

# DRH Hardware Maintenance Guide

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**Date**        2013-04-10

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# About This Document

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## Purpose

This document describes routine maintenance procedures for a DRH (referred to as DRH in this document), such as equipment preventive maintenance and power-on and power-off operations. It also explains how to replace the DRH and optical modules.

## Product Versions

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

Product Name	Product Version
DRH	V100R001

## Intended Audience

This document is intended for:

- System engineers
- Site maintenance engineers

## Organization

### [1 Changes in the DRH Hardware Maintenance Guide](#)

This chapter describes the changes in the *DRH Hardware Maintenance Guide*.

### [2 Preventative Maintenance Items for a DRH](#)

Preventative maintenance improves the reliability of the DRH. You are advised to perform scheduled maintenance yearly.

### [3 Powering On and Off a DRH](#)

After a DRH is powered on, check the status of DRH indicators and voltage. Before the DRH is powered off, follow the normal power-off or emergent power-off procedure as required.

### [4 Replacing a DRH](#)

A distributed base station consists of DRHs and a DCU. Replacing a DRH inteDRHpts all the services carried by the DRH, and alarms are generated.

### [5 Replacing an Optical Module](#)

An optical module implements optical-electrical conversion, enabling optical transmission between a DRH and other devices. You must disconnect optical fibers from an optical module before replacing the optical module. Disconnecting the optical fibers interrupts the transmission of CPRI signals.

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# 1 Changes in the DRH Hardware Maintenance Guide

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This chapter describes the changes in the *DRH Hardware Maintenance Guide*.

Date	Issue	Description	Author
2013-04-10	V1.0	First release	ID: h00173116/z00138293

# 2 Preventative Maintenance Items for a DRH

Preventative maintenance improves the reliability of the DRH. You are advised to perform scheduled maintenance yearly.



When working at heights, the maintenance personnel need to exercise caution to avoid falling of objects, which may cause injuries or death. In addition, the maintenance personnel must always wear helmets in the working area and avoid dangerous areas.

The items in the following checklist are not mandatory but strongly recommended. [Table 2-1](#) lists the preventative maintenance items for a DRH.

**Table 2-1** Preventative maintenance items for a DRH

No.	Item
1	All DRHs are properly installed and in good condition.
2	The cable seals at the entry points of the cabinet are in good condition.
3	All RF cables are free from wear, cuts, cracks, or other damage.
4	All RF cable connectors are sealed properly.
5	All RF cable conduits are in good condition.
6	All power cables are free from wear, cuts, cracks, or other damage.
7	All power cable connectors are in good condition.
8	All power cable conduits are in good condition.
9	All shield layers of power cables are in good condition.
10	All power cables are in good condition.
11	All CPRI optical fibers are free from wear, cuts, cracks, or other damage.
12	All screws are tightened on the cover plate of the maintenance cavity.

No.	Item
13	All alarm cables (optional) are installed and free from any damage.
14	All monitoring cables (optional) are installed and free from any damage.

If any of the requirements in the checklist is not met, perform the following corrective actions.

1. Tighten all connections.
2. Report the problems to the supervisor so that the qualified engineers can be assigned to maintain the DRH.



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# 3 Powering On and Off a DRH

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After a DRH is powered on, check the status of DRH indicators and voltage. Before the DRH is powered off, follow the normal power-off or emergent power-off procedure as required.

## 3.1 Powering On a DRH

Switch on the circuit breakers on the auxiliary power device for a DRH and observe the indicators on the DRH to check the running status.

### Prerequisites

- The DRH hardware is installed and DRH cable connections are secure.
- The input voltage of a DC DRH ranges from -36 V DC to -57 V DC.
- The input voltage of an AC DRH ranges from 90V AC to 290 V AC.

### Context



#### CAUTION

After you unpack a DRH, you must power on it within 24 hours. If you power off the DRH for maintenance, you must restore power to the DRH within 24 hours.

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### Procedure

- Step 1** To power on the DRH, set the corresponding circuit breaker on the auxiliary power device for the DRH to ON.



#### DANGER

Do not look into the optical module without eye protection after the DRH is powered on.

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- Step 2** Wait for three to five minutes, and then check the status of the indicators on the DRH. For details, see section "DRH Indicators" in the *DRH Hardware Description*.



**NOTE**

If DRHs are cascaded, check the status of all DRH indicators.

**Step 3** Take corresponding actions based on the status of the indicators.

If...	Then...
The DRH is operating properly	End the power-on check task.
The DRH is faulty	Set the circuit breaker to OFF, rectify the fault, and go to <a href="#">Step 1</a> .

----End

## 3.2 Powering Off a DRH

The procedure for powering off a DRH varies with the actual condition, for example, in a normal situation or an emergency. You must power off the DRH in a normal situation such as moving the equipment or anticipating a territorial blackout. You must also power off the DRH in an emergency such as a fire, smoke, or water damage.

