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Hardware Guide

Version 8.3 | January 2014 | DOC2749A

RealPresence Collaboration Server (RMX) 4000



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This software has not achieved UC APL certification.

This document provides the latest information for security-conscious users running Version 8.3 software.
The information in this document is not intended to imply that DoD or DISA certifies Polycom RMX systems.

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Use of this software constitutes acceptance of the terms and conditions of the Polycom® RealPresence® Collaboration Server (RMX) 1500/1800/2000/4000 system end-user license agreements (EULA).

The EULA for your version is available on the Polycom Support page for the Polycom® RealPresence® Collaboration Server (RMX®) 1500/1800/2000/4000 system.

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	• The plug-socket combination must be accessible at all times, because it serves as the main disconnecting device.
	• This equipment must be earthed. Do not power this equipment if the integrity of themains earthing conductor cannot be verified.
	• Only trained and qualified personnel should be allowed to install, replace, service or repair this equipment.
	• To prevent system overheating do not operate in an ambient temperature exceeding 40° C / 104° F.
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Information on recycling can be found at: www.polycom.com/WEEE

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Below is a listing of batteries that could be present in the product:

Description:Internal CMOS battery

Type:CR2032 Lithium Coin Cell

Weight:3.3g

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Batteries in this product are not intended to be replaced or removed by the user

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A full copy of the Declaration of Conformity can be obtained from Polycom Ltd, 270 Bath Road, Slough, Berkshire, SL1 4DX, UK.	

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警告

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Taiwan BSMI EMC statement

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This is a Class A product based on the standard of the Voluntary Control Council for Interference by Information Technology Equipment (VCCI). If this equipment is used in a domestic environment, radio disturbance may arise. When such trouble occurs, the user may be required to take corrective actions.

Worldwide EMC statement

This is a class A product. In a domestic environment this product may cause radio interference in which case the user may be required to take adequate measures.

Optional ISDN interface card
If the above is fitted to the system then the following statements also apply; **United States Federal Communication Commission (FCC)** This equipment complies with Part 68 of the FCC rules and the requirements adopted by the ACTA. On the ISDN card itself is a label that contains, among other information, a product identifier in the format US:AAAEQ##TXXXX. If requested, this number must be provided to the telephone company. The following USOC, FIC and SOC codes are applicable to this equipment; USOC Jacks: RJ48S Service Order Code: 6.0N Facility Interface Code: 04DU9.DN, 04DU9.BN, 04DU9.1KN, 04DU9.1SN If this equipment causes harm to the telephone network, the telephone company will notify you in advance that temporary discontinuance of service may be required. But if advance notice isn't practical, the telephone company will notify the customer as soon as possible. Also, you will be advised of your right to file a complaint with the FCC if you believe it is necessary. The telephone company may make changes in its facilities, equipment, operations or procedures that could affect the operation of the equipment. If this happens the telephone company will provide advance notice in order for you to make necessary modifications to maintain uninterrupted service. If trouble is experienced with this equipment, for repair or warranty information, please contact Polycom Inc in the U.S.A. 1-888-248-8294. If the equipment is causing harm to the telephone network, the telephone company may request that you disconnect the equipment until the problem is resolved. Connection to party line service is subject to state tariffs. Contact the state public utility commission, public service commission or corporation commission for information.

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RealPresence Collaboration Server (RMX) 4000 Hardware Description

This Hardware Guide provides information on the RealPresence Collaboration Server (RMX) 4000 and its components. This system utilizes a modular “universal slot” platform, whose components are designed for high performance, capacity and reliance.



The product names, Polycom® RealPresence® Collaboration Server 4000 and RMX® 4000 are used interchangeably throughout this document.

Main Features

The Polycom RMX 4000 offers the following features:

- Linux® based
- Chassis based on the ATCA standard
- Built-in redundancy, hot swappable parts
- Physical separation between management and signaling networks, with high speed switching fabric on the media boards increasing system bandwidth
- Support for standard network interfaces (IP, ISDN and LAN) and large number of ports
- H.323, SIP, PSTN and ISDN
- New hardware technologies
- High availability, redundancy, on-line upgrading and dynamic resource allocation
- Easy integration of conference elements into external network management
- Enhanced Continuous Presence (multi-image video)
- IVR (Interactive Voice Response) module
- Resilient multipoint conferencing - Polycom Lost Packet Recovery (LPR)

Main Components

The Main components on the system are:

- CNTL 4000 (CPU) Module: Controls and manages the RMX 4000
- Fabric Switch Module (FSM 4000): Performs media processing functions on the RMX 4000
- AC/DC Power Supply Modules: Provides current to the RMX system
- Fan Drawer: Fans provide airflow and cools the RMX system.
- Multi Processor Module (MPMx/MPMRx) Cards: perform the various RTP, audio and video processing functions on the RMX 4000

- RTM LAN Card(s): Routes data between the MPMx/MPMRx cards and components of the system, and sends media by IP packets and provides connectivity to external IP networks
- RTM IP Card: contains an Ethernet Switch that manages the network of the system
- RTM ISDN card: Converts ISDN T1/E1 media to IP packets and provides connectivity to external ISDN networks

RealPresence Collaboration Server (RMX) 4000 Specifications

Physical	
Height	6U (26.56 cm.)
Width	19” (48.26 cm.)
Depth	15.74” (40 cm.)
Weight	Up to 40 Kg (88 lbs).
Media Protocols	
Audio	G.711a/u, G.722, G.722.1C, G.722.1, G.723.1, G.719 G.729A, Polycom Siren™ 14, Siren 22 (in mono or stereo) and Siren LPR.
Video	H.261, H.263, H.264, H.264 High Profile
Network Interfaces	
IP, ISDN, PSTN and LAN	H.323, SIP, ISDN, PSTN, VoIP, and LAN
Power Supply	
AC Input/ Range, BTU	Voltage range:100-240 VAC ±10%, 7-14 AMP, 50/60 Hz. Maximum BTU output per hour: 5120.
DC Input/Range, BTU	Voltage range:-40.5-60 V DC SELV, with circuit breaker. Maximum BTU output per hour: 5120.
Power Consumption	
AC Maximum Power consumption	1500 Watts
DC Maximum Power consumption	1500 Watts
Environment	
Operating temperature	0° to 40°C (32° to 104°F).
Storage temperature	-40° to 70°C (40° to 158°F).
Relative humidity	15% to 90% non-condensing.
Operating altitude	360m (1200ft) below sea level and up to 4Km (13,000ft)
Transit/Storage	Sea level and up to 15Km (50,000ft)
Operating ESD	4kV.

RealPresence Collaboration Server (RMX) 4000 System Capacities

Conferencing Capacities

The following table summarizes the different system capacities.

System Functions and Capacities RMX 4000

System Functions	MPMx Mode	MPMRx Mode
Maximum number of Video participants in a conference	180	800
Maximum number of PSTN participants in a conference	400	400
Maximum number of VOIP participants in a conference	720	800
Maximum number of Audio calls per second	5	5
Maximum number of Video calls per second	2	2
Maximum number of Conferences	800	800
Maximum number of Meeting Rooms	2000	2000
Maximum number of Entry Queues	80	80
Maximum number of Profiles	80	80
Maximum number of Conference Templates	200	200
Maximum number of SIP Factories	80	80
Maximum number of IP Services (standard Mode)	2	8
Maximum number of ISDN Services	2	2
Maximum number of IVR Services	80	80
Maximum number of Recording Links	20 (default)	20 (default)
Maximum number of IVR Video Slides	150	150
Maximum number of Log Files (1Mb max.)	8000	8000
Maximum number of CDR Files	4000	4000
Maximum number of Fault Files	1000	1000
Number of Participant alerts	Unlimited	Unlimited
Maximum number of concurrent RMX Web Client connections to the MCU	20	20
Maximum number Address Book entries	4000	4000
Maximum number of Users	100	100

System Functions and Capacities RMX 4000

System Functions	MPMx Mode	MPMRx Mode
Maximum number of Gateway Profiles	80	80
Maximum number of Reservations (internal Scheduler)	4000	4000

MPMx Resource Capacities

Two *MPMx* card assemblies are available: *MPMx-S* (Single) and *MPMx-D* (Double) each offer different resource capacities, as summarized in the following three tables:



System Resources are now reported in terms of HD720p30 CP ports. One HD video port equals 3 CIF video ports.

MPMx – Resource Capacity per Resolution per card (CP Mode)

Resource Type	MPMx - S	MPMx - D
Voice	180	360
H.263 CIF	30	60
H.263 4CIF15	15	30
H.264 CIF	45	90
SD H.264	30	60
HD720p30	15	30
HD720p60/HD1080p30 Asymmetric	8	15
HD720p60/HD1080p30 Symmetric	8	15

The following table summarizes the resource capacities of the various cards that can be installed in an RMX per line rate in VSW conferencing mode.

MPMx Resource Capacity per Line Rate in VSW

Resource Type	MPMx
VSW 2Mbps	80*
VSW 4Mbps	40
VSW 6Mbps	20
ISDN	7 E1 or 9 T1 (per RTM ISDN card)

* Capacity numbers may be lower when LPR and/or Encryption are enabled.

MPMRx Resource Capacities

The following sections list the resource capacities of the RMX 4000.

MPMRx Resource Capacities in Non-Mixed CP and SVC Conferences

The port consumption ratios of different calls against that of a HD720p30 call are as shown in this table.

