Netra Modular System Service Manual Supplement

Part No: E59323-05
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Contents

Using This Documentation

- **Overview –** Describes how to troubleshoot and maintain the serviceable components of Oracle's Netra Modular System.
- **Audience –** Trained technicians and authorized Oracle service personnel.
- **Required Knowledge –** Training on the hazards within the equipment and how to remove and replace the hardware.

Product Documentation Library

Documentation and resources for this product and related products are available at http://www.oracle.com/goto/netra-modular-system/docs.

Feedback

Provide feedback about this documentation at http://www.oracle.com/goto/docfeedback.

Monitoring Faults

These topics describe the LEDs and provide references to documentation for monitoring faults.

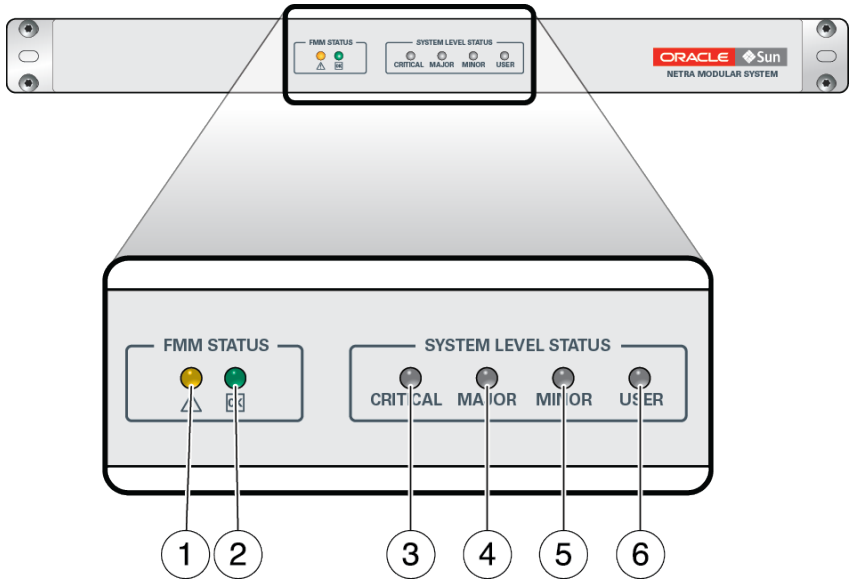
Related Information

- “Servicing the System Components” on page 19
- “Servicing PDUs” on page 87
- “Servicing an Oracle Server X5-2M” on page 57
- “Servicing an Oracle Server X6-2M” on page 71
- “Servicing Ethernet Switches” on page 111

Modular System LEDs

These are the status indicators (LEDs) on the front of the modular system. These LEDs are driven by the system management software (also referred to as the FSA).

FIGURE 1 Status LEDs



No.	Name
1	FMM Amber Alert LED: an error has occurred
2	FMM Green OK LED: solid green = system up with no errors. Flashing green = power up sequence
3	Critical System Fault LED: service required
4	Major System Fault LED: an error has occurred
5	Minor System Fault LED: an error has occurred
6	User LED: user-customizable LED

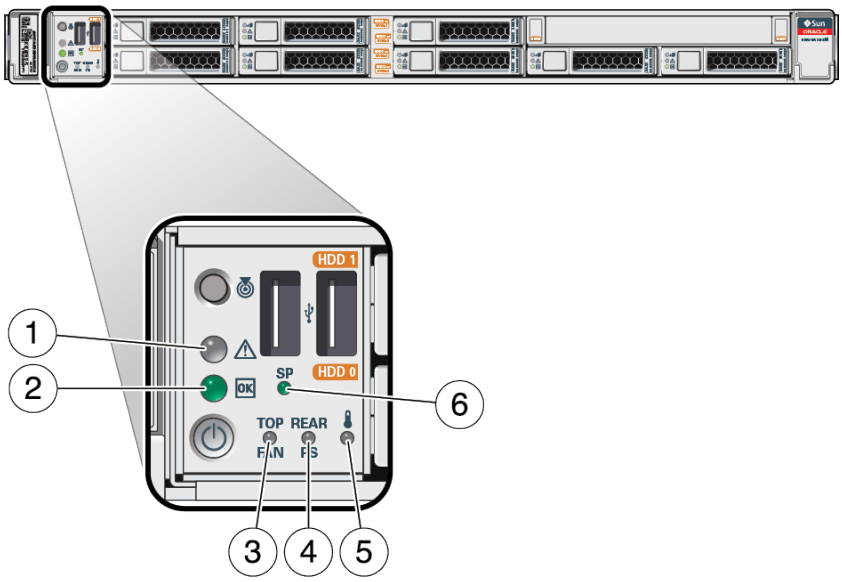
Related Information

- “Oracle Server X5-2M LEDs” on page 15
- “Oracle Server X6-2M LEDs” on page 16
- “Fault Monitoring Documentation” on page 17
- “Servicing the System Components” on page 19
- “Servicing an Oracle Server X5-2M” on page 57

Oracle Server X5-2M LEDs

The following figure shows the status indicators (LEDs) on the front panel of the Oracle Server X5-2M (applies to both the compute node and management node). These LEDs are controlled by Oracle ILOM.

FIGURE 2 Oracle Server X5-2M LEDs



No.	Name
1	Service Required LED: amber
2	Power/OK LED: solid or flashing (ok to hotswap) green
3	Top Fan Fault LED: amber
4	Rear Power Supply Fault LED: amber
5	System Over Temperature Warning LED: amber
6	SP OK LED: green

For detailed information about node faults, refer to the following documentation:

- *Oracle x86 Servers Administration, Diagnostics, and Applications Documentation*

http://docs.oracle.com/cd/E23161_01/

- *Oracle Server X5-2 Service Manual*

  http://docs.oracle.com/cd/E41059_01/html/E48312/napsm.html#scrolltoc

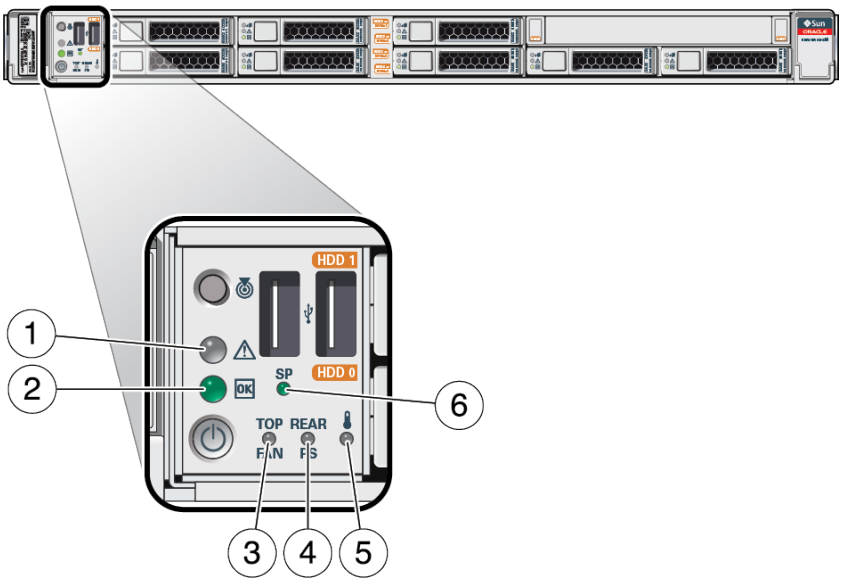
Related Information

- “Modular System LEDs” on page 13
- “Fault Monitoring Documentation” on page 17
- “Servicing an Oracle Server X5-2M” on page 57

Oracle Server X6-2M LEDs

The following figure shows the status indicators (LEDs) on the front panel of the Oracle Server X6-2M (applies to both the compute node and management node). These LEDs are controlled by Oracle ILOM.

FIGURE 3 Oracle Server X6-2M LEDs



No.	Name
1	Service Required LED: amber
2	Power/OK LED: solid or flashing (ok to hotswap) green
3	Top Fan Fault LED: amber
4	Rear Power Supply Fault LED: amber
5	System Over Temperature Warning LED: amber
6	SP OK LED: green

For detailed information about node faults, refer to the following documentation:

- *Oracle x86 Servers Administration, Diagnostics, and Applications Documentation*

  `http://docs.oracle.com/cd/E23161_01/`
- *Oracle Server X6-2 Service Manual*

  `http://docs.oracle.com/cd/E62159_01/html/E62171/index.html`

Related Information

- “Modular System LEDs” on page 13
- “Fault Monitoring Documentation” on page 17
- “Servicing an Oracle Server X6-2M” on page 71

Fault Monitoring Documentation

For detailed instructions and information about using Oracle ILOM to monitor faults on the modular system, refer to the following documentation:

- Oracle Integrated Lights Out Manager 3.2 Documentation Library at:

  `https://docs.oracle.com/cd/E37444_01/index.html`
- CLI Reference for Mapping Management Tasks to CLI Targets at:

  `https://docs.oracle.com/cd/E37444_01/html/E37447/z40000091420195.html#scrolltoc`
- Oracle x86 Servers Administration, Diagnostics, and Applications Documentation at:

  `http://docs.oracle.com/cd/E23161_01/`

Related Information

- “Modular System LEDs” on page 13

- “Oracle Server X5-2M LEDs” on page 15
- “Oracle Server X6-2M LEDs” on page 16
- “Servicing the System Components” on page 19
- “Servicing PDUs” on page 87
- “Servicing an Oracle Server X5-2M” on page 57
- “Servicing an Oracle Server X6-2M” on page 71
- “Servicing Ethernet Switches” on page 111

Servicing the System Components

These topics describe how to service the integrated hardware components that are part of the Netra Modular System.

Related Information

Safety and ESD Precautions

Before servicing any components, read and follow the safety precautions. Damage to the equipment and/or personal injury might occur if the precautions are not followed.

- For detailed safety information about the modular system, refer to "Preparing for Installation" in *Netra Modular System Installation Guide*
- For general safety and compliance information, refer to the Netra Modular System Safety and Compliance Guide (`http://docs.oracle.com/cd/E59318_01/pdf/E59325.pdf`).

Related Information

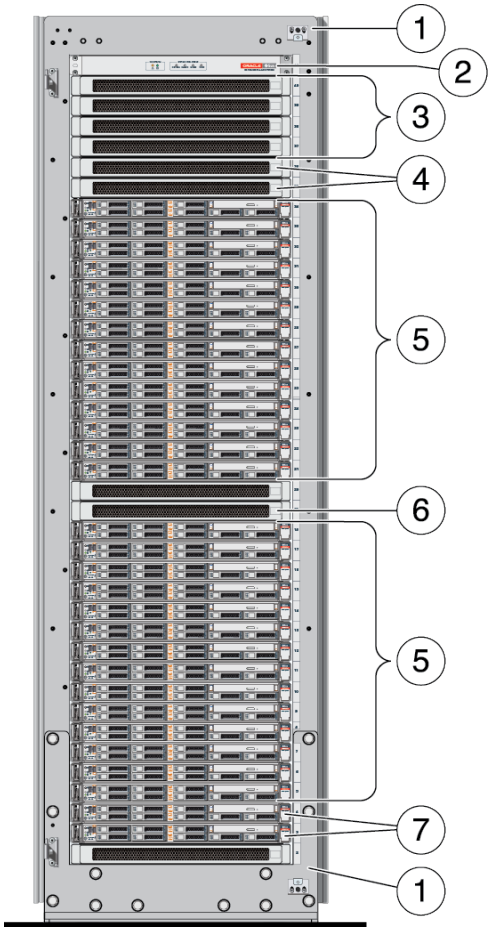
- "Replaceable CRUs" on page 27
- "Replaceable FRUs" on page 27
- "Servicing the System Components" on page 19
- "Servicing PDUs" on page 87
- "Servicing an Oracle Server X5-2M" on page 57
- "Servicing Ethernet Switches" on page 111
- "Servicing Cords and Cables" on page 123

Identifying Component Locations and Slot Numbers

- "Front Components" on page 21
- "Rear Components" on page 22
- "Component Slot Numbers" on page 25

Front Components

FIGURE 4 Component Locations on Front



No.	Name
1	Seismic frame
2	System Status LEDs
3	Ventilated covers for either Oracle Switch ES2-72 group (fiber) or MPO coupler panels (fiber)
4	Ventilated covers for Oracle Switch ES2-64 group (copper)

No.	Name
5	Compute nodes
6	FMM
7	Management node

Related Information

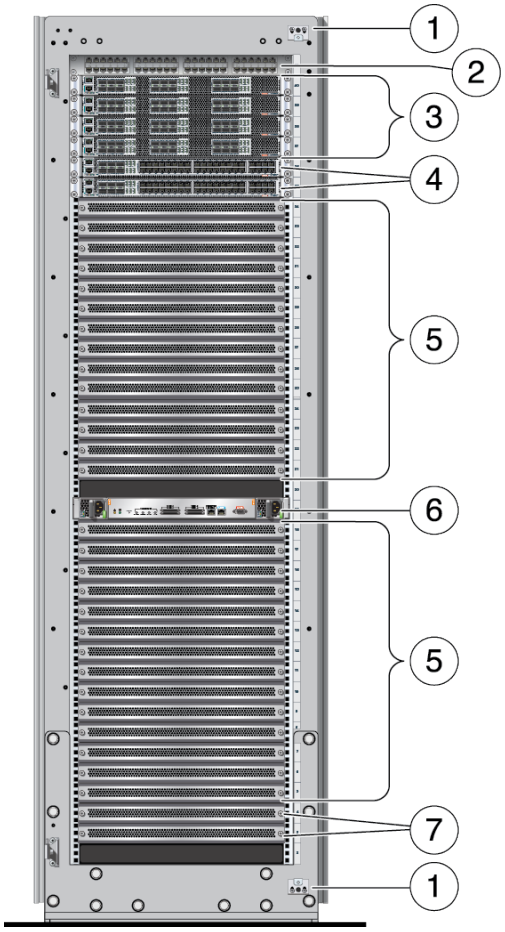
- “Rear Components” on page 22
- “Component Slot Numbers” on page 25

Rear Components

Depending upon your system configuration, the rear components resemble one of the following.

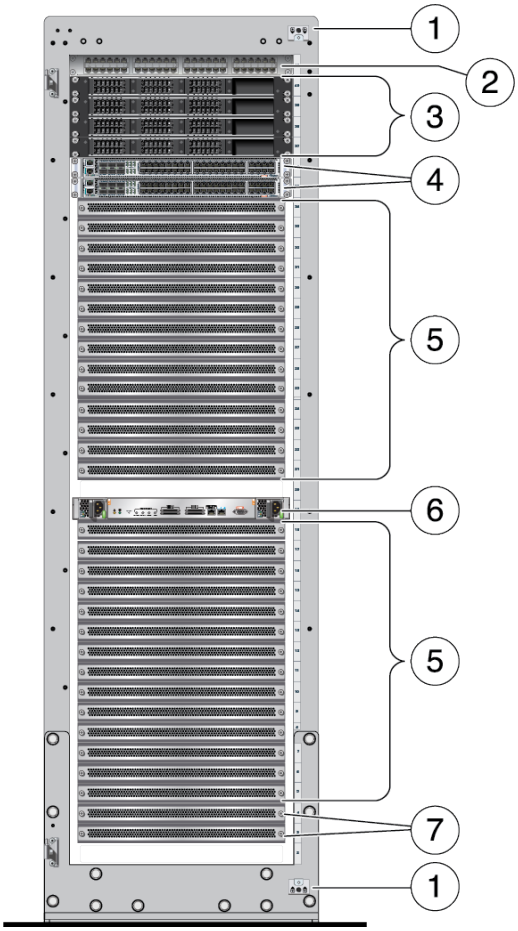
- Figure 5, “Component Locations at Rear (Switches),” on page 23
- Figure 6, “Component Locations at Rear (MPO Coupler),” on page 24

FIGURE 5 Component Locations at Rear (Switches)



No.	Name
1	Seismic frame
2	RJ-45 coupler panel
3	Oracle Switch ES2-72 group (fiber)
4	Oracle Switch ES2-64 group (copper)
5	FBSs to compute nodes
6	FMM
7	FBSs to management nodes

FIGURE 6 Component Locations at Rear (MPO Coupler)



No.	Name
1	Seismic frame
2	RJ-45 coupler panel (copper)
3	MPO coupler panel group (fiber)
4	Oracle Switch ES2-64 group (copper)
5	FBSs to compute nodes
6	FMM
7	FBSs to management nodes

Related Information

- “Front Components” on page 21
- “Component Slot Numbers” on page 25

Component Slot Numbers

Note - In place of the optional fiber switches, slots 37-40 can contain MPO coupler panels (fiber).

Slot #	Rear/Front View
42	Seismic Frame
41	RJ-45 Coupler Panel/LED Status Panel
40	Switch F4 (Optional)
39	Switch F3 (Optional)
38	Switch F2 (Optional)
37	Switch F1 (Optional)
36	Switch CU B
35	Switch CU A
34	FBS/Compute Node
33	FBS/Compute Node
32	FBS/Compute Node
31	FBS/Compute Node
30	FBS/Compute Node
29	FBS/Compute Node
28	FBS/Compute Node
27	FBS/Compute Node
26	FBS/Compute Node
25	FBS/Compute Node
24	FBS/Compute Node
23	FBS/Compute Node
22	FBS/Compute Node
21	FBS/Compute Node
20	FMM Cables
19	FMM Slot
18	FBS/Compute Node
17	FBS/Compute Node
16	FBS/Compute Node
15	FBS/Compute Node
14	FBS/Compute Node
13	FBS/Compute Node
12	FBS/Compute Node
11	FBS/Compute Node
10	FBS/Compute Node
9	FBS/Compute Node
8	FBS/Compute Node
7	FBS/Compute Node
6	FBS/Compute Node
5	FBS/Compute Node
4	FBS/Management Node
3	FBS/Management Node
2	(reserved)
1	Seismic Frame

Related Information

- “Front Components” on page 21
- “Rear Components” on page 22

Component Types and Service Classifications

Some components in the modular system are removable and serviceable.

Serviceable components are two types:

- CRUs can be removed and replaced by any qualified technician.
- FRUs must be removed and installed only by authorized Oracle service personnel.

Components have three service classifications:

- **Hot-pluggable** – Using the proper software commands, you can install or remove hot-pluggable components while the modular system is running.
- **Hot-swappable** – You can install or remove hot-swappable components while the modular system is running, without using any software commands.
- **Cold-swappable** – You must remove power from the modular system to service the components.

Component Name	Component Type	Service Classification
PDU	FRU	Cold-swappable
FBA	FRU	Cold-swappable
FBS PCB (FBN)	CRU	Hot-pluggable
FMM	FRU	Hot-swappable
Coupler panel (RJ-45 and MPO)	FRU	Hot-pluggable
System Status LED Panel	CRU	Hot-swappable
Power cords	CRU	Hot-swappable
Other cables	FRU	Hot-pluggable
Compute or management node	CRU	Hot-pluggable
Switches	FRU	Hot-pluggable

Related Information

- “Replaceable CRUs” on page 27
- “Replaceable FRUs” on page 27
- “Servicing the System Components” on page 19
- “Identifying Component Locations and Slot Numbers” on page 20

- "Safety and ESD Precautions" on page 19

Replaceable CRUs

These are CRUs that a trained technician can replace within the modular system.

Additionally, there are FRUs that can be replaced or serviced only by authorized Oracle service personnel. (See "Replaceable FRUs" on page 27.) If an item not listed here needs service, contact your service representative.

Description	Links
Oracle Server X5-2M or Oracle Server X6-2M entirely, and some of its components	"Servicing an Oracle Server X5-2M" on page 57 "Servicing an Oracle Server X6-2M" on page 71
System Status LED Panel	"Replacing the System Status LED Panel" on page 42
FBS PCB (FBN)	"Replace an FBS PCB" on page 29
Power cords	■ "Replace an FMM Power Cord" on page 130 ■ "Replace an FBS Power Cord" on page 132 ■ "Replace a Switch Power Cord" on page 133

Related Information

- "Oracle Server X5-2M CRUs" on page 61
- "Replaceable FRUs" on page 27
- "Servicing the System Components" on page 19
- "Safety and ESD Precautions" on page 19
- "Servicing the System Components" on page 19
- "Identifying Component Locations and Slot Numbers" on page 20

Replaceable FRUs

These are FRUs that can be replaced only by authorized Oracle service personnel who have been instructed on the hazards within the equipment and are qualified to remove and replace hardware.

Description	Links
Oracle Switch ES2-72 and Oracle Switch ES2-64	"Servicing Ethernet Switches" on page 111

Description	Links
Coupler panel	"Replacing the RJ-45 Coupler Panel" on page 37 "Replacing the MPO Coupler Panel" on page 39
FMM	"Replacing the FMM" on page 31
PDU	"Servicing PDUs" on page 87
FBA and Cables	"Servicing the FBA and Cables" on page 44
Cables	"Servicing Cords and Cables" on page 123

Related Information

- "Replaceable CRUs" on page 27
- "Front Components" on page 21
- "Servicing the System Components" on page 19
- "Safety and ESD Precautions" on page 19

Activating and Deactivating System Assets

Some modular system components are configured as ASR assets. You must deactivate these before service and reactivate them after service.

- "Deactivate an ASR Asset" on page 28
- "Activate an ASR Asset" on page 29

▼ Deactivate an ASR Asset

Before You Begin An FMM, node, or switch can be configured as an ASR asset. If it is configured as an ASR asset, then you must deactivate it before servicing or replacing it.

1. **Log in to the ASR Manager.**
2. **At the ASR Menu, type:** `/opt/asrmanager/bin/asr`.
3. **At the ASR prompt, type the following command to deactivate the asset:**

```
asr> deactivate_asset -i asset-IP-address asset
```

where *asset-IP-address* is the Oracle ILOM IP address of the asset and *asset* is the name of the asset: fmm, node, or switch.

A compute node IP's range is from 10.10.0.2 to 23 and 25 to 32.

Related Information

- “Activate an ASR Asset” on page 29
- “Identifying Component Locations and Slot Numbers” on page 20
- “Servicing PDUs” on page 87
- “Servicing an Oracle Server X5-2M” on page 57
- “Servicing Ethernet Switches” on page 111
- “Servicing Cords and Cables” on page 123
- “Identifying Port Mapping” on page 139

▼ Activate an ASR Asset

Before You Begin If the original component was configured as an ASR asset, then you must activate it after servicing or the replacement. An FMM, node, or switch can be configured as an ASR asset.

1. **Log in to the ASR Manager.**
2. **At the ASR Menu, type:`/opt/asrmanager/bin/asr`.**
3. **At the ASR prompt, type the following command to activate the asset:**

```
asr> activate_asset -i asset-IP-address  asset
```

where *asset-IP-address* is the Oracle ILOM IP address of the asset and *asset* is the name of the asset: fmm, node, or switch.

Related Information

- “Deactivate an ASR Asset” on page 28
- “Identifying Component Locations and Slot Numbers” on page 20
- “Servicing PDUs” on page 87
- “Servicing an Oracle Server X5-2M” on page 57
- “Servicing Ethernet Switches” on page 111
- “Servicing Cords and Cables” on page 123
- “Identifying Port Mapping” on page 139

▼ Replace an FBS PCB

This task can take approximately 30 minutes to complete.

Before You Begin You can identify a faulty FBS PCB (also known as FBN) location with diagnostics.

If the FBS PCB fault cannot be corrected, replace the FBS PCB as follows. The PCB is a unit within the FBS that gets replaced when there is a fault.

1. **Follow safety and ESD precautions.**

   See “Safety and ESD Precautions” on page 19.

2. **From the front, locate the node corresponding to the location of the FBS PCB you are replacing.**

3. **Power down the host.**

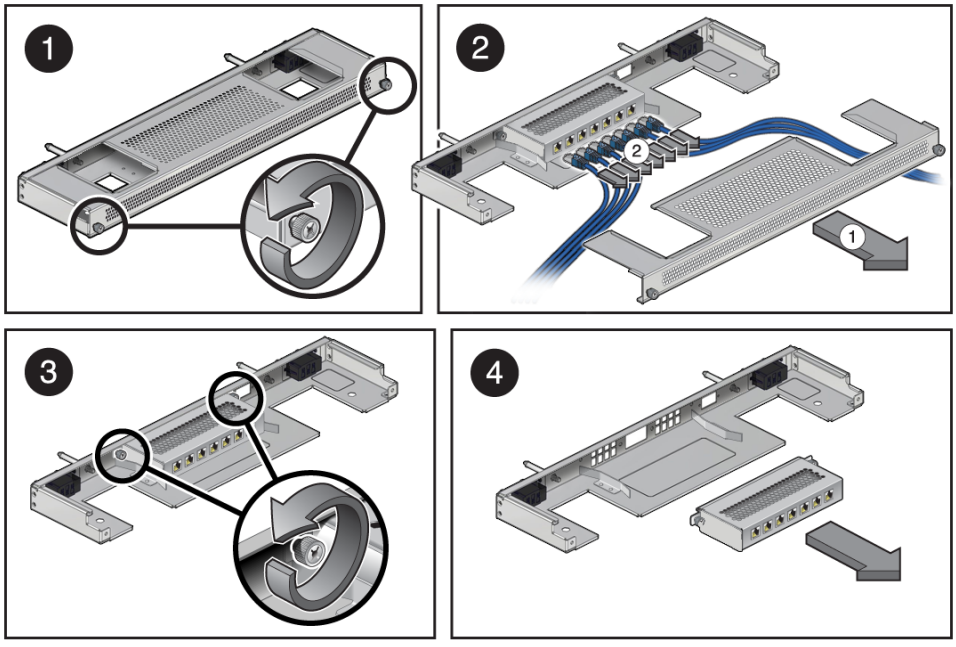
4. **Power down the node by performing one of the following.**

   - **Slide the node out about 3-4 inches**

   - **Remove the node completely**

     See “Remove an Oracle Server X5-2M” on page 66 or “Remove an Oracle Server X6-2M” on page 81.

5. **From the rear of the modular system, remove the faulty FBS PCB and install a replacement.**



a. **Remove the FBS cover.**

b. **Disconnect the cables that are connected to the PCB.**

c. **Loosen the two thumbscrews on the PCB unit.**

d. **Remove the PCB unit.**

e. **Install the replacement PCB unit.**

f. **Tighten the two thumbscrews on the PCB unit.**

g. **Connect the cables to the replacement PCB.**

h. **Replace the FBS cover.**

6. **Reboot the FMM.**

   The system management software automatically configures the replacement PCB.

