BTS3900 GSM

V300R008

Site Maintenance Guide

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Part Number

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About This Document

Purpose

After the system deployment of the BTS, commercial operations are started at the site. To ensure smooth operation, you need to perform routine maintenance on the BTS.

This document describes the routine hardware maintenance items of the BTS3900 GSM. The maintenance items are equipment room environment maintenance, power and grounding system maintenance, and cabinet maintenance. This document also describes the procedures for replacing parts, modules, and boards.

Product Version

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

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

Intended Audience

This document is intended for:

- Technical support engineers
- Maintenance engineers

Change History

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

Organization

1 Preparations for Site Maintenance

This describes the preparations for site maintenance. The preparations for site maintenance involve obtaining site information, selecting maintenance items, and arranging maintenance tools and spare parts.

2 BTS3900 Routine Hardware Maintenance Items

This describes the BTS3900 hardware maintenance. The BTS3900 hardware maintenance refers to the routine maintenance of the equipment room environment, cabinets, power supply, and grounding system of the BTS3900.

3 Powering On and Powering Off a BTS3900 Cabinet

This describes how to power on and power off a BTS3900 cabinet. The procedures for powering off the BTS3900 cabinet in normal and emergent cases are different.

4 Replacing BTS3900 Parts

This describes how to replace the BTS3900 parts. The BTS3900 parts consist of BBU3900 parts, DCDU-01, FAN unit, PMU/PSU, GATM, and DRFU.

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.
[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.

Action	Description
Drag	Press and hold the primary mouse button and move the pointer to a certain position.

1 Preparations for Site Maintenance

This describes the preparations for site maintenance. The preparations for site maintenance involve obtaining site information, selecting maintenance items, and arranging maintenance tools and spare parts.

Obtaining Site Information

Before maintaining a site, obtain the following information:

- Current faults and alarms
- Hardware configurations
- Software version
- Transmission and networking
- Timeslot consolidation equipment if any
- Local environment
- Spare parts

Selecting Maintenance Items

Select suitable maintenance items based on actual requirements. The maintenance items are as follows:

- Maintaining the room environment
- Maintaining a BTS cabinet
- Replacing BTS boards and modules
- Maintaining BTS power supply and grounding
- Cleaning the fan box
- Cleaning the air filters

Arranging Tools and Spare Parts

Arrange the following maintenance tools and spare parts based on the site information and maintenance items:

- Frequency test devices

  The frequency test device consists of a frequency generator, a spectrum analyzer, and various connectors and cables.

  Generally, a frequency meter and a rubidium clock are used.

- Power test devices

  The power test devices are used to measure and analyze the output power of a BTS. The output power determines the effect of downlink coverage.

  Generally, a power meter is used.

- Antenna and feeder test devices

  The antenna and feeder test devices are used to measure the standing wave ratio, return loss, and cable insertion loss, and to locate faults.

  Generally, a SiteMaster is used.

- Other devices
  - Measuring tools:
    - One 50 m ribbon tape, one 5 m measuring tape, and one 400 mm level bar
    - Marking pen
  - Drilling tools:
    - One percussion drill and a few matching bits
    - One cleaning device
    - One power connector board (with three 2-phase sockets and three 3-phase sockets, current capacity greater than 15 A)
  - Fastening tools:
    - Three cross screwdrivers (4', 6', and 8') and three straight screwdrivers (4', 6', and 8')
    - Four adjustable wrenches (6', 8', 10', and 12'), two combination wrenches (17' and 19'), and one set of inner hexagon spanners.
  - Small tools:
    - Sharp-nose pliers (8')
    - Pincer pliers (8')
    - Diagonal pliers (8')

  NOTE

  When some parts are faulty and the parts need to be replaced, arrange related tools and new parts.

2 BTS3900 Routine Hardware Maintenance Items

About This Chapter

This describes the BTS3900 hardware maintenance. The BTS3900 hardware maintenance refers to the routine maintenance of the equipment room environment, cabinets, power supply, and grounding system of the BTS3900.

2.1 BTS Equipment Room Maintenance Items
This describes the maintenance items in the BTS equipment room. The maintenance items consist of the environment alarm, temperature, humidity, illumination, sockets, indoor air conditioner, protective devices, and dustproof condition.

2.2 BTS Power Supply and Grounding System Maintenance Items
This describes the maintenance items of the BTS power supply and the grounding system. The maintenance items consist of power cables, voltage, PGND cables, earth resistance, and battery.

2.3 BTS3900 Cabinet Maintenance Items
BTS3900 cabinet maintenance items pertain to fans, air filters, cabinet surface, locks and doors on cabinet, cabinet cleanliness, fan boxes cleanliness, board LEDs, and ESD wrist strap.

2.1 BTS Equipment Room Maintenance Items

This describes the maintenance items in the BTS equipment room. The maintenance items consist of the environment alarm, temperature, humidity, illumination, sockets, indoor air conditioner, protective devices, and dustproof condition.

Table 2-1 describes how to maintain the BTS3900 equipment room environment.

Table 2-1 Maintenance of the BTS3900 equipment room environment

Item	Interval	Operation Guide	Reference Standard
Checking environmental alarms	Every day	Check whether power supply alarms, fire alarms, or smoke alarms are reported. **NOTE** This maintenance item is performed on the LMT. For other maintenance items, you need to perform them in the equipment room.	No power supply alarms, fire alarms, or smoke alarms are reported.
Checking the temperature in the equipment room	Each time site maintenance is performed	Record the temperature read on the thermometer in the equipment room.	-5℃～45℃
Checking the temperature in the equipment room	Each time site maintenance is performed	Record the humidity read on the hygrometer in the equipment room.	5%-95% RH
Checking the illumination in the equipment room	Every two months	Check whether the routine and emergency illumination in the equipment room is normal.	-
Checking sockets	Every two months	Check whether sockets are normal.	-
Checking the air conditioner	Every two months	Check whether the air conditioner is working normally.	-
Checking protective devices	Every two months	Check whether anti-disaster devices, equipment protection devices, and fire fighting devices are in good condition.	• There are portable and qualified foam extinguishers in the equipment room. • There is no danger of damage to the equipment by rats or insects.

Item	Interval	Operation Guide	Reference Standard
Cleaning the equipment room	Every two months	Check whether cabinets, equipment housing, equipment interior, tables, floor, doors, and windows are clean.	All the check items are clean.

2.2 BTS Power Supply and Grounding System Maintenance Items

This describes the maintenance items of the BTS power supply and the grounding system. The maintenance items consist of power cables, voltage, PGND cables, earth resistance, and battery.

Table 2-2 describes how to maintain the BTS power supply and grounding system.

Table 2-2 Maintenance items of the BTS power supply and the grounding system

Item	Interval	Operation Guide	Reference Standard
Checking power cables	Every month or every quarter	Check the connections of power cables carefully.	The connections are secure. The power cables are in good condition and the connection points are not corroded.
Checking the voltage	Every month or every quarter	Use a multimeter to measure the voltage of the power supply.	The voltage is within standard range.
Checking PGND cables	Every month or every quarter	Check whether the connections of PGND cables and the grounding bar are secure.	The connections are secure and the connection points are not corroded. The PGND cables and the grounding bar are in good condition and corrosion preventive.
Checking the grounding resistance	Every month or every quarter	Use an earth resistance meter to measure the grounding resistance and record it. Conduct the test before the rainy season.	The grounding resistance is less than 10 ohms.
Checking the storage batteries	Every year	Check the storage batteries and rectifiers every year.	The battery capacity is within the normal range and the batteries are correctly connected. The performance parameters of rectifiers are normal.