Port Consumption Ratios of Different Calls

HD1080p60	HD1080p30	HD720p30	AVC SD	AVC CIF	Audio	SVC
1	4	2	0.5	0.5	0.5	0.33

In other words, to make one1080p60 call, you need 4x 720p 30 ports; to make one 1080p 30 call, 2x 720p 30 ports; and so forth.

When the required resource is not a whole number, it's rounded up to the nearest whole number. For example, to make an SVC call requiring1/3 of an HD720p30 port. However in the *Port Gauge*, one port appears allocated.

MPMRx-D Non-Mixed Port Resource Capacities

The following table lists the system capacities for each license in non-mixed conferences.

Licensed Capacity for Systems with MPMRx-D card, Non-Mixed Conferences

Licensed ports	AVC HD1080p60	AVC HD1080p30	AVC HD720p30	AVC SD	AVC CIF	Audio	SVC
5	1	2	5	10	10	10	15
10	2	5	10	20	20	20	30
15	3	7	15	30	30	30	45
20	5	10	20	40	40	40	60
25	6	12	25	50	50	50	75
30	7	15	30	60	60	60	90
35	8	17	35	70	70	70	105
40	10	20	40	80	80	80	120
45	11	22	45	90	90	90	135
50	12	25	50	100	100	100	150
55	13	27	55	110	110	110	165
60	15	30	60	120	120	120	180
65	16	32	65	130	130	130	195

MPMRx-S Non-Mixed Port Resource Capacities

The following table lists the system capacities for each license in non-mixed conferences.

Licensed Capacity for Systems with MPMRx-S card, Non-Mixed Conferences

Licensed ports	AVC HD1080p60	AVC HD1080p30	AVC HD720p30	AVC SD	AVC CIF	Audio	SVC
5	1	2	5	10	10	10	15
10	2	5	10	20	20	20	30
15	3	7	15	30	30	30	45
20	5	10	20	40	40	40	60

Resource Capacities in CP and SVC Mixed Conferences

The following table shows the port consumption ratios of different calls against that of an HD720p30 call.

Port Consumption Ratios, in Mixed Conferences

HD1080p60	HD1080p30	HD720p30	AVC SD	AVC CIF	Audio	SVC
NA	3	1.5	0.75	0.75	0.75	0.33

In other words, to make one1080p60 call, you need 4x 720p30 ports; to make one 1080p30 call, 2x 720p30 ports; and so forth.

When the required resource is not a whole number, it's rounded up to the nearest whole number. For example, to make an SVC call requiring1/3 of an HD720p30 port. However in the *Port Gauge*, one port appears allocated.

MPMRx-D Mixed Port Resource Capacities

The following table lists the system capacities for each license in mixed conferences.

Licensed Capacity for Systems with MPMRx-D card, Mixed Conferences

Licensed ports	AVC HD1080p60	AVC HD1080p30	AVC HD720p30	AVC SD	AVC CIF	Audio	SVC
5	NA	1	3	6	6	6	15
10	NA	3	6	13	13	13	30
15	NA	5	10	20	20	20	45
20	NA	6	13	26	26	26	60
25	NA	8	16	33	33	33	75
30	NA	10	20	40	40	40	90

Licensed ports	AVC HD1080p60	AVC HD1080p30	AVC HD720p30	AVC SD	AVC CIF	Audio	SVC
35	NA	11	23	46	46	46	105
40	NA	13	26	53	53	53	120
45	NA	15	30	60	60	60	135
50	NA	16	33	66	66	66	150
55	NA	18	36	73	73	73	150
60	NA	20	40	75	75	75	150
65	NA	21	42	75	75	75	150

MPMRx-S Mixed Port Resource Capacities

The following table lists the system capacities for each license in mixed conferences.

Licensed Capacity for Systems with MPMRx-S card, Mixed Conferences

Licensed ports	AVC HD1080p60	AVC HD1080p30	AVC HD720p30	AVC SD	AVC CIF	Audio	SVC
5	NA	1	3	6	6	6	15
10	NA	3	6	13	13	13	30
15	NA	5	10	20	20	20	45
20	NA	6	12	22	22	22	45

Total Resource Capacities in Video Switching (VSW) Conferences

The table below lists the maximum resource capacities of *RMX 4000* per line rate in VSW conferences (line rate being the deciding factor) when used with *MPMRx* cards.

Resource Capacities in Video Switching (VSW) Conferences

Resource Type and Line Rate	Resources with MPMRx
VSW 2Mb	200
VSW 4Mb	100
VSW 6Mb	60
ISDN	7 E1 or 9 T1 (per RTM ISDN card)

Total Resource Capacities per MPMRx-D Card in CP & SVC Conferences

The RMX system allocates port resources in AVC HD720p30 units. The number of ports used for each types of calls differs between AVC-SVC mixed conferences and non-mixed conferences.

The table below lists the maximum resource capacities of the *RMX 4000* per resolution in CP Conferencing and SVC modes when used with *MPMRx-D* card.

Total Resource Capacities per MPMRx-D Card

Resolutions	Non-Mixed Endpoints	Mixed Endpoints
Audio	130	75
AVC SD	130	75
AVC CIF	130	75
SVC	195	150
HD720p30	65	42
HD720p TIP	65	42
HD720p RTV	65	42
HD1080p30	32	21
HD1080p60	16	NA

Total Resource Capacities per MPMRx-S Card in CP & SVC Conferences

The RMX system allocates port resources in AVC HD720p30 units. The number of ports used for each types of calls differs between AVC-SVC mixed conferences and non-mixed conferences.

The table below lists the maximum resource capacities of the *RMX 4000* per resolution in CP Conferencing and SVC modes when used with *MPMRx-S* card.

Total Resource Capacities per MPMRx-S Card

Resolutions	Non-Mixed Endpoints	Mixed Endpoints
Audio	40	22
AVC SD	40	22
AVC CIF	40	22
SVC	60	45
HD720p30	20	12
HD720p TIP	20	12
HD720p RTV	20	12
HD1080p30	10	6
HD1080p60	5	NA



Note: About special licenses

For both mixed and non-mixed conferences, special licenses are available to provide up to 100 ports for MPMRx-D, or up to 30 ports for MPMRx-S.

For more information, please contact your local Polycom representative.

Safety Requirements

This section describes the requirements your site must meet for the safe installation and operation of the system.

Site Safety Requirements

For your protection, please read these safety instructions completely before operating the equipment.

- Look carefully for potential hazards in your work area: moist floors, ungrounded power cables, frayed power cords, missing safety grounds and so forth.
- Locate the main circuit breaker within the room.
- Locate the emergency power **OFF** switch within the room.
- Never assume that power is disconnected from a circuit.
- Use only the power cords supplied with the system.
- Each power cord should only be connected to a power outlet that has a protective ground contact.
- Ensure that power cords are easily accessible from the back of the system at all times.
- Place the equipment in a well-ventilated area where the vents are free from obstruction.
- Do not place heavy objects directly on top of the RMX 4000 unit.
- Do not use liquids around your equipment.
- Keep the area around the RMX 4000 clean and free of clutter.
- Decide on a suitable location for the equipment rack that will hold the RMX 4000 unit. It should be situated in a clean, dust-free area that is well ventilated. Avoid areas where heat, electrical noise and electromagnetic fields are generated. You will also need it placed near a grounded power outlet.

General Installation Precautions



Attention:
The RMX 4000 can weigh up to 40 kg when all slots are occupied. Two people are required to lift the MCU out of the box and also when installing it in a rack.

- Use a regulating uninterruptable power supply (UPS) to protect the RMX 4000 from power surges and voltage spikes, to keep your MCU operating in case of a power failure. The RMX 4000 requires either two (DC) or three (AC) power supply cables, each connected to a power supply.
- Allow the power supply units to cool before touching them.
- When handling electronic components, standard anti-static precautions must be observed:
  - Wear a grounding strap
  - Handle cards by their edges only and do not touch their components or connector pins
  - Keep components in anti-static bags, when not installed in the RMX 4000

Rack Mount Safety Precautions

The following precautions should be followed when installing the RMX 4000 on a rack:

- The RMX 4000 has a height of 6U. Ensure this space is available on the rack.

- Ensure that the leveling jacks on the bottom of the rack are fully extended to the floor with the full weight of the rack resting on them.
- In a single rack installation, stabilizers should be attached to the rack.
- In multiple rack installations, the racks should be coupled together.
- Always make sure the rack is stable before extending a component from the rack.
- You should extend only one component at a time - extending two or more simultaneously may cause the rack to become unstable.
- Before you install the rails, determine the placement of each component in the rack.
- Install the heaviest components on the bottom of the rack first, and then work up.
- Always keep the rack's trays and card's slots closed when not servicing, to maintain proper cooling.

Installing the RealPresence Collaboration Server (RMX) 4000

The following procedures have to be performed to install the RMX 4000 in your site:

- Unpacking the RMX
- Installing the RTM ISDN card on the RMX
- Installing the RMX in a rack or as a standalone
- Connecting the RMX to the power source
- Connecting the network (LAN, IP and ISDN) cables to the RMX

Unpacking the RealPresence Collaboration Server (RMX) 4000

Carefully remove the RMX 4000 from its packing case can check the contents.

