normally.
- The signaling channel loopback test and traffic channel loopback test are conducted. The test results are normal.

Procedure

Step 1 Connect the MS to the USB port of the computer using a USB cable.

Step 2 Activate the GPRS or EGPRS data services using the MS. Then, test PS services through multi-service testing, such as multimedia message sending, website browsing, and file downloading.

Step 3 Check whether the multimedia message sending, website browsing, and file downloading are successful.

If...	Then...
The testing of one type of PS services is successful,	You can infer that the BTS hardware meets the requirements of PS services.
The testing of three types of PS services fails,	Check whether the test MS is faulty. For example, the test MS does not have a SIM card, or the SIM card does not support authentication and encryption.

Step 4 Repeat **Step 1** through **Step 3** to commission PS services in all the other logical cells covered by the BTS.

----End

10 Checking the BTS3900 Environment

About This Chapter

This describes the various environment alarms of the BTS3900. It also describes how to perform environment monitoring for the BTS3900.

10.1 BTS Environment Alarm Types

This describes the various types of environment alarms of the BTS. The alarms consist of the fire alarm, smoke alarm, infrared alarm, water alarm, temperature alarm, humidity alarm, air-conditioner alarm, door status alarm, and burglar alarm.

NOTE

- Critical alarm: devices or resources may be unusable, and restoration should be performed at once.
- Major alarm: The QoS of devices or resources severely deteriorates, and measures should be taken as soon as possible.
- The thresholds of temperature alarm and humidity alarm are subject to the local climate and terrain conditions and should be specified on the basis of the field requirements.

Fire Alarm

The fire alarm is the environment alarm generated when the equipment room is on fire. This is a critical alarm.

Smoke Alarm

The smoke alarm is an environment alarm generated when the smoke density in the equipment room reaches a predefined threshold. This is a critical alarm.

Infrared Alarm

The infrared alarm is an environment alarm generated when an infrared facility is taken into the equipment room or is in the infrared detection range of the cabinet. This is a major alarm.

Water Alarm

The water alarm is an environment alarm generated when water immersion occurs in the equipment room.

Temperature Alarm

The temperature alarm consists of the overtemperature alarm and the undertemperature alarm. This is a major alarm.

- The overtemperature alarm is generated when the ambient temperature is higher than the predefined upper threshold of the temperature.
- The undertemperature alarm is generated when the ambient temperature is lower than the predefined lower threshold of the temperature.

Humidity Alarm

The humidity alarm consists of the high humidity alarm and the low humidity alarm. This is a major alarm.

- The high humidity alarm is generated when the environment humidity is higher than the predefined upper threshold of the humidity.

- The low humidity alarm is generated when the environment humidity is lower than the predefined lower threshold of the humidity.

Air-Conditioner Alarm

The air-conditioner alarm is generated when the air-conditioner is not running properly or the AC power supply is not normal. This is a major alarm.

Door Status Alarm

The door status alarm is an environment alarm generated when the door of the equipment room or the door of the cabinet is opened. This is a major alarm.

Burglar Alarm

The burglar alarm is generated when the infrared alarm or door status alarm occurs. This is a critical alarm.

10.2 Monitoring Environment

This function is performed to monitor and manage the environment parameters in a site. By performing this function, you can view the current temperature and humidity and set the temperature and humidity thresholds. The BTS can run normally in a safe and suitable site environment. You can also clear a burglar alarm or a smoke alarm and disable an EAC alarm.

Prerequisite

You have logged in to the BTS through the Site Maintenance Terminal.

Context

Table 10-1 describes the parameters.