2.3 BTS3900 Cabinet Maintenance Items

BTS3900 cabinet maintenance items pertain to fans, air filters, cabinet surface, locks and doors on cabinet, cabinet cleanliness, fan boxes cleanliness, board LEDs, and ESD wrist strap.

Table 2-3 describes how to maintain the BTS3900 cabinet.

Table 2-3 Cabinet maintenance items for the BTS3900

Item	Interval	Operation Guide	Reference Standard
Checking the fans	Every week, every month, or every quarter	Check the fans.	No alarms related to the fans are reported.
Checking the air filter	Every quarter	If there is dust on the air filter, clean the air filter.	-
Checking the exterior of the cabinet	Every month or every quarter	Check whether there are dents, cracks, holes, or corrosion on the surface of the cabinet and whether the cabinet label is legible.	-
Checking the lock and door of the cabinet	Every month or every quarter	Check whether the lock is normal and the door can be opened and closed easily.	-
Checking the cleanness of the cabinet	Every month or every quarter	Check whether the cabinet is clean.	The cabinet surface is clean. The subracks are not dusty.
Checking the cleanness of the fan box	Every year	If there is dust on the surface of the fan box or inside the fan box, clean the fan box.	-
Checking board LEDs	Every month or every quarter	Check whether the board LEDs are normal.	For details about the status of LEDs, refer to **BTS3900 GSM Hardware Description**.
Checking the ESD wrist strap	Every quarter	Use either of the following methods: ● Use an ESD wrist strap tester to test the ESD wrist strap. ● Use a multimeter to test the grounding resistance of the ESD wrist strap.	If you are using an ESD wrist strap tester, the LED GOOD is on. If you are using a multimeter, the grounding resistance is between 0.75 megohm and 10 megohms.

3 Powering On and Powering Off a BTS3900 Cabinet

About This Chapter

This describes how to power on and power off a BTS3900 cabinet. The procedures for powering off the BTS3900 cabinet in normal and emergent cases are different.

3.1 Powering On the BTS3900
This describes how to power on the BTS3900 cabinet and handle the power supply failure to the internal parts of the cabinet.

3.2 Powering Off the BTS3900
This describes how to power off the BTS3900 cabinet. The BTS3900 power-off is classified into normal power-off and emergency power-off.

3.1 Powering On the BTS3900

This describes how to power on the BTS3900 cabinet and handle the power supply failure to the internal parts of the cabinet.

Prerequisite

- The input power cables are correctly and securely connected.
- The power input of the BTS3900 cabinet meets the specifications listed in **Power Supply Requirements for the BTS3900**.
- The power switches on the DCDU are all set to OFF.
- The external power supply to the BTS3900 cabinet is disconnected.

Context

Table 3-1 lists the power switches on the DCDU.

Table 3-1 Power switches on the DCDU

Module	Power Switch on the DCDU
-	SPARE2
GATM	SPARE1
BBU	BBU
FAN	FAN
RFU5	RFU5
RFU4	RFU4
RFU3	RFU3
RFU2	RFU2
RFU1	RFU1
RFU0	RFU0

Procedure

Step 1 Switch on the external power equipment to power on the cabinet.

If...	Then...
The cabinets are BTS3900 (+24 V) cabinet and BTS3900 (220 V) cabinet,	Go to **Step 2**.
The cabinet is BTS3900 (-48 V) cabinet,	Go to **Step 3**.

Step 2 Check whether the PSU is running properly by referring to **PSU (AC/DC)** and **PSU (DC/DC)**.

Step 3 Check whether the input voltage of the DCDU in the BTS3900 is normal.

If...	Then...
The input voltage of the DCDU is not in the range -38.4 V DC to -57 V DC,	The DC power supply inside the cabinet is abnormal, go to **Step 4**.
The input voltage of the DCDU is in the range -38.4 V DC to -57 V DC,	The cabinet power-on check is complete. Go to **Step 7**.

Step 4 Switch off the external power supply of the BTS3900 cabinet to disconnect the power supply to the cabinet.

Step 5 Check the connection and routing of the power cables for the DCDU.

Step 6 Go to **Step 3** to check whether the input voltage of the DCDU is normal.

Step 7 Switch on the power switches on the DCDU, and then check the DC power supply to the internal parts of the cabinet based on **Table 3-2**.

Table 3-2 LED status of different parts when power supply is normal

Part	Normal LED Status
GATM	The RUN LED on the board panel blinks.
BBU	All the LEDs on the BBU panel are on.
FAN unit	The fans run normally and the RUN LED on the panel blinks.
DRFU	All the six LEDs on each DRFU are on.

Step 8 When there is a power supply failure to the internal parts of the cabinet after powering on the cabinet, check the following items listed in **Table 3-3**.

Table 3-3 Troubleshooting

Fault Type	Handling Measures
Power supply failure to all the internal parts of the cabinet	Check whether the GND cable and the -48 V power cable are inversely connected. ● If the cable connection is wrong, set all the power switches on the DCDU to OFF, and then reconnect the power cables. ● If the cable connection is correct, replace the DCDU.

Power supply failure to a board in the cabinet	Check the following items: 1. Remove the board, and then check whether the pins of the board slot on the backplane are distorted, broken, or missing. Replace the subrack if necessary. 2. Install the board into the subrack and check the LED on the board. 3. If the LED blinks improperly, remove the board and insert it into another idle slot that can house the board of the same type. Then, check the LED on the board. ● If the board works properly, you can infer that the slot is faulty. Replace the subrack. ● If the board still works improperly, replace the board.
Power supply failure to any other part in the cabinet	Use a multimeter to measure the input voltage of the faulty part. ● If the input voltage is in the range -38.4 V and -57 V, replace the part. ● If the input voltage is not in the range -38.4 V and -57 V, check the connections of power cables for the part. If the power cables are in poor connection, set all the power switches on the DCDU to OFF, and then reconnect the power cables. If the power cables are in good connection, replace the DCDU because the power switches on it may be faulty.

----End

3.2 Powering Off the BTS3900

This describes how to power off the BTS3900 cabinet. The BTS3900 power-off is classified into normal power-off and emergency power-off.

Procedure

Step 1 Choose normal power-off or emergency power-off based on the specific requirement.

If...	Then...
The BTS is powered off in the case of an equipment swap or a foreseeable regional blackout,	Go to **Step 2** to perform the normal power-off.

If...	Then...
The BBU incurs electric spark, smog, or water immersion,	Go to **Step 3** to perform the emergency power-off.

Step 2 To perform normal power-off, do as follows:

1. Modify the management status to block all the DRFUs in the cabinet. For details, refer to **Modifying Management Status (LMT)**.
2. Set all the power switches on the DCDU to **OFF**.
3. Switch off the external power supply to the BTS3900.

Step 3 Switch off the external power supply to the BTS3900. Then, if time allows, turn off the power switch on the DCDU.

----End

4 Replacing BTS3900 Parts

About This Chapter

This describes how to replace the BTS3900 parts. The BTS3900 parts consist of BBU3900 parts, DCDU-01, FAN unit, PMU/PSU, GATM, and DRFU.

4.1 Replacing BBU3900 Parts
This describes how to replace the BBU3900 parts. The BBU3900 parts consist of the BBU3900, and the internal boards of the BBU3900.

4.2 Replacing the DCDU-01
This describes how to replace the DCDU-01. The DCDU-01 allows one input and ten outputs. It supplies the -48 V DC power to the boards and modules in the cabinet. The replacement of the DCDU-01 disrupts all the services carried by the BTS.

4.3 Replacing the FAN Unit
This describes how to replace the FAN unit. The FAN unit regulates the temperature at the air inlet of the cabinet and in the fan box. It can adjust the rotation speed of the fans to implement ventilation and dissipation for the cabinet. Replacing the FAN unit may result in over-temperature alarms due to interruption of heat dissipation for the cabinet but has no negative effect on services of the BTS.