To unpack and lift the RMX 4000:

1. When you receive the RMX 4000 packing case, inspect the equipment for damage and verify that the components match the packing slip.
2. The RMX 4000 is shipped in a packing case with Stratocell® packaging, and the top cover must be unlocked and lifted where the RMX is placed on the inside of an anti-static plastic bag.
3. Open the top cover of the packing case.

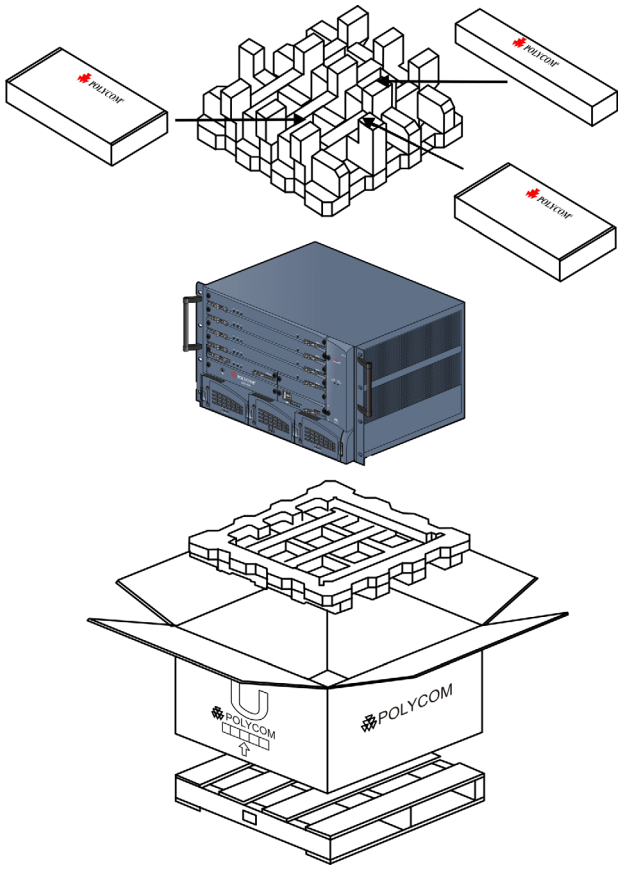
   Boxes are placed on the top Stratocell® and contain the following:

   - *Installation Accessories*. This kit contains the power cables, 4 ethernet cables, USB key and documentation.
   - *Rack Installation Accessories*. This kit contains the accessories for the 19" rack.
   - *Optional - ISDN Package.* Contains the ISDN card and *ISDN Software License*.

Write down the RMX's serial number that is on a sticker on the back of the unit. It will be needed for product registration later in the process.

Make sure that boxes contain all the required parts.

4 Remove the boxes and top Stratocell®.



5 Holding the handle on each side, lift the RMX 4000 from the box, and place it on a flat surface or install it in a rack. Remove any packaging material prior to positioning the RMX 4000.

Attention:
Two people are required to lift the MCU out of the box and when installing it in a rack.

Installing the RTM ISDN Card on the RealPresence Collaboration Server (RMX) 4000

The ISDN card is shipped out of the box and must be manually installed into the rear of the RMX 4000. It is recommended that the ISDN card be installed before the RMX 4000 is installed in a rack. For more information on installing the ISDN card, Installing or Replacing the RTM ISDN Card.

An RMX Software License is included with the ISDN card and must be registered as part of the *Product Registration* and *Product Activation*. For more information, refer to the *ISDN Software Licence* document you received with your shipment.

Installing the RMX in a Rack or as a Standalone

Either place the RMX 4000 on a hard, flat surface such as a desktop or mount it on a 19”/23” rack or a rack with telescopic rail runners.

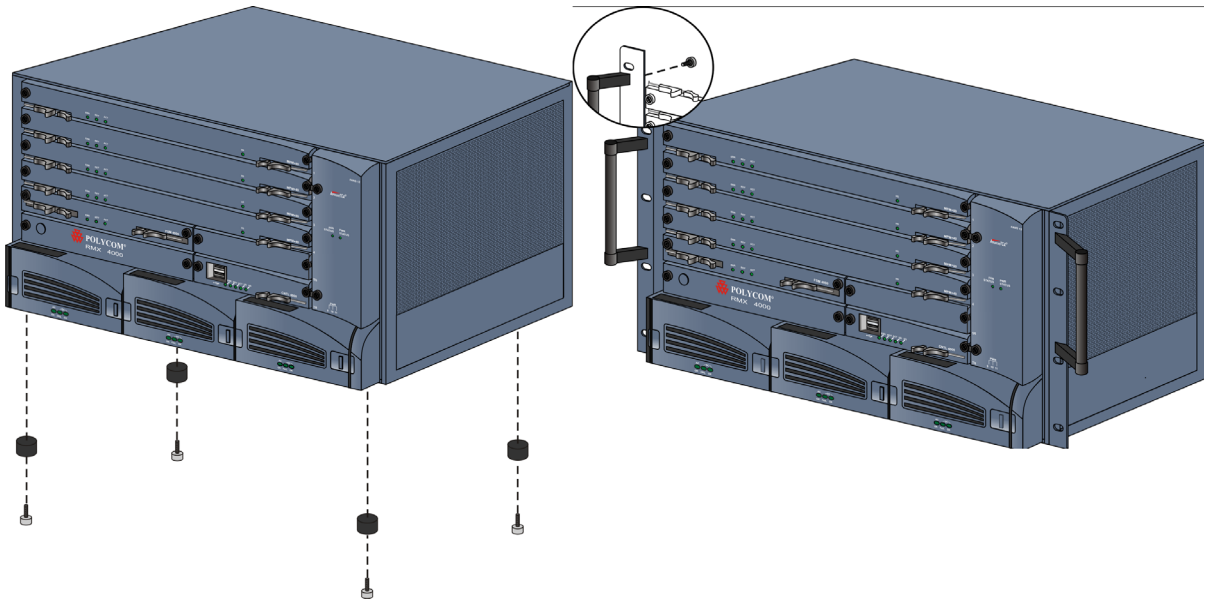
Standalone RealPresence Collaboration Server (RMX) 4000 Installation

- Place the RMX 4000 on a flat surface or desktop.
  The RMX 4000 must rest on the four feet at the base of the MCU and must be shifted or moved into position using the two handles attached to the front.

Rack Mount Preparations

- Optional - Depending on the rack installed in your site, you may need to remove the handles if they are attached to the RMX 4000. Unscrew the handles from the chassis as shown in Telescopic Rail Runner Assembly for RealPresence Collaboration Server (RMX) 4000.
- Optional - If the opening in the rack that is allocated to the RMX 4000 is exactly 6U, the feet must be removed from the RMX 4000 to install it in the rack. Unscrew the feet from the chassis as shown in Telescopic Rail Runner Assembly for RealPresence Collaboration Server (RMX) 4000.

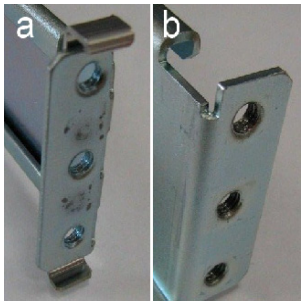
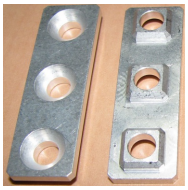
Optional feet and handle removal



Telescopic Rail Runner Assembly for RealPresence Collaboration Server (RMX) 4000

Before installing the telescopic rail runners in the rack, make sure that the kit has the following parts.

Rail Runners Kit Contents

Part/Kit no.	Item	Item no.	Item Sample	Item Quantity
ASY2716A-L0				
Rail runner	**Rail Runner End Views**: Left rail runner (two types available: item (**a**) with or **(b)** without rail runner clip **Note:** The rail runner clip is designed to attach and clip onto the chassis runner frame.	1		1
	Right rail runner (two types available: with or without rail runner clip) **Note:** The rail runner clip is designed to attach and clip onto the chassis runner frame.	2	See Figure 1-2	1
Rack spacer assembly kit	Rack spacer	3	Front & Rear 	4
	Flat head screw - M5*10mm	4		8

Rail Runners Kit Contents

Part/Kit no.	Item	Item no.	Item Sample	Item Quantity
Rail runner assembly kit	Flat head screw - M3*8mm	5		4
	Flat washer M3	6		4
	Nut spring M3	7		4
RMX chassis assembly kit	Pan head screw - M5*12mm	8		2
	Flat washer M5	9		2