   Note - Wait until the FMM is back online and the LED on the PCB stops blinking before continuing.

7. **Install the node into the corresponding slot.**

   For detailed instructions, see "Install an Oracle Server X5-2M" on page 68 or "Install an Oracle Server X6-2M" on page 83.

Related Information

- "Servicing Cords and Cables" on page 123

Replacing the FMM

This task can take approximately 90 minutes to complete with two field engineers.

FMM replacement does not impact node or data network operation. You can replace the FMM on a live system. However, due to the complexity of this operation, you might want to replace it during a maintenance or nonpeak usage period.

- "Remove the FMM" on page 32
- "Install the FMM" on page 35

Related Information

- “Identifying Component Locations and Slot Numbers” on page 20
- “Replaceable CRUs” on page 27
- “Replaceable FRUs” on page 27
- “Safety and ESD Precautions” on page 19
- “Remove or Install a Filler Panel” on page 53

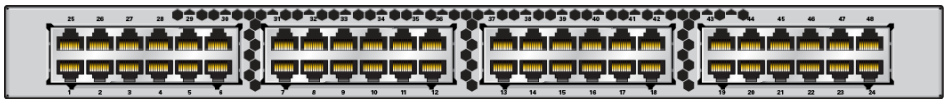
▼ Remove the FMM

Caution - The FMM is on a slide rail like the nodes. You must remove the FMM completely from the modular system. Do not slide the FMM out partially and let it hang in the rails. Two persons are needed for the removal and installation procedures.

Tip - Obtain tools needed: a No. 1 and No. 3 Phillips screwdriver and a long, thin, flat-head screwdriver.

1. **Follow safety and ESD precautions.**
   See “Safety and ESD Precautions” on page 19.

2. **Locate the FMM.**
   The FMM is located at slot 19 in the modular system. (See “Front Components” on page 21.) There is a cable routing space above it in slot 20. Slot numbers are marked on the frame both front and rear.



3. **If the FMM is configured as an ASR asset, deactivate it.**
   See “Deactivate an ASR Asset” on page 28.

4. **From the front of the modular system:**

a. **Remove the filler panels at slots 19 and 20.**

   For detailed information, see "Remove or Install a Filler Panel" on page 53.

b. **Using a No. 1 Phillips screwdriver remove the filler panel support brackets at slot 19, and save the screws.**

Note - The screws are located inside, on rails about 2 ½ inches from the front edge of the rail. They are not captive, so take care not to drop or lose them.

---

c. **Using a No. 3 Phillips screwdriver, remove the filler and node support brackets at slot 20, and save the screws.**

d. **Disconnect all Ethernet cables.**

Note - Cables are labeled U19, PT-*xx*, where *xx* is the port number.

Tip - It's helpful to tie all of the Ethernet cables together (for example, with an old cable), and wrap the other end up and around the upper-left door hinge. This action will prevent the cables from falling down and will keep them on top of the FMM when it is replaced.

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5. **From the rear of the modular system:**

a. **Using a No. 3 Phillips screwdriver, remove the node support bracket at slot 20 and save the screws**

Note - Notice the orientation. The shelf is on top.

---

b. **Disconnect the power cables from each side of the FMM.**

c. **Remove all ties holding down the FBH cables to the tray.**

d. **Using a long, thin, flat-head screwdriver, disconnect the FBH connectors from the FMM chassis.**

e. **Disconnect the DB-9 LED panel cable from the DB-9 port.**

f. **Disconnect the Cat-5e cable from the console port.**

6. **Arrange for an assistant to help you remove and carry the FMM to an antistatic equipped workbench.**

See “Safety and ESD Precautions” on page 19.

Caution - You must completely remove the FMM. The modular system rails do not support partial removal and service. Partially removing the FMM and letting it hang in the rails can damage the rails and possibly the FMM.

7. **From the front of the modular system:**

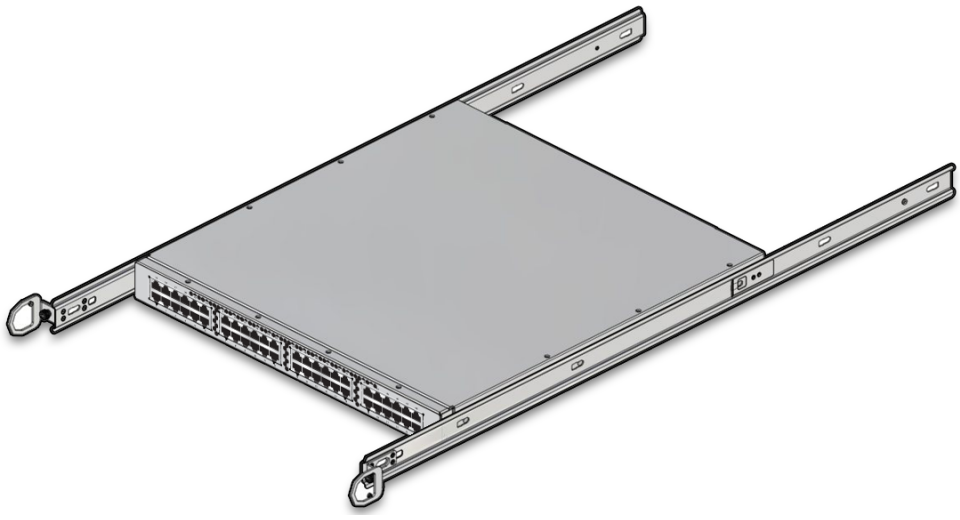
   a. **Using a No. 1 Phillips screwdriver, loosen the thumbscrews on the front of the FMM slides.**

   b. **Using the D-shaped metal handles, pull the FMM straight toward you a few inches.**

Caution - Be careful to avoid pinching your fingers with the D-shaped metal handles.

   c. **Using two persons, pull the FMM completely out, with each person holding one side.**

   d. **Place the FMM on a workbench that has antistatic protection.**



8. **Remove the FBH tray from the slides.**

9. **Remove the rail slides from the faulty FMM, then install them on the replacement FMM.**

Note - The rail slides have a spring-loaded clip that holds the rails in place. Move the locking clip in an outward motion to release the FMM locking pin from the rail slides. Be careful not to over bend the locking clip.

10. **Insert and align the FBH tray on the slides of the replacement FMM, then tighten the thumbscrews.**

11. **Install the replacement FMM.**

Note - Do not connect the power cords until completing the other steps of installing the FMM.

See "Install the FMM" on page 35.

Related Information

- "Identifying Component Locations and Slot Numbers" on page 20
- "Servicing Cords and Cables" on page 123
- "Servicing the System Components" on page 19

▼ Install the FMM

Caution - Two persons are required to install the FMM, to prevent damage to the equipment and personnel.

Caution - Make sure that the Ethernet cables are on top of the FMM when installing the FMM.

1. **Follow safety and ESD precautions.**

See "Safety and ESD Precautions" on page 19.

2. **At the front of the modular system, insert the replacement FMM** *to about six inches less than full installation***.**

3. **From the rear of the modular system:**

   a. **Lift all cables that will connect to the FMM up onto the FBH tray.**

   b. **Pull the FMM into the frame the rest of the distance, to completely install it.**

4. **From the front of the modular system:**

   a. **Tighten the slide screws.**

   b. **Attach all the blue cables, then the orange Ethernet cables.**

Note - Cables are labeled U19, PT-*xx* - where *xx* is the port number.

Caution - Reconnecting the Ethernet cables incorrectly will cause connectivity issues and unpredictable system behavior.

   c. **Using a No. 1 Phillips screwdriver, install the filler panel support brackets at slot 19.**

   d. **Using a No. 3 Phillips screwdriver, reinstall the node support bracket and filler panel support brackets at slot 20 with the saved screws.**

      Make sure that the orientation is correct, with the shelf on top.

   e. **Install the filler panel at slot 19.**

   f. **Install the filler panel at slot 20.**

5. **From the rear of the modular system:**

   a. **Attach the DB-9 LED panel cable to the DB-9 port.**

   b. **Attach the Cat-5e cable to the console port.**

   c. **Attach the FBH cables to the correct ports as follows:**

      i. **Review the labels on the two FBH cable pairs.**

         One pair of cables routes to the upper section (above the FMM) of the rack and will connect to the top ports on the FMM. The other pair of cables routes to the lower section of the rack (below the FMM) and will connect to the bottom two ports on the FMM.

      ii. **From the lower cable pair, locate the cable labeled "U19, PT-FBH 2/3," and connect it to port 2.**

      iii. **Locate the remaining lower cable labeled "U19, PT-FBH 1/4," and connect it to port 4.**

iv. **From the top cable pair, locate the cable labeled "U19, PT-FBH 1/4," and connect it to port 1.**

v. **Locate the remaining top cable labeled "U19, PT-FBH 2/3," and connect it to port 3.**

d. **Attach ties to secure the FBH cables to the tray.**

e. **Attach the power cables on each side.**

f. **Using a No. 3 Phillips screwdriver, reinstall the support bracket at slot 20 with the saved screws.**

Note - After power on, FMM automatically detects and programs the frame configuration based on the backup copies stored in the two system management software PCB and the FMM switch.

---

g. **If it is an ASR asset, activate the FMM.**

See "Activate an ASR Asset" on page 29.

h. **If you want to view the FMM SN, from the FMM CLI, type:** `show /SYS component_serial_number`.

Related Information

- "Identifying Component Locations and Slot Numbers" on page 20
- "Servicing Cords and Cables" on page 123
- "Servicing the System Components" on page 19

Replacing the RJ-45 Coupler Panel

Replacing the coupler panel might require that you stop all applications.

- "Remove the RJ-45 Coupler Panel" on page 38
- "Install the RJ-45 Coupler Panel" on page 38

Related Information

- "Safety and ESD Precautions" on page 19
- "Replaceable CRUs" on page 27

- “Replaceable FRUs” on page 27
- “Activating and Deactivating System Assets” on page 28
- “Servicing Cords and Cables” on page 123

▼ Remove the RJ-45 Coupler Panel

1. **To avoid any lost connections or frozen operations, stop all applications currently running or scheduled to run.**
2. **Follow safety and ESD precautions.**
   See “Safety and ESD Precautions” on page 19.
3. **If any external cables are connected to the coupler panel:**
   a. **Record the connection locations for all external cables connected to the coupler panel.**
      Customer cabling identifiers are specific to their modular systems and are not labeled at the factory. In contrast, factory cables are labeled with connection information.
   b. **Disconnect all external cables.**
4. **Using a No. 3 Phillips screwdriver, remove the four screws holding the coupler panel to the frame.**
5. **Carefully pull out the coupler panel.**
6. **Disconnect the internal cables from the coupler panel.**
7. **Install the replacement coupler panel.**
   See “Install the RJ-45 Coupler Panel” on page 38.

Related Information

- “Replaceable CRUs” on page 27
- “Replaceable FRUs” on page 27
- “Servicing Cords and Cables” on page 123

▼ Install the RJ-45 Coupler Panel

1. **Follow safety and ESD precautions.**

See “Safety and ESD Precautions” on page 19.

2. **Connect the internal cables to the correct ports, per cable labels.**

   The correct ports are the ones that face the front of the modular system when the coupler panel is installed. These cables loop over the top of the coupler panel when installed properly. Refer to the labels on the cables.

3. **Carefully push the coupler panel back into the slot, keeping clear of the fiber cables.**

4. **Using a No. 3 Phillips screwdriver, insert the four screws to attach the coupler panel to its mounting brackets.**

5. **Reconnect the external cables, including any external cables the customer had connected, to the ports on the coupler panel.**

   For the customer external cables, refer to the notes created earlier to reconnect cables to their previous locations.

6. **Resume applications that were stopped for the service.**

Related Information

- “Replaceable CRUs” on page 27
- “Replaceable FRUs” on page 27
- “Servicing Cords and Cables” on page 123

Replacing the MPO Coupler Panel

Replacing the MPO coupler panel might require that you stop all applications. Each MPO coupler panel contains three fiber coupler modules. These modules connect to the fiber cables. If only one coupler panel, it is labeled A and goes in slot 37. If two, second is labeled B and goes in slot 38, and so on. For more information about the MPO coupler panel, refer to “MPO Coupler Panel” in *Netra Modular System Installation Guide*.

- “Remove the MPO Coupler Panel” on page 40
- “Install the MPO Coupler Panel” on page 41

Related Information

- “Safety and ESD Precautions” on page 19

- "Replaceable CRUs" on page 27
- "Replaceable FRUs" on page 27
- "Identifying Component Locations and Slot Numbers" on page 20
- "Activating and Deactivating System Assets" on page 28
- "Servicing Cords and Cables" on page 123

▼ Remove the MPO Coupler Panel

1. **To avoid any lost connections or frozen operations, stop all applications currently running or scheduled to run.**

2. **Follow safety and ESD precautions.**

   See "Safety and ESD Precautions" on page 19.

3. **If any external cables are connected to the coupler panel:**

   a. **Record the connection locations for all external cables connected to the coupler panel.**

      Customer cabling identifiers are specific to their modular systems and are not labeled at the factory. In contrast, factory cables are labeled with connection information.

   b. **Disconnect all external cables.**

4. **Using a No. 3 Phillips screwdriver, remove the four screws holding the coupler panel to the frame.**

Caution - When removing the MPO coupler panel at slot 40, take care that it does not snag the Ethernet cables connected to the RJ-45 coupler panel at slot 41. You might need to go in through the front of the frame to disentangle the Ethernet cables from the MPO coupler panel.

5. **Carefully pull out the coupler panel.**

6. **If replacing one of the faulty modules within the coupler panel, do the following:**

   a. **Disconnect the internal fiber cables from the faulty module.**

   b. **Pull the two mushroom heads to release the faulty module, then remove the module.**

7. **Install the coupler panel.**

See “Install the MPO Coupler Panel” on page 41.

Related Information

- “Replaceable CRUs” on page 27
- “Replaceable FRUs” on page 27
- “Servicing Cords and Cables” on page 123

▼ Install the MPO Coupler Panel

1. **Follow safety and ESD precautions.**

   See “Safety and ESD Precautions” on page 19.

2. **If installing a replacement module within the coupler panel, do the following:**

   a. **Insert the module fully until it is completely seated, and the mushroom heads have receeded.**

   b. **Connect the internal fiber cables to the correct ports, per cable labels, to the replacement module.**

      The correct ports are the ones that face the front of the modular system when the coupler panel is installed. These cables go through the second opening in the coupler panel. Refer to the labels on the cables.

3. **Carefully push the coupler panel back into the slot, keeping clear of the fiber cables.**

4. **Using a No. 3 Phillips screwdriver, insert the four screws to attach the coupler panel to its mounting brackets.**

5. **Reconnect the external cables, including any external cables, to the ports on the coupler panel.**

   For any custom external cables, refer to the notes created earlier to reconnect cables to their previous locations.

6. **Resume applications that were stopped for the service.**

Related Information

- “Replaceable CRUs” on page 27
- “Replaceable FRUs” on page 27

- “Servicing Cords and Cables” on page 123

Replacing the System Status LED Panel

This task can take approximately 30 minutes to complete.

Also referred to as the alarm panel, this LED panel provides the FMM and system status. For more information, see “Modular System LEDs” on page 13.

You can replace the LED panel with no impact to operation of the modular system. The LED panel is connected to the FMM by a DB-9 LED cable.

- “Remove the LED Panel” on page 42
- “Install the LED Panel” on page 43

Related Information

- “Safety and ESD Precautions” on page 19
- “Replace the DB-9 LED Cable” on page 128
- “Modular System LEDs” on page 13.
- “Servicing the System Components” on page 19

▼ Remove the LED Panel

1. **Follow safety and ESD precautions.**

   See “Safety and ESD Precautions” on page 19.

2. **Using a No. 3 Phillips screwdriver, remove the fours screws (two on each side) holding the LED panel to the front of the modular system.**

   Note - It might be easier to perform this step if you remove the filler panel at slot 40.

3. **Gently pull the LED panel out so as to not damage the DB-9 LED cable.**

4. **Loosen the thumbscrews and carefully disconnect the DB-9 LED cable.**

   If you are replacing the cable, see “Replace the DB-9 LED Cable” on page 128.

5. **Remove the cable protector from the rear top edge, and save it for reuse on the replacement LED panel.**

6. **Discard the faulty LED panel.**

7. **Install the new LED panel.**

   See “Install the LED Panel” on page 43.

Related Information

- “Safety and ESD Precautions” on page 19
- “Replace the DB-9 LED Cable” on page 128
- “Identifying Component Locations and Slot Numbers” on page 20

▼ Install the LED Panel

1. **Follow safety and ESD precautions.**

   See “Safety and ESD Precautions” on page 19.

2. **Attach the cable protector (saved from faulty panel) to the replacement LED panel.**

3. **Connect the DB-9 LED cable to the replacement LED panel.**

   See “Precautions for Handling Cords and Cables” on page 123.

4. **Check the functioning of the LED panel to ensure that the replacement LED panel is operating.**

5. **Insert the LED panel into the slot, being careful not to crimp or damage the cable.**

6. **When the LED panel is seated properly, insert the four screws and tighten them.**

7. **Affix the applicable label onto the LED panel.**

   The replacement comes with two labels, one for the Netra Modular System commercial use and another for CGBU Oracle Virtual Network Platform use.

Related Information

- “Safety and ESD Precautions” on page 19
- “Replace the DB-9 LED Cable” on page 128

- “Identifying Component Locations and Slot Numbers” on page 20

Servicing the FBA and Cables

Access to some server components is only possible by removing the FBA.

These topics describe how to service the FBA and cables.

- “Remove the FBA” on page 44
- “Install the FBA” on page 49
- “Replace a Faulty Cable” on page 52

Related Information

- “Safety and ESD Precautions” on page 19
- “Identifying Component Locations and Slot Numbers” on page 20
- “Replace a Faulty Cable” on page 52
- “Servicing an Oracle Server X5-2M” on page 57
- “Servicing an Oracle Server X6-2M” on page 71

▼ Remove the FBA

Removing the FBA provides access to other components, such as the power supply, for service.

1. **Follow safety and ESD precautions.**

   See “Safety and ESD Precautions” on page 19.

2. **Remove the server from the system, and place the server on an antistatic surface.**

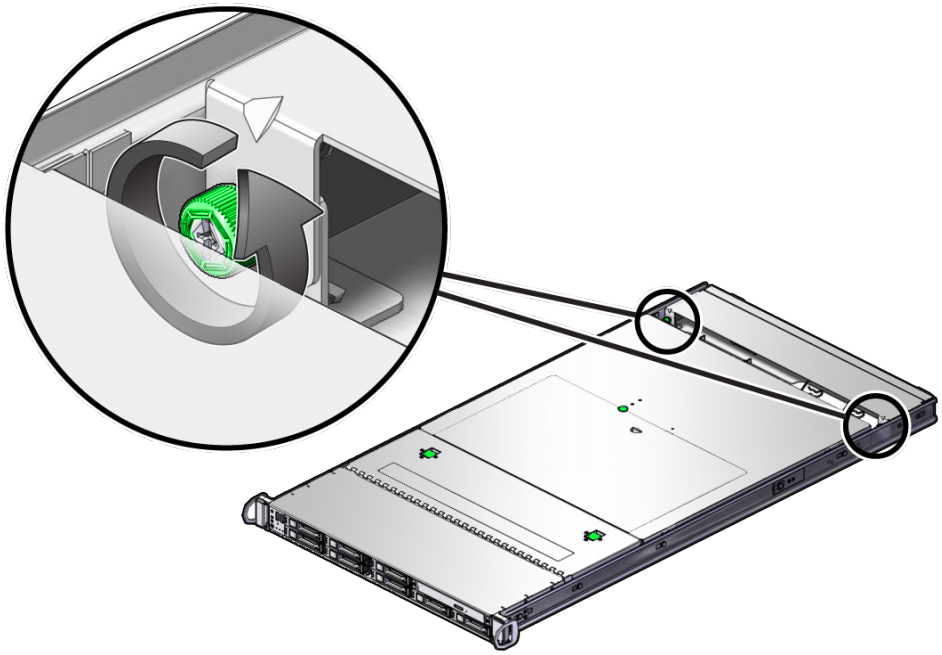
   See “Servicing an Oracle Server X5-2M” on page 57.

   See “Servicing an Oracle Server X6-2M” on page 71.

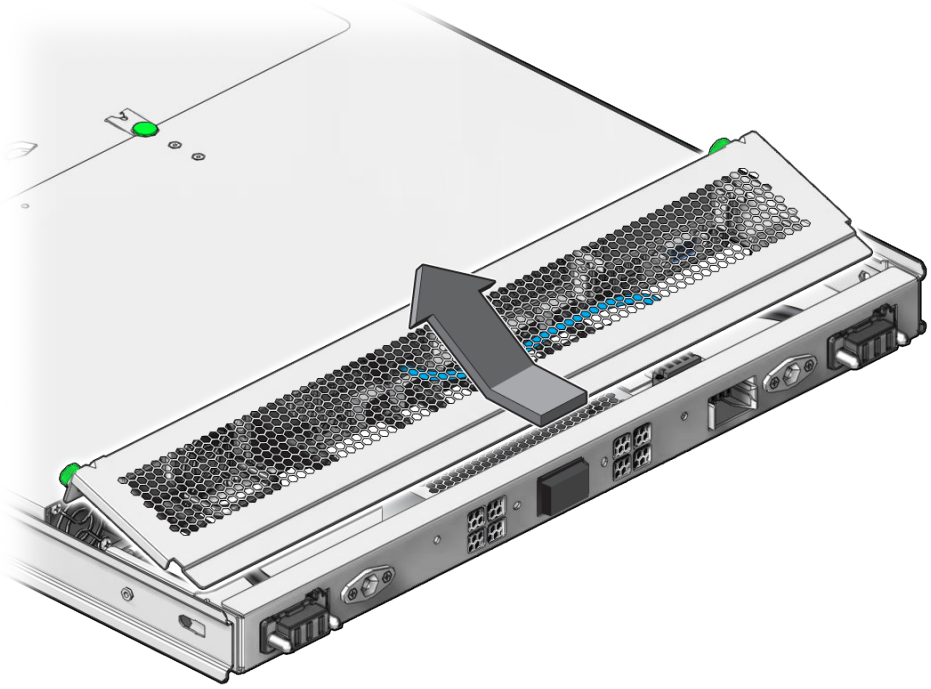
3. **Release both stops on the side rails to allow the FBA to slide back.**

4. **Slide the rails with attached FBA away from the server.**

5. **Loosen the captive FBA cover screws on both the right and left sides.**

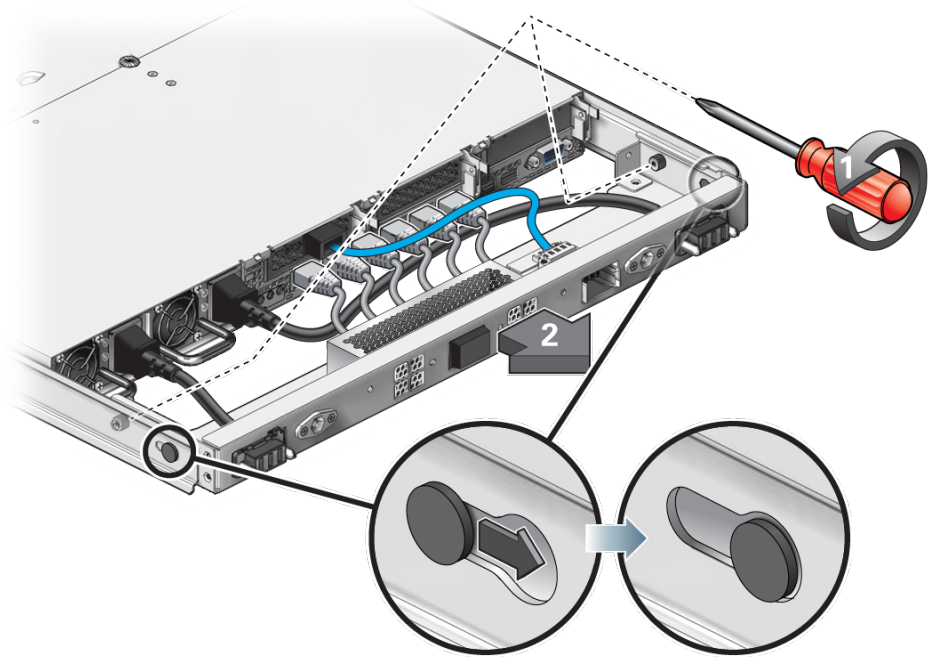


6. **Slide the cover back and off the server, then set the cover aside.**



7. **Loosen the two captive screws at the bottom right and left of the FBA (panel 1).**

These screws fasten the FBA to the slide rails.



8. **Pull the FBA away from the server (panel 2) until the FBA aligns with the slide rail slot holes.**

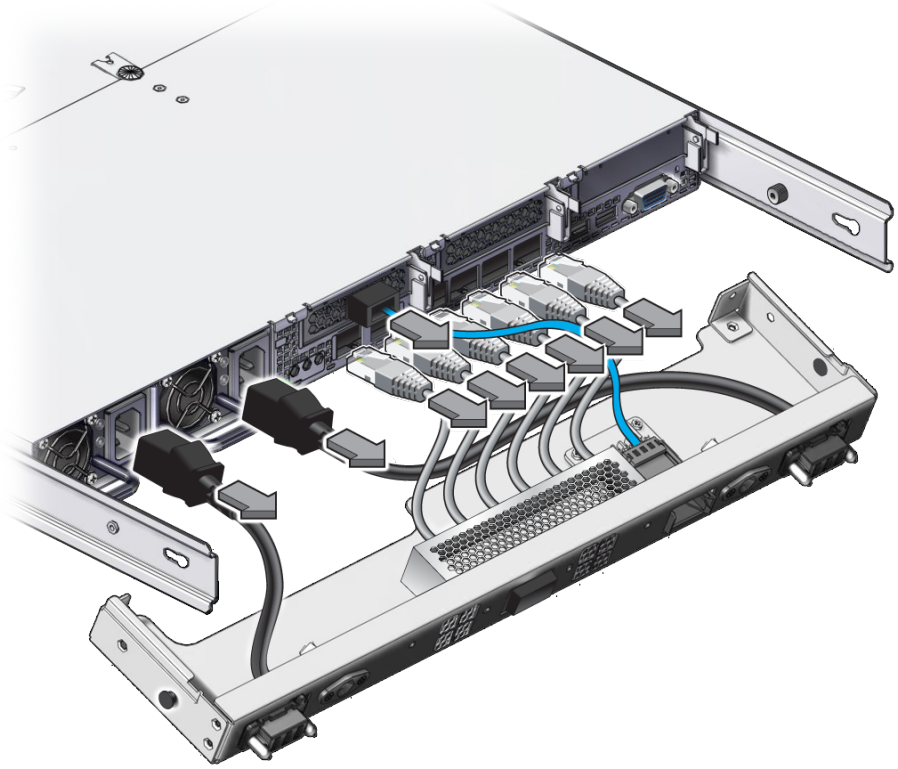
9. **Gently pull one of the slide rails away from the FBA, just far enough for it to disengage.**

Note - Align the holes in the slide rail with the studs on the FBA.