4.4 Replacing the PMU/PSU
This describes how to replace the PMU/PSU. The PMU is the power and environment monitoring unit, and the PSU is the power supply unit that converts AC power into DC power. The replacement of a PMU disrupts the power supply monitoring function that is performed by the PMU. The replacement of a PSU disrupts the DC power supply to the BTS.

4.5 Replacing the GATM
This describes how to replace the GSM antenna and TMA control module (GATM). The GATM controls the RET antenna and supplies power to the TMA. The replacement of the GATM disrupts the services carried on it.

4.6 Replacing the DRFU
This describes how to replace the Double Radio Filter Unit (DRFU). The DRFU is located in the multi-transceiver subsystem of the BTS. One DRFU provides two TRXs. The replacement of the DRFU disrupts the services carried on it.

4.1 Replacing BBU3900 Parts

This describes how to replace the BBU3900 parts. The BBU3900 parts consist of the BBU3900, and the internal boards of the BBU3900.

4.1.1 Replacing the BBU3900
This describes how to replace the BBU3900. The BBU3900 is the BTS control unit and enables the interaction between the BTS and the BSC. The replacement of BBU3900 disrupts all the services carried on the BTS.

4.1.2 Replacing the BBU Parts
This describes how to replace the faulty BBU parts, which consist of the UBFA, UPEU, UEIU, GTMU, and optical module.

4.1.1 Replacing the BBU3900

This describes how to replace the BBU3900. The BBU3900 is the BTS control unit and enables the interaction between the BTS and the BSC. The replacement of BBU3900 disrupts all the services carried on the BTS.

Prerequisite

1. The configuration (involving hardware and software) of the faulty BBU3900 is determined and a new BBU3900 of the same configuration is available.
2. The required tools and materials, such as ESD gloves, ESD wrist strap, cross screwdriver, straight screwdriver, ESD box or bag, dustfree cotton cloth, and fiber cleaner, are available.

Context

It takes about 30 minutes to replace the BBU3900. The time covers the activities of disconnecting and connecting cables.

WARNING

The replacement of the BBU3900 disrupts all the services carried on the BTS. Therefore, perform this task with caution.

WARNING

Take proper ESD prevention measures, for example, wear an ESD wrist strap or ESD gloves to prevent the boards, modules, and electronic components from being damaged by the static generated by human body.

Procedure

Step 1 Power off the BTS.

Step 2 Label the cables on the BBU3900 and remove the cables. Then, take proper insulation measures to remove the BBU3900 and put it in an ESD box.

Step 3 Take a new BBU3900 out of the packing box and ensure that the new BBU3900 is not damaged. Check and ensure that the new BBU3900 and the BBU3900 to be replaced are of the same hardware configuration and the same version. Then, install a new BBU3900.

Step 4 Switch on the external power supply of the BTS and power on the BBU3900.

Step 5 Perform the software loading and data configuration for the BBU3900 on the LMT.

----End

Postrequisite

After replacing the BBU3900, verify the following items:

- The related alarms on the LMT or M2000 are cleared.
- An MS can access the cell in service area of the BBU3900.

Contact the local Huawei office to dispose of the faulty BBU3900.

4.1.2 Replacing the BBU Parts

This describes how to replace the faulty BBU parts, which consist of the UBFA, UPEU, UEIU, GTMU, and optical module.

4.1.2.1 Replacing the UBFA

The UBFA is the fan module in the BBU. It works with the air inlet box in the cabinet to form a ventilation path. During the replacement of the UBFA, the heat generated by the BBU might not be properly ventilated and, with the increase of the temperature, an overtemperature alarm might be triggered. The services, however, are not affected.

4.1.2.2 Replacing the UPEU

The UPEU is the power module of the BBU and provides power for the boards in the BBU. The UPEU supports –48 V DC input. During the replacement of the UPEU, the BBU is powered off and the ongoing-services are disrupted.

4.1.2.3 Replacing the UEIU

The Universal Environment Interface Unit (UEIU) is used to transmit the monitoring signals of the service boards in the BBU. During the replacement of the UEIU, the external devices cannot be monitored.

4.1.2.4 Replacing the GTMU

As the basic transmission and control entity of the BBU, the GTMU controls and manages the entire BTS. It provides the interfaces associated with reference clock, power supply, OM, and external alarm collection. During the replacement of the GTMU, the services carried by the BTS are disrupted.

4.1.2.5 Replacing the UELP

The UELP is used for E1/T1 surge protection of the BBU. Each UELP provides surge protection for four E1/T1 signals. The UELP replacement interrupts the E1/T1 links. Thus, the ongoing BTS services are disrupted.

Replacing the UBFA

The UBFA is the fan module in the BBU. It works with the air inlet box in the cabinet to form a ventilation path. During the replacement of the UBFA, the heat generated by the BBU might

not be properly ventilated and, with the increase of the temperature, an overtemperature alarm might be triggered. The services, however, are not affected.

Prerequisite

- The number and types of faulty UBFAs are determined, and new UBFAs are available.
- The installation positions of the faulty UBFAs are recorded.

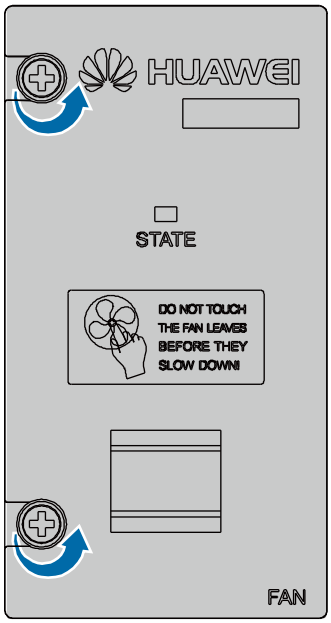
Context

It takes about three minutes to replace a UBFA. The duration of the replacement involves the removal of the faulty UBFA, the installation of the new UBFA, and the time required for the operation of the UBFA.

Procedure

Step 1 Loosen the screws on the panel of the UBFA, as shown in **Figure 4-1**.

Figure 4-1 Loosening the screws



Step 2 Remove the faulty UBFA from the slot.

Step 3 Slide the new UBFA into the slot of the faulty UBFA.

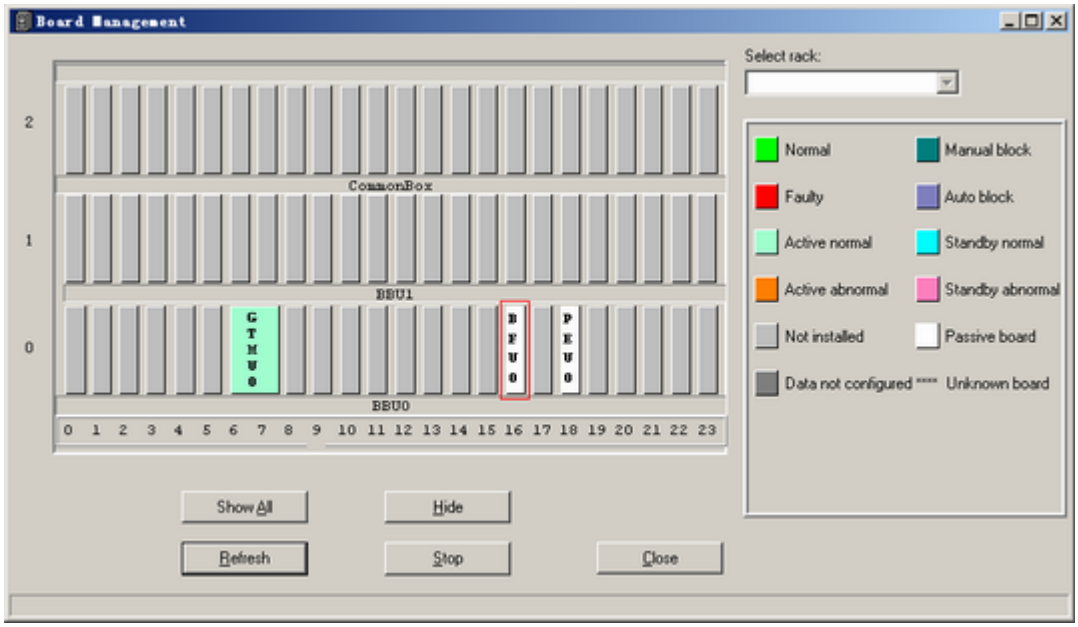
Step 4 Fasten the screws on the panel of the new UBFA.