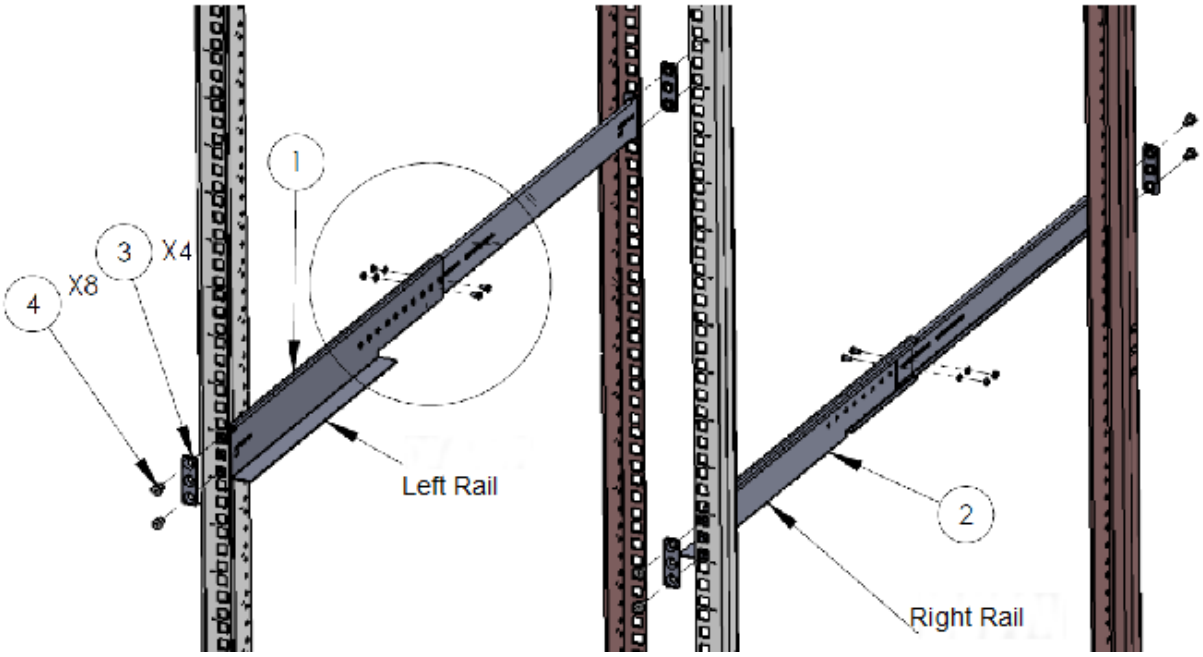
Telescopic Rail Runner Assembly

Rack Rail Runners require a minimum of 48cm and a maximum of 80cm within the rack for installation

1 Determine the location of the RMX on the rack:

- Allow for a 1U gap above and below the system for ventilation.
- Use the *Rack Spacer* (3) to predetermine its position on the rack post, making sure that square studs of the spacer fit into the rack post's square/rounded mounting holes. Mark the spacer's location on the rack post. Repeat this process for the 3 remaining vertical posts ensuring that the system can be horizontally seated.

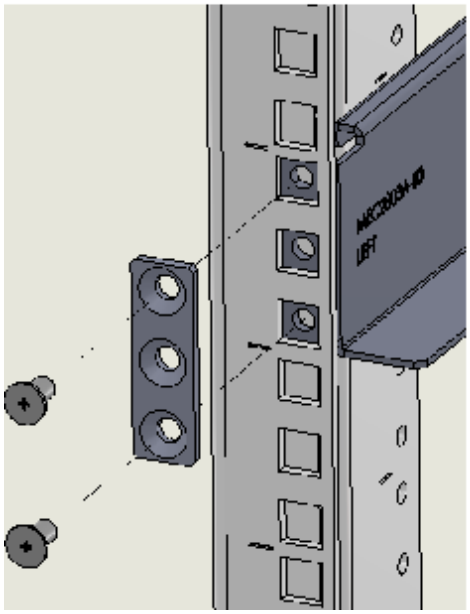
Front view of RMX Rail Runner Assembly



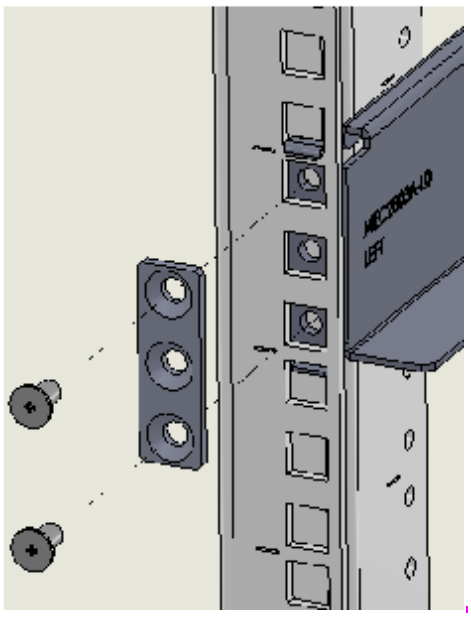
2 Position the *Rack Spacer* (3) onto the marked rack post together with left rack rail runner (1) and fasten the flat head screws 3*10mm (4) as shown in the following figure.

Detail of Front Rack Spacer Assembly (left rail runner is shown here) for all RMX types

RMX 4000 rack assembly view without rail runner clip§



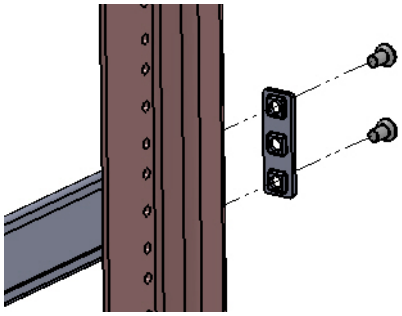
RMX 4000 rack assembly view with rail runner clip§



On the RMX4000 the center hole on the *Rack Spacer* must be left clear as it is required for fixing the RMX to the rack post.

3 Adjust the telescopic rack rail runner to the rack opening and mount it onto the marked position of the rear post as described in step 2.

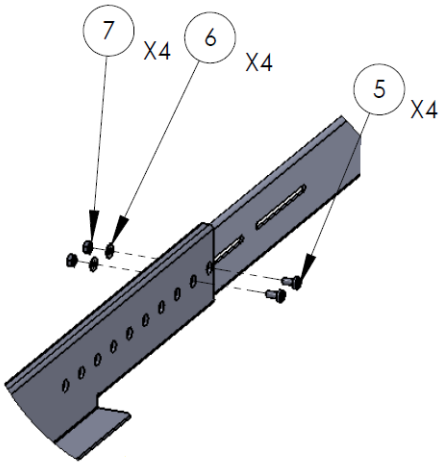
Detail of Rear RMX 4000 Rack Spacer Assembly



4 Repeat steps 2 and 3 for the right rack rail runner.

5 Install the flat head screw  (5), flat washer  (6) and nut spring  (7) in the middle of the telescopic rack rail runner for added stability as shown in the figure below.

Detail of Left Raid Runner (front internal view)

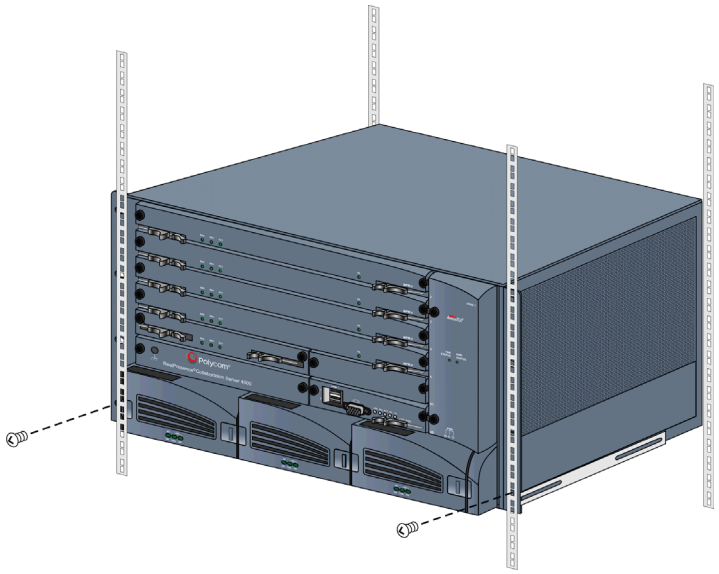


The number of screws to install depends on the rack width.

6 Repeat step 2 for the right rack rail runner.

Attention:
Two people are required to lift the MCU out of the box and when installing it in a rack.

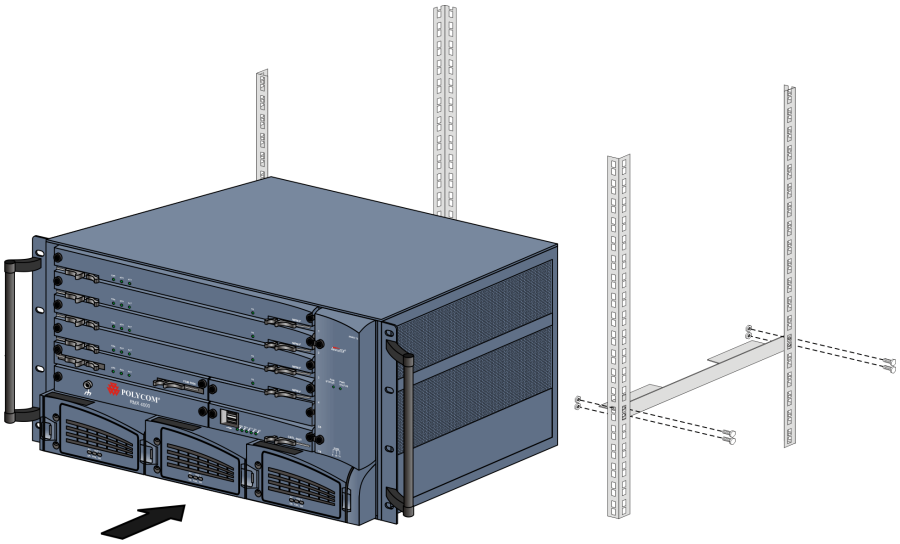
RMX 4000 Bolt Installation



Optional 19” Rack Assembly

1 When the RMX is to be rack-mounted, chassis runners must be installed on the rack as shown in the figure below. Two chassis runners are included in the *Rack Installation Accessories* kit and are attached facing inward from the outside of the 19”/23“rack mount. Installing chassis runners and RMX in a rack.