### Procedure

**To perform a normal power-off, perform the following steps:**



**NOTE**

If DRHs are cascaded, consider the impacts of power-off operations on lower-level DRHs to prevent service interruption.

**Step 1** Set the corresponding circuit breaker on the auxiliary power device for the DRH to OFF.

**To perform an emergent power-off, perform the following steps:**



### CAUTION

Emergent power-off may lead to damage on the DRH. Therefore, this type of power-off is not recommended in normal cases.

**Step 1** Disconnect the power supply from the auxiliary power device for the DRH.

**Step 2** If time permits, set the corresponding circuit breaker on the auxiliary power device for the DRH to OFF.

----End

# 4 Replacing a DRH

This chapter describes the procedure and precautions for replacing a DRH.

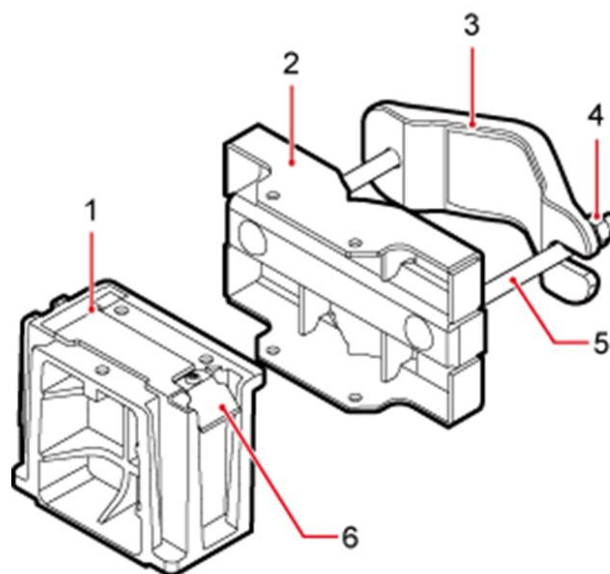
## Prerequisites

- The WebLMT or M2000 communicates with the station properly.
- The types of faulty DRHs are confirmed as follows:
  - Log in to the WebLMT or M2000 and run the MML command to query the manufacturing information of the DRHs. The types of DRHs to be replaced can be determined according to the values of **Type** and **Description** in the command execution result.
  - Run the **DSP BRDMFRINFO** command.
- Tools and materials, such as ESD gloves, M5 Phillips screwdrivers, M6 Phillips screwdrivers, M6 inner hexagon torque wrench, waterproof tape, and PVC insulation tape, are ready.
- The number and type of DRHs to be replaced are confirmed, and new DRHs are ready.

## Context

Figure 4-1 shows DRH components.

**Figure 4-1** DRH components



(1) Main mounting bracket (2) Pole mounting bracket (3) Auxiliary mounting bracket (4) Nut (5) Square-neck bolt (6) Hoist clamp on the main mounting bracket

## Procedure

- Step 1** Instruct the WebLMT or M2000 administrator to block the DRH.
- Run the **LST IBSLOCELL** command to list all cells on the DRH.
  - Run the **BLK IBSLOCELL** command to block all cells on the DRH.
- Step 2** Power off the DRH by referring to [3.2 Powering Off a DRH](#).
- Step 3** Wear ESD gloves.

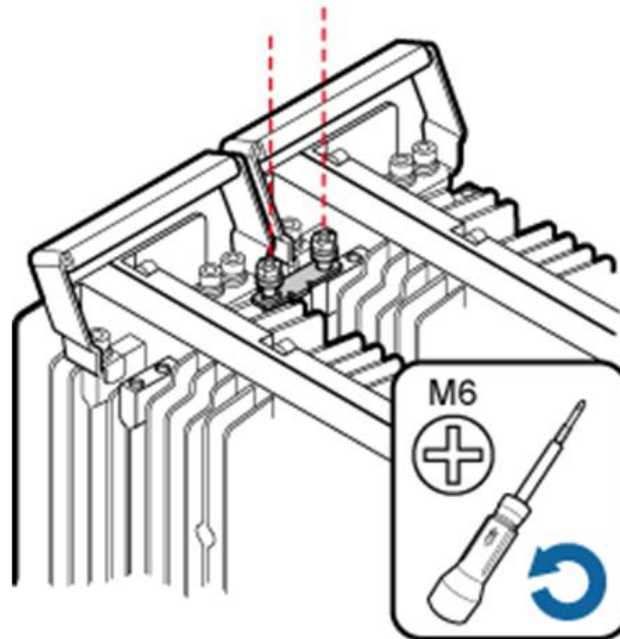


Take proper ESD protection measures, for example, wear ESD gloves, to prevent electrostatic damage to the boards, modules, or electronic components.