Table 10-1 Parameters in the Environment Monitor dialog box

Parameter	Meaning	Value Range
Clear Robbery Alarm	Clearing the infrared alarm and the door status alarm	-
Set Temperature and Humidity Threshold	Set the upper and lower thresholds of temperature and humidity. Based on the thresholds, the alarm box reports a temperature alarm and a humidity alarm.	-
Relay Operation	Control the relay status. The relay is used to start or close the refrigeration device, heating device, dehumidifier, humidifier, fire extinguisher, and anti-burglar device. The default state is Close.	-

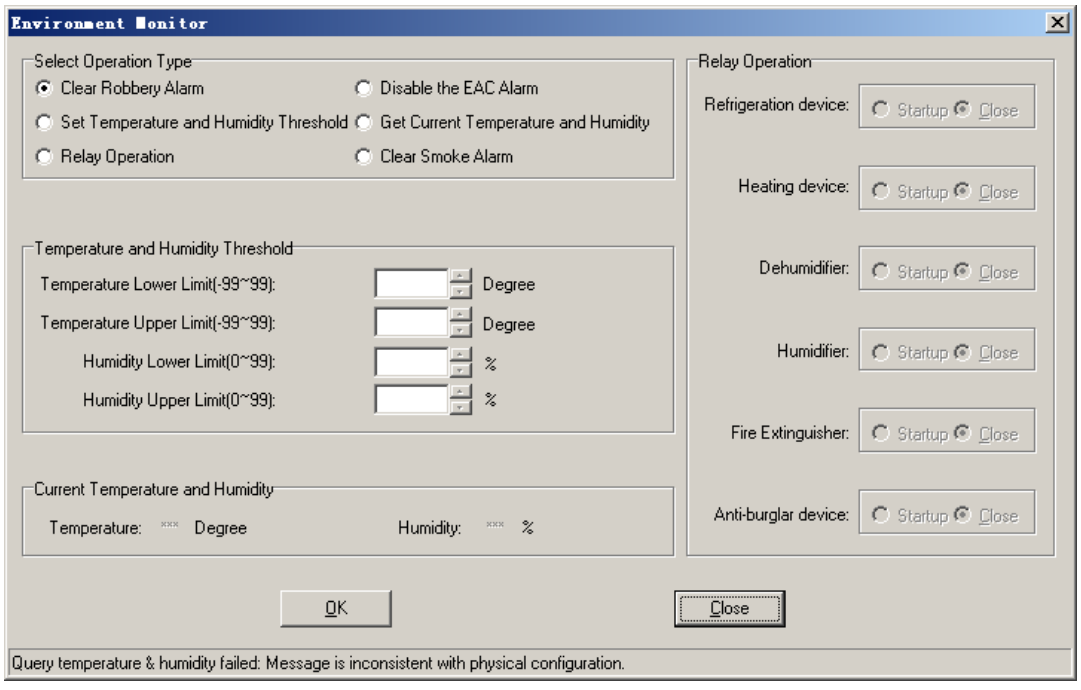
Parameter	Meaning	Value Range
Disable the EAC Alarm	Disable the reporting of alarms in a short time. In the maintenance of equipment, the related personnel can select the option to disable the reporting of alarms for ten minutes. After ten minutes, the alarms can be reported. If the equipment is maintained for more than 10 minutes, restart the alarm shield.	-
Get Current Temperature and Humidity	View the temperature and humidity associated with the base station in operation. This parameter can be used for querying the status of the environment alarm.	-
Clear Smoke Alarm	Clearing the smoke alarm	-

Procedure

Step 1 In the left pane of the **Site Maintenance Terminal System** window, click **Site** . In the right pane of the window, double-click **Environment Monitor**.

The **Environment Monitor** dialog box is displayed, as shown in **Figure 10-1**.

Figure 10-1 Environment Monitor dialog box



Step 2 Perform the following operations in the **Select Operation Type** area:

Select...	Then...
Clear Robbery Alarm	Go to **Step 3**.
Set Temperature and Humidity Threshold	In the **Temperature and Humidity Threshold** area, set the thresholds. Then, go to **Step 3**.
Relay Operation	In the **Relay Operation** area, set the related options to start or stop the equipment. Then, go to **Step 3**.
Disable the EAC Alarm	Go to **Step 3**.
Get Current Temperature and Humidity	Go to **Step 3**.
Clear Smoke Alarm	Go to **Step 3**.