Installing Chassis Runners and the RMX 4000 in a Rack

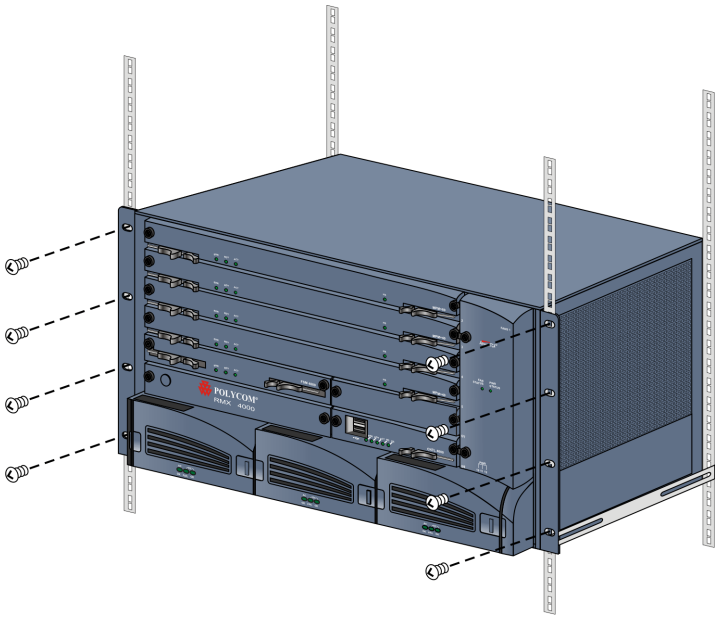


2 Mount the RMX on top of the rack brackets using the blades or placing it on a rack mount shelf with runners.

3 Fasten the RMX to the rack with 8 screws into the holes provided on the RMX's front as shown below.

Rack mounting screws must be supplied by the rack's manufacturer.

RMX 4000 Rack Mount



Rack mounting screws must be supplied by the rack's manufacturer.

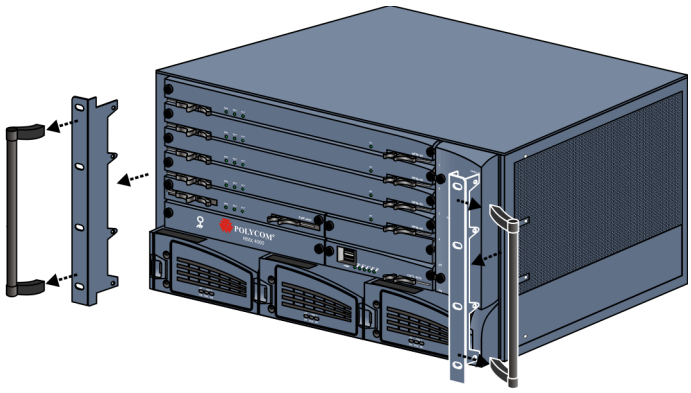
The airflow of the RMX 4000 is from right to left. Be sure that the areas on the left and right side of the system are clear for proper ventilation.

When the unit is installed on a rack, the rack must be properly grounded to the central office ground. The rack must be grounded with two-hole compression-type connectors using copper conductors (tinned or untinned). Wire, bus bar or braided strap connectors are acceptable.

Mounting the RealPresence Collaboration Server (RMX) 4000 in a 23” Rack

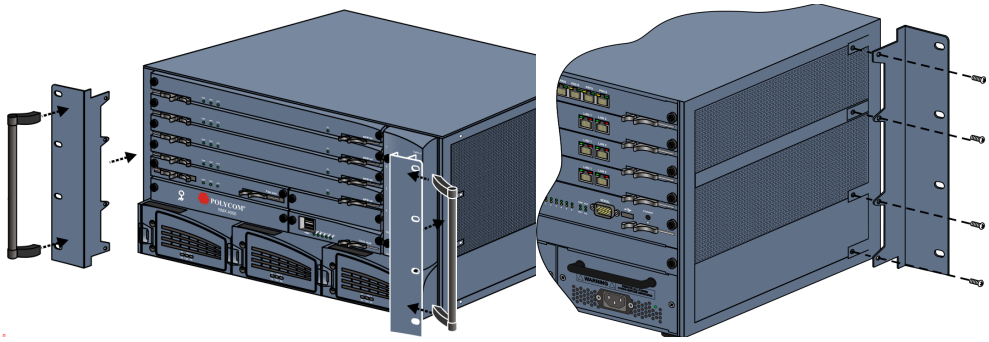
1 Mounting the RMX 4000 on a 23” rack requires that first the handles and then the 19” brackets be removed from the MCU, as shown in the figure below.

Removing and attaching 19” and 23” brackets



2 After removal, attach the 23” brackets as provided in the *Rack Installation Accessories* kit, and re-install the handles to the 23” brackets, as shown in the figure below.

Installing the handles and brackets & detailed rear view of 23” bracket attachment



3 Mount the RMX on top of the rack brackets using the blades or place it on a rack mount shelf with chassis runners.

4 Fasten the RMX to the rack with 8 screws into the holes provided on the RMX’s front as shown in figure above.

Rack mounting screws must be supplied by the rack’s manufacturer.

The airflow of the RMX 4000 is from right to left. Be sure that the areas on the left and right side of the system are clear for proper ventilation.

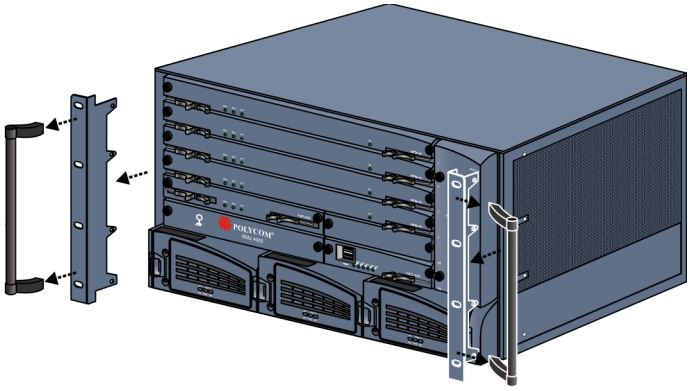
When the unit is installed on a rack, the rack must be properly grounded to the central office ground. The rack must be grounded with two-hole compression-type connectors using copper conductors (tinned or untinned). Wire, bus bar or braided strap connectors are acceptable.

Reverse Mounting the RealPresence Collaboration Server (RMX) 4000 in a Rack

It is possible to reverse mount the RMX 4000 in a rack using 19” or 23” brackets.

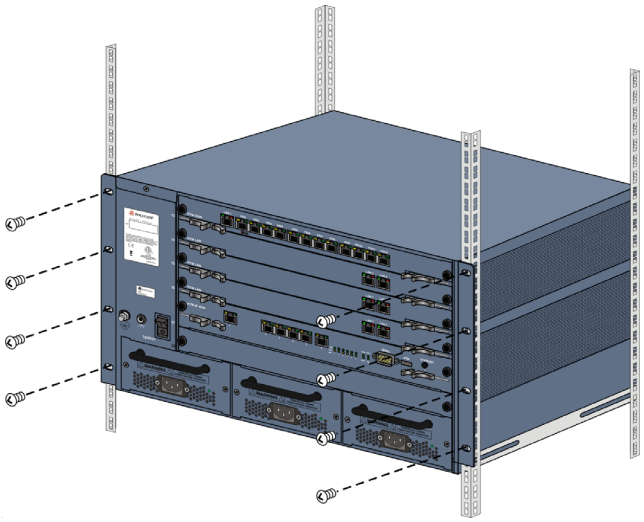
To reverse mount the RMX 4000 on a 19” rack:

1 Remove the handles and brackets from the front of the RMX.



2 Attach the brackets to the rear of the RMX.

3 Place the RMX in a rack and tighten the 8 screws securing the RMX to the rack.



Rack mounting screws must be supplied by the rack’s manufacturer.

Connecting the RealPresence Collaboration Server (RMX) 4000 to Power Sources

You can connect either an AC Inlet or to DC power according to the power system required at your site:

- For systems with AC Power, up to three power supplies can be installed with one being redundant (n+1).
- For systems with DC Power, up to two power supplies can be installed with one being redundant (n+1), and each power supply has a built in circuit breaker. With DC power, slot 10 (the center slot) must remain unoccupied.

Follow the steps appropriate specified below for your power system.