Step 5 Check the **STATE** LED on the panel of the module and take actions accordingly.

If...	Then...
The green **STATE** LED blinks slowly (on for 1 second and off for 1 second).	On the **Board Management** window of the Site Maintenance Terminal System, check whether the UBFA runs normally, as shown in **Figure 4-2**.

If...	Then...
The green **STATE** LED does not blink slowly (on for 1 second and off for 1 second).	Power off the BBU, and then remove the board. Check whether there is a damaged pin. If there is no damaged pin, reinstall the board, and then check whether the board runs normally. If there is a damaged pin, replace the board.

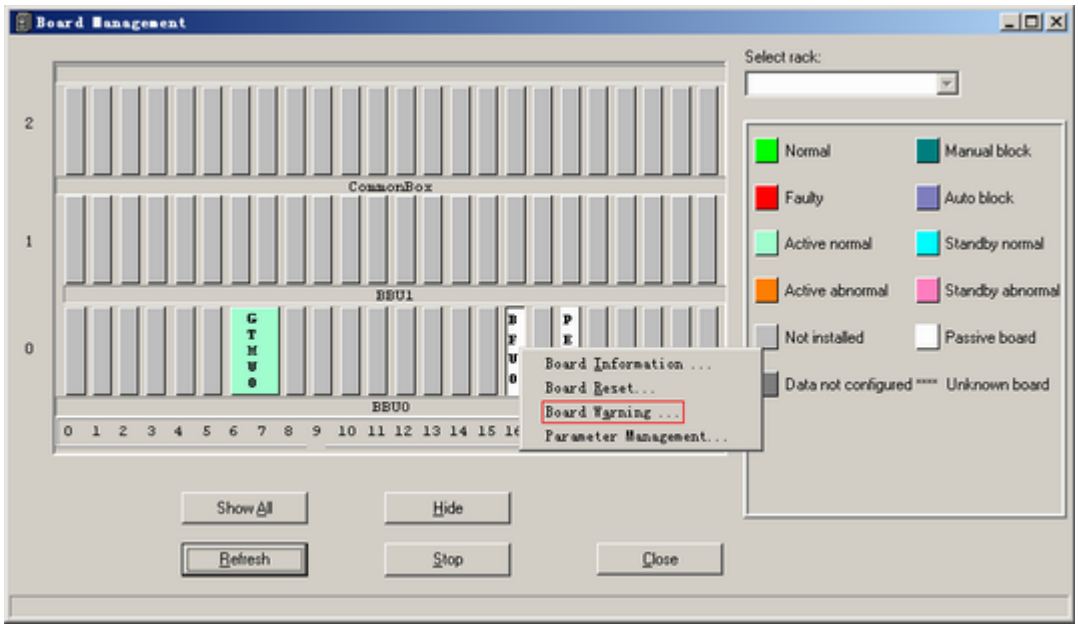
Figure 4-2 Checking whether the UBFA runs normally



If...	Then...
The UBFA icon is displayed white,	The board runs properly. Then, go to the next step.
The UBFA icon is displayed in other color,	The board runs improperly. Reinstall the board.

Step 6 On the **Board Management** window of the Site Maintenance Terminal System, right-click the board to be queried, and choose **Board Alarm** from the shortcut menu, as shown in **Figure 4-3**.

Figure 4-3 Querying UBFA alarms



If...	Then...
Alarms are not present,	The replacement is successful.
Alarms are present,	Rectify the fault as recommended.

NOTE

The alarms associated with the fans are the overtemperature alarm, undertemperature alarm, block alarm, and communication alarm.

----End

Postrequisite

Contact the local Huawei office to handle the faulty UBFA.

Replacing the UPEU

The UPEU is the power module of the BBU and provides power for the boards in the BBU. The UPEU supports –48 V DC input. During the replacement of the UPEU, the BBU is powered off and the ongoing-services are disrupted.

Prerequisite

- The number and types of faulty UPEUs are determined, and new UPEUs are available.
- The installation positions of faulty UPEUs and the interconnection relations of the cables on the UPEU panels are recorded.
- The required tools and materials such as ESD wrist strap/ESD gloves and ESD box/ESD bag are kept ready.

Context

It takes about 10 minutes to replace the module. The duration of the replacement involves the removal of the cables and the faulty UPEU, the installation of the new UPEU, the connection of the cables to the new UPEU, and the time elapsed for the operation of the UPEU.

CAUTION

Take correct ESD prevention measures, such as wearing an ESD wrist strap or ESD gloves, to avoid static damage to boards, modules, and electronic components.

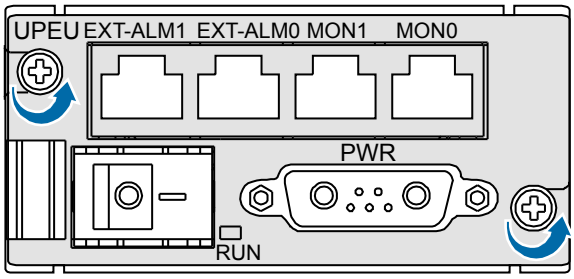
Procedure

Step 1 Power off the BBU by referring to **Powering Off the BBU**.

Step 2 Remove the cables from the panel of the faulty UPEU.

Step 3 Loosen the screws on the panel of the UPEU, as shown in **Figure 4-4**.

Figure 4-4 Loosening the screws



Step 4 Remove the faulty UPEU from the slot.

Step 5 Put the faulty UPEU into an ESD bag.

Step 6 Slide the new UPEU into the slot of the faulty UPEU.

Step 7 Fasten the screws on the panel of the new UPEU.

Step 8 Install the cables on the panel of the new UPEU according to the recorded installation position.

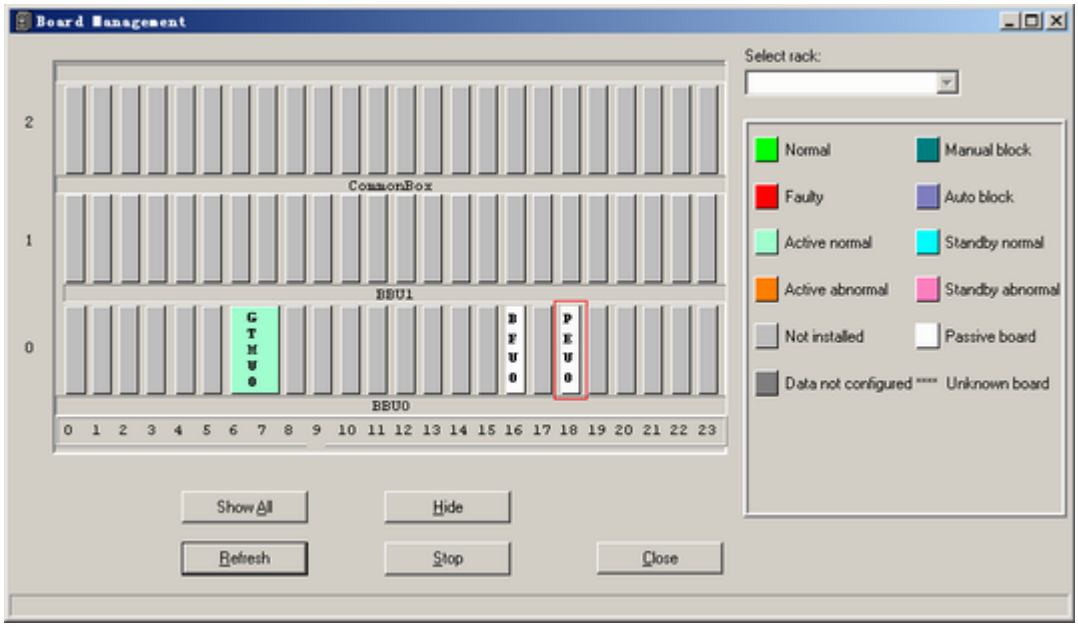
Step 9 Power on the BBU by referring to **Powering On the BBU**.