Step 3 Click **OK**.

----End

11 FAQs for BTS Commissioning

About This Chapter

This describes the fault symptoms and cause analysis in the BTS commissioning.

11.1 Failed Communication Between the Site Maintenance Terminal and the BTS

This describes the fault symptom and analyzes the cause of the failed communication between the Site Maintenance Terminal and the BTS. It also provides the fault handling suggestions.

Fault Symptom

You fail to log in to the BTS on the Site Maintenance Terminal System. The result of running the **ping** commands shows that the connection between the Site Maintenance Terminal PC and the BTS cannot be established.

Cause Analysis and Handling Suggestion

Table 11-1 lists the possible causes and related suggestions.

Table 11-1 Possible causes and handling suggestions for failed communication between the Site Maintenance Terminal and the BTS

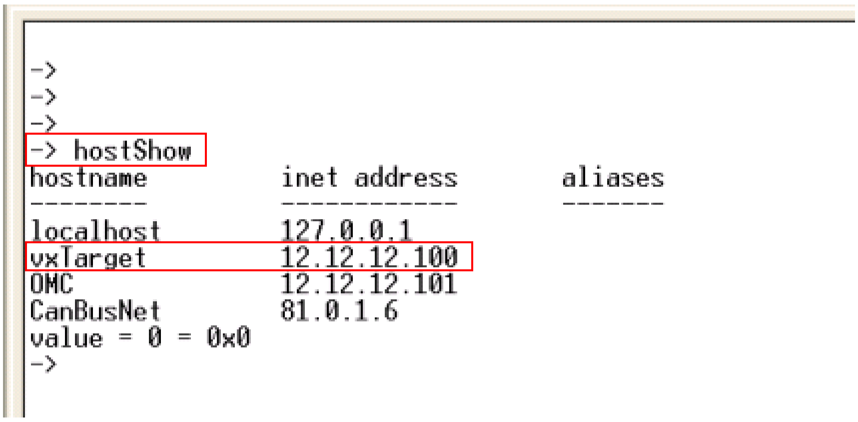
Cause of the Fault	Handling Suggestion
The crossover cable is faulty.	Check the connection of the crossover cable. Check whether the RJ45 connectors on both ends are functional. If the RJ45 connector is faulty, replace it with a new one.
The IP address of the Site Maintenance Terminal PC is incorrect.	Check whether the IP address of the Site Maintenance Terminal PC is on the same network segment as that of the board by referring to **Checking Whether the IP Address of the Site Maintenance Terminal PC is on the Same Network Segment as That of the Board**.

Checking Whether the IP Address of the Site Maintenance Terminal PC is on the Same Network Segment as That of the Board

1. Remove the crossover cable from the **ETH** port on the BBU panel.
2. Connect the **ETH** port to the serial port of the Site Maintenance Terminal PC by using the debug cable, serial port cable, and extended serial port cable.
3. Connect the Ethernet port of the debug cable to the Ethernet port of the Site Maintenance Terminal PC by using the crossover cable.
4. Check the IP address of the board. Take the Windows XP operating system as an example. On the Windows XP operating system, choose **Start** > **Program** > **Accessories** > **Communications** > **HyperTerminal**.
5. Configure the HypterTerminal according to the instructions, and then connect to the board.

6. Run the **hostShow** command on the displayed **HyperTerminal** window to check the IP address of the board. The IP address of the board is **12.12.12.100**, as shown in **Figure 11-1**.

Figure 11-1 Checking the IP address of the board



CAUTION

The IP address shown in **Figure 11-1** is only for reference and is subject to the actual configurations on site.

7. Check whether the IP address of the Site Maintenance Terminal PC is on the same network segment as **12.12.12.100**. If the IP addresses are not on the same network segment, change the IP address of the Site Maintenance Terminal PC by referring to **4.1 Setting the IP Address of the Site Maintenance Terminal PC**.