The following restrictions apply to the conductors and connectors that may be used to ground the unit when rack mounted:

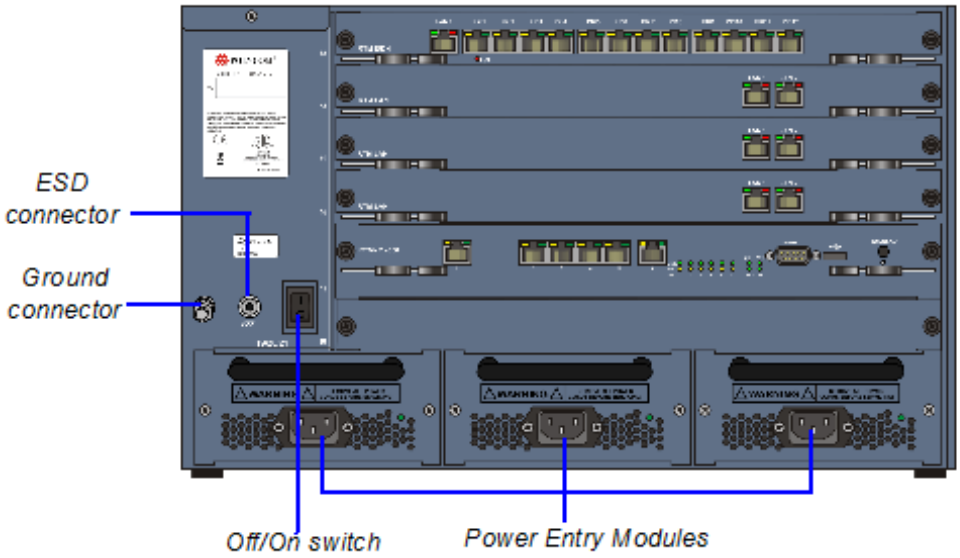
- When using bare conductors, they must be coated with an appropriate antioxidant compound before crimp connections are made. Tinned, solder-plated or silver-plated connectors do not have to be prepared in this manner.
- The same bolt assemblies should not secure multiple connectors.
- Listed fastening hardware must be compatible with the materials being joined and must be preclude loosening, deterioration and electrochemical corrosion of the hardware and joint materials.

Connecting the RealPresence Collaboration Server (RMX) 4000 to AC Power



- Do not connect the green or green-yellow wire to the system single-point ground screw.
- Customers are required to only use AC power cables supplied by Polycom.
- The size of the protective earthing conductor should be a minimum of 10 AWG.
- All three outlets intended for connection of the three power cords must be protected with an external overcurrent protection device either in building or in the rack with the rating not higher than 20 Amp.
- Do not use an Extension cords with any of the cables.

1 Make sure that the power button is switched OFF on the RMX 4000.



2 Insert the power cables into the power connectors on the rear panel of the RMX 4000.

Connecting the RealPresence Collaboration Server (RMX) 4000 to -48DC SELV Power

Perform the following steps to connect the RealPresence Collaboration Server (RMX) 4000 to -48CD SELV power.

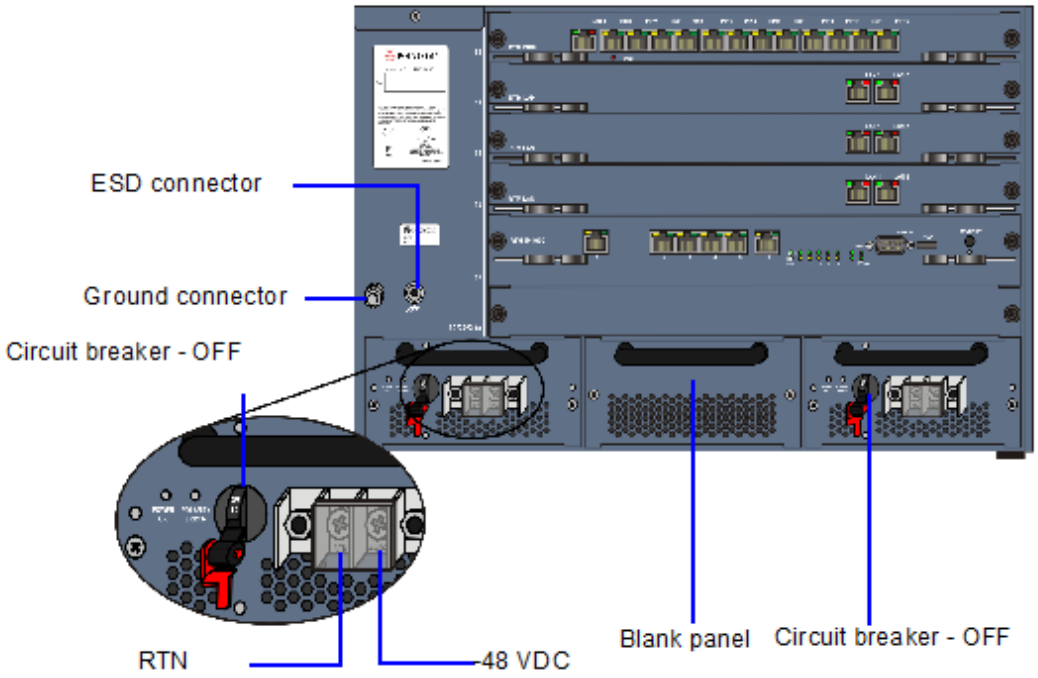
1 On the DC Power Rail Modules (PRM's), set the two circuit breakers to OFF. For more information on circuit breaker types, see Types of DC Circuit Breakers installed on the RealPresence Collaboration Server (RMX) 4000.

2 Ensure that the cables from the Main that supplies electricity to the DC power units are OFF or disconnected.

3 Remove the transparent plastic caps on the terminal block.

4 Using the two wires of an 10 AWG cable running from the DC power distribution unit, connect the black wire into the -48 VDC terminal block and the red wire to the RTN terminal block.

- A 10 AWG cable must be used to connect the mains with the RMX 4000 DC Power Rail Module.
- The supply wires for DC version must be terminated using quick connectors.
- Extension cords may not be used.



The center PRM slot/module is fitted with a blank panel and the slot cannot be used on a system with DC Voltage.

5 Connect the green or green-yellow wire to the system single-point M6x15 “Ground” bolt

The rating of the protective earthing conductor should be a minimum of 10 AWG.

If the unit is rack mounted, the single-point ground on the MCU must be connected to the rack with a single conductor and fixed as to prevent loosening. When using bare conductors, they must be coated with an appropriate antioxidant compound before crimp connections are made. Tinned, solder-plated or silver plated connectors do not have to be prepared in this manner.

6 Replace the transparent plastic cap on the terminal block.

7 Turn ON the circuit breaker on each of the DC Power Rail Modules.

Types of DC Circuit Breakers installed on the RealPresence Collaboration Server (RMX) 4000

On the RMX, two types of circuit breakers may be installed:

- ON/OFF circuit breaker - Type A
- ON/OFF circuit breaker with locking mechanism - Type B

Connecting Cables to the RealPresence Collaboration Server (RMX) 4000



- LAN4, LAN5 and the Serial ports are only for debugging and not for customer use.
- Do not remove the protective plastic caps from LAN1, LAN4 and LAN5 ports.

To connect the cables (AC and DC systems):

- **RTM-IP 4000**:
  - ➢ Connect the Management Network cable to **LAN 2.**
  - ➢ Connect the Signaling cable to **LAN 3.** This port is also available for Signaling and Mangement Redundancy. For more information, see *RealPresence Collaboration Server (RMX) 1500/1800/2000/4000 Administrators Guide,* LAN Redundancy and Multiple Network Services.
  - ➢ Connect the Shelf Management cable to **LAN 6**.



When an NTP Server is used for the *RMX Time*, the Shelf Management cable must be connected to the shelf port.

- **RTM LAN** type cards:
  - ➢ When an **RTM LAN - 4** port card is installed on the RMX 4000, connect the LAN cable to **LAN 2*.**



- An MPMx/MPMRx card on the front of the RMX must always be seated or connected opposite to either an RTM LAN - 4 ports or RTM ISDN card on the rear of the chassis.
- * When using an MPMx card with the RTM LAN - 4 Ports, connect the LAN cable to **LAN 4**.

♦ With Multiple Networks and LAN Redundancy configurations, **LAN 1** port is used. For more information, For more information, see *RealPresence Collaboration Server (RMX) 1500/1800/2000/4000 Administrators Guide,* LAN Redundancy and Multiple Network Services. Connect the *LAN* cable to **LAN 1.**



- * When using an MPMx card with the RTM LAN - 4 Ports with Multiple Networks and LAN Redundancy configurations, connect the LAN cable to **LAN 3.**
- The RTM LAN type card is always required with Multiple Networks and LAN Redundancy configurations.

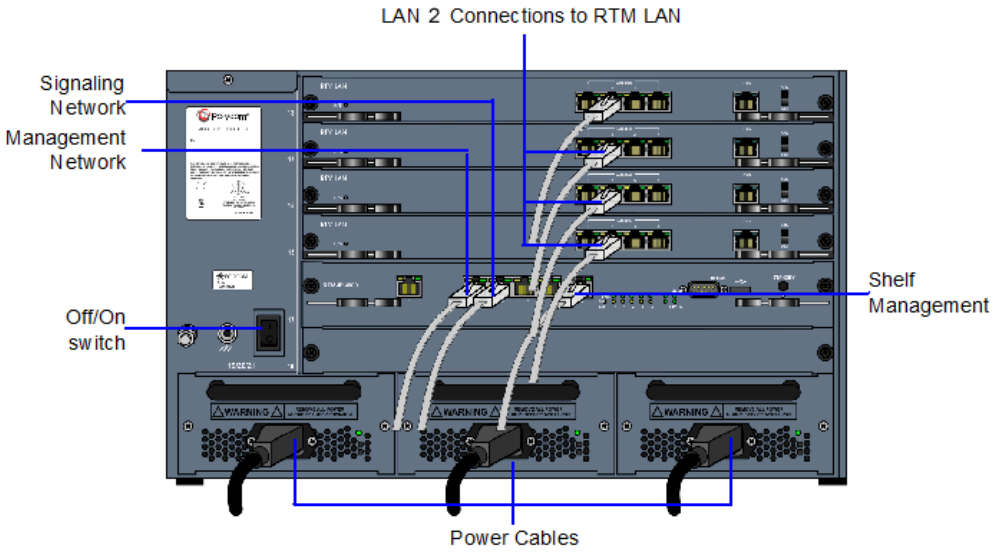
➢ When an **RTM LAN - 2 port** card is installed on the RMX 4000, connect the LAN cable to **LAN 2.**

- An MPMx/MPMRx card on the front of the RMX must always be seated or connected opposite to either an RTM LAN - 2 ports or RTM ISDN card on the rear of the chassis.
- The RTM LAN type card is always required with Multiple Networks and LAN Redundancy configurations.