Step 10 Check the **RUN** LED on the panel of the new module and take actions accordingly.

If...	Then...
The **RUN** LED is on,	On the **Board Management** window of the Site Maintenance Terminal System, check whether the UPEU runs normally, as shown in **Figure 4-5**.

If...	Then...
The **RUN** LED is off,	Take the following measures to rectify the fault: ● Verify that the power switch is set to **ON**. ● Power off the BBU and check whether the power cable is securely connected. ● Power off the BBU, and then remove the board. Check whether there is a damaged pin. If there is no damaged pin, reinstall the board. If there is a damaged pin, replace the board. Power on the BBU and check whether the LEDs blink normally.

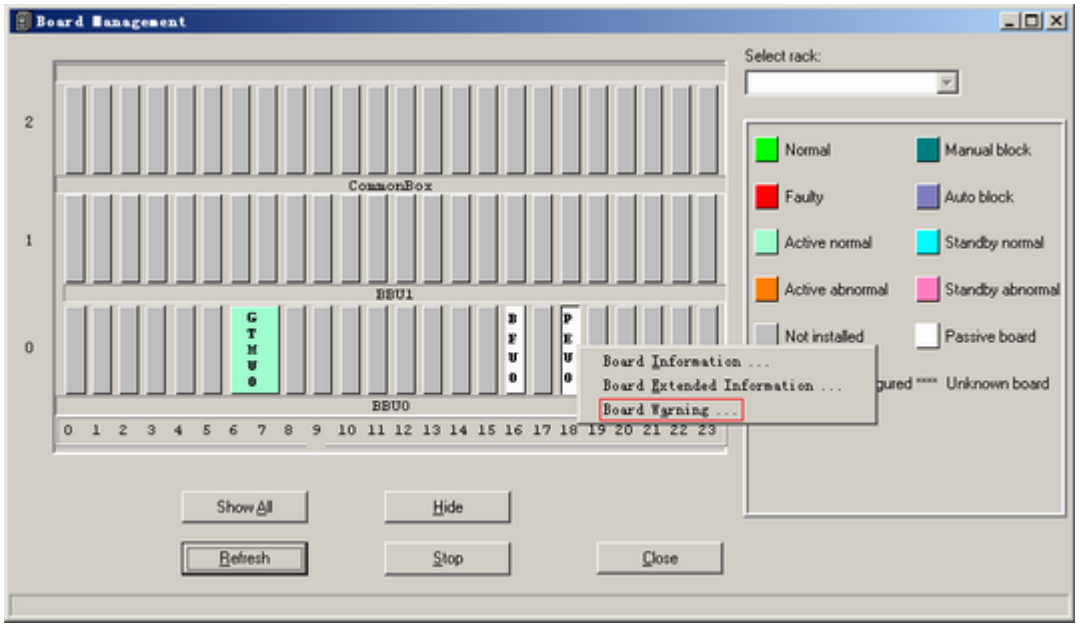
Figure 4-5 Checking whether the UPEU runs properly



If...	Then...
The UPEU icon is displayed white,	The board runs properly. Then, go to the next step.
The UPEU icon is displayed in other color,	The board runs improperly. Reinstall the board.

Step 11 On the **Board Management** window of the Site Maintenance Terminal System, right-click the board to be queried, and choose **Board Alarm** from the shortcut menu, as shown in **Figure 4-6**.

Figure 4-6 Querying UPEU alarms



If...	Then...
Alarms are not present,	The replacement is successful.
Alarms are present,	Rectify the fault as recommended.

----End

Postrequisite

Contact the local Huawei office to handle the faulty UPEU.

Replacing the UEIU

The Universal Environment Interface Unit (UEIU) is used to transmit the monitoring signals of the service boards in the BBU. During the replacement of the UEIU, the external devices cannot be monitored.

Prerequisite

- The number and types of faulty UEIUs are determined, and new UEIUs are available.
- The installation positions of the faulty UEIUs and the interconnection relations of the cables on the UEIU panels are recorded.
- The required tools and materials such as ESD wrist strap/ESD gloves and ESD box/ESD bag are kept ready.

Context

This board is hot swappable.

It takes about 5 minutes to replace the board. The duration of the replacement involves the removal of the cables and the faulty UEIU, the installation of the new UEIU and the cables, and the time elapsed for the operation of the UEIU.

CAUTION

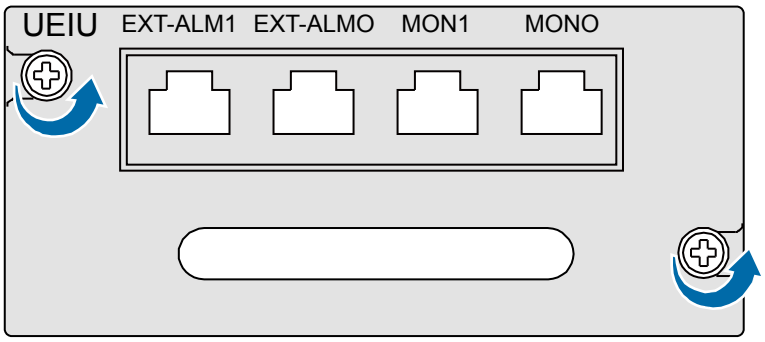
Take correct ESD prevention measures, such as wearing an ESD wrist strap or ESD gloves, to avoid static damage to boards, modules, and electronic components.

Procedure

Step 1 Remove the cables from the panel of the faulty UEIU.

Step 2 Loosen the screws on the panel of the UEIU, as shown in **Figure 4-7**.

Figure 4-7 Loosening the screws



Step 3 Remove the faulty UEIU from the slot.

Step 4 Put the faulty UEIU into an ESD bag.

Step 5 Slide the new UEIU into the slot of the faulty UEIU.

Step 6 Fasten the screws on the panel of the new board.

Step 7 Install the cables on the panel of the new board according to the recorded installation positions.

----End

Postrequisite

Contact the local Huawei office to handle the faulty UEIU.

Replacing the GTMU

As the basic transmission and control entity of the BBU, the GTMU controls and manages the entire BTS. It provides the interfaces associated with reference clock, power supply, OM, and external alarm collection. During the replacement of the GTMU, the services carried by the BTS are disrupted.

Prerequisite

- The number and types of faulty GTMUs are determined, and new GTMUs are available.
- The installation positions of the faulty GTMUs and the interconnection relations for the cables on the GTMU panels are recorded.
- The required tools and materials such as ESD wrist strap/ESD gloves and ESD box/ESD bag are available.

Context

This board is hot swappable.