10. **Disengage the FBA from the other slide rail.**

Note - Before removing the cables, label them or or note which cables connect where on the server. The FBA cables are not labeled at the factory.

11. **Disconnect all of the cables from the server, including the power cords.**



12. **Determine the applicable action:**

- **If you are replacing the entire FBA, disconnect all cables and power cords from the FBA, then properly dispose of the faulty FBA.**
- **If you are replacing a cable or power cord, disconnect and properly dispose of the faulty cable or power cord.**

See “Replace a Faulty Cable” on page 52.

See “Install the FBA” on page 49.

Related Information

- “Safety and ESD Precautions” on page 19

- "Identifying Component Locations and Slot Numbers" on page 20
- "Replace a Faulty Cable" on page 52
- "Servicing an Oracle Server X5-2M" on page 57
- "Servicing an Oracle Server X6-2M" on page 71

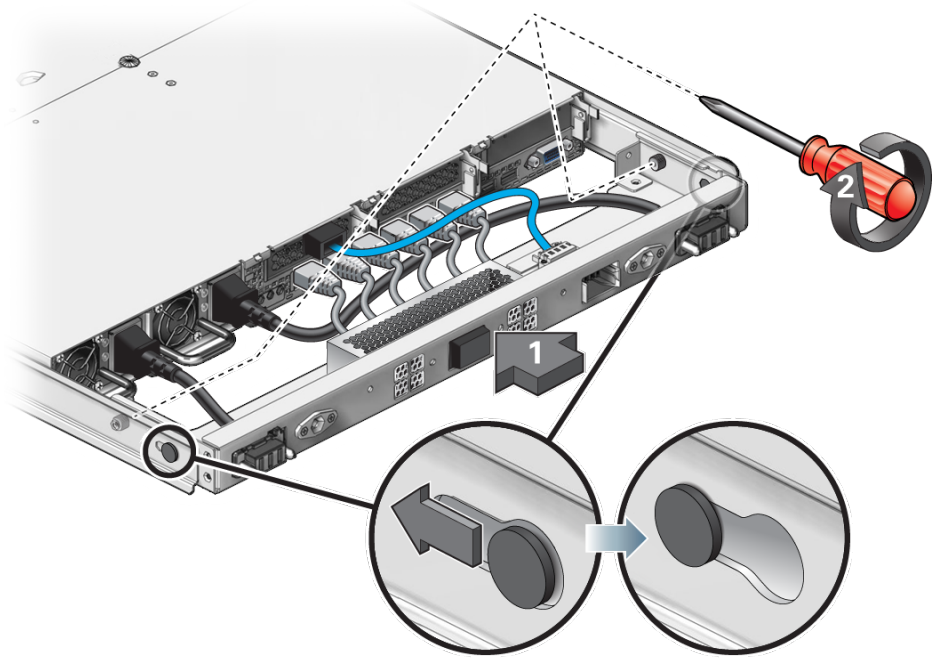
▼ Install the FBA

1. **Follow safety and ESD precautions.**

   See "Safety and ESD Precautions" on page 19.

2. **If replacing a faulty FBA, remove the cover from the new FBA.**

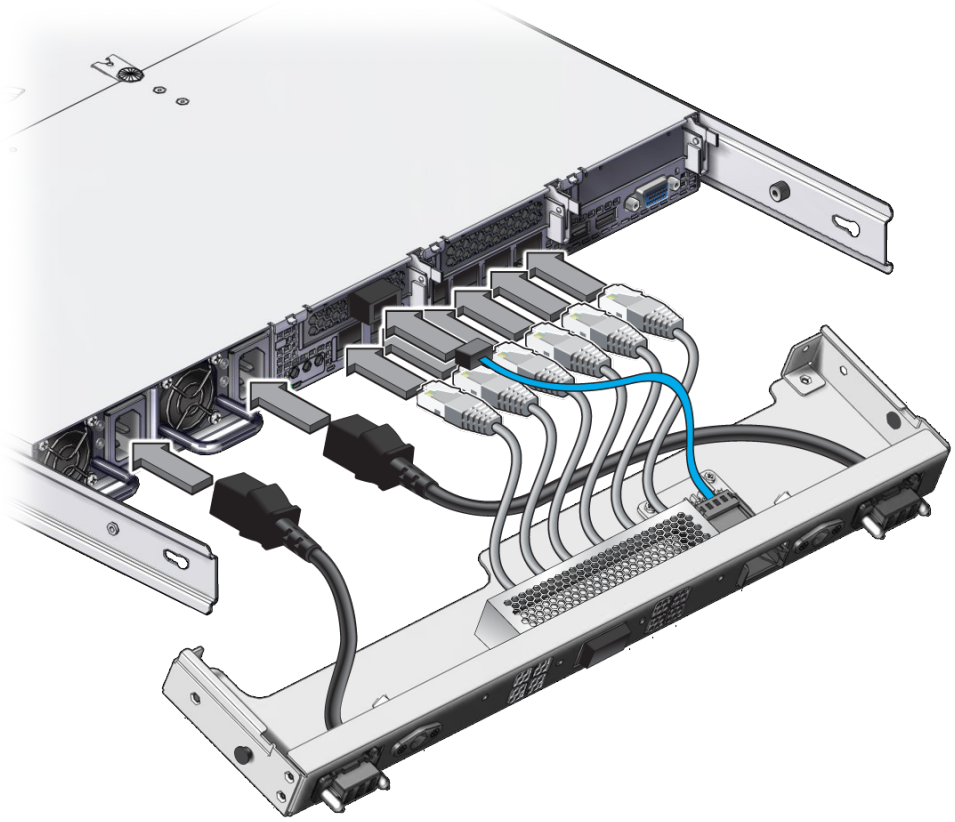
3. **Align the FBA studs with the hole slots on the server's slide rail, and push the FBA slightly toward the server to engage it in the slide rail (panel 1).**



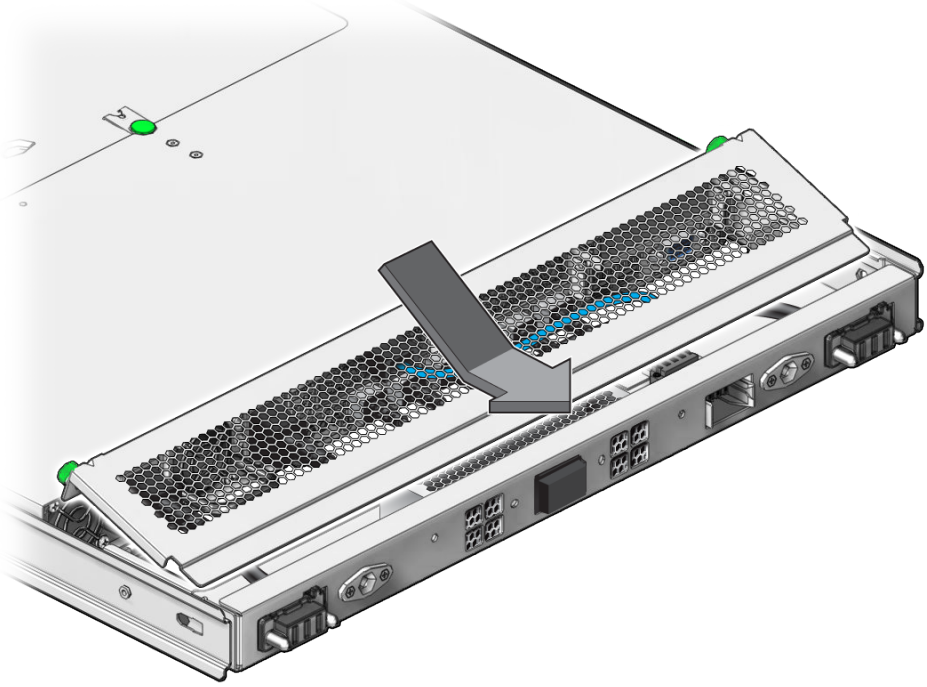
4. **While holding the FBA in place, tighten the two captive screws that fasten the FBA to the slide rail (panel 2).**

5. **Connect all cables including the power cords.**

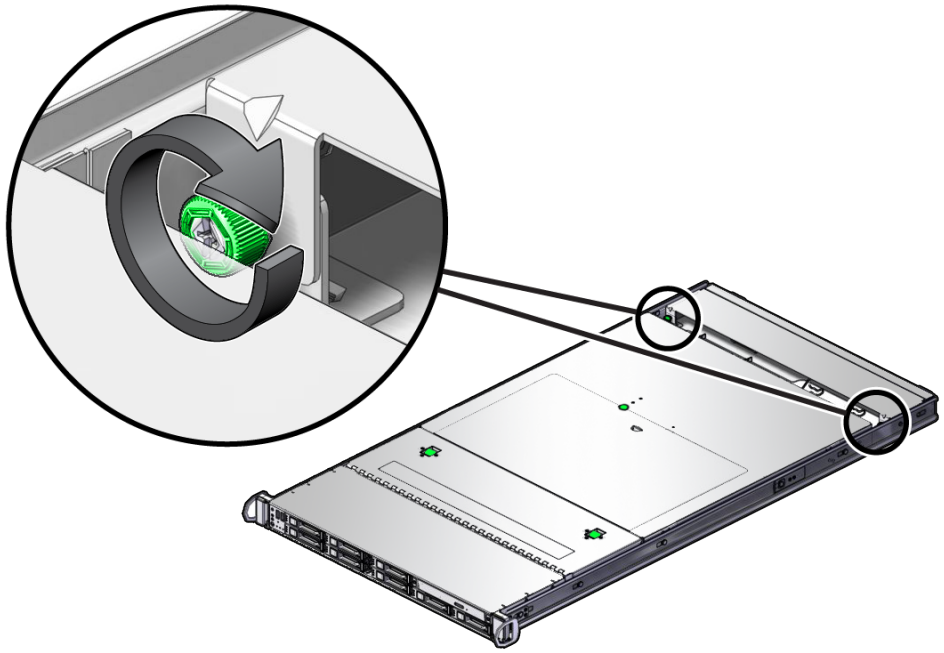
Caution - Take care to connect the cables to the correct ports, as some cables cross over each other. Cables connected left to right on the FBA do not connect exactly in the same order on the server. For Oracle Server X5-2M and Oracle Server X6-2M, the NET MGT and SER MGT cables cross.



6. **Replace the FBA cover on both the right and left sides.**



7. **Tighten the captive FBA cover screws on both the right and left sides.**



8. **Push the FBA and rails toward the server until the rails engage with the stops.**

Related Information

- “Safety and ESD Precautions” on page 19
- “Identifying Component Locations and Slot Numbers” on page 20
- “Servicing an Oracle Server X5-2M” on page 57
- “Servicing an Oracle Server X6-2M” on page 71

▼ Replace a Faulty Cable

1. **Follow safety and ESD precautions.**
   See “Safety and ESD Precautions” on page 19.

2. **Perform Step 2 through Step 9 of “Remove the FBA” on page 44 to remove the FBA and gain access to the cables.**

3. **Carefully pull the faulty cable out of the FBA.**

4. **Install the replacement cable.**

5. **Install the FBA.**
   See “Install the FBA” on page 49.

Related Information

- “Safety and ESD Precautions” on page 19
- “Identifying Component Locations and Slot Numbers” on page 20
- “Servicing an Oracle Server X5-2M” on page 57
- “Servicing an Oracle Server X6-2M” on page 71

▼ Remove or Install a Filler Panel

This task can take approximately 5 minutes to complete.

Filler panels are installed in empty slots only on the front of the modular system, to ensure that cooling is maximized within the system. If you remove a filler panel and install a component, save the filler panel. The rear of the modular system does not have filler panels.

Two types of filler panels are used. Solid filler panels cover empty node slots. Vented filler panels cover switches, empty switch slots, the FMM, and server support brackets.

1. **Follow safety and ESD precautions.**
   See “Safety and ESD Precautions” on page 19.

2. **Remove the filler panel by grasping it with a hand on left and right sides, then rock it a little while pulling it toward you.**
   The filler panels are held on by mounting brackets. Two types of mounting brackets hold the panels on. Empty node slots and the FMM have one type of mounting brackets. All other components use another type.
   The filler panels over switch locations have a removable metal baffle attached to them.

3. **Perform one of the following steps to remove the mounting bracket:**

   - **If you removed a filler panel for an empty node slot or the FMM, use a No. 1 Phillips screwdriver to remove the screws holding the bracket to the rails on both sides.**

   - **To remove the other type of mounting bracket, use a No. 3 Phillips screwdriver to loosen (not remove) the two screws holding the bracket to both sides, then remove the bracket only.**

4. **Save the filler panels, screws, and mounting brackets for use later.**
5. **Install a filler panel and mounting brackets.**
   - **For an empty node or the FMM slot:**
     a. **Use a No. 1 Phillips screwdriver to insert the screws into the mounting brackets to the rails on both sides to reinstall them.**
     b. **Place the filler panel on the front slot to be covered, then press it onto the mounting bracket until the filler panel snaps into place.**
   - **For other component slots:**
     a. **Insert the mounting brackets under the loosened screws.**
     b. **Use a No. 3 Phillips screwdriver to tighten the four screws onto the mounting brackets.**
     c. **Place the filler panel on the front slot to be covered, then press it onto the mounting bracket until the filler panel snaps into place.**

Related Information

- "Thermal and Cooling Requirements" in *Netra Modular System Installation Guide*
- "Identifying Component Locations and Slot Numbers" on page 20

Getting Help

Contact Support

If you cannot solve a system problem, use the following table to collect information that you might need to communicate to support personnel.

System Configuration Information Needed	Your Information
Service contract number	

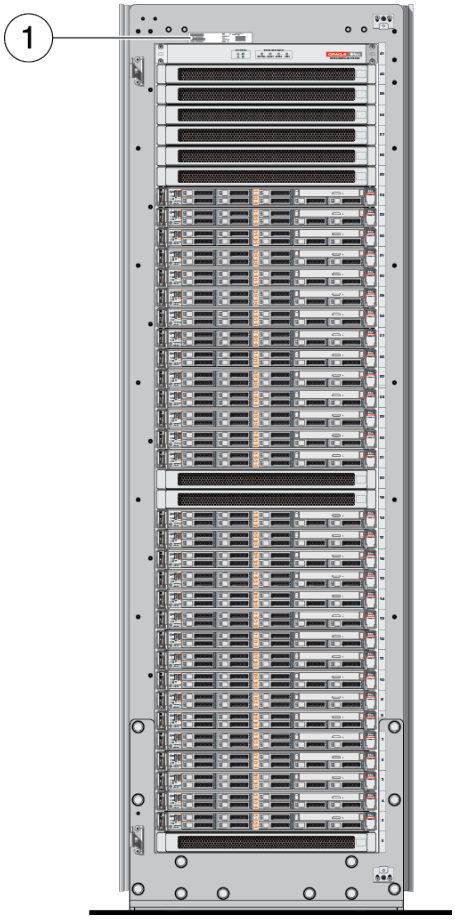
System Configuration Information Needed	Your Information
System model	
Operating environment	
System serial number	
Peripherals attached to the system	
Email address and phone number for you and a secondary contact	
Street address where the system is located	
Superuser password	
Summary of the problem and the work being done when the problem occurred	

Related Information

- “Master Serial Number Location” on page 55
- “Identifying Component Locations and Slot Numbers” on page 20
- “Component Types and Service Classifications” on page 26

Master Serial Number Location

You might need to have your modular system's master serial number when you ask for service. Record this number for future use. Use one of the following resources or methods to locate your serial number.



- The serial number is recorded on the modular system's master serial number information label that is attached to the top of the system in the front, left corner, above the LED status panel.
- The serial number is recorded on the yellow Customer Information Sheet (CIS) attached to your system packaging. This sheet includes the serial number.
- From the Oracle ILOM web interface, view the serial number on the System Information screen.

Related Information

- “Contact Support” on page 54
- “Identifying Component Locations and Slot Numbers” on page 20
- “Component Types and Service Classifications” on page 26

Servicing an Oracle Server X5-2M

The modular system is designed for the components such as the nodes to be *line-replaceable items*, meaning that instead of servicing the nodes, you return the nodes to Oracle and receive replacements. However, if you want to service a node, these topics describe how.

Note - You cannot service a node while it is in the modular system. The modular system's design differs from other racks and frames that allow you to partially remove a node for service. Only the SSDs (and their fillers) are hot-swappable components, provided that the OS or other critical applications are not running on the SSDs being serviced.

These topics describe how to service the Oracle Server X5-2M (both compute and management nodes). The same documentation is applicable to both node types (compute and management).

Related Information

- "Monitoring Faults" on page 13
- "Servicing Ethernet Switches" on page 111

Related Oracle Server X5-2M Documentation

The same documentation is applicable to both node types (compute and management).

The Oracle Server X5-2M serviceable components, and access to those components, are mostly the same as the Oracle Server X5-2. Links to the Oracle Server X5-2 documentation are provided in lieu of procedures in this document. Only where access and/or service is different are service procedures provided in this document.

Refer to the following service documentation to service CRUs:

- Servicing storage drives and fan modules at:

  `http://docs.oracle.com/cd/E41059_01/html/E48312/napsm.ceihcaeg.html#scrolltoc`
- Servicing batteries, DIMMs, PCIe risers and cards, and flash drives at:

  `http://docs.oracle.com/cd/E41059_01/html/E48312/napsm.z4000020165586.html#scrolltoc`
- General servicing and monitoring at:

  `http://docs.oracle.com/cd/E41059_01/html/E48312/napsm.html#scrolltoc`

Related Information

- “Oracle Server X5-2M Differences” on page 58
- “Oracle Server X5-2M CRUs” on page 61
- “Oracle Server X5-2M Fault Troubleshooting” on page 64
- “Prepare an Oracle Server X5-2M for Service” on page 65
- “Servicing Ethernet Switches” on page 111

Oracle Server X5-2M Differences

The Oracle Server X5-2M is a customized modular version of the Oracle Server X5-2. These are the Oracle Server X5-2M differences for the Netra Modular System.

- Thumb-pull levers for removing a node from the system replace the green hot-swap levers.
- After you push the Power button, the green Power/OK LED begins flashing to indicate hot-swap is initiated. See “Oracle Server X5-2M LEDs” on page 15.
- FBA provides plug-and-play capability, eliminating the cabling process. This feature is the most significant physical difference between the servers.

- Serial console is not available because the serial port is used by the modular system to detect the node's presence. Access to the SP is through the network (NET_MGT) port through a switch in the FMM. See “FMM Serial Port” on page 142.
- The node power supply is not a CRU-serviceable item.
- The BIOS is customized.
- Some Oracle ILOM functions are either not available or have restrictions.
- Up to five SSDs are supported in a single node.
- The DVD drive is not available.
- A factory configuration containing an Oracle Quad 10Gb Ethernet Adapter is available. See “Switch and Node Configurations” on page 114.

Note - Because the nodes and access are identical in their serviceable components (DIMMs, hard drives, batteries, and fans) to the Oracle Server X5-2, the procedures for servicing these Oracle Server X5-2M components are mostly the same. The key difference is that some FRUs can be accessed only by removing the FBA.

The Oracle ILOM on a node in the modular system supports all the standard Oracle ILOM interfaces that are described in the Oracle ILOM documentation.

Related Information

- “Related Oracle Server X5-2M Documentation” on page 58
- “Oracle Server X5-2M CRUs” on page 61
- “Removing and Installing an Oracle Server X5-2M” on page 65

Oracle Server X5-2M Features

These topics describe the server's features.

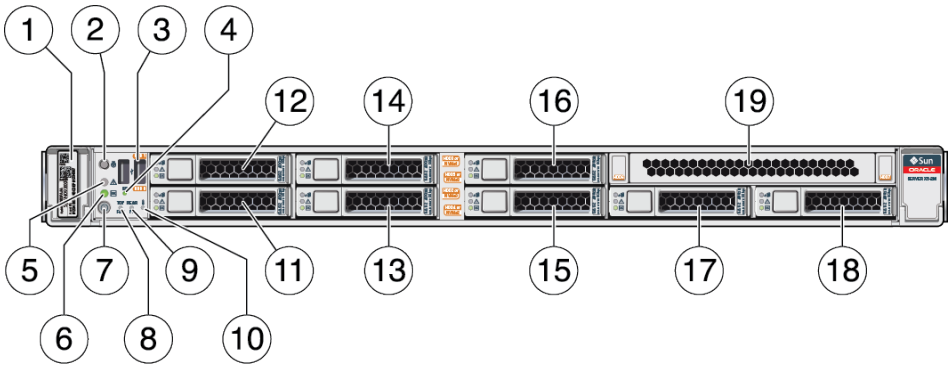
- “Oracle Server X5-2M Front Components” on page 60
- “Oracle Server X5-2M Removed From System” on page 61

Related Information

- “Oracle Server X6-2M Differences” on page 72
- “Monitoring Faults” on page 13
- “Oracle Server X6-2M CRUs” on page 77
- “Oracle Server X6-2M FRUS” on page 78
- “Oracle Server X6-2M Service Labels” on page 78

Oracle Server X5-2M Front Components

FIGURE 7 Oracle Server X5-2M Front Components



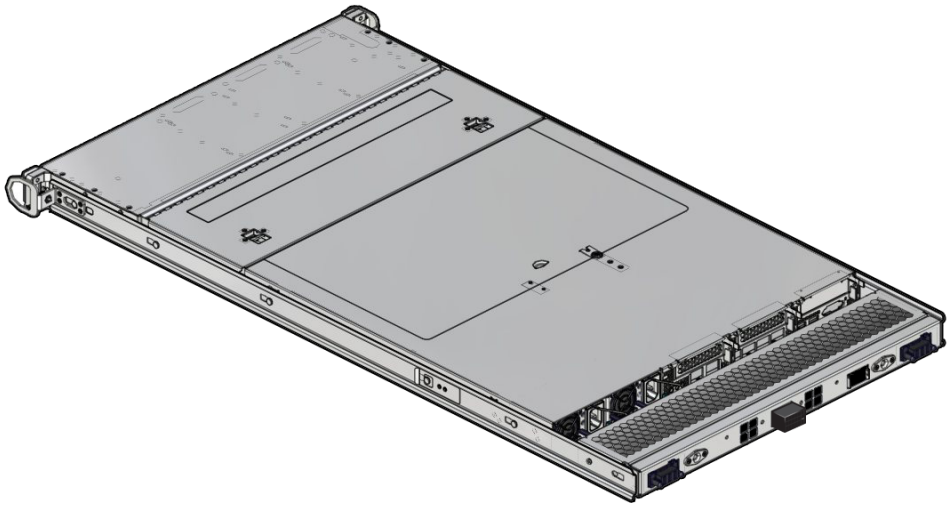
No.	Name
1	Product Serial Number (PSN) label and Radio Frequency Identification (RFID) tag
2	Locator LED/Locator button: white
3	USB 2.0 connectors (2)
4	SP OK LED: green
5	Service Required LED: amber
6	Power/OK LED: solid or flashing (ok to hot-swap) green
7	Power button
8	Top Fan Fault LED: amber
9	Rear Power Supply (PS) Fault LED: amber
10	System Over Temperature Warning LED: amber
11	Storage drive 0 (SSD)
12	Storage drive 1 (SSD)
13	Storage drive 2 (SSD)
14	Storage drive 3 (SSD)
15	Storage drive 4 (SSD)
16	Storage drive 5 (SSD)
17	Storage drive 6 (SSD)
18	Storage drive 7 (SSD)
19	Filler panel

Related Information

- “Oracle Server X5-2M Removed From System” on page 61
- “Oracle Server X5-2M Fault Troubleshooting” on page 64

Oracle Server X5-2M Removed From System

FIGURE 8 Oracle Server X5-2M Removed From System, Viewed from Rear of the FBA



Related Information

- “Oracle Server X5-2M Front Components” on page 60
- “Oracle Server X5-2M Fault Troubleshooting” on page 64

Oracle Server X5-2M CRUs

You can replace the following CRUs on the Oracle Server X5-2M:

- SSDs
- Fan modules
- 3-volt lithium batteries
- DIMMs
- USB internal flash drives

Note - In addition to these CRUs (with part numbers specific to the modular system), also you can service some of the CRUs listed in the *Oracle X5-2 Server Service Manual*. Part numbers for those correlate with the Oracle X5-2 server. See "Oracle Server X5-2M Differences" on page 58.

For CRU locations, refer to "CRU Locations" at: `http://docs.oracle.com/cd/E41059_01/html/E48312/napsm.z400000a1418630.html#scrolltoc`.

Additionally, there are FRUs that can be replaced or serviced only by authorized Oracle service personnel. (See "Oracle Server X5-2M FRUs" on page 62.) If an item not listed here needs service, contact your service representative.

Related Information

- "Oracle Server X5-2M Differences" on page 58
- "Removing and Installing an Oracle Server X5-2M" on page 65
- "Oracle Server X5-2M Fault Troubleshooting" on page 64
- "Power Down an Oracle Server X5-2M" on page 69

Oracle Server X5-2M FRUs

FRUs can be replaced or serviced only by authorized Oracle service personnel. If an item not listed in "Oracle Server X5-2M CRUs" on page 61 needs service, contact your service representative.

For detailed information about servicing FRUs, see Servicing FRUs at `http://docs.oracle.com/cd/E41059_01/html/E48320/z4000136165586.html#scrolltoc`.

Related Information

- "Oracle Server X5-2M Fault Troubleshooting" on page 64
- "Servicing the FBA and Cables" on page 44

Oracle Server X5-2M Service Labels

These service labels are affixed at the factory to the nodes. You can use these as guides for removing the nodes and servicing the memory, fan, and battery. For detailed instructions and safety precautions, see the topics in this manual.