♦ With Multiple Networks and LAN Redundancy configurations, **LAN 1** port is used. For more information, For more information, see *RealPresence Collaboration Server (RMX) 1500/1800/2000/4000 Administrators Guide,* LAN Redundancy and Multiple Network Services. Connect the *LAN* cable to **LAN 1.**

- **Optional.** If RTM ISDN is installed, for each installed **RTM ISDN**:
  - ➢ Connect the E1/T1 cables to their **PRI** Ports.
  - ➢ Connect the LAN cable to **LAN 1.**

RMX 4000 Rear Panel View with AC Power and Communication Cables



Attention:
Two people are required to lift the MCU out of the box and when installing it in a rack.

Write down the serial number of the RealPresence Collaboration Server (RMX), located on a sticker on the back of the unit. It will be needed for product registration later in the process.

For more information about specific card connections, see:

- RTM-IP 4000
- RTM ISDN
- RTM LAN LEDs - with 4 LAN Ports

First-time Power-up

1 For first entry installation, you must insert the *USB key* containing the modified IP addresses in USB port on the RMX's back panel.



For more information about modifying the lan.cfg file on the USB key and using the USB key, see the *RealPresence Collaboration Server 1500/1800/2000/4000 Getting Started Guide*, Procedure 1: First-time Power-up.

2 **AC System -** Turn ON the power by pressing on the power switch located on the rear panel of the RMX 4000.

DC System - Turn ON the Main that supplies power to the RMX and then turn ON the circuit breaker on the each of DC power rail modules.

The parameters in the lan.cfg file are uploaded from the USB key to the RMX's memory and applied during the power-up sequence.

System power-up sequence may take up to five minutes.

During the First-time Power-up the red ERR LED on the RMX's front panel remains ON until both the Management and IP Network Services have been defined.

When the RMX's configuration is completed (including the Management and IP Network Services), and if there are no System Errors, the green RDY LED on the CNTL module (on the RMX's front panel) turns ON.

3 Remove the USB key.

RealPresence Collaboration Server (RMX) 4000 Components

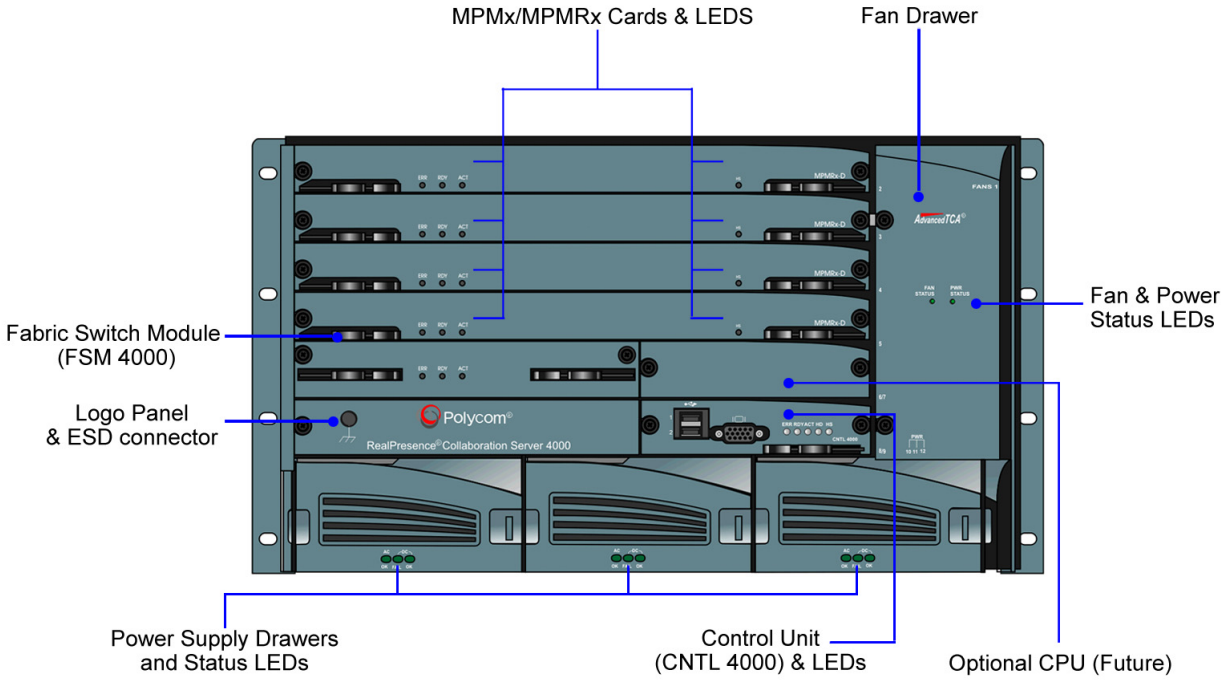
On the RMX 4000 components are located on both the front and rear of the MCU as listed in RMX 4000 Component Description.

For more information see the descriptions of the RealPresence Collaboration Server (RMX) 4000 Front Panel and RealPresence Collaboration Server (RMX) 4000 Rear Panel.

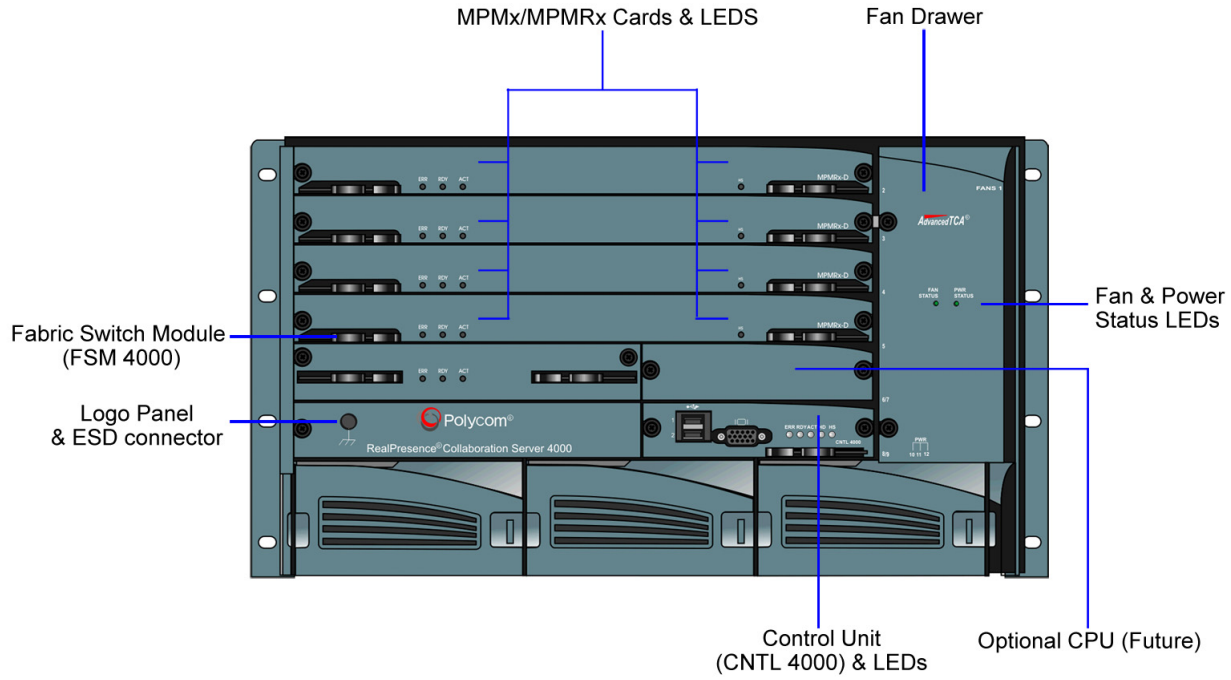
RealPresence Collaboration Server (RMX) 4000 Front Panel

The front panel provides access to the RMX 4000 main CNTL 4000 module, Fabric Switch Module (FSM 4000), MPMx/MPMRx modules, Power Supply drawers, Status LEDs, and Fan drawer. The figure below shows the front panel of the RMX 4000 fitted with AC Power supplies.