It takes about 15 minutes to replace the board. The duration of the replacement involves the removal of the cables and the faulty board, the installation of the new board and the cables, and the time required for the operation of the board.

CAUTION

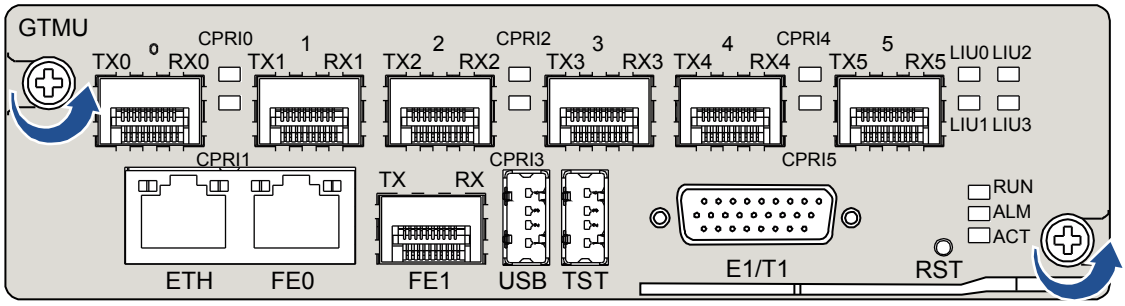
Take correct ESD prevention measures, such as wearing an ESD wrist strap or ESD gloves, to avoid static damage to boards, modules, and electronic components.

Procedure

Step 1 Remove the cables from the panel of the faulty GTMU.

Step 2 Loosen the screws on the panel of the GTMU, as shown in **Figure 4-8**.

Figure 4-8 Loosening the screws



Step 3 Remove the faulty GTMU from the slot.

Step 4 Put the faulty GTMU into an ESD bag.

Step 5 Slide the new GTMU into the slot of the faulty GTMU.

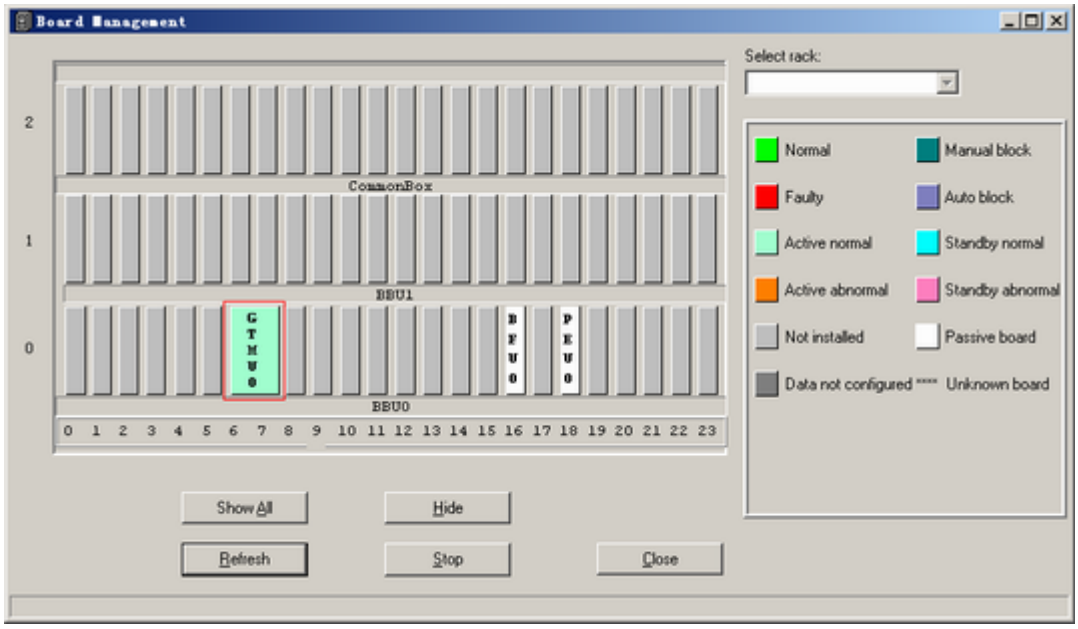
Step 6 Fasten the screws on the panel of the new GTMU.

Step 7 Install the cables on the panel of the new GTMU according to the recorded installation positions.

Step 8 Check the LEDs on the panel of the new board.

If...	Then...
The RUN LED is on, and the ALM and ACT LEDs are off,	On the **Board Management** window of the Site Maintenance Terminal System, check whether the GTMU runs normally, as shown in **Figure 4-9**.
The RUN, ALM, or ACT LED is in other state,	Power off the BBU, and then remove the GTMU. Check whether there is a damaged pin. If there is no damaged pin, reinstall the board, and then check whether the board runs normally. If there is a damaged pin, replace the board.

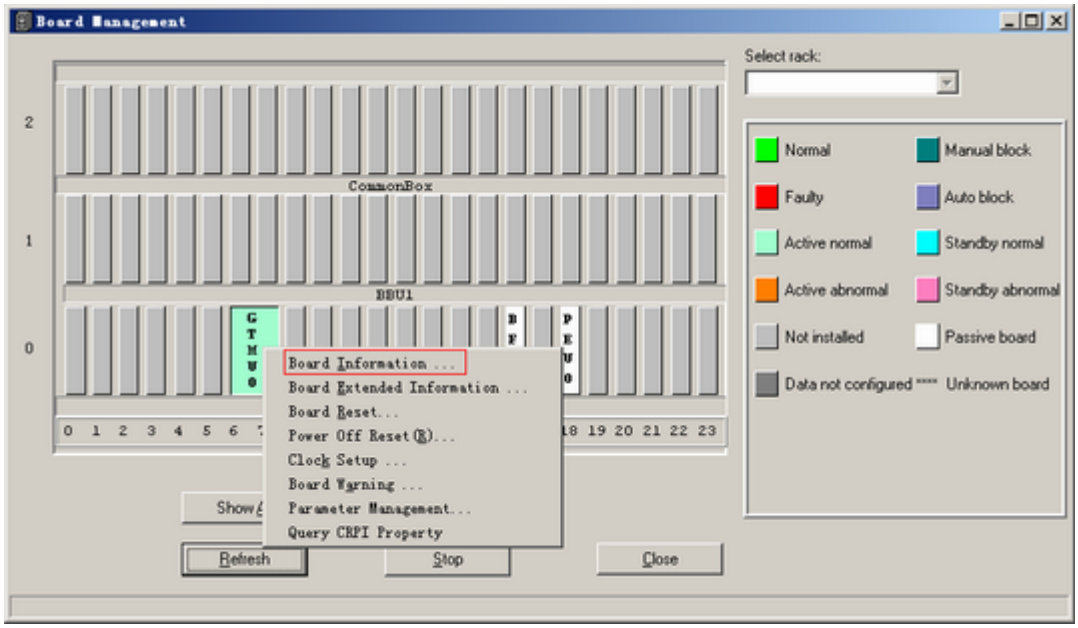
Figure 4-9 Checking whether the GTMU runs properly



If...	Then...
The GTMU icon is displayed green,	The board runs properly. Then, go to the next step.
The GTMU icon is displayed in other color,	The board runs improperly. Reinstall the board.

Step 9 On the **Board Management** window of the Site Maintenance Terminal System, right-click the GTMU to be queried, and choose **Board Information** from the shortcut menu. Check whether the software version of the GTMU matches the software version of the BTS, as shown in **Figure 4-10**.