FIGURE 9 Label for Oracle Server X5-2M Removal

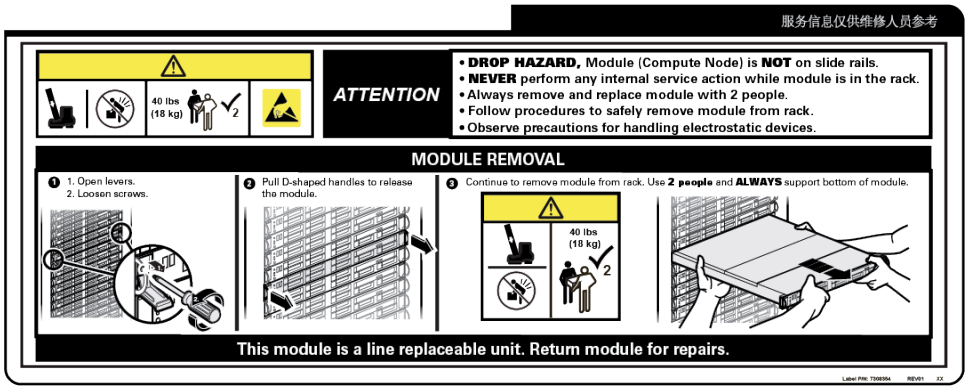
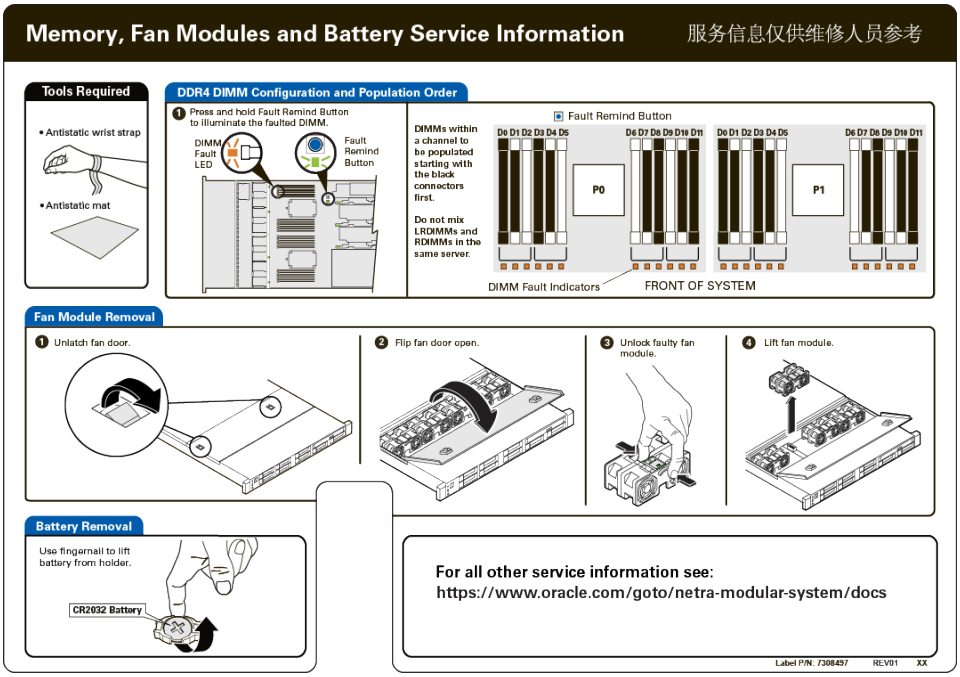


FIGURE 10 Label for Oracle Server X5-2M Service



Related Information

- “Oracle Server X5-2M Fault Troubleshooting” on page 64
- “Removing and Installing an Oracle Server X5-2M” on page 65

Oracle Server X5-2M Fault Troubleshooting

For detailed information about troubleshooting faults, refer to the information about troubleshooting and diagnostics at:

`http://docs.oracle.com/cd/E41059_01/html/E48312/napsm.z40008681293329.html#scrolltoc`

Related Information

- “Oracle Server X5-2M CRUs” on page 61
- “Oracle Server X5-2M Differences” on page 58
- “Prepare an Oracle Server X5-2M for Service” on page 65
- “Power Down an Oracle Server X5-2M” on page 69
- “Related Oracle Server X5-2M Documentation” on page 58

▼ Prepare an Oracle Server X5-2M for Service

In the *Oracle Server X5-2 Service Manual*, a distinction is made about CRUs that can be serviced without turning off power. This distinction does *not* apply to nodes used in the modular system. Any service on a node requires that the node be completely powered off and removed from the system to a clean, antistatic workbench.

Note - If you pull a node out a few inches, you must wait at least 5 seconds before reinserting the node. Failing to wait might cause the node not to power on.

- **Before servicing a node, read the safety precautions and the power-down procedures at:**

  `http://docs.oracle.com/cd/E41059_01/html/E48312/napsm.z4000019165586.html#scrolltoc`

Related Information

- “Oracle Server X5-2M CRUs” on page 61
- “Power Down an Oracle Server X5-2M” on page 69
- “Removing and Installing an Oracle Server X5-2M” on page 65

Removing and Installing an Oracle Server X5-2M

Caution - You cannot service a node while it is in the modular system. The system's design differs from other racks and frames that allow you to partially remove a node for service. You must completely remove the node to service the components.

Note - To avoid damage to the node and personnel, two persons are required for the physical task of removing or inserting a node.

▼ Remove an Oracle Server X5-2M

1. **If the node is configured as an ASR asset, deactivate it.**

   See "Deactivate an ASR Asset" on page 28.

2. **Follow the safety precautions provided in the "Preparing for Service" topic at:**

   `http://docs.oracle.com/cd/E41059_01/html/E48312/napsm.z4000019165586.html#scrolltoc`

3. **Prepare an antistatic surface on a workbench where you will place the node.**

4. **Arrange for an assistant to help you remove and carry the node to a workbench.**

Caution - You must completely remove the node. The modular system rails do not support partial removal and service. Partially removing a node and letting it hang in the rails can damage the rails and possibly the node.

5. **Take the node offline.**

   See "Prepare an Oracle Server X5-2M for Service" on page 65.

6. **When the green OK LED is blinking slowly, begin the removal process:**

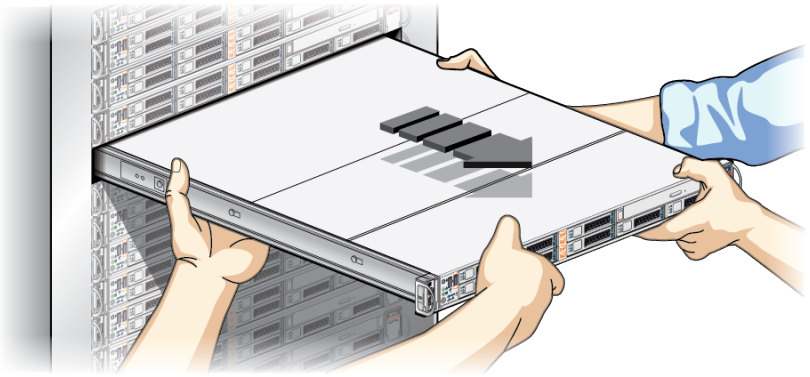
   a. **Loosen the two thumbscrews on the node's front rails.**

Caution - Be careful to avoid pinching your fingers with the D-shaped metal handles in the next step.

   b. **Using the D-shaped metal handles, pull the node straight toward you about three inches to disconnect the backplane connectors.**

   c. **Using two persons, pull it out of the rack with each person holding one side.**

Caution - Ensure that both persons support the front and rear of the node from underneath to prevent damage to it.



d. **Place the node on a workbench that has an antistatic surface large enough for the entire node.**

e. **Perform the service.**

7. **When the service is completed, install the node as described in "Install an Oracle Server X5-2M" on page 68.**

Related Information

- "Prepare an Oracle Server X5-2M for Service" on page 65
- "Install an Oracle Server X5-2M" on page 68
- "Related Oracle Server X5-2M Documentation" on page 58

Install an Oracle Server X5-2M

1. **Follow the safety precautions provided in the "Preparing for Service" topic at:**

   http://docs.oracle.com/cd/E41059_01/html/E48312/napsm.z4000019165586.html#scrolltoc

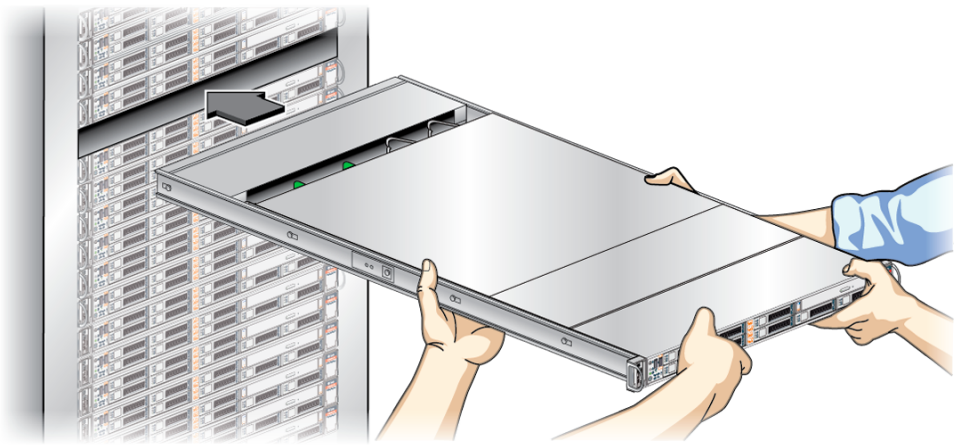
2. **Confirm that you have the correct node configuration for your modular system.**

   Two node configurations, based on the switch configuration for your system, are available. See "Switch and Node Configurations" on page 114.

3. **Arrange for an assistant to help you carry and install the node.**

Caution - Ensure that both persons support the front and rear of the node from underneath to prevent damage to it.

4. **Using two persons, align the node with the open slot.**



5. **Carefully engage the node with the rails on each side of the system, then slowly push the node straight forward, completely into the system.**

   The mating backplane connectors engage. The green OK LED begins to flash, indicating power-up sequence has started.

   When the green OK LED is solid, the node is initialized and ready for installing and updating software.

6. **Tighten the two thumbscrews on the node's front rails.**

7. **Activate the node if it is an ASR asset.**

   See “Activate an ASR Asset” on page 29.

8. **If the node installed is a replacement for a faulty node, use the same packaging to ship the faulty node to Oracle.**

   See “Return an Oracle Server X5-2M to Oracle” on page 70.

9. **Install and update the software.**

   See “Install and Update Software on an Oracle Server X5-2M” on page 70.

Related Information

- “Prepare an Oracle Server X5-2M for Service” on page 65
- “Removing and Installing an Oracle Server X5-2M” on page 65
- “Related Oracle Server X5-2M Documentation” on page 58

▼ Power Down an Oracle Server X5-2M

Depending upon your intent, there are multiple methods for powering down a node. This procedure provides standard instructions. For more options and links to detailed instructions, refer to “Powering Down the Server” at:

`http://docs.oracle.com/cd/E41059_01/html/E48312/napsm.z400061b1011735.html#scrolltoc`

1. **Stop all applications that are running or scheduled to run within the service period.**

2. **If the node is not responding, remove it from the modular system without powering it down.**

   See “Remove an Oracle Server X5-2M” on page 66.

3. **If the node is responding, gracefully power down the node by pressing and quickly releasing the Power button on the front panel.**

   For location of the power button, see “Oracle Server X5-2M Features” on page 59.

   The green OK LED begins to flash, indicating that the node power-down sequence has completed.

Related Information

- “Prepare an Oracle Server X5-2M for Service” on page 65

- "Oracle Server X5-2M CRUs" on page 61
- "Oracle Server X5-2M Fault Troubleshooting" on page 64
- "Related Oracle Server X5-2M Documentation" on page 58

Install and Update Software on an Oracle Server X5-2M

1. **Install a compatible OS.**

   For supported versions, refer to the *Netra Modular System Product Notes*.

   For installation instructions, refer to the documentation for the OS.

2. **Download and install the Netra Modular System system management software package and any updates from MOS.**

   For detailed instructions, refer to the *Netra Modular System Product Notes*.

   If the node you replaced was a faulty management node at slot 3, after you install the software, the replacement node automatically starts the system management software upon reboot. However, if the node you replaced was a management node at slot 4 (backup), it does not automatically start.

Return an Oracle Server X5-2M to Oracle

When you notify Oracle that a node is faulty, Oracle sends you a replacement node with instructions for returning the faulty node.

1. **If troubleshooting results in a decision to replace a faulty node, contact MOS for a replacement node.**

2. **When you receive the replacement node, use the packaging to return the faulty node to Oracle.**

Related Information

- "Getting Help" on page 54

Servicing an Oracle Server X6-2M

The modular system is designed for the components such as the nodes to be line-replaceable items, meaning that instead of servicing the nodes, you return the nodes to Oracle and receive replacements. However, if you want to service a node, these topics describe how.

Note - You cannot service a node while it is in the modular system. The system's design differs from other racks and frames that allow you to partially remove a node for service. Only the SAS HDD/SSDs and NVMe SSD storage drives (and their fillers) are hot-swappable components, provided that the OS or other critical applications are not running on the HDDs being serviced.

The Oracle Server X6-2M serviceable components, and access to most components, are the same as the Oracle Server X6-2. Links to the Oracle Server X6-2 documentation are provided in lieu of procedures in this document. Only where access and/or service is different are service procedures provided in this document.

These topics describe how to service the Oracle Server X6-2M (both compute and management nodes). The same documentation is applicable to both node types (compute and management).

Related Information

- "Monitoring Faults" on page 13

- “Servicing Ethernet Switches” on page 111

Related Oracle Server X6-2M Documentation

The Oracle Server X6-2M serviceable components, and access to those components, are mostly the same as the Oracle Server X6-2.

Refer to the following service documentation to service CRUs:

- Servicing storage drives and fan modules at:

  http://docs.oracle.com/cd/E62159_01/html/E62171/ceihcaeg.html#scrolltoc
- Servicing batteries, DIMMs, PCIe risers and cards, and flash drives at:

  http://docs.oracle.com/cd/E62159_01/html/E62171/z4000020165586.html#scrolltoc
- General servicing and monitoring at:http://docs.oracle.com/cd/E62159_01/html/E62171/index.html.

Related Information

- “Oracle Server X6-2M Differences” on page 72
- “Oracle Server X6-2M CRUs” on page 77
- “Oracle Server X6-2M FRUS” on page 78
- “Oracle Server X6-2M Fault Troubleshooting” on page 79
- “Prepare an Oracle Server X6-2M for Service” on page 80
- “Servicing Ethernet Switches” on page 111

Oracle Server X6-2M Differences

The Oracle Server X6-2M is a customized modular version of the Oracle Server X6-2. These are the Oracle Server X6-2M differences for the Netra Modular System.

- Thumb-pull levers for removing a node from the system replace the green hot-swap levers.
- After you push the Power button, the green Power/OK LED begins flashing to indicate hot-swap is initiated. See “Oracle Server X6-2M LEDs” on page 16.
- FBA provides plug-and-play capability, eliminating the cabling process. This feature is the most significant physical difference between the servers.

- Serial console is not available because the serial port is used by the modular system to detect the node's presence. Access to the SP is through the network (NET_MGT) port through a switch in the FMM. See “FMM Serial Port” on page 142.
- The node power supply is not a CRU-serviceable item.
- The BIOS is customized.
- Some Oracle ILOM functions are either not available or have restrictions.
- Implementation of support for Ethernet adapters, PCIe cards, and switch updates may vary. See “Switch and Node Configurations” on page 114.
- The DVD drive is not available.

Note - Because the nodes are identical in their serviceable components (DIMMs, hard drives, batteries, and fans) to the Oracle Server X6-2, the procedures for servicing these Oracle Server X6-2M components are mostly the same. The key difference is that some FRUs can be accessed only by removing the FBA.

The Oracle ILOM on a node in the modular system supports all the standard Oracle ILOM interfaces that are described in the Oracle ILOM documentation.

Related Information

- “Safety and ESD Precautions” on page 19
- “Oracle Server X6-2M Features” on page 73
- “Oracle Server X6-2M CRUs” on page 77
- “Oracle Server X6-2M FRUS” on page 78
- “Removing and Installing an Oracle Server X6-2M” on page 80

Oracle Server X6-2M Features

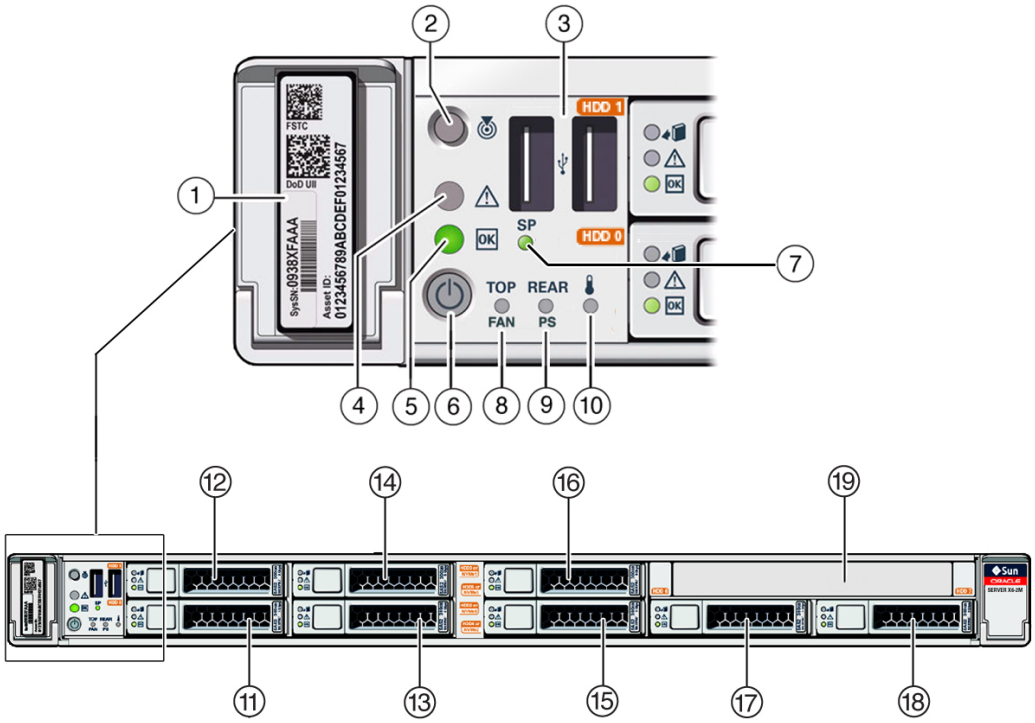
- “Oracle Server X6-2M Front Components” on page 74
- “Oracle Server X6-2M Removed From System” on page 75
- “Oracle Server X6-2M Rear Components” on page 76

Related Information

- “Oracle Server X6-2M Differences” on page 72
- “Monitoring Faults” on page 13
- “Oracle Server X6-2M CRUs” on page 77
- “Oracle Server X6-2M FRUS” on page 78
- “Oracle Server X6-2M Service Labels” on page 78

Oracle Server X6-2M Front Components

FIGURE 11 Oracle Server X6-2M Front Components



No.	Name
1	Product Serial Number (PSN) label and Radio Frequency Identification (RFID) tag
2	Locator LED/Locator button: white
3	USB 2.0 connectors (2)
4	Service Required LED: amber
5	Power/OK LED: green
6	Power button
7	SP OK LED: green
8	Top Fan Fault LED: amber
9	Rear Power Supply (PS) Fault LED: amber
10	System Over Temperature Warning LED: amber

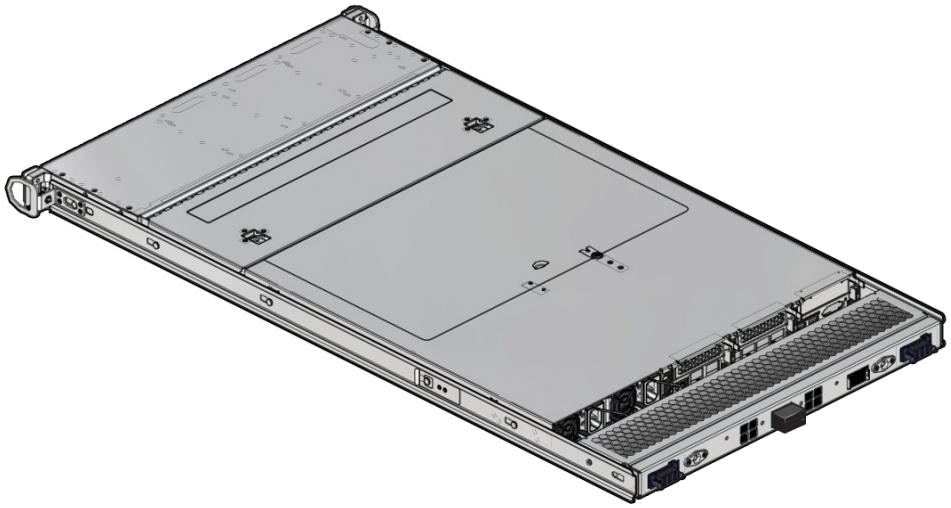
No.	Name
11	Storage drive 0 (SAS HDD/SSD)
12	Storage drive 1(SAS HDD/SSD)
13	Storage drive 2 (SAS HDD/SSD or NVMe SSD)
14	Storage drive 3 (SAS HDD/SSD or NVMe SSD)
15	Storage drive 4 (SAS HDD/SSD or NVMe SSD)
16	Storage drive 5 (SAS HDD/SSD or NVMe SSD)
17	Storage drive 6 (SAS HDD/SSD)
18	Storage drive 7 (SAS HDD/SSD)
19	Filler panel

Related Information

- “Oracle Server X6-2M Removed From System” on page 75
- “Oracle Server X6-2M Rear Components” on page 76

Oracle Server X6-2M Removed From System

FIGURE 12 Oracle Server X6-2M Removed From System, Viewed from Rear of the FBA



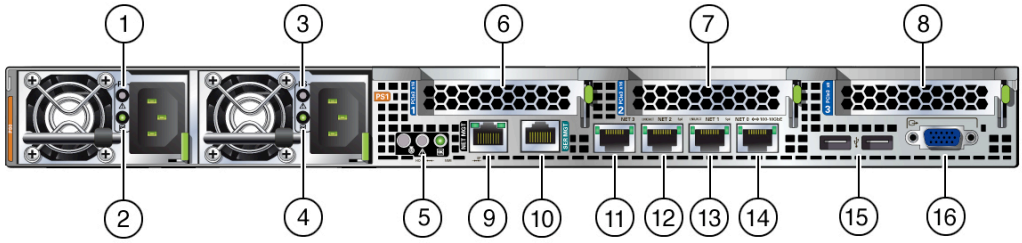
Related Information

- “Oracle Server X6-2M Front Components” on page 74
- “Oracle Server X6-2M Rear Components” on page 76

Oracle Server X6-2M Rear Components

After the FBA is removed, this is the view of the server back panel. See “Remove the FBA” on page 44.

FIGURE 13 Oracle Server X6-2M Server Rear View



No.	Name
1	Power Supply (PS) 0
2	Power Supply (PS) 0 status indicators: Service Required LED: amber, AC OK LED: green
3	Power Supply (PS) 1
4	Power Supply (PS) 1 status indicators: Service Required LED: amber, AC OK LED: green
5	System status indicators: Locator LED: white, Service Required LED: amber, Power/OK LED: green
6	PCIe card slot 1 (This slot is for a standard PCIe card or the optional Oracle PCIe NVMe switch card. This slot is nonfunctional in single-processor systems.)
7	PCIe card slot 2
8	PCIe card slots 3 and 4 (Slot 4 is for the internal HBA card. Slot 4 is internal and is not visible from the rear of the server.)
9	Oracle ILOM service processor (SP) network management 10/100/1000BASE-T port (NET MGT)

No.	Name
10	SER MGT /RJ-45 serial port
11	Network 100/1000/10000 port: NET 3 (Nonfunctional in single-processor systems.)
12	Network 100/1000/10000 port: NET 2 (Nonfunctional in single-processor systems.)
13	Network 100/1000/10000 port: NET 1
14	Network 100/1000/10000 port: NET 0
15	USB 2.0 connectors (2)
16	DB-15 video connector

Note - All of the PCIe slots comply with the PCI Express 3.0 specification and can accommodate 25 watt PCIe3 cards.

Related Information

- “Oracle Server X6-2M Front Components” on page 74
- “Oracle Server X6-2M Removed From System” on page 75

Oracle Server X6-2M CRUs

You can replace the following CRUs on the nodes:

- HDDs and SSDs
- Fan modules
- 3-volt lithium batteries
- DIMMs
- USB internal flash drives

Note - In addition to these CRUs (with part numbers specific to the modular system), also you can service some of the CRUs listed in the *Oracle Server X6-2 Service Manual*. Part numbers for those correlate with the Oracle Server X6-2. See “Oracle Server X6-2M Differences” on page 72.

For CRU locations, refer to Customer-Replaceable Units at `http://docs.oracle.com/cd/E62159_01/html/E62171/z400000a1418630.html#scrolltoc`.

Additionally, there are FRUs that can be replaced or serviced only by authorized Oracle service personnel. (See “Oracle Server X6-2M FRUS” on page 78.) If an item not listed here needs service, contact your service representative.

Related Information

- “Oracle Server X6-2M Differences” on page 72
- “Oracle Server X6-2M Fault Troubleshooting” on page 79
- “Prepare an Oracle Server X6-2M for Service” on page 80
- “Removing and Installing an Oracle Server X6-2M” on page 80

Oracle Server X6-2M FRUS

FRUs can be replaced or serviced only by authorized Oracle service personnel. If an item not listed in needs service, contact your service representative.

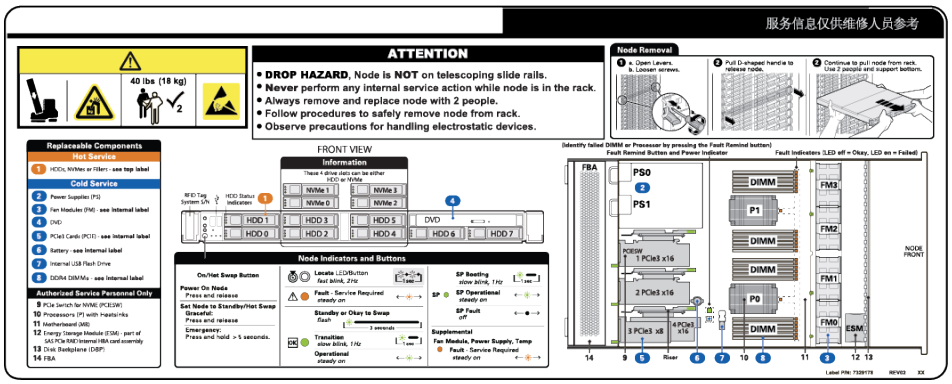
For detailed information about servicing FRUs, see Servicing FRUs at `http://docs.oracle.com/cd/E62159_01/html/E62171/z4000136165586.html#scrolltoc`.