11.2 Faulty E1 Link

This describes the fault symptom and analyzes the cause of the faulty E1 link. It also provides the fault handling suggestions.

Fault Symptom

When logical cells and all the links of upper layers are available, the E1 link on the BTS side is abnormal.

Cause Analysis

The possible causes of the faulty E1 link are as follows:

- Improper physical connection of cables
- High bit error rate (BER) in transmission

Handling Suggestion

1. Check all the connections on the E1 link and the connectors at both ends of each cable. Ensure that the connections are reliable and the connectors are functional.

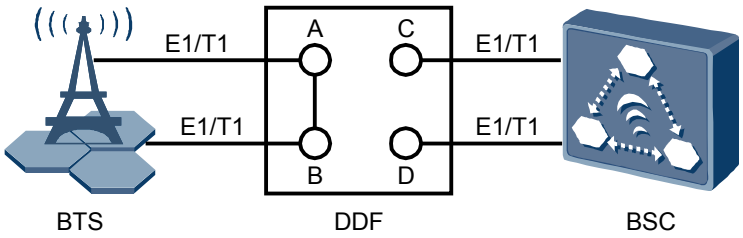
2. Check whether the E1 link on the BTS side is normal through the physical loopback test.
3. Check the transmission channels. Ensure that all transmission channels are available.

For example, the physical loopback test is performed to troubleshoot the UELP failure, which is one of the physical link faults.

1. Check the connection between the E1/T1 cable and the OUTSIDE port on the UELP and check the connector at the end of the E1/T1 cable. If any connector is damaged or does not work properly, replace it with a new connector.
2. Check the connection between the E1 transfer cable and the INSIDE port on the UELP and the connection between the E1 transfer cable and the E1/T1 port on the GTMU. Check the connectors at both ends of the cable. If any connector is damaged or does not work properly, replace it with a new connector.
3. Perform the physical loopback test and troubleshoot the fault in the UELP.

   (1) On the BTS side, disconnect A from C, disconnect B from D, and then connect A to B on the DDF, as shown in **Figure 11-2**. Thus, a physical loopback on the BTS side is formed. The normal E1/T1 connection between the BTS and the BSC consists of the connection between A and C and connection between B and D.

Figure 11-2 Physical loopback of the E1/T1 cable on the BTS side



   (2) Check the status of the **LIU** LED corresponding to the E1/T1 cable in loopback mode. **Table 11-2** describes the meaning of the states of the LED.

Table 11-2 Meaning of the states of the **LIU** LED (UELP used)

If...	Then...
The LED is **OFF**,	The E1/T1 link on the BTS side is normal. Troubleshooting the UELP failure is successful. The testing task on the BTS side is complete.
The LED is **ON** or blinks at **4 Hz**,	The E1/T1 link on the BTS side is not normal. Continue to troubleshoot the fault in the UELP.

   (3) Disconnect the E1 transfer cable and the E1/T1 cable. Then, directly connect the E1/T1 cable to the E1/T1 port on the GTMU.

   (4) When the UELP is not used, determine whether the E1/T1 link is normal based on the status of the **LIU** LED on the GTMU panel, as listed in **Table 11-3**.

Table 11-3 Meanings of the states of the **LIU** LED (UELP not used)

If...	Then...
The LED is **OFF**,	The UELP is faulty. a. Check whether the connection between the UELP and the backplane of the BBU is reliable. b. Replace the UELP with a new UELP.
The LED is **ON** or blinks at **4 Hz**,	The E1 link on the BTS side is not normal, but the UELP is functional.

(5) Reconnect the E1/T1 cable to the OUTSIDE port on the UELP and ensure that the connection is proper.

(6) Reconnect the INSIDE port on the UELP and the E1/T1 port on the GTMU with the E1 transfer cable and ensure that the connection is proper.