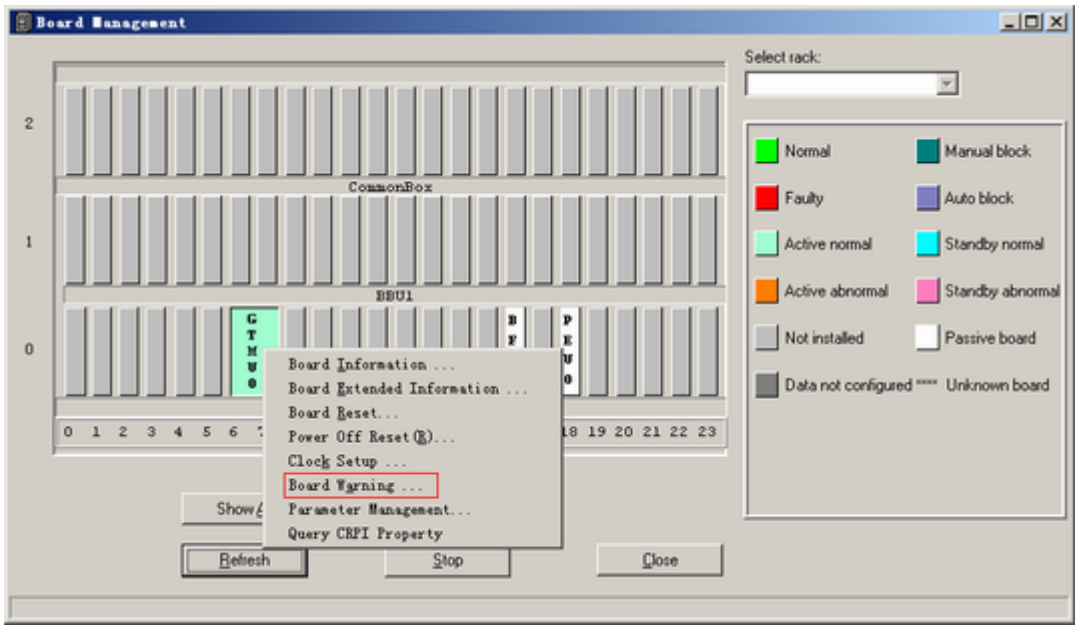
Figure 4-10 Querying the software version of the GTMU



If...	Then...
The software version of the GTMU matches the current BTS software version,	Go to the next step.
The software version of the GTMU does not match the current BTS software version,	Load and activate the software.

Step 10 On the **Board Management** window of the Site Maintenance Terminal System, right-click the board to be queried, and choose **Board Alarm** from the shortcut menu, as shown in **Figure 4-11**.

Figure 4-11 Querying GTMU alarms



If...	Then...
Alarms are not present,	The replacement is successful.
Alarms are present,	Rectify the fault as recommended.

Step 11 Check whether the board can process the services. Perform dialing tests after the board replacement. If the board before the replacement supports PS services, check whether the board after the replacement can process the PS services, such as web browsing, to ensure that the board can provide services properly.

----End

Postrequisite

Contact the local Huawei office to handle the faulty GTMU.

Replacing the UELP

The UELP is used for E1/T1 surge protection of the BBU. Each UELP provides surge protection for four E1/T1 signals. The UELP replacement interrupts the E1/T1 links. Thus, the ongoing BTS services are disrupted.

Prerequisite

- The number and types of faulty UELPs are determined, and new UELPs are kept ready.
- The installation positions of the UELP and the interconnection relations of the cables on the UELP panel are recorded.
- The required tools and materials such as ESD wrist strap/ESD gloves and ESD box/ESD bag are kept ready.

Context

It takes about two minutes to replace the board. The duration of the replacement involves the removal of the cables and the faulty board, the installation of the new board and the cables, and the time required for the operation of the board.

CAUTION

Take correct ESD prevention measures, such as wearing an ESD wrist strap or ESD gloves, to avoid static damage to boards, modules, and electronic components.

Procedure

Step 1 Remove the cables from the panel of the faulty UELP.

Step 2 Loosen the screws on the panel of the UELP, as shown in **Figure 4-12**.

Figure 4-12 Loosening the screws

Step 3 Remove the faulty UELP from the slot.

Step 4 Slide the new UELP into the slot of the faulty UELP.

Step 5 Fasten the screws on the panel of the new UELP.

Step 6 Install the cables on the panel of the new UELP according to the recorded installation positions.

Step 7 Perform the dialing test to verify that the services are resumed.

----End

Postrequisite

Contact the local Huawei office to handle the faulty UELP.

4.2 Replacing the DCDU-01

This describes how to replace the DCDU-01. The DCDU-01 allows one input and ten outputs. It supplies the -48 V DC power to the boards and modules in the cabinet. The replacement of the DCDU-01 disrupts all the services carried by the BTS.

Prerequisite

The required tools and materials, such as ESD wrist strap, cross screwdriver, ESD box or bag, dustfree cotton cloth, fiber cleaner, and key to the cabinet door, are available.

Context

It takes about 15 minutes to replace the DCDU-01. The time covers the activities of disconnecting the cables, removing the faulty module, installing a new module, and connecting the cables to the new module.

WARNING

Take proper ESD prevention measures, for example, wear an ESD wrist strap or gloves to prevent the boards, modules, and electronic components from being damaged by the static generated by human body.

Procedure

Step 1 Switch off the external power supply to the BTS.

Step 2 Label the cables on the DCDU-01, and then disconnect the cables.

Step 3 Use a cross screwdriver to remove the four M6x12 screws that fix the DCDU-02 to the cabinet.

Step 4 Pull out the DCDU-02 by one-third of its length. Then, hold the DCDU-02 with one hand and remove it from the subrack.

Step 5 Install a new DCDU-01 by referring to **Installing the DCDU-01**.

Step 6 Connect the cables to the ports on the new DCDU-01 panel based on the labels.

Step 7 Switch on the external power supply to the BTS3900 by referring to **Powering On the BTS3900**.

----End

Postrequisite

1. Record the bar code, name, and PCB version of the faulty DCDU-02.
2. Check whether there is obvious physical damage to the DCDU-02. The damage may be burned PCB, burned components, distorted connectors, bent pins, or broken pins.
3. Record the fault information, such as the cause, symptom, and site name.
4. Place the faulty DCDU-02 into an ESD box and store it properly.
5. Contact the local Huawei office to dispose of the faulty DCDU-02.

4.3 Replacing the FAN Unit

This describes how to replace the FAN unit. The FAN unit regulates the temperature at the air inlet of the cabinet and in the fan box. It can adjust the rotation speed of the fans to implement ventilation and dissipation for the cabinet. Replacing the FAN unit may result in over-temperature alarms due to interruption of heat dissipation for the cabinet but has no negative effect on services of the BTS.

Prerequisite

- The location of the faulty FAN unit is obtained, and a new FAN unit is available.

- Ensure that the new FAN unit is in good condition and the version of the new FAN unit is consistent with that of the faulty FAN unit.
- The required tools and materials, such as ESD wrist strap, cross screwdriver, ESD box or bag, and the key to the cabinet door, are available.

Context

It takes about 20 minutes to replace a FAN unit.

WARNING

Take proper ESD prevention measures, for example, wear ESD wrist straps or gloves to prevent the boards, modules, and electronic components from being damaged by the static generated by human body.

Procedure

Step 1 Set the FAN switch on the DCDU to OFF.

Step 2 Label the cables on the panel of the FAN unit and then remove the cables.

Step 3 Loosen the four screws fixing the fan subrack.

Step 4 Pull out the FAN unit by one-third of its length. Hold the FAN unit with the other hand and then pull out the FAN unit.

Step 5 Install a new FAN unit by referring to **Installing the FAN Unit**.

Step 6 Install the cables to the panel of the FAN unit based on the labels.

Step 7 Set the FAN switch on the DCDU to ON.