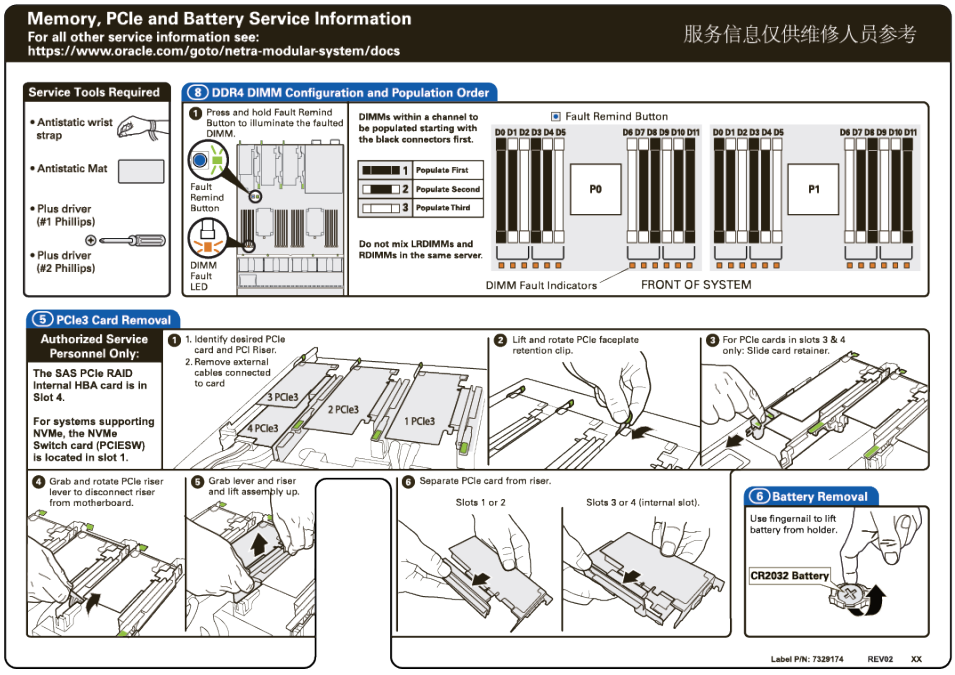
Related Information

- “Oracle Server X6-2M Fault Troubleshooting” on page 79
- “Servicing the FBA and Cables” on page 44

Oracle Server X6-2M Service Labels

These service labels are affixed at the factory to the nodes. You can use these as guides for removing the nodes and servicing the memory, fan, and battery. For detailed instructions and safety precautions, see the topics in this manual.





Related Information

- “Oracle Server X6-2M Fault Troubleshooting” on page 79
- “Removing and Installing an Oracle Server X6-2M” on page 80

Oracle Server X6-2M Fault Troubleshooting

For detailed information about troubleshooting faults, refer to the information about troubleshooting and diagnostics at:

`http://docs.oracle.com/cd/E62159_01/html/E62171/z40008681293329.html#scrolltoc`

Related Information

- “Oracle Server X6-2M CRUs” on page 77
- “Oracle Server X6-2M Differences” on page 72
- “Prepare an Oracle Server X6-2M for Service” on page 80

- "Removing and Installing an Oracle Server X6-2M" on page 80
- "Related Oracle Server X6-2M Documentation" on page 72

▼ Prepare an Oracle Server X6-2M for Service

In the *Oracle Server X6-2 Service Manual* a distinction is made about CRUs that can be serviced without turning off power. This distinction does *not* apply to nodes used in the modular system. Any service on a node requires that the node be completely powered off and removed from the system to a clean, antistatic workbench.

Note - If you pull a node out a few inches, you must wait at least 5 seconds before reinserting the node. Failing to wait might cause the node not to power on.

- **Before servicing a node, read the safety precautions and the power-down procedures at:**

  `http://docs.oracle.com/cd/E62159_01/html/E62171/z400061b1011735.html#scrolltoc`

Related Information

- "Oracle Server X6-2M CRUs" on page 77
- "Power Down an Oracle Server X6-2M" on page 84
- "Removing and Installing an Oracle Server X6-2M" on page 80

Removing and Installing an Oracle Server X6-2M

Caution - You cannot service a node while it is in the modular system. The system's design differs from other racks and frames that allow you to partially remove a node for service. You must completely remove the node to service the components.

Note - To avoid damage to the node and personnel, two persons are required for the physical task of removing or inserting a node.

- "Remove an Oracle Server X6-2M" on page 81
- "Install an Oracle Server X6-2M" on page 83
- "Install and Update Software on an Oracle Server X6-2M" on page 85
- "Return an Oracle Server X6-2M to Oracle" on page 85

Remove an Oracle Server X6-2M

1. **If the node is configured as an ASR asset, deactivate it.**
   See "Deactivate an ASR Asset" on page 28.
2. **Follow the safety precautions provided in the "Preparing for Service" topic at:**
   `http://docs.oracle.com/cd/E62159_01/html/E62171/z4000019165586.html#scrolltoc`
3. **Prepare an antistatic surface on a workbench where you will place the node.**
4. **Arrange for an assistant to help you remove and carry the node to a workbench.**

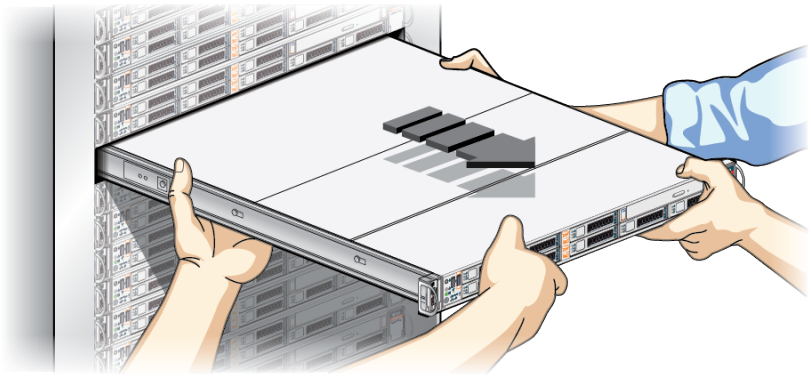
Atenció - You must completely remove the node. The modular system rails do not support partial removal and service. Partially removing a node and letting it hang in the rails can damage the rails and possibly the node.

5. **Take the node offline.**
   See "Power Down an Oracle Server X6-2M" on page 84.
6. **When the green OK LED is blinking slowly, begin the removal process:**
   a. **Loosen the two thumbscrews on the node's front rails.**

Caution - Be careful to avoid pinching your fingers with the D-shaped metal handles in the next step.

   b. **Using the D-shaped metal handles, pull the node straight toward you about three inches to disconnect the backplane connectors.**
   c. **Using two persons, pull it out of the rack with each person holding one side.**

Caution - Ensure that both persons support the front and rear of the node from underneath to prevent damage to it.



d. **Place the node on a workbench that has an antistatic surface large enough for the entire node.**

e. **Perform the service.**

7. **When the service is completed, install the node as described in "Install an Oracle Server X6-2M" on page 83.**

Related Information

- "Prepare an Oracle Server X6-2M for Service" on page 80
- "Install an Oracle Server X6-2M" on page 83
- "Related Oracle Server X6-2M Documentation" on page 72

Install an Oracle Server X6-2M

1. **Follow the safety precautions provided in the "Preparing for Service" topic at:**

   http://docs.oracle.com/cd/E62159_01/html/E62171/z4000019165586.html#scrolltoc

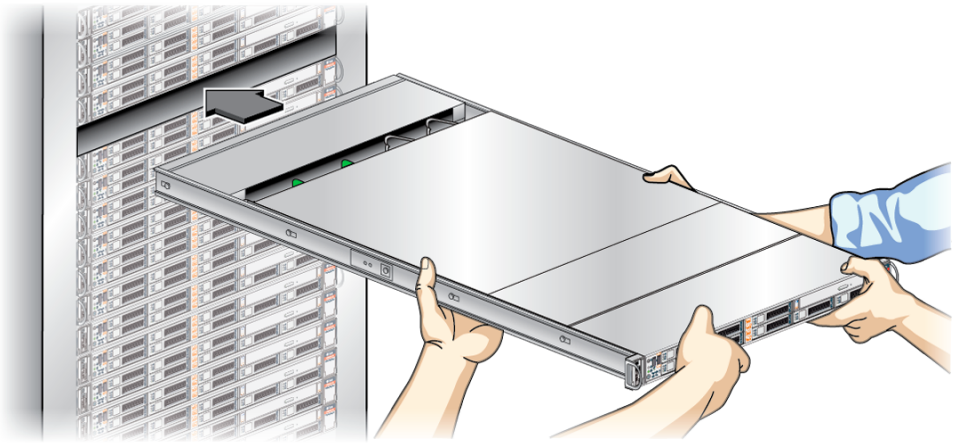
2. **Confirm that you have the correct node configuration for your modular system.**

   Two node configurations, based on the switch configuration for your system, are available. See "Switch and Node Configurations" on page 114.

3. **Arrange for an assistant to help you carry and install the node.**

Caution - Ensure that both persons support the front and rear of the node from underneath to prevent damage to it.

4. **Using two persons, align the node with the open slot.**



5. **Carefully engage the node with the rails on each side of the system, then slowly push the node straight forward, completely into the system.**

   The mating backplane connectors engage. The green OK LED begins to flash, indicating power-up sequence has started.

   When the green OK LED is solid, the node is initialized and ready for installing and updating software.

6. **Tighten the two thumbscrews on the node's front rails.**

7. **Activate the node if it is an ASR asset.**

See “Activate an ASR Asset” on page 29.

8. **If the node installed is a replacement for a faulty node, use the same packaging to ship the faulty node to Oracle.**

   See “Return an Oracle Server X6-2M to Oracle” on page 85.

9. **Install and update the software.**

   See “Install and Update Software on an Oracle Server X6-2M” on page 85.

Related Information

- “Prepare an Oracle Server X6-2M for Service” on page 80
- “Removing and Installing an Oracle Server X6-2M” on page 80
- “Related Oracle Server X6-2M Documentation” on page 72

▼ Power Down an Oracle Server X6-2M

Depending upon your intent, there are multiple methods for powering down a node. This procedure provides standard instructions. For more options and links to detailed instructions, refer to “Powering Down the Server” at:

`http://docs.oracle.com/cd/E62159_01/html/E62171/z400061b1011735.html#scrolltoc`

1. **Stop all applications that are running or scheduled to run within the service period.**

2. **If the node is not responding, remove it from the modular system without powering it down.**

   See “Remove an Oracle Server X6-2M” on page 81.

3. **If the node is responding, gracefully power down the node by pressing and quickly releasing the Power button on the front panel.**

   For location of the power button, see “Oracle Server X6-2M Features” on page 73.

   The green OK LED begins to flash, indicating that the node power-down sequence has completed.

Related Information

- “Prepare an Oracle Server X6-2M for Service” on page 80
- “Oracle Server X6-2M CRUs” on page 77
- “Related Oracle Server X6-2M Documentation” on page 72

- “Oracle Server X6-2M Fault Troubleshooting” on page 79

Install and Update Software on an Oracle Server X6-2M

1. **Install a compatible OS.**

   For supported versions, refer to the *Netra Modular System Product Notes*.

   For installation instructions, refer to the documentation for the OS.

2. **Download and install the Netra Modular System system management software package and any updates from MOS.**

   For detailed instructions, refer to the *Netra Modular System Product Notes*.

   If the node you replaced was a faulty management node at slot 3, after you install the software, the replacement node automatically starts the system management software upon reboot. However, if the node you replaced was a management node at slot 4 (backup), it does not automatically start.

Return an Oracle Server X6-2M to Oracle

When you notify Oracle that a node is faulty, Oracle sends you a replacement node with instructions for returning the faulty node.

1. **If troubleshooting results in a decision to replace a faulty node, contact MOS for a replacement node.**

2. **When you receive the replacement node, use the packaging to return the faulty node to Oracle.**

Related Information

- “Getting Help” on page 54

Servicing PDUs

This task can take approximately 120 minutes to complete.

These topics describe how to reset PDU circuit breakers and service PDUs.

Related Information

- "Getting Help" on page 54
- "Identifying Component Locations and Slot Numbers" on page 20
- "Component Types and Service Classifications" on page 26
- "Replaceable CRUs" on page 27
- "Replaceable FRUs" on page 27
- "3-Phase Power Balancing" in *Netra Modular System Installation Guide*

Related PDU Documentation

The PDUs in the modular system are the same as those used in the Sun Rack II. Complete documentation for the PDUs is available at:

`http://docs.oracle.com/cd/E19657-01/index.html`

Note - Only the standard PDUs are compatible in the modular system. The compact PDUs are not compatible. See "PDU Physical Specifications" on page 94.

Note - The I/O interfaces on the PDU are not supported in the modular system.

The topics covered in this *Netra Modular System Service Manual Supplement* describe differences in the PDU location and service procedures related to this modular system.

Related Information

- “Preparing for PDU Service” on page 92
- “Replacing a PDU” on page 98
- “Identifying Component Locations and Slot Numbers” on page 20
- “Component Types and Service Classifications” on page 26

▼ Troubleshooting a PDU

If the system management software reports that one or more modular system components have lost power on the same power supply unit, perform the following troubleshooting.

1. **Verify that the component's PSU is working correctly.**
2. **Verify that all of the building's power input mains to the PDUs have power.**
   Check the building's electrical circuit panel to ensure that none of the breakers for the PDU inputs are off.
3. **Determine if a PDU circuit breaker has tripped.**
   See “PDU Circuit Breaker Overview” on page 88.
4. **If none of these steps resolve the issue, replace the PDU.**
   See “Replacing a PDU” on page 98.

PDU Circuit Breaker Overview

Each PDU contains six circuit breakers, one for each outlet group. These circuit breakers are safety devices to protect components from damage and you from personal injury. A circuit breaker trips and shuts the power off to an outlet group when it detects an overloaded circuit, a short circuit, or another fault condition.

When operating normally in the On (|) position, the circuit breakers are flush with the side of the PDU. When tripped to the Off (0) position, the circuit breakers extend beyond the side of the PDU.

In the modular system, because there is not sufficient room for resetting the breakers by hand, a special PDU circuit breaker reset tool is provided. Use this tool to reset a PDU circuit breaker from the rear of the modular system.

Note - If a PDU breaker trips, all nodes using that breaker are affected.

Each node has two power supplies: PS0 and PS1. From the rear view of the modular system, the PS0 is connected to the left PDU, and the PS1 is connected to right PDU. When a PDU breaker trips, all of the PSUs in that breaker group lose power, generating a failure event.

LEDs for all nodes experiencing a failed PSU have the amber service light on. The system management software detects the PS0 or PS1 failed state, then lights the Major System Fault LED and sends out both events and alarms to its clients. See “Modular System LEDs” on page 13.

Caution - To prevent injury and component damage, always determine the cause of a tripped circuit breaker before resetting it.

Related Information

- “Switch On or Off a PDU Breaker” on page 89
- “Safety Notices” on page 92
- “Attach an Antistatic Wrist Strap” on page 98
- “Metering Unit Restriction” on page 110
- “Replacing a PDU” on page 98
- “Identifying Component Locations and Slot Numbers” on page 20
- “Component Types and Service Classifications” on page 26
- “3-Phase Power Balancing” in *Netra Modular System Installation Guide*

▼ Switch On or Off a PDU Breaker

A single, fully populated modular system contains 28 compute nodes, 2 management nodes, up to 6 switches, and 2 PDUs.

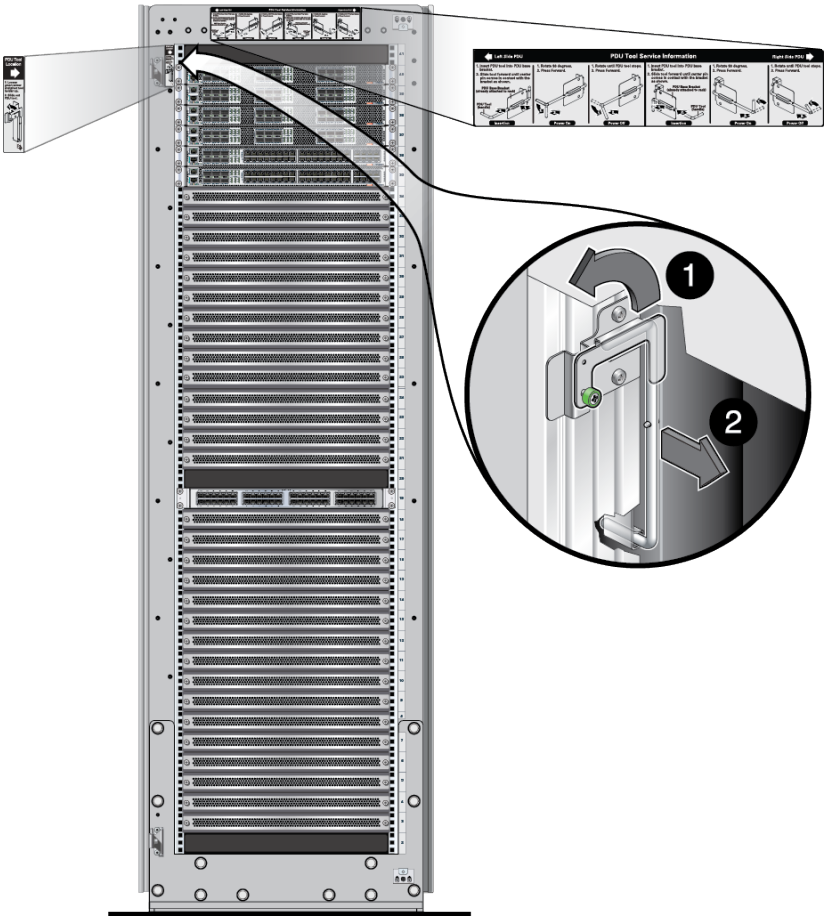
A configuration of multiple modular systems (up to 8) contains as many compute nodes as is needed, up to the maximum of 30 nodes per modular system. Each modular system has up to 6 switches and 2 PDUs, regardless of how many modular systems are connected.

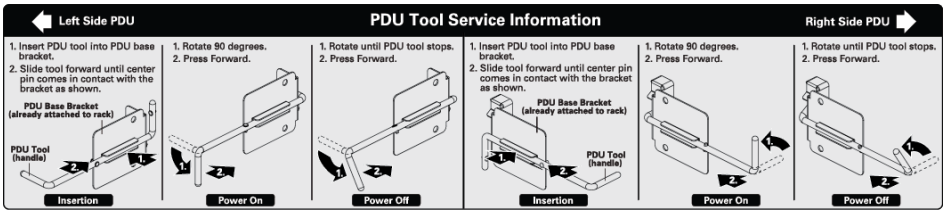
1. **If a circuit breaker has tripped to off, determine which group of nodes (up to six) have lost power.**

   See “Monitoring Faults” on page 13.

2. **At the rear of the modular system, open the door and remove the PDU circuit breaker reset tool.**

The tool (shaped like a hex key wrench but with two right angles) is mounted in its holder on the top left side of the frame.





3. **Insert the PDU circuit breaker reset tool into the bracket (left or right) corresponding to the circuit breaker:**

   a. **Rotate the tool 90 degrees.**

   b. **Press forward to switch on or off the circuit breaker.**

   If the circuit break is off, this action turns it on. If the breaker is on, this action turns it off. For a detailed illustration of the reset process, refer to the PDU Tool Service Information label at the top of the frame.

Related Information

- “Safety Notices” on page 92
- “Metering Unit Restriction” on page 110
- “Replacing a PDU” on page 98

- “Identifying Component Locations and Slot Numbers” on page 20
- “Component Types and Service Classifications” on page 26
- “Monitoring Faults” on page 13
- “3-Phase Power Balancing” in *Netra Modular System Installation Guide*

Preparing for PDU Service

Before removing or installing a PDU, observe the following safety precautions and service preparations.

- “Safety Notices” on page 92
- “ESD Precautions” on page 94
- “PDU Physical Specifications” on page 94
- “PDU Electrical Specifications” on page 95
- “Tools Needed for Servicing a PDU” on page 96
- “Attach an Antistatic Wrist Strap” on page 98

Related Information

- “Identifying Component Locations and Slot Numbers” on page 20
- “Component Types and Service Classifications” on page 26
- “Switch On or Off a PDU Breaker” on page 89
- “Replacing a PDU” on page 98

Safety Notices

Before installing a PDU into the modular system, observe the following safety and usage notices.

Caution - PDU installation and configuration must be done by qualified personnel with experience installing similar hardware.

Caution - You must completely remove the PDU. You cannot service the PDU within the frame.

Caution - Before installing and using the PDU, check it for any external damage. If the PDU is damaged, do not install or operate the PDU. Contact your service representative.

Caution - The PDU is heavy. Use two persons to lift and install the PDU into the modular system. Also, you might need additional help when routing the PDU power input cords.

Caution - The PDU and any electrical equipment connected to it can be damaged by power load ratings above the values listed in “PDU Electrical Specifications” on page 95.

Caution - Do not use the PDU in damp conditions. If a liquid spills on the PDU, or if the PDU becomes damp from condensation, immediately disconnect the power input lead connector from the AC power supply. Contact your service representative before using the PDU again. You might need to return it for inspection.

Caution - Choose the maximum permitted fuse/circuit breaker load in the building according to the values listed in “PDU Electrical Specifications” on page 95. Observe all national and local regulations, safety provisions, and fuse load variations.

Caution - Never bend or rest any object on a PDU's power input lead.

Caution - Ensure that the total power consumed by all of the connected equipment does not exceed the respective nominal power rating of the PDU.

Caution - Always provide an easily accessible safety disconnect for units with fixed connections.

Caution - When connecting equipment to the PDU, ensure that you install the most symmetrical load to all of the phases as possible.

Caution - Reduced Air Flow – Install equipment in the modular system in a way that does not compromise the amount of air flow required for the safe operation of the equipment.

Caution - Mechanical Loading – Mount equipment in the modular system to prevent a hazardous condition due to uneven mechanical loading.

Caution - Circuit Overloading – When connecting equipment to the PDU, consider the damaging effect that overloading the circuits might have on overcurrent protection and supply wiring. Always review the equipment nameplate ratings when considering circuit overloading issues.

Caution - Reliable Earthing – Always maintain the reliable earthing of modular system equipment. Give particular attention to supply connections other than the direct connections to the branch circuit (for example, when using power strips).

Related Information

- “ESD Precautions” on page 94
- “PDU Physical Specifications” on page 94
- “PDU Electrical Specifications” on page 95
- “Tools Needed for Servicing a PDU” on page 96
- “Attach an Antistatic Wrist Strap” on page 98

ESD Precautions

Electronic equipment is susceptible to damage by static electricity. Use a grounded antistatic wriststrap, footstrap, or equivalent safety equipment to prevent electrostatic damage when you install or service a PDU and other components.

Caution - To protect electronic components from electrostatic damage, which can permanently disable the component or require repair by service technicians, place components on an antistatic surface, such as an antistatic discharge mat, an antistatic bag, or a disposable antistatic mat. Wear an antistatic grounding strap connected to a metal surface on the modular system when you work on components.

Related Information

- “Safety Notices” on page 92
- “PDU Physical Specifications” on page 94
- “PDU Electrical Specifications” on page 95
- “Tools Needed for Servicing a PDU” on page 96
- “Attach an Antistatic Wrist Strap” on page 98

PDU Physical Specifications

Dimension	Measurement
Length	1674 mm / 65.91 in.

Dimension	Measurement
Depth	47 mm / 1.85 in.
Width	134 mm / 5.28 in.
Power-input lead-cord nominal length	4 m / 13.12 ft.
Weight (including cords, without packaging):	
Low-voltage PDUs for North and South America, Japan, and Taiwan:	
■ 22 kVA, single phase	20.4 kg / 44.97 lbs
■ 24 kVA, three phase	18.00 kg / 39.68 lbs
High-voltage PDUs for EMEA and APAC:	
■ 22 kVA, single phase (Not UL® rated. Meets safety approvals for EMEA and APAC.)	13.00 kg / 28.66 lbs
■ 24 kVA, three phase	14.00 kg / 30.86 lbs

Note - 1 to 1.5m (3.3 to 4.9 ft.) of the cords are routed within the modular system cabinet, so the site's AC power receptacle must be within 2m (6.6 ft.) of the modular system.

Note - Compact PDUs are not supported.

Related Information

- “Safety Notices” on page 92
- “ESD Precautions” on page 94
- “PDU Physical Specifications” on page 94
- “Tools Needed for Servicing a PDU” on page 96
- “Attach an Antistatic Wrist Strap” on page 98

PDU Electrical Specifications

The following tables describe the standard PDU electrical specifications, including the number and type of connectors and receptacles.

TABLE 1 Specifications for North and South America, Japan, and Taiwan Low-Voltage PDUs

Specification	22 kVA	24 kVA
Number of inputs	3 x 50A single phase	2 x 60A 3 phase
Voltage	200 to 240 VAC single phase	200 to 220 VAC 3 phase
Frequency	50/60Hz	50/60Hz
Current	36.8A max. per input	34.6A max. per phase

Specification	22 kVA	24 kVA
Power rating	22 kVA	24 kVA
Output current	110.4A (3 x 36.8A)	120A (6 x 20A)
Outlets	42 x C13 6x C19	42 x C13 6 x C19
Outlet groups	6	6
Group protection†	20A	20A
Data center receptacle	Hubbell CS8264C	IEC309 60A 4 PIN 250VAC 3 phase IP67

†UL489 2-pole circuit breaker.

TABLE 2 Specifications for EMEA and APAC High-Voltage PDUs

Specification	22 kVA	24 kVA
Number of inputs	3x32A single phase	2 x 25A 3 phase
Voltage	220 to 240 VAC	220/380 to 240/415 VAC 3 phase
Frequency	50/60Hz	50/60Hz
Current	32A max per input	18A max. per phase
Power rating	22 kVA	24 kVA
Output current	96A (3x32A)	109A (6 x 18.1A)
Outlets	42 x C13 6 x C19	42 x C13 6 x C19
Outlet groups	6	6
Group protection†	20A	20A
Data center receptacle	IEC309 32A 3 PIN 250 VAC single phase IP44	IEC309 32A 5 PIN 230/400V 3 phase IP44

†UL489 1-pole circuit breaker.