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- Step 4** Loosen the screws on the cover plate of the DRH cabling cavity using an M5 Phillips screwdriver, and then open the cover plate.
- Step 5** Record all the cable connections on the panel of the module to be replaced.
- Step 6** Disconnect cables from the cabling cavity and bottom panel.
- Step 7** **Optional:** If a DRH installed in centralized mode is to be replaced, first use an M6 Phillips screwdriver to loosen the two screws on the metal sheet of the DRH and remove the metal sheet, as shown in [Figure 4-2](#).

**Figure 4-2** Removing the metal sheet from a DRH installed in centralized mode



 **NOTE**

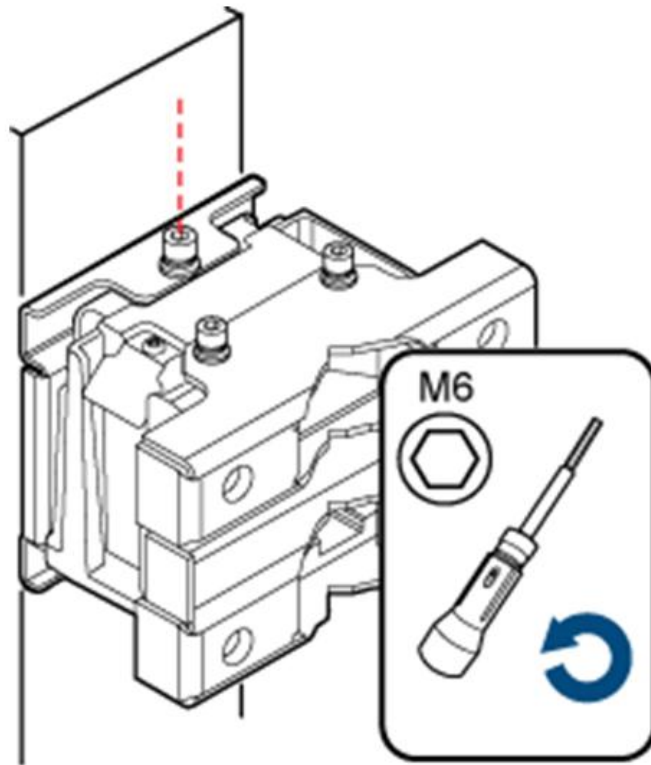
The subsequent operations are the same as those in the procedure for replacing a single DRH.

**Step 8** Use an M6 inner hexagon torque wrench to loosen the captive screw on the attachment plate, as shown in [Figure 4-3](#), then raise the DRH bottom to remove it, as shown in [Figure 4-4](#).

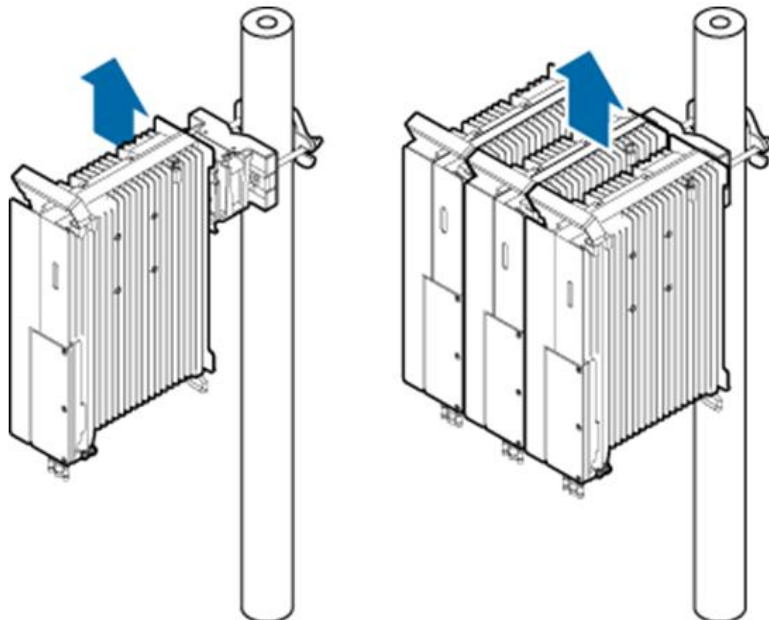
 **NOTE**

In scenarios where DRHs are installed in centralized mode, the DRH in the middle can be removed without removing the two DRHs on its right and left sides. The procedure is identical to the procedure for removing a single DRH.

**Figure 4-3** Loosening captive screws on the attachment plate



**Figure 4-4** Supporting the DRH bottom





## CAUTION

When removing the DRH, hold the DRH handle with one hand and raise the DRH bottom with the other hand.