----End

Postrequisite

After replacing the FAN unit, verify the following items:

- The fans run normally.
- The cable connections are correct and secure.
- After the FAN unit is powered on, the RUN LED on the panel is green and blinks at 0.5 Hz.
- On the M2000 or the LMT, the alarms related to the FAN unit are cleared after the FAN unit is powered on.

Contact the local Huawei office to dispose of the faulty FAN unit.

4.4 Replacing the PMU/PSU

This describes how to replace the PMU/PSU. The PMU is the power and environment monitoring unit, and the PSU is the power supply unit that converts AC power into DC power. The replacement of a PMU disrupts the power supply monitoring function that is performed by the PMU. The replacement of a PSU disrupts the DC power supply to the BTS.

Prerequisite

- The location of the PMU/PSU to be replaced is determined.
- The version of the new PMU/PSU is consistent with that of the PMU/PSU to be replaced.
- The required tools, such as a straight screwdriver, an ESD wrist strap, and the key to the cabinet door, are available.

Context

- There are no PMU or PSU in the cabinet using -48 V DC power.
- There are a maximum of four PSUs in the cabinet using +24 V DC power. There are no PMU in this type of cabinet.
- There are a maximum of one PMU and three PSUs in the cabinet using 220 V AC power.
- The PMU is the core of the power and environment monitoring unit. It collects, processes, and reports all the environment variables.
- The PSU converts the AC power (mains) or +24 V DC power to -48 V DC power.

WARNING

Calculate the system load before replacing the PMU/PSU. If there are insufficient standby PSUs or the batteries cannot sustain the system, removing the PSU resets the BTS and negatively affects the ongoing services.

WARNING

Take proper ESD prevention measures, for example, wear ESD wrist straps or gloves to prevent the boards, modules, and electronic components from being damaged by the static generated by human body.

Procedure

Step 1 Loosen the screws on the panel of the PMU/PSU.

Step 2 Loosen the handles on the PMU/PSU panel and slide the PMU/PSU along the guide rails.

Step 3 Install a new PMU/PSU by referring to **Install a new PMU/PSU**.

----End

Postrequisite

- After replacing the PMU/PSU, ensure that the related alarms on the LMT or M2000 are cleared.
- Contact the local Huawei office to dispose of the faulty PMU/PSU.

4.5 Replacing the GATM

This describes how to replace the GSM antenna and TMA control module (GATM). The GATM controls the RET antenna and supplies power to the TMA. The replacement of the GATM disrupts the services carried on it.

Prerequisite

The required tools and materials, such as ESD wrist strap, cross screwdriver, ESD box or bag, dustfree cotton cloth, and key to the cabinet door, are available.

Context

WARNING

Take proper ESD prevention measures, for example, wear ESD wrist straps or gloves to prevent the boards, modules, and electronic components from being damaged by the static generated by human body.

Procedure

Step 1 Set the power switch on the DCDU that corresponds to the GATM to be replaced to OFF.

Step 2 Label the cables on the GATM, and then disconnect the cables.

Step 3 Use a cross screwdriver to loosen the four screws on the GATM panel.

Step 4 Pull out the GATM by one-third of its length. Then, hold the GATM with one hand and remove it from the subrack.

Step 5 Place the removed GATM in an ESD box.

Step 6 Ensure that the new GATM is in good condition and that the hardware version of the new GATM is consistent with that of the faulty GATM.

Step 7 Install a new GATM by referring to **Installing the GATM**.

Step 8 Connect the cables to the ports on the new GATM panel based on the labels.

Step 9 Set the power switch on the DCDU that corresponds to the new GATM to ON.

----End

Postrequisite

1. Record the bar code, name, and PCB version of the faulty board.
2. Check whether there is obvious physical damage to the board. The damage may be burned PCB, burned components, distorted connectors, bent pins, or broken pins.
3. Record the fault information, such as the cause, symptom, and site name.
4. Put the board into the ESD bag, and then put the bag into the board box. Keep it properly.

5. Contact the local Huawei office to dispose of the faulty board.

4.6 Replacing the DRFU

This describes how to replace the Double Radio Filter Unit (DRFU). The DRFU is located in the multi-transceiver subsystem of the BTS. One DRFU provides two TRXs. The replacement of the DRFU disrupts the services carried on it.

Prerequisite

The required tools and materials, such as torque wrench, ESD wrist strap, cross screwdriver, ESD box or bag, dustfree cotton cloth, and key to the cabinet door, are available.

Context

It takes about six minutes to replace the DRFU. The replacement time covers the activities of disconnecting the cables, removing screws from the module, removing the faulty module, installing a new module, fastening the screws to the panel, connecting the cables to the new module, and downloading the software.

WARNING

Use both hands to install the DRFU because it is heavy.

WARNING

Take proper ESD prevention measures, for example, wear ESD wrist straps or gloves to prevent the boards, modules, and electronic components from being damaged by the static generated by human body.

Procedure

Step 1 Set the power switch on the DCDU that corresponds to the DRFU to be replaced to OFF.

Step 2 Label the cables on the DRFU, and then disconnect the cables.

WARNING

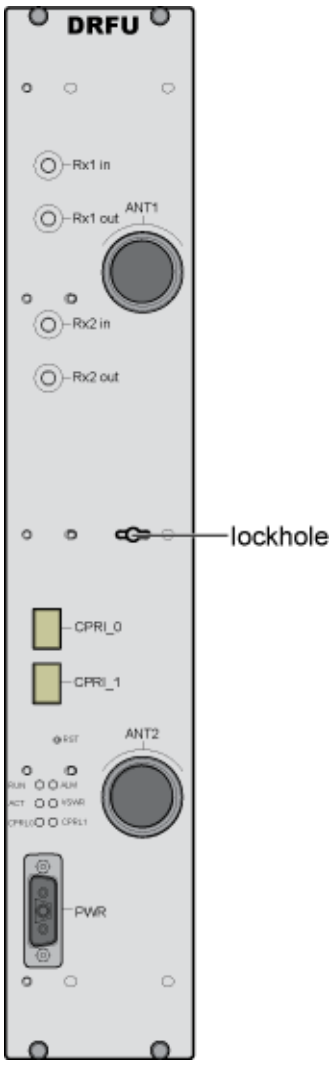
The connectors of the RF cables are tightly connected. Therefore, use a torque wrench to remove the connectors.

Step 3 Use a cross screwdriver to loosen the four screws on the DRFU panel.

Step 4 Insert the standard handle delivered with the BTS into the lockhole at the center part of the DRFU panel. Turn the standard handle at an angle of 90°, and then pull out the module by holding the standard handle firmly. Hold the module at the bottom with one hand, and then remove the module from the rack. **Figure 4-13** shows the standard handle. **Figure 4-14** shows the lockhole on the panel of the DRFU.

Figure 4-13 Standard handle

Figure 4-14 Lockhole on the DRFU panel



Step 5 Place the removed DRFU in an ESD box.

Step 6 Ensure that the new DRFU is in good condition, and that the hardware version of the new DRFU is consistent with that of the faulty DRFU.

Step 7 Install a new DRFU by referring to **Installing the DRFU**.

Step 8 Connect the cables to the ports on the new DRFU panel based on the labels.

Step 9 Set the power switch on the DCDU that corresponds to the new DRFU to ON.

----End

Postrequisite

1. Clear related alarms according to the alarm handling suggestions in the online help.
2. Check whether the new DRFU can provide the services properly.
3. Record the bar code, name, and PCB version of the faulty board.

4. Check whether there is obvious physical damage to the board. The damage may be burned PCB, burned components, distorted connectors, bent pins, or broken pins.
5. Record the fault information, such as the cause, symptom, site name, and slot number.
6. Put the board into the ESD bag and then put the bag into the board box. Keep it properly.
7. Contact the local Huawei office to dispose of the faulty DCDU.