Related Information

- "3-Phase Power Balancing" in *Netra Modular System Installation Guide*
- "Safety Notices" on page 92
- "ESD Precautions" on page 94
- "PDU Physical Specifications" on page 94
- "Tools Needed for Servicing a PDU" on page 96
- "Attach an Antistatic Wrist Strap" on page 98

Tools Needed for Servicing a PDU

Prior to installing a standard PDU into your modular system, prepare the work area and assemble the following tools:

- T-25 Torx wrench key (included in the modular system shipping kit)
- T-30 Torx wrench key (included in the modular system shipping kit)
- M5 shipping screws and washers (included in the PDU shipping kit)
- M12 torque wrench and M12 concrete bolts, such as Hilte M12 HSL-3-B anchors, if you need to move a modular system that is anchored to the floor.
- No. 3 Phillips screwdriver
- Cordless drill and matching T-25 and T-30 drill bits

Also, you must supply:

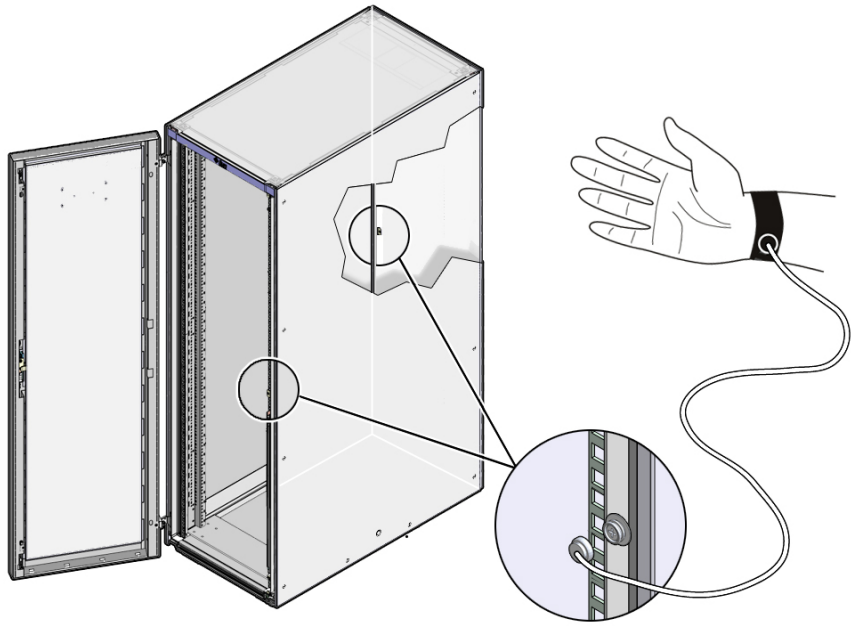
- Antistatic wrist strap
- Tie wraps
- Clean antistatic work table, or area, near the modular system

Related Information

- “Safety Notices” on page 92
- “ESD Precautions” on page 94
- “PDU Electrical Specifications” on page 95
- “PDU Electrical Specifications” on page 95
- “Attach an Antistatic Wrist Strap” on page 98

▼ Attach an Antistatic Wrist Strap

- **Attach a wrist strap to your wrist and to the ESD grounding jack on the rear rail of the modular system.**



Related Information

- “Safety Notices” on page 92
- “ESD Precautions” on page 94
- “PDU Physical Specifications” on page 94
- “PDU Electrical Specifications” on page 95
- “Tools Needed for Servicing a PDU” on page 96
- “PDU Circuit Breaker Overview” on page 88

Replacing a PDU

These topics describe the procedures for replacing a PDU.

- “Troubleshoot the Fault and Follow Safety Precautions” on page 99

- “Power Off and Disconnect Components” on page 100
- “Provide Access to a PDU” on page 100
- “Remove a PDU” on page 103
- “Install a Replacement PDU” on page 105
- “Connect and Install Adjacent Components” on page 107
- “Return the Modular System to Previous Location” on page 108
- “Power On the System” on page 110

Related Information

- “Preparing for PDU Service” on page 92
- “Identifying Component Locations and Slot Numbers” on page 20
- “Component Types and Service Classifications” on page 26
- “Replaceable FRUs” on page 27

▼ Troubleshoot the Fault and Follow Safety Precautions

1. **If you have not done so already, troubleshoot the fault before replacing a PDU.**
   See “Troubleshooting a PDU” on page 88.
2. **Follow the safety and ESD precautions and the preparation guidelines.**
   See “Preparing for PDU Service” on page 92.
3. **Arrange for an assistant to help you remove and carry the PDU to a workbench.**
4. **Power off and disconnect adjacent components.**
   See “Power Off and Disconnect Components” on page 100.

Related Information

- “Identifying Component Locations and Slot Numbers” on page 20
- “Provide Access to a PDU” on page 100
- “Remove a PDU” on page 103
- “Install a Replacement PDU” on page 105
- “Connect and Install Adjacent Components” on page 107
- “Power On the System” on page 110

Power Off and Disconnect Components

1. **Shut down and power off components that are adjacent to the PDU.**
2. **Switch off the main power circuit breakers to all PDU inputs.**

   These are the main power breakers to the room or building outlets that supply power to the PDUs.
3. **Disconnect the faulty PDU's main power cords from their AC power sockets.**
4. **Provide access to the components.**

   See “Provide Access to a PDU” on page 100.

Related Information

- “Troubleshoot the Fault and Follow Safety Precautions” on page 99
- “Identifying Component Locations and Slot Numbers” on page 20
- “Remove a PDU” on page 103
- “Install a Replacement PDU” on page 105
- “Connect and Install Adjacent Components” on page 107
- “Power On the System” on page 110

Provide Access to a PDU

If the modular system is installed in a location where enough physical access to the side panel and PDUs are not possible, for example, if multiple systems are side-by side, you must move the modular system that contains the faulty PDU.

Note - If the modular system is mounted to the floor with concrete anchor bolts, you will need an M12 torque wrench and 10 new M12 concrete anchors and bolts, such as Hilte HSL-3-B M12/25, to reanchor the modular system.

1. **Remove the front and rear doors of the modular system cabinet.**

2. **If access to the modular system requires moving it, perform the following steps:**

   a. **Follow safety precautions.**

      See “Safety Notices” on page 92.

   b. **Disconnect the I/O cables from the modular system.**

   c. **Disconnect the power cords to the other PDU.**

d. **If the modular system is mounted to the floor, use an M12 torque wrench to remove the anchor bolts, and discard the used anchor bolts.**

e. **Remove the seismic brackets.**

f. **If the system has castor rollers, unlock them.**

g. **Using two persons, carefully move the modular system to a nearby location that allows space for removing the side panel and performing the PDU replacement.**

"Move the Modular System to the Installation Location" in *Netra Modular System Installation Guide*

Caution - The side panel's grounding strap is not visible until the side panel is partially removed. Be careful not to damage the grounding strap when removing the side panel.

3. **Remove the side panel and disconnect the grounding strap corresponding to the PDU that is being replaced.**

4. **Remove the seismic side:**

a. **Remove any straps holding cables to the seismic side.**

b. **Disconnect the ground strap to the seismic side.**

c. **Using a T-30 Torx screwdriver, remove and set aside the 24 screws that connect the seismic side to the RETMA rail top hats.**

Caution - In the next step, remove the top 4 screws last, and support the seismic side as you remove these last 4 screws.

d. **Using a T-30 Torx screwdriver, remove and set aside the 30 screws that connect the seismic side to the frame.**

5. **Remove the four screws holding the coupler panel to its support brackets, then carefully pull the coupler panel out of the way.**

Note - Do not disconnect any cables from the coupler panel.

See "Remove the RJ-45 Coupler Panel" on page 38.

6. **Remove the following:**

a. **Either the MPO coupler panel or the switch at slot 40.**

b. **Rear side rail at slot 40 on the replacement PDU side.**

c. **If the faulty PDU is 24kVA, the MPO coupler panel or switch and rear side rail at slot 39.**

   See “Servicing Ethernet Switches” on page 111.

7. **Remove the faulty PDU.**

   See “Remove a PDU” on page 103.

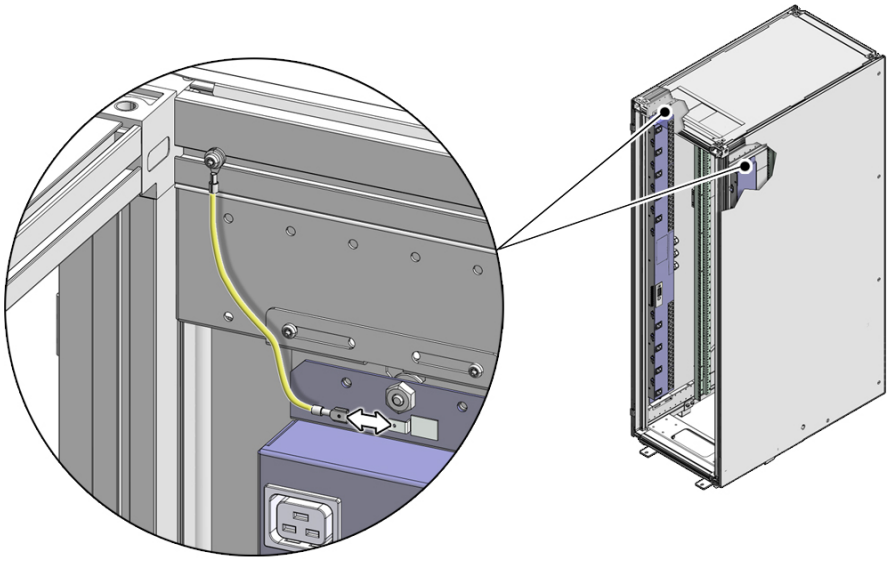
Related Information

- “Troubleshoot the Fault and Follow Safety Precautions” on page 99
- “Identifying Component Locations and Slot Numbers” on page 20
- “Install a Replacement PDU” on page 105
- “Connect and Install Adjacent Components” on page 107
- “Power On the System” on page 110

▼ Remove a PDU

1. **From the faulty PDU, carefully remove the two grounding cords, top and bottom, that connect the PDU to the modular system.**

Caution - Do not touch the grounding cords to the other PDU when removing cords from the faulty PDU.



2. **Note the forward/rear position of the bottom PDU bracket relative to the modular system, so that later you can install the replacement PDU in the same location.**

3. **Using a T-30 Torx screwdriver, remove the two screws that hold the bottom PDU bracket to the modular system, and set the screws aside for use later.**

   The bottom PDU bracket remains attached to the PDU.

4. **Note the forward/rear position of the top PDU bracket relative to the modular system interior, so that later you can install the replacement PDU in the same location.**

5. **From the top PDU bracket attached to the modular system:**

   a. **Using a T-25 Torx screwdriver, remove the two screws that hold the PDU to the top PDU bracket, and set the screws aside for use later.**

   b. **Using a T-30 Torx screwdriver, remove the two screws that hold the top PDU bracket to the modular system, and set the screws aside for use later.**

   c. **Remove the PDU bracket from the modular system.**

6. **Disconnect the component power cords (FBS, FMM, switches), starting at the top and working to the bottom.**

Caution - Never twist, kink, or tightly bend a power input lead.

Caution - Keep the bottom bracket resting on the frame while removing the power cords, to prevent strain on the power cords.

7. **Remove the PDU and place it on a clean antistatic workbench.**

8. **Using a T-25 Torx screwdriver, remove the bottom bracket from the faulty PDU.**

   Save this bracket for installation on the replacement PDU.

9. **Install the replacement PDU.**

   See “Install a Replacement PDU” on page 105.

Related Information

- “Identifying Component Locations and Slot Numbers” on page 20
- “Troubleshoot the Fault and Follow Safety Precautions” on page 99
- “Power On the System” on page 110

▼ Install a Replacement PDU

1. **Unpack the replacement PDU and perform the following on an antistatic workbench:**

   a. **If the replacement PDU came with brackets installed, remove and discard the brackets.**

Note - Only the mounting brackets from the modular system are compatible.

   b. **Using a T-25 Torx screwdriver, attach the modular system bottom PDU bracket to the replacement PDU.**

      This bracket is the one you removed from the faulty PDU.

   c. **Turn all circuit breaker switches on the replacement PDU to the on position.**

2. **Feed the PDU input cords through the side and out the top of the frame.**

3. **Connect the power cords to their correct PDU sockets, as indicated on the power cord labels.**

4. **In the same position as originally installed, attach the top PDU bracket to the modular system using a T-30 Torx screwdriver.**

   Earlier you noted the location.

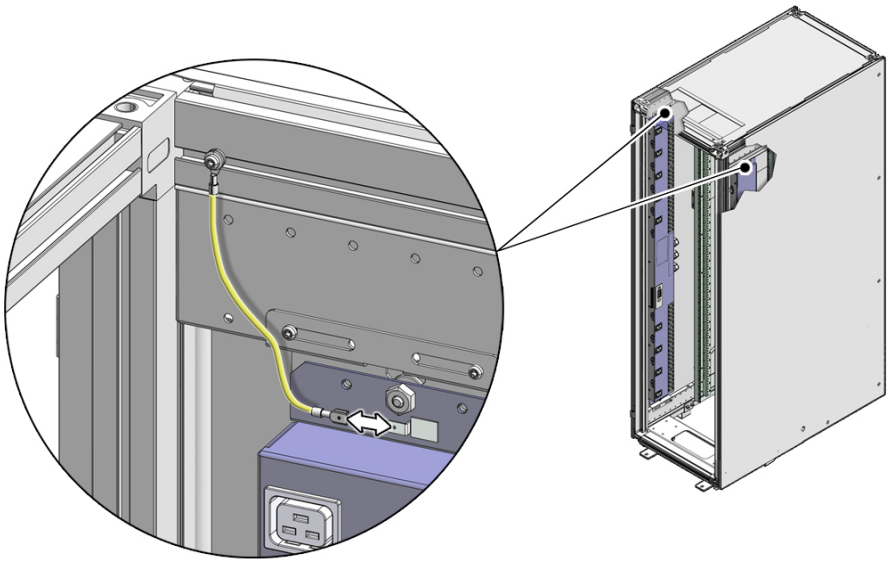
   Note - Make sure you place the bottom PDU bracket inside the modular system, and when adding the top PDU bracket, also have the PDU inside that top bracket.

5. **Hang the PDU in the top bracket, then use a T-25 Torx screwdriver to install the screws that attach the PDU to the top bracket.**

   Note - Only the top and bottom mounting brackets from the modular system are compatible. If the replacement PDU came with brackets attached, do not use those brackets to install the PDU.

6. **In the same position as originally installed, use a T-30 Torx screwdriver to install the screws that attach the bottom PDU bracket to the modular system.**

7. **Reattach the grounding straps, top and bottom.**



8. **Connect and install adjacent components.**

   See “Connect and Install Adjacent Components” on page 107.

Related Information

- “Troubleshoot the Fault and Follow Safety Precautions” on page 99
- “Identifying Component Locations and Slot Numbers” on page 20
- “Power On the System” on page 110

▼ Connect and Install Adjacent Components

1. **Install the following components:**

   a. **Either the MPO coupler panel or switch at slot 39 first, if removed for a 24kVA PDU**

   b. **Rear switch-side rail at slot 39, if removed**

   c. **Either the MPO coupler panel or switch at slot 40**

   d. **Rear switch-side rail on slot 40**

   See “Servicing Ethernet Switches” on page 111.

2. **Install the coupler panel at level 41.**
   See “Install the RJ-45 Coupler Panel” on page 38.

3. **Install the seismic side:**

Caution - Do not trap switch power cords between the seismic side and the RETMA rail-top hats.

Caution - Keep the seismic side and the modular system side panel's grounding cords clear.

   a. **Supporting the seismic side, install the top 4 screws.**

Caution - Before proceeding, verify that the holes line up for the other 26 screws.

   b. **Install the 30 M6 screws that connect the seismic side to the frame in 46 in-lbs.**

   c. **Install the 24 RETMA screws that connect the seismic side to the RETMA rail-top hats.**

d. **Connect the seismic side grounding cord.**

e. **Reconnect any ties or straps holding cables to the seismic side.**

4. **Install the side panel and connect the grounding cords.**

5. **If you moved the modular system to provide access to the PDU, return the modular system to its former location and secure it.**

   See "Return the Modular System to Previous Location" on page 108.

6. **Connect any external I/O cables that were disconnected for the service.**

7. **Connect all PDU power input cords to their inputs.**

8. **Install the front and rear doors of the modular system cabinet.**

9. **Carefully check all the components and parts that you handled, to ensure that they are installed and connected correctly.**

10. **Switch on the main power circuit breakers.**

    These are the main power breakers to the room or building outlets that supply power to the PDUs.

Related Information

- "Troubleshoot the Fault and Follow Safety Precautions" on page 99
- "Identifying Component Locations and Slot Numbers" on page 20

▼ Return the Modular System to Previous Location

If the modular system was mounted to the floor with concrete anchor bolts, you will need an M12 torque wrench and 10 new M12 concrete anchors and bolts, such as Hilte HSL-3-B M12/25, to reanchor the modular system.

1. **If access to the modular system required moving it, perform the following:**

   a. **Follow safety precautions.**

      Refer to "ESD and Safety Precautions" in *Netra Modular System Installation Guide*.

   b. **Using two persons, carefully move the modular system to its previous location.**

c. **If the system has caster rollers, lock them.**

2. **If the modular system was anchored to a concrete floor:**

   a. **Remove the used anchors and any debris from the concrete holes.**

   Note - You might have to drill holes in other locations if any of the holes do not hold a new anchor securely.

   b. **Install the anchors and bolts as follows:**

   Caution - Follow the instructions that come with the manufacturer's anchors and bolts.

      i. **Insert 10 anchors through the seismic plate into the holes in the concrete floor.**

      ii. **Using an M12 torque wrench, install and loosely tighten the bolts through the anchors and seismic plate, one in each hole, until all bolts are in.**

      iii. **Tighten each bolt in each anchor approximately 10 in-lbs at a time, until the torque-indicator bolt cap breaks off for each bolt.**

      This cap feature is on the Hilte bolts. Other manufacturers might have different methods for confirming proper torque. Carefully follow the manufacturer's instructions to ensure a secure mounting of the bolts.

3. **Continue from Step 6 in "Connect and Install Adjacent Components" on page 107.**

Related Information

- "Troubleshoot the Fault and Follow Safety Precautions" on page 99
- "Identifying Component Locations and Slot Numbers" on page 20
- "Install a Replacement PDU" on page 105
- "Connect and Install Adjacent Components" on page 107
- "Power On the System" on page 110

▼ Power On the System

- **Power on the modular system.**

Related Information

- “Troubleshoot the Fault and Follow Safety Precautions” on page 99
- “Identifying Component Locations and Slot Numbers” on page 20
- “Metering Unit Restriction” on page 110

Metering Unit Restriction

The metering units on the PDUs are not supported. Do not connect network cables to the PDU metering units.

Related Information

- “Identifying Component Locations and Slot Numbers” on page 20
- “Preparing for PDU Service” on page 92
- “Replacing a PDU” on page 98

Servicing Ethernet Switches

These topics describe how to service the switches that are part of the Netra Modular System. These procedures must be performed by authorized Oracle service personnel. Contact your support representative to schedule service. (See “Getting Help” on page 54.)

Related Information

- “Identifying Component Locations and Slot Numbers” on page 20
- “Component Types and Service Classifications” on page 26
- “Servicing Cords and Cables” on page 123
- “Identifying Port Mapping” on page 139
- “Safety and ESD Precautions” on page 19

Related Switch Documentation

The Ethernet switches used in the modular system are documented separately. For a detailed service manual, switch-related safety precautions, and other documentation about the switches, refer to the Oracle Switch ES2-72 and Oracle Switch ES2-64 Documentation Library at:

`http://docs.oracle.com/cd/E60179_01/index.html`

Depending on the configuration ordered, your modular system has up to six Ethernet switches.

For more information about configuring switches, refer to *Oracle Ethernet Switches L2 and L3 Deployment Best Practices*.

Related Information

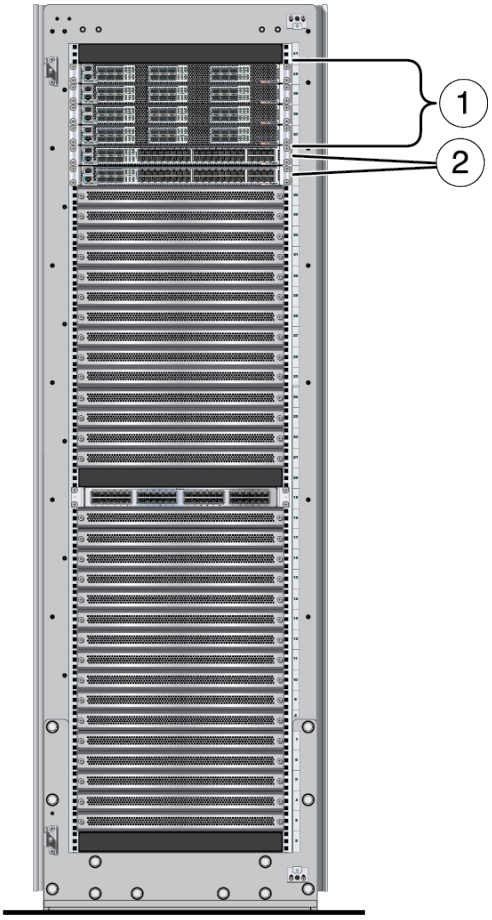
- “Switch and Node Configurations” on page 114
- “Safety and ESD Precautions” on page 19
- “Monitoring Faults” on page 13
- “Replacing Switches” on page 115

Switch Locations and Models

The following figures show the switch locations and models supported in the system.

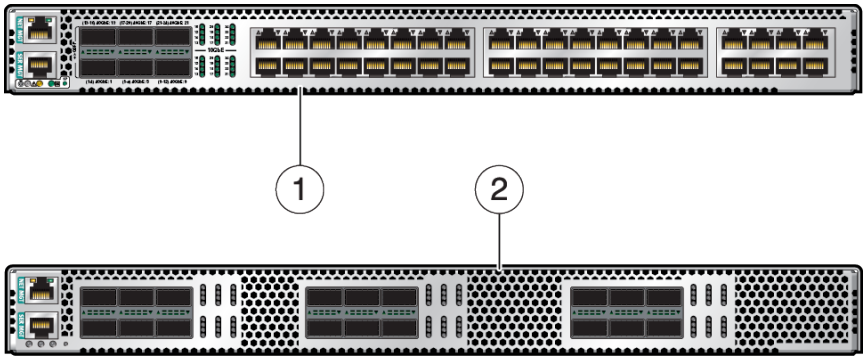
- Figure 14, “Ethernet Switch Locations,” on page 113
- Figure 15, “Ethernet Switch Models,” on page 114

FIGURE 14 Ethernet Switch Locations



No.	Name
1	Oracle Switch ES2-72 group
2	Oracle Switch ES2-64 group

FIGURE 15 Ethernet Switch Models



No.	Name
1	Oracle Switch ES2-64
2	Oracle Switch ES2-72

Related Information

- “Switch and Node Configurations” on page 114
- “Replacing Switches” on page 115
- “Monitoring Faults” on page 13
- “Related Switch Documentation” on page 111

Switch and Node Configurations

When a modular system is ordered, three configurations are available for the switches that affect the node configuration. The configurations cannot be altered after being produced at the factory.

Depending upon which configuration was chosen, you must use the applicable switch when replacing a faulty switch.

The configurations are as follows:

- Two copper switches.
- Two copper switches and two fiber switches.
- Two copper switches and four fiber switches.

Implementation of support for Ethernet adapters, PCIe cards, and switch updates may vary. For the newest list of supported adapters and cards and switch updates, refer to the *Netra Modular System Product Notes* and the product page at `https://www.oracle.com/servers/netra/netra-modular-system`.

Note - When ordering additional or replacement nodes, it is critical that the correct node configuration be obtained. Incompatible nodes will not operate correctly in your modular system. Oracle uses data from the original modular system order to assist in the correct node configuration.

Note - Alternatively, in place of any fiber switches, the modular system can have up to four MPO coupler (fiber) modules. Fiber switches cannot be combined with fiber coupler panels.

Related Information

- “Switch Locations and Models” on page 112
- “Replacing Switches” on page 115
- “Monitoring Faults” on page 13
- “Related Switch Documentation” on page 111

Replacing Switches

This task can take approximately 60 minutes to complete.

The modular system can have up to six Ethernet switches. They work as redundant pairs and can be purchased only in configurations of 2, 4, or 6. Replacing one of a redundant pair can be done such as to not impact node and data network operation of a live system. However, due to the complexity of this operation, you might want to replace switches during a scheduled maintenance or nonpeak usage period.

- “Remove an Ethernet Switch” on page 116
- “Install an Ethernet Switch” on page 118

Related Information

- “Safety and ESD Precautions” on page 19
- “Monitoring Faults” on page 13
- “Switch Locations and Models” on page 112
- “Switch and Node Configurations” on page 114
- “Related Switch Documentation” on page 111

▼ Remove an Ethernet Switch

Before You Begin You will need a No. 3 Phillips screwdriver for the procedure.

1. **Follow the safety and ESD precautions.**

   See “Safety and ESD Precautions” on page 19.

2. **Locate the faulty switch.**

   Slots are marked on the right side of the frame, both front and rear. See “Front Components” on page 21.

3. **Deactivate the switch ASR asset.**

   See “Activating and Deactivating System Assets” on page 28.

4. **Power down the switch.**

5. **At the front of the system:**

   a. **Remove the filler panel at the faulty switch's level.**

      See “Remove or Install a Filler Panel” on page 53.

Note - Depending on the switch location, it may be helpful to remove several filler panels.

Note - If removing the switch at level 35, and a node is not installed at level 34, remove the filler panel at level 34.

---

   b. **To keep the power cords out of the way, carefully make a loop and pull the cable through the rail slot above and out of the switch rail slot, then tie it up.**

      You cannot tie the cable up to its own rail, because it is being removed with the switch.

Note - Power cords feed through the mounting brackets and can easily fall into the side panels when removed. Securing them with ties prevents you from having to pull them out of the side panel.