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- Step 9** Install a new DRH. For details, see the *DRH Installation Guide*.
- Step 10** Reconnect all required cables, waterproof the connector on the RF jumper, and verify that vacant cable troughs in the cabling cavity are equipped by waterproof blocks.
- Step 11** Close the cover plate of the DRH cabling cavity, and then tighten the protection screw on the cover plate of the DRH cabling cavity using an M5 Phillips screwdriver.
- Step 12** Power on the DRH by referring to [3.1 Powering On a DRH](#).
- Step 13** Check the operating status of the new DRH by observing the status of DRH indicators. When the RFU is normal, the RUN indicator is blinking for 1s on and 1s off.
- Step 14** Instruct the WebLMT or M2000 administrator to unblock the DRH.
- Run the **LST IBSLOCELL** command to list all cells on the DRH.
  - Run the **UBL IBSLOCELL** command to unblock all cells on the DRH.
- Step 15** Take off the ESD gloves, and pack up all the tools.

----End

## Follow-up Procedure

- Place the removed DRH into the ESD box or bag. Then, place the ESD box or bag into a foam-padded carton or the packing box of the new DRH.
- Fill in the fault form with detailed information about the removed component.
- Contact the local Huawei office to handle the faulty component.

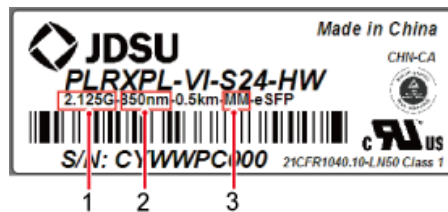
# 5 Replacing an Optical Module

An optical module implements optical-electrical conversion, enabling optical transmission between a DRH and other devices. You must disconnect optical fibers from an optical module before replacing the optical module. Disconnecting the optical fibers interrupts the transmission of CPRI signals.

## Prerequisites

- Confirm the type of a faulty optical module and do as follows:
  - Log in to the WebLMT or M2000 and run the **DSP SFP** command.
  - Confirm the type of the faulty optical module according to the **Transmission Rate**, **Wavelength**, and **Transmission mode** fields in the query result and obtain an optical module of the same type. [Figure 5-1](#) shows the label on the optical module.

**Figure 5-1** Label on the optical module



(1) Peak rate

(2) Wavelength

(3) Transmission mode

- If the software version does not support query of the type of the optical module by using an MML command, obtain all types of optical modules.
- If a fault in the optical module on the DRH side causes disconnection of the CPRI link, the MML command to query the type of the fault cannot be used. In this case, query the type of the corresponding optical module on the DCU side instead and obtain a new optical module of the same type. For the detailed querying method, see the *DCU3900 Hardware Maintenance Guide*.
- The following tools and materials are available: ESD gloves, M4 Phillips screwdrivers, and an ESD box or bag.

## Context

- Optical modules are inserted into CPRI ports on a DRH.
- Optical modules are hot-swappable when the same CPRI ports are used.



- It takes about five minutes to replace an optical module on the DRH, which involves disconnecting optical fibers, removing the faulty optical module, inserting a new optical module, reconnecting the optical fibers, and waiting for CPRI links to resume.

## Procedure

**Step 1** Wear ESD gloves.



Take proper ESD protection measures, for example, wear ESD gloves, to prevent electrostatic damage to the boards, modules, or electronic components.

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**Step 2** Loosen the screws on the cover plate of the DRH cabling cavity using an M4 Phillips screwdriver, and then open the cover plate.

**Step 3** Record the connections of the optical module and optical fibers.

**Step 4** Press the latch on the optical fiber connector, and then remove the connector from the faulty optical module.



Do not look into the optical fiber or optical module without eye protection after the optical fiber is removed from the optical module.

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**Step 5** Lower the puller on the faulty optical module, and then pull the puller until the optical module is removed from the DRH.

**Step 6** Choose the optical module of the same type as the faulty optical module according to the label on the module. Install the new optical module into the DRH.



The optical modules to be installed must match CPRI rates.

**Step 7** Insert the optical fiber connector into the new optical module.

**Step 8** Check the operating status of the new DRH by observing the status of DRH indicators. For details about the status of indicators, see section "DRH Indicators" in the *DRH Hardware Description*.

**Step 9** Reconnect the cables in the cabling cavity.

**Step 10** Close the cabling cavity of the DRH and use an M4 Phillips screwdriver to tighten the screws on the cover plate for the cabling cavity.

**Step 11** Take off the ESD gloves, and pack up all the tools.

----End

## Follow-up Procedure

- Place the replaced optical module into the ESD box or bag. Then, place the ESD box or bag into a foam-padded carton or the packing box of the new module.
- Fill in the fault form with detailed information about the replaced module.
- Contact the local Huawei office to handle the faulty optical module.