CAUTION

After the physical loopback test is complete, you should restore the normal E1/T1 connection at the DDF on the BTS side and ensure that the connection is proper.

11.3 Failure of an MS to Search the Network

This describes the fault symptom and analyzes the cause of the failure of an MS to search the network.

Fault Symptom

An MS fails to find the network.

Cause Analysis

The possible causes are as follows:

- The downlink signals are weak. Therefore, the MS is unable to locate the cell.
- The downlink interference is strong. The MS is unable to locate the cell or receive the correct downlink system information.
- The cell radius is small.

NOTE

When the MS fails to find the network, pay attention to the output power of the local cell and the radio network coverage.

11.4 Service Dialing Failure

This describes the fault symptom and analyzes the cause of the service dialing failure. It also provides the fault handling suggestions.

Fault Symptom

Service dialing failure may occur in either of the following cases:

- Location update failure
- Service dialing failure

Cause Analysis and Handling Suggestion

Table 11-4 lists the possible causes and related suggestions.

Table 11-4 Possible causes and handling suggestions for service dialing failure

Cause of the Fault	Handling Suggestion
The MS is faulty.	Replace the MS with a new one.
The CS domain or the PS domain on the CN side is not ready.	Keep the CS domain and the PS domain ready.

11.5 Low GRPS Data Transmission Rate

This describes the fault symptom and analyzes the cause of low GPRS data transmission rate.

Fault Symptom

During the service test, the following problems may occur: low GPRS data rate in the PS domain of the newly added BTS, or a high BER on the Abis interface.

Cause Analysis

The possible causes are as follows:

- The E1 cable is not properly grounded. You can enable the grounding status of the E1 cable by setting the DIP switch **SW2** on the **GTMU**. Table 11-5 describes the DIP switch **SW2**.

Table 11-5 Description of the DIP switch SW2 on the GTMU

Setting of DIP Bit				Description
1	2	3	4	
ON	ON	ON	ON	The E1 cable is grounded.

Setting of DIP Bit				Description
1	2	3	4	
OFF	OFF	OFF	OFF	The E1 cable is not grounded.

If...	Then...
Only one end of the E1 cable is grounded,	The E1 cable is grounded properly.
Both ends of the E1 cable are grounded,	The E1 cable is not grounded properly.

- The data configuration negotiated between the BSC and the BTS is not consistent.
- The cell signals are weak.
- The MS capability is limited.

12 Data Sheet for Commissioning

The commissioning data sheet is used to record the process and result of the commissioning.

Table 12-1 BTS commissioning data sheet

Site Name			
BTS Model			
Date and Time			
Commissioning Engineers			
Commissioning Mode	□ Online Commissioning □ Offline Commissioning		
Commissioning Result	□ Successful □ Failed		
Commissioning Item		Conclusion	Handling of Exceptional Cases
Preparation for BTS Commissioning	Faults in BTS hardware installation cleared?		
	The BTS successfully powered on?		
	Data configuration for BTS commissioning in BSC available on the Site Maintenance Terminal PC?		
	Board software for upgrade downloaded to the Site Maintenance Terminal PC?		

	Tools and devices required for commissioning ready for use?		
	Procedures for BTS commissioning clarified?		
Commissioning Phase	Successfully log in to the BTS on the Site Maintenance Terminal System?		
	Site management rights successfully obtained?		
	BTS software versions compatible?		
	BTS board software running normally?		
	Transmission normal?		
	Network topology correct?		
	VSWR normal?		
	Connection of antenna system normal?		
	Output power of the TRXs (all the TRXs) normal?		
	All the LEDs in normal states?		
	Alarm generated?		
	Performing the Loopback Test		
	Performing the Loopback Test of a Signaling Channel		
	Performing the Loopback Test of a Traffic Channel		
	Service test		
	Site environment		
	Site management rights released?		
Commissioning Result			
	Description of Unsolved Problems	Impact	

Unsolved problems during commissioning		