---

   c. **Disconnect the switch power cords from the power supplies.**

6. **At the rear of the modular system:**

   a. **Locate the switch to be replaced (LEDs are not lit).**

      See “Switch Locations and Models” on page 112.

b. **If removing a switch at slot 37:**

   i. **Separate the fiber cables from the fiber cable tray.**

   ii. **Using a No. 3 Phillips screwdriver, remove the fiber cable tray and the fiber cable tray brackets.**

c. **Remove all cables from the switch ports, noting the locations for later when installing the replacement switch.**

   The fiber cable ends are labeled with the switch and switch port numbers.

Caution - The switch is on slide rails. Do not remove the rail screws at the rear.

Caution - Do not attempt to remove the switch from the rear of the system.

d. **If the customer has any cables connected, label the cables so that you can match their locations when reinstalling them later.**

7. **At the front of the modular system:**

   a. **Remove the screws that attach the mounting brackets to the modular system cabinet.**

Caution - In the next step, be sure to support the switch, because the switch is supported by the rails only until it is about 10" from being removed. After that, if unsupported, it will fall.

   b. **Carefully slide the switch completely out, and take it to an antistatic workbench.**

8. **On an antistatic workbench:**

   a. **Remove the rail guides and mounting brackets from the faulty switch.**

   b. **Install the rail guides and mounting brackets on the replacement switch.**

   c. **Transfer the transceivers from the faulty switch to the same ports on the replacement switch.**

      See “Replacing the Ethernet Transceiver” on page 119.

9. **Install the replacement switch.**

See “Install an Ethernet Switch” on page 118.

Related Information

- “Related Switch Documentation” on page 111
- “Switch and Node Configurations” on page 114

▼ Install an Ethernet Switch

Before You Begin You will need a No. 3 Phillips screwdriver for the procedure.

1. **Follow the safety and ESD precautions.**
   See “Safety and ESD Precautions” on page 19.

2. **If installing a switch that has another component directly below and a component directly above, remove both of that switch's rails at the rear of the modular system.**

   Note - Do not remove these rails if the slot below the switch is empty.

3. **At the front of the modular system:**

   Caution - If installing a switch at slot 35 and a node is not present in slot 34, take extra precautions that rear slide rails are engaged as you insert the switch.

   a. **Carefully slide the replacement switch completely in.**
      If you did not remove the slide rails earlier, slide them into the rail guides on either side of the switch.

   b. **Feed the power cords through the mounting bracket.**

   Caution - Do not plug in the power cords yet.

   c. **Tighten the screws that attach the mounting brackets to the modular system cabinet.**

4. **At the rear of the modular system:**

   a. **Reconnect all cables to the switch ports.**
      The locations you noted when removing the faulty switch.

Data cables are labeled U*xx*, PT-*xx*, where *xx* is the port number.

b. **Connect the NET MGT and NET SER cables.**

c. **Connect the switch power cords to the power supplies.**

d. **If you removed switch rails, reinstall them, then slide them into the rail guides on either side of the switch.**

e. **Install the filler panels.**

See “Remove or Install a Filler Panel” on page 53.

f. **If you removed the switch at slot 37:**

i. **Reinstall the fiber cable tray.**

ii. **Reattach the fiber cables to the tray.**

5. **Refer to the switch documentation to power on the unconfigured switch, and, if needed, update the firmware.**

You might need to obtain a patch release (such as 21378426) with the .pkg images for SP and HOST to update and configure the new switch. In the switch README, find the instructions to update the firmware on the switch.

6. **Reboot the FMM.**

7. **Activate the switch.**

See “Activate an ASR Asset” on page 29.

Related Information

- “Safety and ESD Precautions” on page 19
- “Related Switch Documentation” on page 111
- “Switch Locations and Models” on page 112
- “Switch and Node Configurations” on page 114

Replacing the Ethernet Transceiver

Related Information

- “Safety and ESD Precautions” on page 19
- “Monitoring Faults” on page 13
- “Related Switch Documentation” on page 111

▼ Remove an Ethernet Transceiver

For detailed information about the transceiver and service procedures, see “Related Switch Documentation” on page 111.

1. **Follow the safety and ESD precautions.**
   See “Safety and ESD Precautions” on page 19.
2. **To view the PN, transceiver type, and other information:**

   ```
   show int phy-info ex 0/x
   ```

   where x is one of the ports of the Ethernet transceiver being replaced.
3. **Disconnect the fiber cable from the transceiver.**
4. **Pull out the transceiver.**
5. **Install the replacement Ethernet transceiver.**
   See “Install an Ethernet Transceiver” on page 120.

Related Information

- “Switch Locations and Models” on page 112
- “Related Switch Documentation” on page 111
- “Replacing Switches” on page 115
- “Monitoring Faults” on page 13

▼ Install an Ethernet Transceiver

For detailed information about the transceiver and service procedures, see “Related Switch Documentation” on page 111.

1. **Follow the safety and ESD precautions.**

See “Safety and ESD Precautions” on page 19.

2. **Insert the replacement transceiver.**

3. **Connect the fiber cable to the transceiver.**

Related Information

- “Switch Locations and Models” on page 112
- “Related Switch Documentation” on page 111
- “Replacing Switches” on page 115
- “Monitoring Faults” on page 13

Servicing Cords and Cables

These topics describe how to replace the FRU cords and cables in the modular system.

Related Information

Precautions for Handling Cords and Cables

When servicing cords and cables, observe these precautions.

Caution - Be careful not to pinch replacement cords and cables while running them through the channels of the modular system and around components.

Caution - Leave no more than two or three consecutive FBS covers off at any time, otherwise cords and cables start to move, which makes replacing the covers more difficult.

Related Information

- "Safety and ESD Precautions" on page 19
- "Identifying Component Locations and Slot Numbers" on page 20
- "Component Types and Service Classifications" on page 26
- "Replaceable FRUs" on page 27
- "Replaceable CRUs" on page 27

Replace an Ethernet Cable From FMM to a Switch or a Coupler Panel

This procedure replaces cables from the FMM to the switch management ports and the coupler panel.

1. **Follow safety and ESD precautions.**
   See "Safety and ESD Precautions" on page 19.

2. **Disconnect the faulty cable from switch or coupler panel.**

   Note - The coupler panel connection is on the side of the coupler panel that faces the front of the modular system. (See "Rear Components" on page 22.)

3. **Connect the replacement cable.**

   Tip - In the following steps, you will be instructed to replace the FBS covers. They are easy to install incorrectly. When installed correctly, the top back edge of each cover will be underneath its FBS. A cover's edge must not be laying on top of an FBS. You can either look at RU 18 or 34 for reference, or you can remove and install the one at RU 34 to see how it to install it correctly.

4. **Remove the nearby FBS covers, and start laying in the replacement cable, reinstalling FBS covers as you install the cable toward the FMM.**
   See "Replace an FBS PCB" on page 29 for FBS cover removal instructions.
   See "Precautions for Handling Cords and Cables" on page 123.

5. **When the cable is at the FBS at slot 21, install the remaining FBS covers.**

6. **Remove the cosmetic cover from slots 19 and 20.**
7. **Remove the front and rear node support brackets at slot 20.**
8. **If necessary, remove the cosmetic cover mounting bracket to provide access cable removal and insertion.**
9. **Disconnect the faulty cable from the FMM.**
10. **Coil up the excess replacement cable.**
11. **Connect the cable to the FMM port vacated by the faulty cable.**
12. **Reinstall the node support brackets (slot 20).**
13. **If removed earlier, reinstall the cosmetic cover mounting bracket, then the cosmetic covers.**
14. **Reboot the FMM.**

Related Information

- “Identifying Component Locations and Slot Numbers” on page 20
- “Safety and ESD Precautions” on page 19
- “Identifying Port Mapping” on page 139
- “Replacing Switches” on page 115
- “Replacing the RJ-45 Coupler Panel” on page 37

▼ Replace an Ethernet Cable From FBS to a Switch or a Coupler Panel

This procedure describes how to replace cables from the FBS to the coupler panel, switch serial management ports, or switch Ethernet ports.

1. **Follow safety and ESD precautions.**

   See “Safety and ESD Precautions” on page 19.

2. **Remove FBS cover at the location of the failed cable.**

   See “Replace an FBS PCB” on page 29 for FBS cover removal instructions.

3. **Disconnect the faulty cable.**

4. **Connect the replacement cable.**

5. **Remove the nearby FBS covers, and start laying in the replacement cable, reinstalling FBS covers as you install the cable up the frame.**

   See “Precautions for Handling Cords and Cables” on page 123.

6. **When you have the replacement cable up to the FBS at slot 34, install the remaining FBS covers.**

7. **Disconnect the faulty cable from the switch or the coupler panel.**

   Note - The coupler panel connection is on the side of the coupler panel that faces the front of the modular system. See “Rear Components” on page 22.

8. **Connect the replacement cable to the switch or coupler panel.**

9. **Coil up any excess cable.**

Related Information

- “Front Components” on page 21
- “Identifying Component Locations and Slot Numbers” on page 20
- “Safety and ESD Precautions” on page 19
- “Identifying Port Mapping” on page 139
- “Replacing Switches” on page 115
- “Replacing the RJ-45 Coupler Panel” on page 37

▼ Replace an Ethernet Cable From FBS to FMM

This task can take approximately 45 minutes to complete.

1. **Remove FBS cover at the slot where the faulty cable is located.**

2. **Disconnect the faulty cable.**

3. **Connect the replacement cable.**

4. **Remove the nearby FBS covers, and start laying in the replacement cable, reinstalling FBS covers as you install the cable toward the FMM.**

   See “Replace an FBS PCB” on page 29 for FBS cover removal instructions.

   See “Precautions for Handling Cords and Cables” on page 123.

5. **When the cable is at the FBS before the FMM (slot 18 or 21), install the remaining FBS covers.**
6. **Remove the cosmetic covers from slots 19 and 20.**
7. **Remove the front and rear node support brackets at slot 20.**
8. **If necessary, remove the cosmetic cover mounts to plug in the replacement cable.**
9. **Disconnect the faulty cable from the FMM.**
10. **Coil up the excess replacement cable.**
11. **Connect the cable to the FMM port vacated by the faulty cable.**
12. **Reinstall the node support brackets (slot 20).**
13. **Reinstall the cosmetic cover mount (if removed), and the cosmetic covers.**
14. **Reboot the FMM.**

Related Information

- “Front Components” on page 21
- “Identifying Component Locations and Slot Numbers” on page 20
- “Safety and ESD Precautions” on page 19
- “Identifying Port Mapping” on page 139
- “Replacing Switches” on page 115
- “Replacing the FMM” on page 31

▼ Replace a Fiber Cable from FBS to MPO Coupler Panel

This procedure describes how to replace fiber cables from the FBS to the MPO coupler panel.

1. **Follow safety and ESD precautions.**
   See “Safety and ESD Precautions” on page 19.
2. **Remove FBS cover at the location of the failed cable.**
   See “Replace an FBS PCB” on page 29 for FBS cover removal instructions.
3. **Using the label sheet, label the new cable.**

4. **Disconnect the faulty cable.**
5. **Connect the replacement cable.**
6. **Remove the nearby FBS covers, and start laying in the replacement cable bundle, reinstalling FBS covers as you move up the frame.**

   See “Precautions for Handling Cords and Cables” on page 123.

   Note - Leave the faulty cable in place, because it is part of a bundle that has other cables in use on other nodes.

7. **When you have the replacement cable bundle up to the FBS at slot 34, install the remaining FBS covers.**
8. **Remove the MPO coupler panel.**

   See “Remove the MPO Coupler Panel” on page 40.

9. **Disconnect the faulty cable bundle from the MPO coupler panel.**

   Note - The MPO coupler panel connection is on the side of the coupler panel that faces the front of the modular system. See “Rear Components” on page 22.

10. **Connect the replacement cable bundle to the MPO coupler panel.**
11. **Coil up any excess cable.**
12. **Install the MPO coupler panel.**

    See “Install the MPO Coupler Panel” on page 41.

Related Information

- “Replacing the MPO Coupler Panel” on page 39
- “Front Components” on page 21
- “Identifying Component Locations and Slot Numbers” on page 20
- “Safety and ESD Precautions” on page 19
- “Identifying Port Mapping” on page 139
- “Replacing the RJ-45 Coupler Panel” on page 37

▼ Replace the DB-9 LED Cable

You can replace the DB-9 LED cable with no impact to the operation of the modular system.

Obtain a No. 3 Phillips screwdriver for the procedure.

1. **Follow safety and ESD precautions.**
   See “Safety and ESD Precautions” on page 19.
2. **From the front of the modular system:**
   a. **Remove the status LED panel located on the top front of the modular system.**
      See “Remove the LED Panel” on page 42.
   b. **Disconnect the existing cable from the LED panel.**
   c. **Connect the new cable to the LED panel, then route the cable to the rear of the modular system and over the coupler panel at slot 41.**
3. **Install the LED panel.**
   See “Install the LED Panel” on page 43.
4. **At the rear of the modular system:**
   a. **Remove the node rear support bracket from slot 20.**
   b. **Starting from the top, remove the FBS covers a few at a time.**
      See “Replace an FBS PCB” on page 29 for FBS cover removal instructions.
      See “Precautions for Handling Cords and Cables” on page 123.
   c. **Lay the new cable in the right-side channel.**
   d. **If possible, remove the faulty cable completely.**
   e. **Disconnect the DB-9 cable from the FMM.**
   f. **Connect the new DB-9 cable to the FMM.**
5. **Install the node rear support bracket at slot 20.**

Related Information

- “Front Components” on page 21
- “Identifying Component Locations and Slot Numbers” on page 20
- “Safety and ESD Precautions” on page 19

- "Identifying Port Mapping" on page 139
- "Replacing the System Status LED Panel" on page 42

Replace an FMM Power Cord

This task can take approximately 30 minutes to complete.

Before You Begin Obtain a No. 3 Phillips screwdriver for the procedure.

1. **Follow safety and ESD precautions.**
   See "Safety and ESD Precautions" on page 19.
2. **Remove the node at slot 15.**
   See "Front Components" on page 21 and "Remove an Oracle Server X5-2M" on page 66 or "Remove an Oracle Server X6-2M" on page 81.
3. **Remove the slot 15 side rail on the side corresponding to the faulty power cord.**
4. **Disconnect the faulty power cord from PDU.**
5. **Remove the node rear support bracket from slot 20.**
   Notice the orientation. The shelf is on top.
6. **Disconnect the faulty power cord from the FMM PSU.**
   The cable might be tied to the frame chassis with a Velcro strip.
7. **Connect the replacement power cord to the FMM PSU.**
8. **Connect the replacement power cord to same location on the PDU.**
   There is no need to reattach the Velcro strip, because it is only needed for shipping.
9. **Remove the faulty power cable, if possible.**
10. **Verify that the FMM PSU has power.**
11. **Install the node rear support bracket at slot 20.**
    Make sure the shelf is on top.
12. **Reinstall the side rail and the node in slot 15.**
    See "Install an Oracle Server X5-2M" on page 68 or "Install an Oracle Server X6-2M" on page 83.

Related Information

- “Front Components” on page 21
- “Identifying Component Locations and Slot Numbers” on page 20
- “Safety and ESD Precautions” on page 19

FBS Power Cord Replacement Information

Use this information to identify the correct FBS power cord replacement location and length.

Node Slot With Failed FBS Cord	Remove Node and Rail From Slot	Replace With FBS Power Cord Length
34	None	Short
33	34	Short
32	34	Short
31	33	Short
30	32	Short
29	32	Short
28	31	Short
27	30	Short
26	29	Short
25	29	Long
24	28	Long
23	28	Long
22	27	Long
21	27	Long
18	15	Short
17	14	Short
16	14	Short
15	13	Short
14	12	Short
13	11	Short
12	11	Short
11	10	Short
10	9	Short
9	9	Short
8	8	Short
7	7	Short
6	6	Short

Node Slot With Failed FBS Cord	Remove Node and Rail From Slot	Replace With FBS Power Cord Length
5	5	Short
4	5	Short
3	4	Short

▼ Replace an FBS Power Cord

This task can take approximately 30 minutes to complete.

Before You Begin

After obtaining a replacement power cord and verifying that the replacement cord is the correct length, perform these steps. For replacement cord information, see "FBS Power Cord Replacement Information" on page 131.

Note - Replacement cords are available in short and long lengths.

Obtain a No. 3 Phillips screwdriver for the procedure.

1. **Follow safety and ESD precautions.**

   See "Safety and ESD Precautions" on page 19.

2. **Locate the node with the faulty FBS power cord, then power down the node.**

   For powering down a node, see "Power Down an Oracle Server X5-2M" on page 69 or "Power Down an Oracle Server X6-2M" on page 84.

3. **Determine which adjacent node must be powered down, so that you can access the socket on the PDU.**

   See "FBS Power Cord Replacement Information" on page 131.

4. **Remove both nodes from the system.**

   See "Remove an Oracle Server X5-2M" on page 66 or "Remove an Oracle Server X6-2M" on page 81.

5. **From where the adjacent node was removed, remove the right or left side rails from that slot:**

   Note - This step is necessary because the side rail is blocking access to where the FBS power cord connects to the PDU.

   a. **If the faulty FBS power cord is on the right side of the FBS, remove the right side rail of the adjacent node slot.**

b. **If the faulty FBS power cord is on the left side of the FBS, remove the left side rail of the adjacent node slot.**

6. **Disconnect the power cord from the PDU.**

   See “Servicing PDUs” on page 87.

7. **Remove the power cord from the FBS:**

   See “Replace an FBS PCB” on page 29 for FBS cover removal and installation instructions.

   a. **To remove the power cord, push down on the white tab on the power cord at the FBS wall.**

   b. **Slide the white tab backward, then slide the FBS power cord connector to the right to disengage the FBS power cord.**

   c. **Remove the FBS power cord completely from the modular system.**

8. **Install the new power cord:**

   a. **Insert the new power cord into the FBS.**

   b. **Slide the FBS power cord connector to the left, to position the connector in the FBS.**

   c. **Slide the white tab forward, locking the connector into place.**

9. **Plug new power cord into the PDU.**

10. **Install the side rail and both nodes.**

    See “Install an Oracle Server X5-2M” on page 68 or “Install an Oracle Server X6-2M” on page 83.

Related Information

- “Front Components” on page 21
- “Identifying Component Locations and Slot Numbers” on page 20
- “Safety and ESD Precautions” on page 19

▼ Replace a Switch Power Cord

This task can take approximately 30 minutes to complete.

Before You Begin Obtain a No. 3 Phillips screwdriver for the procedure.

1. **Follow safety and ESD precautions.**

   See “Safety and ESD Precautions” on page 19.

2. **Remove the status LED panel.**

   See “Replacing the System Status LED Panel” on page 42.

3. **Remove all of the cosmetic covers between the status LED panel and the faulty switch power cord, including the cover of the switch containing the faulty power cord.**

4. **Remove the coupler panel from the RETMA rails, leaving the cables connected, if possible.**

   See “Replacing the RJ-45 Coupler Panel” on page 37.

5. **Remove the fiber tray, if it is blocking the power cord.**

6. **Disconnect the faulty power cord from the switch.**

   See “Servicing PDUs” on page 87.

7. **Manipulate the power cable up to the top of the rack, above the switches, so that the cable doesn’t get lost or trapped in the side of the rack.**

8. **Remove the faulty power cord from the rear of the modular system.**

9. **Connect the replacement power cord to the switch.**

10. **Connect the replacement power cord to the PDU, routing it around the RETMA rails (same as the other switch power cords).**

11. **Verify that the switch now has power on the replacement cord and associated PSU.**

12. **Install the fiber tray, coupler panel, and LED panel.**

13. **Replace all cosmetic covers removed earlier.**

Related Information

- “Front Components” on page 21
- “Identifying Component Locations and Slot Numbers” on page 20
- “Safety and ESD Precautions” on page 19
- “Identifying Port Mapping” on page 139

- “Replacing Switches” on page 115

Replace a Fiber Shuffle Cable

1. **Follow safety and ESD precautions.**
   See “Safety and ESD Precautions” on page 19.

2. **Find the faulty fiber shuffle cable.**
   The following table lists the fiber shuffle associations in groups of three or four slots per fiber shuffle.

Slots By Group for Fiber Shuffle Cables
3, 5, 7, 9
4, 6, 8, 10
11, 13, 15, 17
2, 14, 16, 18
21, 23, 25
22, 24, 26
27, 29, 31, 33
28, 30, 32, 34

3. **Remove the FBS covers:**
   See “Replace an FBS PCB” on page 29 for FBS cover removal instructions.

   a. **Remove the FBS cover at the location of the failing fiber shuffle cable**

   b. **Remove the covers of the other three tails of the fiber shuffle cable (within the same group).**

4. **Disconnect the cable tails:**

   a. **Disconnect the faulty fiber shuffle cable, hanging it out of the way.**

      i. **If the faulty shuffle cable is on the switch at slot 37 or 39, remove the PMT-A fiber cable.**

      ii. **If the faulty shuffle cable is on the switch at slot 38 or 40, remove the PMT-B fiber cable.**

   b. **Disconnect those other three tails (within the same group), hanging them out of the way.**

5. **Remove the three FBS covers in-between the FBS covers that you already removed.**
6. **Label the six fiber shuffle cable ends with the labels provided in the FRU kit.**
7. **Connect the new fiber shuffle cable to the ports.**
8. **Starting at the bottom, reinstall the FBS covers:**
   a. **Install all but the top two of the removed FBS covers.**
   b. **Remove the nearby FBS covers, and start laying in the replacement cable, reinstalling FBS covers as you install the cable up the frame.**
      See “Precautions for Handling Cords and Cables” on page 123.
9. **Disconnect the faulty fiber shuffle cable from the two switches, and coil it up out of the way.**
10. **Connect the new fiber shuffle cable to the new switches:**
    a. **Coil up the excess shuffle length.**
    b. **Velcro the cable to the fiber tray.**

Related Information

- “Front Components” on page 21
- “Identifying Component Locations and Slot Numbers” on page 20
- “Safety and ESD Precautions” on page 19
- “Identifying Port Mapping” on page 139
- “Replacing Switches” on page 115

▼ Replace an FBH Cable

This task can take approximately 45 minutes to complete.

1. **Follow safety and ESD precautions.**
   See “Safety and ESD Precautions” on page 19.
2. **Power down the FMM.**
3. **At the rear of the modular system:**

a. **Remove the node rear support bracket from slot 20.**

Note - Notice the orientation. The shelf is on top.

b. **Remove the ties holding down the FBH cables to the tray.**

4. **Disconnect the faulty cable from the FMM, and pull the connector end out of the modular system.**

5. **Connect the new FBH cable to the FMM, and tie all four FBH cables to the FBH tray.**

6. **If the FBH cable goes to slots 3-10 or slots 28-34:**

   a. **Remove the first eight FBS covers, up or down the modular system.**
   See “Replace an FBS PCB” on page 29 for FBS cover removal instructions.

   b. **Remove the faulty cable.**

   c. **Start laying in the replacement cable.**

   d. **Reinstall the first five or six FBS covers.**

7. **Remove other nearby FBS covers as needed, laying in the replacement cable as you work up or down, reinstalling FBS covers as you install the FBH cable.**
   See “Precautions for Handling Cords and Cables” on page 123.

8. **Disconnect the faulty FBH cable from the FBS PCB, and remove it from the channel.**

9. **Connect the new cable to the FBS PCB.**

10. **Repeat Step 8 and Step 9 iteratively until you have completed the process for each FBH connection.**
    Repeat these steps six times for an FBH above the FMM, and seven times for an FBH below the FMM.
    When done, you will have completely removed the faulty cable.

Note - If you replaced the cables for an FBH above the FMM, then an extra unused cable remains in the bundle. Also, an extra RJ-45 connector remains in the plastic wrapping.

11. **Install the node rear support bracket at slot 20.**

Note - Check the orientation to ensure that the shelf is on top.

12. **Power on the FMM.**

The FMM power cycle is needed for the PCB to get updated with new FBH cables.

Related Information

- “Front Components” on page 21
- “Identifying Component Locations and Slot Numbers” on page 20
- “Safety and ESD Precautions” on page 19

Identifying Port Mapping

Related Information

- “Activating and Deactivating System Assets” on page 28
- “Replacing the RJ-45 Coupler Panel” on page 37
- “Replacing the MPO Coupler Panel” on page 39
- “Front Components” on page 21

FMM Software Ports

25	UL: U25 Net MGT	1	LR: U03 Net 1
26	UR: U26 Net MGT	2	LL: U04 Net 1
27	UL: U27 Net MGT	3	LL: U03 Net MGT
28	UR: U28 Net MGT	4	LR: U04 Net MGT
29	UL: U29 Net MGT	5	LL: U05 Net MGT
30	UR: U30 Net MGT	6	LR: U06 Net MGT
31	UL: U31 Net MGT	7	LL: U07 Net MGT
32	UR: U32 Net MGT	8	LR: U08 Net MGT
33	UL: U33 Net MGT	9	LL: U09 Net MGT
34	UR: U34 Net MGT	10	LR: U10 Net MGT
35	LL: U35 Net MGT	11	LL: U11 Net MGT
36	LL: U36 Net MGT	12	LR: U12 Net MGT
37	LL: U37 Net MGT	13	LL: U13 Net MGT
38	LL: U38 Net MGT	14	LR: U14 Net MGT
39	LL: U39 Net MGT	15	LL: U15 Net MGT
40	LL: U40 Net MGT	16	LR: U16 Net MGT
41	LR: CP Port 41	17	LL: U17 Net MGT
42	LR: CP Port 42	18	LR: U18 Net MGT
43	LR: CP Port 43	19	Not connected
44	LR: CP Port 44	20	Not connected
45	LR: CP Port 45	21	UL: U21 Net MGT
46	LR: CP Port 46	22	UR: U22 Net MGT
47	LR: CP Port 47	23	UL: U23 Net MGT
48	LR: CP Port 48	24	UR: U24 Net MGT

Related Information

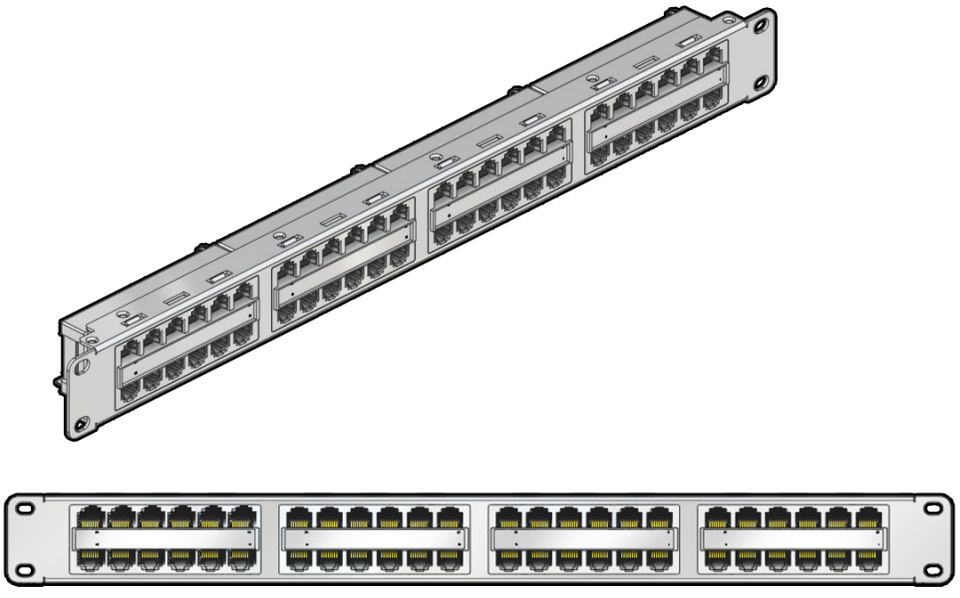
- “Identifying RJ-45 Coupler Panel Ports” on page 141
- “Identifying Switch Ports” on page 147
- “Activating and Deactivating System Assets” on page 28

Identifying RJ-45 Coupler Panel Ports

Related Information

- “Replacing the RJ-45 Coupler Panel” on page 37
- “Replacing the MPO Coupler Panel” on page 39
- “Activating and Deactivating System Assets” on page 28
- “Fault Monitoring Documentation” on page 17

RJ-45 Coupler Panel Ports

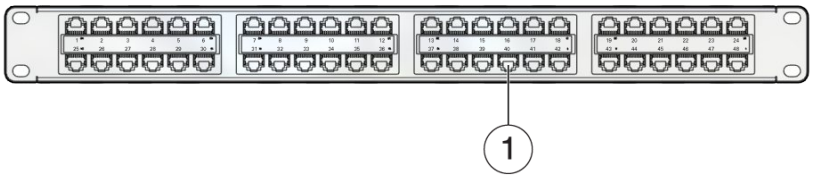


Related Information

- “FMM Software Ports” on page 140
- “FMM Serial Port” on page 142
- “Multiple-System Configuration Ports” on page 143
- “Ethernet Management Network Port” on page 143
- “Other Network Ports” on page 144
- “Ports to FBS PCB” on page 145
- “Replace an Ethernet Cable From FMM to a Switch or a Coupler Panel” on page 124
- “Replace an Ethernet Cable From FBS to a Switch or a Coupler Panel” on page 125

FMM Serial Port

FIGURE 16 Port 40 for Serial Console



No.	Name
1	Serial management port (40) for the FMM

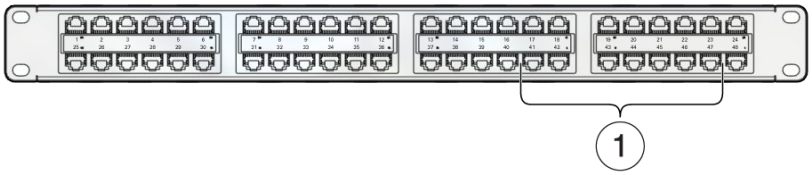
Also, port 40 allows access to the management network (SPs and net1 of u3 and u4).

Related Information

- “FMM Software Ports” on page 140
- “Multiple-System Configuration Ports” on page 143
- “Ethernet Management Network Port” on page 143
- “Other Network Ports” on page 144

Multiple-System Configuration Ports

FIGURE 17 Ports 41-47 for Connecting Multiple Netra Modular Systems



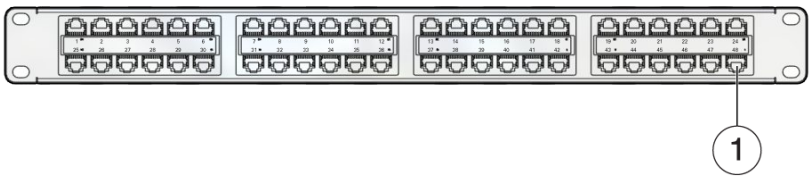
No.	Name
1	Ports 41-47 are used for connecting up to eight modular systems

Related Information

- “FMM Software Ports” on page 140
- “FMM Serial Port” on page 142
- “Ethernet Management Network Port” on page 143
- “Other Network Ports” on page 144
- “Ports to FBS PCB” on page 145

Ethernet Management Network Port

FIGURE 18 Port 48 for Ethernet Management



No.	Name
1	Ethernet management port (48)

Related Information

- “FMM Software Ports” on page 140
- “FMM Serial Port” on page 142
- “Multiple-System Configuration Ports” on page 143
- “Other Network Ports” on page 144
- “Ports to FBS PCB” on page 145

Other Network Ports

Ports 3 to 18 and 21 to 34 provide direct access to net3 on the servers.

Related Information

- “FMM Software Ports” on page 140
- “RJ-45 Coupler Panel Ports” on page 141
- “FMM Serial Port” on page 142
- “Multiple-System Configuration Ports” on page 143
- “Ethernet Management Network Port” on page 143
- “Ports to FBS PCB” on page 145

Ports to FBS PCB

RJ-45 Coupler Panel	Modular System Connection
1	Not connected
2	Not connected
3	U03 Net 3
4	U04 Net 3
5	U05 Net 3
6	U06 Net 3
7	U07 Net 3
8	U08 Net 3
9	U09 Net 3
10	U10 Net 3
11	U11 Net 3
12	U12 Net 3
13	U13 Net 3
14	U14 Net 3
15	U15 Net 3
16	U16 Net 3
17	U17 Net 3
18	U18 Net 3
19	Not connected
20	Not connected
21	U21 Net 3
22	U22 Net 3
23	U23 Net 3
24	U24 Net 3
25	U25 Net 3
26	U26 Net 3
27	U27 Net 3
28	U28 Net 3
29	U29 Net 3
30	U30 Net 3
31	U31 Net 3
32	U32 Net 3
33	U33 Net 3
34	U34 Net 3
35	Not connected
36	Not connected
37	Not connected
38	Not connected
39	Not connected
40	FMM ILOM
41	FMM Port 41
42	FMM Port 42
43	FMM Port 43
44	FMM Port 44
45	FMM Port 45
46	FMM Port 46
47	FMM Port 47
48	FMM Port 48

Related Information

- “FMM Software Ports” on page 140
- “RJ-45 Coupler Panel Ports” on page 141
- “FMM Serial Port” on page 142
- “Multiple-System Configuration Ports” on page 143
- “Ethernet Management Network Port” on page 143
- “Other Network Ports” on page 144

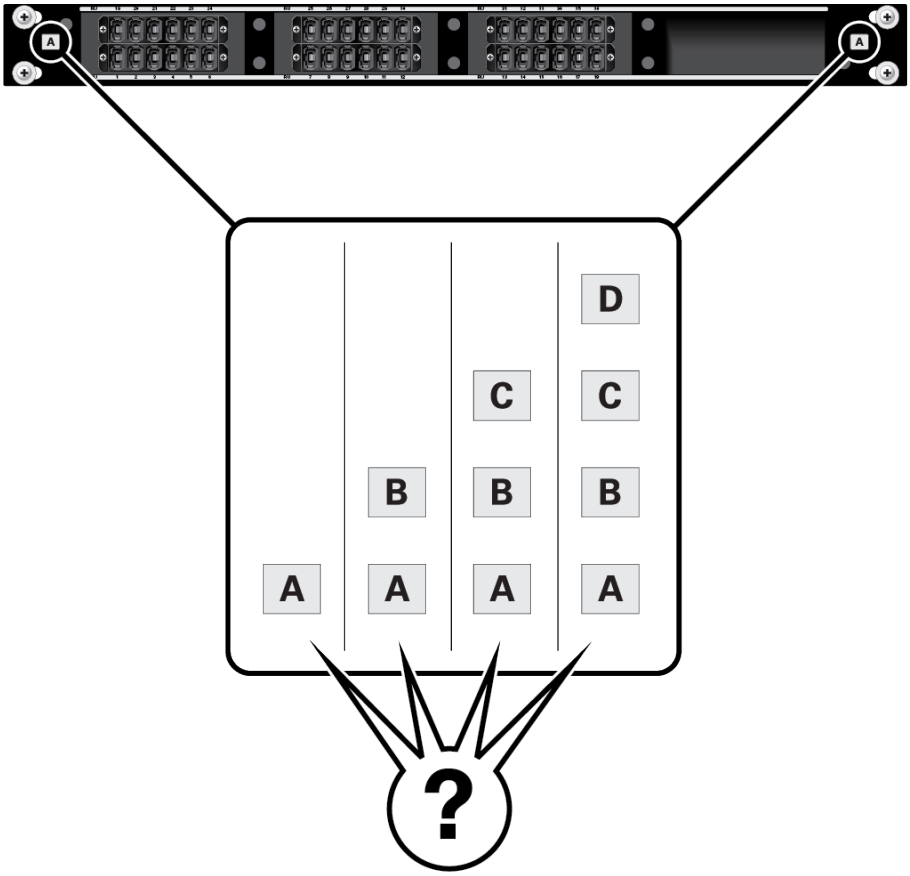
Identifying MPO Coupler Panel Ports

MPO couplers can be installed instead of the Oracle Switch ES2-72 group. MPO couplers cannot be combined with fiber switches in the four slots designated for either a switch group or an MPO group.

Up to four MPO coupler panels can be installed, based on node configurations and connectivity per node.

- Panel letter designations A, B, C, or D correspond to the PMT-*x* interfaces on the node blind-mate interface (VFI connector) at the FBS.
- Each node supports up to 4 PMT connections (each one a 12-fiber optic interface).
- Each panel (A, B, C or D) connects to the corresponding PMT-*x* connection on a node. For example, 30 of the ports on panel A connect to 30 FBS interfaces at PMT-A, respectively.
- The panel port number connects to the FBS at the corresponding RU location (slot). For example:
  - Port 8 on panel A connects to FBS PMT-A at slot 8.
  - Port 8 on panel B connects to FBS PMT-B at slot 8.
  - Port 3 on panel A connects to port A on the FBS at slot 3.
  - Port 17 on panel C connects to port C on the FBS at slot 17.

  Note - You can connect compatible external technology to match what is on the FBA port A at slot 3 and on the FBA port C at slot 17, as well as all any of the other ports on the MPO panels.
- Each panel is technology independent, and the type of data available at each panel's port is dependent upon the node configuration.
- Depending on the node type and PCIe card configuration, the fiber I/O cards map to the FBS/FBA ports A, B, C, and D.



Related Information

- “Replacing the MPO Coupler Panel” on page 39
- “Replace an Ethernet Cable From FMM to a Switch or a Coupler Panel” on page 124
- “Replace an Ethernet Cable From FBS to a Switch or a Coupler Panel” on page 125
- “Replace a Fiber Cable from FBS to MPO Coupler Panel” on page 127
- “Activating and Deactivating System Assets” on page 28
- “Fault Monitoring Documentation” on page 17

Identifying Switch Ports

- “Copper Switch Slot 35 to FBS-PCB Ports” on page 148

Copper Switch Slot 35 to FBS-PCB Ports

Note - Spare ports on the Oracle Switch ES2-64, depending on switch configuration, can provide access to management net0 and net2 on the servers.

Switch Cu A	FBN port
1	Fiber uplink
2	Fiber uplink
3	Fiber uplink
4	Fiber uplink
5	Fiber uplink
6	Fiber uplink
7	Fiber uplink
8	Fiber uplink
9	Fiber uplink
10	Fiber uplink
11	Fiber uplink
12	Fiber uplink
25	UL: U21 Net 0
26	UL: U23 Net 0
27	UL: U25 Net 0
28	UL: U27 Net 0
29	UL: U29 Net 0
30	UL: U31 Net 0
31	UL: U33 Net 0
32	spare
33	spare
34	spare
35	spare
36	spare
37	spare
38	UR: U34 NET 0
39	UR: U32 NET 0
40	UR: U30 NET 0
41	UR: U28 NET 0
42	UR: U26 NET 0
43	UR: U24 NET 0
44	UR: U22 NET 0

Switch Cu A	FBN port
13	Fiber uplink
14	Fiber uplink
15	Fiber uplink
16	Fiber uplink
17	Fiber uplink
18	Fiber uplink
19	Fiber uplink
20	Fiber uplink
21	Fiber uplink
22	Fiber uplink
23	Fiber uplink
24	Fiber uplink
45	LL: U03 Net 0
46	LL: U05 Net 0
47	LL: U07 Net 0
48	LL: U09 Net 0
49	LL: U11 Net 0
50	LL: U13 Net 0
51	LL: U15 Net 0
52	LL: U17 Net 0
53	spare
54	spare
55	spare
56	spare
57	LR: U18 Net 0
58	LR: U16 Net 0
59	LR: U14 Net 0
60	LR: U12 Net 0
61	LR: U10 Net 0
62	LR: U08 Net 0
63	LR: U06 Net 0
64	LR: U04 Net 0

Related Information

- “Copper Switch Slot 36 to FBS-PCB Ports” on page 150
- “Switch Serial Ports to FBS-PCB Ports” on page 151
- “Fiber Switch Slot 37 Ports” on page 152
- “Fiber Switch Slot 38 Ports” on page 153
- “Fiber Switch Slot 39 Ports” on page 154
- “Fiber Switch Slot 40 Ports” on page 155

Copper Switch Slot 36 to FBS-PCB Ports

Switch Cu B	FBN port	Switch Cu B	FBN port
1	Fiber uplink	13	Fiber uplink
2	Fiber uplink	14	Fiber uplink
3	Fiber uplink	15	Fiber uplink
4	Fiber uplink	16	Fiber uplink
5	Fiber uplink	17	Fiber uplink
6	Fiber uplink	18	Fiber uplink
7	Fiber uplink	19	Fiber uplink
8	Fiber uplink	20	Fiber uplink
9	Fiber uplink	21	Fiber uplink
10	Fiber uplink	22	Fiber uplink
11	Fiber uplink	23	Fiber uplink
12	Fiber uplink	24	Fiber uplink
25	UL: U21 Net 2	45	LL: U03 Net 2
26	UL: U23 Net 2	46	LL: U05 Net 2
27	UL: U25 Net 2	47	LL: U07 Net 2
28	UL: U27 Net 2	48	LL: U09 Net 2
29	UL: U29 Net 2	49	LL: U11 Net 2
30	UL: U31 Net 2	50	LL: U13 Net 2
31	UL: U33 Net 2	51	LL: U15 Net 2
32	spare	52	LL: U17 Net 2
33	spare	53	spare
34	spare	54	spare
35	spare	55	spare
36	spare	56	spare
37	spare	57	LR: U18 Net 2
38	UR: U34 NET 2	58	LR: U16 Net 2
39	UR: U32 NET 2	59	LR: U14 Net 2
40	UR: U30 NET 2	60	LR: U12 Net 2
41	UR: U28 NET 2	61	LR: U10 Net 2
42	UR: U26 NET 2	62	LR: U08 Net 2
43	UR: U24 NET 2	63	LR: U06 Net 2
44	UR: U22 NET 2	64	LR: U04 Net 2

Related Information

- “Copper Switch Slot 35 to FBS-PCB Ports” on page 148
- “Switch Serial Ports to FBS-PCB Ports” on page 151
- “Fiber Switch Slot 37 Ports” on page 152
- “Fiber Switch Slot 38 Ports” on page 153
- “Fiber Switch Slot 39 Ports” on page 154

- “Fiber Switch Slot 40 Ports” on page 155

Switch Serial Ports to FBS-PCB Ports

Switch Serial	FBN Elevation
40	17
39	15
38	13
37	11
36	9
35	7

Related Information

- “Copper Switch Slot 35 to FBS-PCB Ports” on page 148
- “Copper Switch Slot 36 to FBS-PCB Ports” on page 150
- “Fiber Switch Slot 37 Ports” on page 152
- “Fiber Switch Slot 38 Ports” on page 153
- “Fiber Switch Slot 39 Ports” on page 154
- “Fiber Switch Slot 40 Ports” on page 155

Fiber Switch Slot 37 Ports

72	LR: U17 PMT-A	60	LR: U9 PMT-A
71	LR: U15 PMT-A	50	LR: U7 PMT-A
70	LR: U13 PMT-A	58	LR: U5 PMT-A
69	LR: U11 PMT-A	57	LR: U3 PMT-A
68	LR: U18 PMT-A	56	LR: U10 PMT-A
67	LR: U16 PMT-A	55	LR: U8 PMT-A
66	LR: U14 PMT-A	54	LR: U6 PMT-A
65	LR: U12 PMT-A	53	LR: U4 PMT-A
64	UR: U34 PMT-A	52	UR: U26 PMT-A
63	UR: U32 PMT-A	51	UR: U24 PMT-A
62	UR: U30 PMT-A	50	UR: U22 PMT-A
61	UR: U28 PMT-A	49	unused
48	UR: U33 PMT-A	36	UR: U25 PMT-A
47	UR: U31 PMT-A	35	UR: U23 PMT-A
46	UR: U29 PMT-A	34	UR: U21 PMT-A
45	UR: U27 PMT-A	33	unused
44	Fiber uplink	32	Fiber uplink
43		31	
42		30	
41		29	
40	Fiber uplink	28	Fiber uplink
39		27	
38		26	
37		25	
24	Fiber uplink	12	Fiber uplink
23		11	
22		10	
21		9	
20	Fiber uplink	8	Fiber uplink
19		7	
18		6	
17		5	
16	Unused	4	Unused
15		3	
14		2	
13		1	

Related Information

- “Copper Switch Slot 35 to FBS-PCB Ports” on page 148
- “Copper Switch Slot 36 to FBS-PCB Ports” on page 150
- “Switch Serial Ports to FBS-PCB Ports” on page 151
- “Fiber Switch Slot 38 Ports” on page 153
- “Fiber Switch Slot 39 Ports” on page 154
- “Fiber Switch Slot 40 Ports” on page 155

Fiber Switch Slot 38 Ports

72	LR: U17 PMT-B	60	LR: U9 PMT-B
71	LR: U15 PMT-B	50	LR: U7 PMT-B
70	LR: U13 PMT-B	58	LR: U5 PMT-B
69	LR: U11 PMT-B	57	LR: U3 PMT-B
68	LR: U18 PMT-B	56	LR: U10 PMT-B
67	LR: U16 PMT-B	55	LR: U8 PMT-B
66	LR: U14 PMT-B	54	LR: U6 PMT-B
65	LR: U12 PMT-B	53	LR: U4 PMT-B
64	UR: U34 PMT-B	52	UR: U26 PMT-B
63	UR: U32 PMT-B	51	UR: U24 PMT-B
62	UR: U30 PMT-B	50	UR: U22 PMT-B
61	UR: U28 PMT-B	49	unused
48	UR: U33 PMT-B	36	UR: U25 PMT-B
47	UR: U31 PMT-B	35	UR: U23 PMT-B
46	UR: U29 PMT-B	34	UR: U21 PMT-B
45	UR: U27 PMT-B	33	unused
44	Fiber uplink	32	Fiber uplink
43		31	
42		30	
41		29	
40	Fiber uplink	28	Fiber uplink
39		27	
38		26	
37		25	
24	Fiber uplink	12	Fiber uplink
23		11	
22		10	
21		9	
20	Fiber uplink	8	Fiber uplink
19		7	
18		6	
17		5	
16	Unused	4	Unused
15		3	
14		2	
13		1	

Related Information

- “Copper Switch Slot 35 to FBS-PCB Ports” on page 148
- “Copper Switch Slot 36 to FBS-PCB Ports” on page 150
- “Switch Serial Ports to FBS-PCB Ports” on page 151
- “Fiber Switch Slot 37 Ports” on page 152
- “Fiber Switch Slot 39 Ports” on page 154
- “Fiber Switch Slot 40 Ports” on page 155

Fiber Switch Slot 39 Ports

72	LR: U17 PMT-A	60	LR: U9 PMT-A
71	LR: U15 PMT-A	50	LR: U7 PMT-A
70	LR: U13 PMT-A	58	LR: U5 PMT-A
69	LR: U11 PMT-A	57	LR: U3 PMT-A
68	LR: U18 PMT-A	56	LR: U10 PMT-A
67	LR: U16 PMT-A	55	LR: U8 PMT-A
66	LR: U14 PMT-A	54	LR: U6 PMT-A
65	LR: U12 PMT-A	53	LR: U4 PMT-A
64	UR: U34 PMT-A	52	UR: U26 PMT-A
63	UR: U32 PMT-A	51	UR: U24 PMT-A
62	UR: U30 PMT-A	50	UR: U22 PMT-A
61	UR: U28 PMT-A	49	unused
48	UR: U33 PMT-A	36	UR: U25 PMT-A
47	UR: U31 PMT-A	35	UR: U23 PMT-A
46	UR: U29 PMT-A	34	UR: U21 PMT-A
45	UR: U27 PMT-A	33	unused
44	Fiber uplink	32	Fiber uplink
43		31	
42		30	
41		29	
40	Fiber uplink	28	Fiber uplink
39		27	
38		26	
37		25	
24	Fiber uplink	12	Fiber uplink
23		11	
22		10	
21		9	
20	Fiber uplink	8	Fiber uplink
19		7	
18		6	
17		5	
16	Unused	4	Unused
15		3	
14		2	
13		1	

Related Information

- “Copper Switch Slot 35 to FBS-PCB Ports” on page 148
- “Copper Switch Slot 36 to FBS-PCB Ports” on page 150
- “Switch Serial Ports to FBS-PCB Ports” on page 151
- “Fiber Switch Slot 37 Ports” on page 152
- “Fiber Switch Slot 38 Ports” on page 153
- “Fiber Switch Slot 40 Ports” on page 155

Fiber Switch Slot 40 Ports

72	LR: U17 PMT-B	60	LR: U9 PMT-B
71	LR: U15 PMT-B	50	LR: U7 PMT-B
70	LR: U13 PMT-B	58	LR: U5 PMT-B
69	LR: U11 PMT-B	57	LR: U3 PMT-B
68	LR: U18 PMT-B	56	LR: U10 PMT-B
67	LR: U16 PMT-B	55	LR: U8 PMT-B
66	LR: U14 PMT-B	54	LR: U6 PMT-B
65	LR: U12 PMT-B	53	LR: U4 PMT-B
64	UR: U34 PMT-B	52	UR: U26 PMT-B
63	UR: U32 PMT-B	51	UR: U24 PMT-B
62	UR: U30 PMT-B	50	UR: U22 PMT-B
61	UR: U28 PMT-B	49	unused
48	UR: U33 PMT-B	36	UR: U25 PMT-B
47	UR: U31 PMT-B	35	UR: U23 PMT-B
46	UR: U29 PMT-B	34	UR: U21 PMT-B
45	UR: U27 PMT-B	33	unused
44	Fiber uplink	32	Fiber uplink
43		31	
42		30	
41		29	
40	Fiber uplink	28	Fiber uplink
39		27	
38		26	
37		25	
24	Fiber uplink	12	Fiber uplink
23		11	
22		10	
21		9	
20	Fiber uplink	8	Fiber uplink
19		7	
18		6	
17		5	
16	Unused	4	Unused
15		3	
14		2	
13		1	

Related Information

- “Copper Switch Slot 35 to FBS-PCB Ports” on page 148
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- “Switch Serial Ports to FBS-PCB Ports” on page 151
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Glossary

A

APIs Application Programmatic Interfaces.

ARP Address Resolution Protocol.

B

bridge A device that connects multiple network components or segments.

BUI Browser user interface.

C

C C programming language.

CIM Common Information Model.

CLI Command line interface.

CRU Customer-replaceable unit.

D

DIMM Dual in-line memory module.

F

FBA Frame backplane adaptor, which is connected directly to the node and mates with the FBS.

FBH Frame backplane harness.

FBN See FBS PCB.

FBS Frame backplane segment, which is attached to the modular system frame and provides the connector to the node FBAs.

FBS PCB FBS printed circuit board (previously FBN). See also FBS.

FMM Frame monitoring module. Provides the backplane features for nodes, networking, and storage devices in the system. The FMM manages the frame backplane nodes and provides a management switch for the management components installed in the system.

FRU Field-replacable unit.

FSA Frame System Agent. See also SMS.

H

HA High availability.

HDD Hard disk drive.

HPI Hardware Platform Interface.

HPI user Hardware Platform Interface user.

http Hypertext transfer protocol.

I

IaaS Infrastructure as a Service. One of three service models of cloud computing with Platform as a Service (PaaS) and Software as a Service (SaaS).

IB Inbound.

ICMP Internet Control Message Protocol.

IPMI Intelligent Platform Management Interface.

J

JMX Java Management Extension API.

O

OoB Out of bound.

OpenHPI Open Hardware Platform Interface.

Oracle ILOM Oracle Integrated Lights Out Management.

P

PCB Printed circuit board, inside the FBS.

PDU Power distribution unit.

ping An echo request message in ICMP.

PSK Pre-shared key, used for authentication.

PSU Power supply unit.

PVI Private Virtual Interconnect.

Q

QOS Quality of service.

R

RDR Resource data records. RDRs are contained in the RDR repository of the resource.

resource A resource represents the management access to a component in the system. Resources provide management capabilities such as power control and event logging. Additional capabilities might be provided through management instruments associated with a resource. These management instruments include sensors, controls, and inventory records. When applicable, management instruments are described in RDRs.

RMCP Remote Management Control Protocol, which is LAN protocol over an IPMI subsystem.

RMS rackmount server.

S

SA Security association.

SAF Service Availability Forum.

SDM Simplified data model.

SLB Server load balancing.

SMS System management software. See also FSA.

SNMP Simple network management protocol.

SP Service processor.

SSD System storage drives (internal USB storage).

T

TCP Transmission Control Protocol.

tenant One of multiple tenants in a hosted cloud computing virtual network configuration. A hosting provider connects multiple tenant networks to their network and offers secure network isolation for each user.

U

UDP User Datagram Protocol.

V

VCPU Virtual CPU.

VIP Virtual IP address.

VM Virtual machine.

VNI Virtual Network Interface.

VPN Virtual private network.

VRID Virtual Router ID.

VRRP Virtual Router Redundancy Protocol.

vSwitch Virtual layer-2 switch in a virtualized network environment.

W

web tier A web that includes components that interact with end users at the outermost tier of application grid infrastructure, typically through HTTP requests and responses.

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