RMX 4000 AC Front View



RMX 4000 DC Front View



MPMx and MPMRx Media Cards

RMX 4000 Component Description

Component	Description
CNTL 4000 (CPU) Module	The CNTL4000 module controls and manages the RMX 4000. The CNTL 4000 module has an ComExpress Pentium-M 1.4GHz processor, a hard disk drive, Compact Flash and DDR RAM. The Operating System is Linux.
Fabric Switch Module (FSM 4000)	The Fabric Switch Module performs media processing functions on the RMX 4000 unit. This card is managed by the RTM-IP 4000.
AC/DC Power Supply Modules	The AC Power Supply drawers are located below the MPMx/MPMRx Cards and are connected to the backplane by means of a power connector. Operating at 100-240 volts AC 50/60 Hz all power supplies have built-in load sharing capabilities. On systems with DC current, the Power Rail Module (PRM) provides direct current to the rear of the RMX through the backplane.
Fan Drawer	Eight fans are mounted sideways and stacked in a drawer. The drawer is connected to the Back-plane by a connector. Airflow is from right to left, and out the side of the MCU. Each time a board temperature sensor passes one of its thresholds an event is sent to the ShelfManager, whereupon an threshold alert is posted on the RMX Manager, and increases the fans speed. There are currently three sets of thresholds: Normal, Major and Critical. When the temperature reaches a critical threshold (and the fan's speed increase did not resolve the issue), the controller of the relevant board initiates a shut down.
Multi Processor Module x (MPMx) Card	The MPMx cards, perform the various RTP, audio and video processing functions on the RMX 4000 unit. TI processors are at the core of each MPMx card which are available in the following assemblies: • MPMx -S • MPMx -D Note: An MPMx located (on the front panel) must face opposite (same slot level) an RTM LAN card (installed on the rear panel). For more information, see RTM LAN Card - with 4 LAN Ports.
Multi Processor Module Rx (MPMRx) Card	The MPMRx cards, perform the various RTP, audio and video processing functions on the RMX 4000 unit. TI processors are at the core of each MPMx card which is available in the following assembly: • MPMx -D Note: An MPMRx located (on the front panel) must face opposite (same slot level) an RTM LAN card (installed on the rear panel). For more information, see RTM LAN Card - with 4 LAN Ports.

The RMX unit can work with either MPMx or MPMRx (but not with both simultaneously) media cards. The card type installed in the system determines the *Card Configuration Mode*.

ISDN support is the same for all card types.

G.719 audio algorithm is not supported with MPMx or MPMRx cards.

Card Configuration Mode Selection During Startup / Restart

When the MCU is started with Version 8.3 installed and no media cards, the RMX is set to *MPMRx Card Configuration Mode* by default

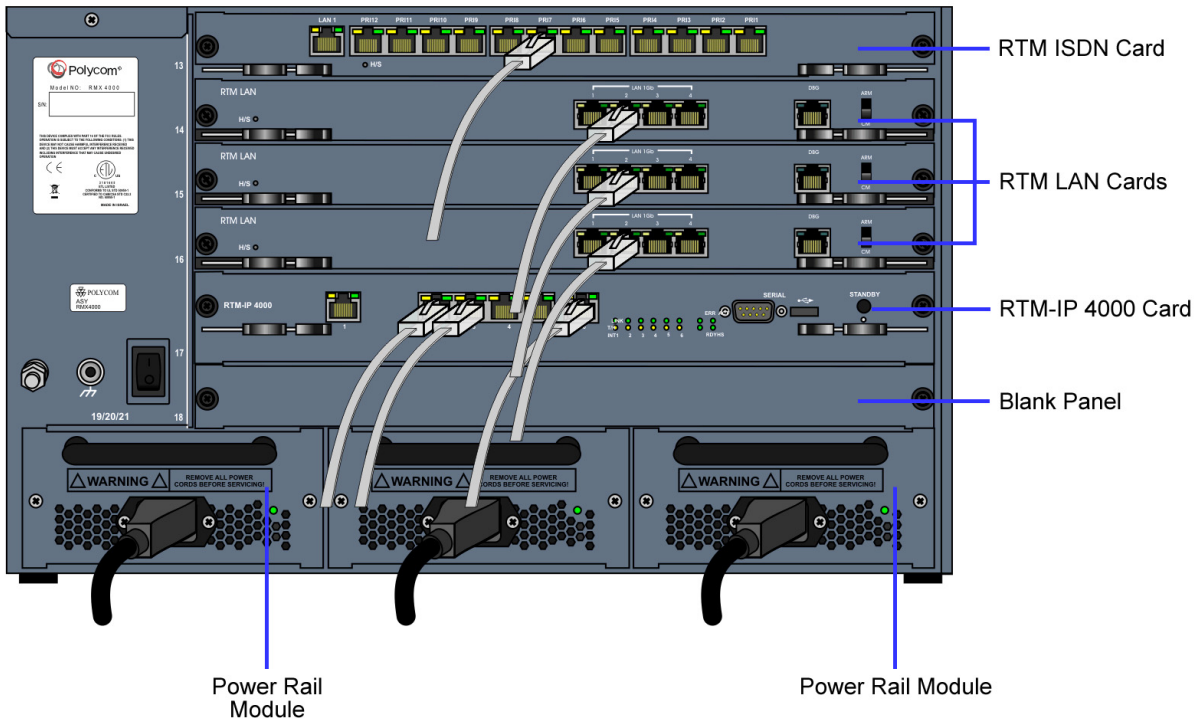
- The switch between Card Configuration Modes occurs during the next restart.
- Installing or swapping MPMx/MPMRx cards while the system is off will not cause a switch in the Card Configuration Mode when the system is restarted – it will restart in the Card Configuration Mode that was active previous to powering down.

RealPresence Collaboration Server (RMX) 4000 Rear Panel

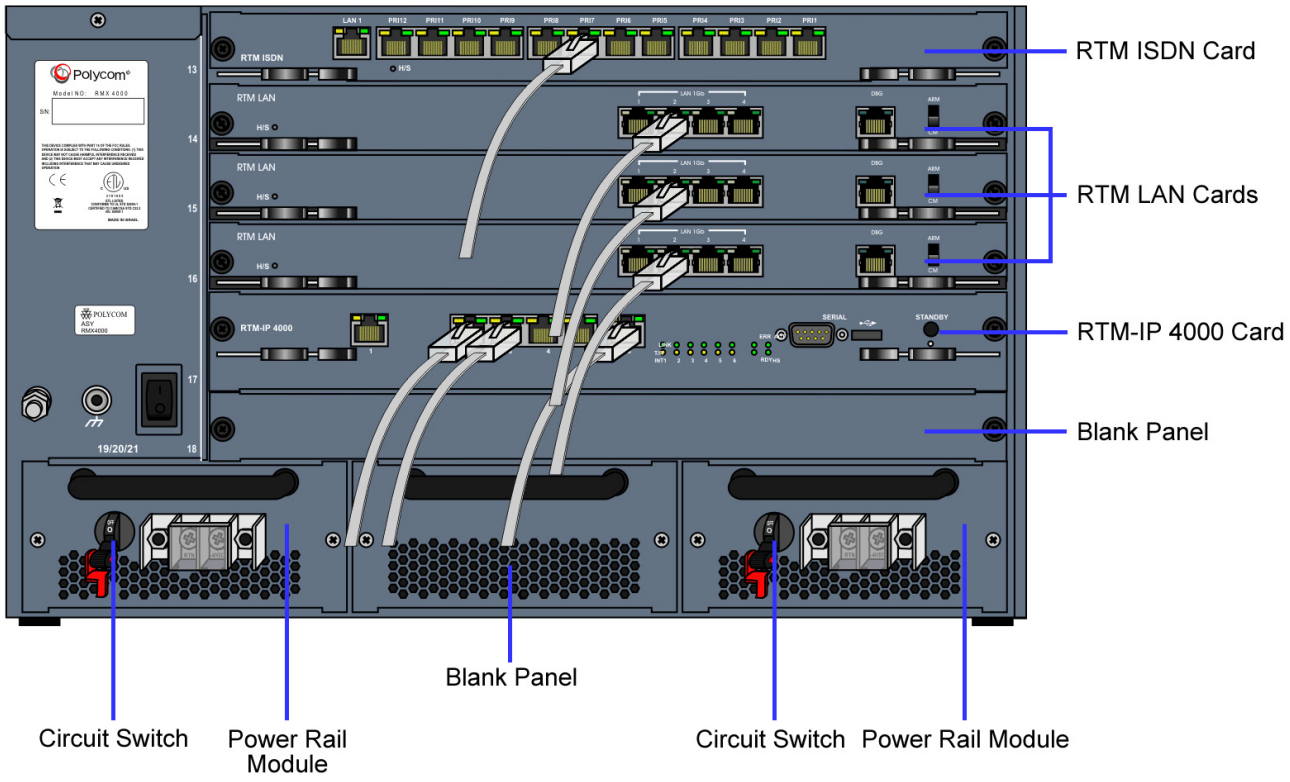
The RMX 4000 rear panel contains the RTM-IP 4000 card and either (or both) RTM ISDN/RTM LAN card(s). In order for an MPMx/MPMRx card to function (i.e. video) one of the RTM boards, either a LAN or ISDN card **MUST** be present in a rear panel slot opposite to an MPMx/MPMRx card.

A single RTM-IP 4000 card must also be located on slot 17 in the rear of the RMX 4000. In addition, the rear panel houses the main AC power switch, AC Power Entry Modules (PEMs) or DC Power Rail Modules (PRMs), and additional communications ports.

RMX 4000 AC Rear View



RMX 4000 DC Rear View



On some DC modules LED indications may not be present.

RTM-IP 4000

A single RTM-IP 4000 card provides system management based on the ATCA standard and connects to the backplane. Through the shelf manager, it controls and monitors the system fans and regulates the AC power supplies. This card contains an Ethernet Switch that manages the network of the system, routes data between the cards and components of the system and provides connectivity to external IP networks.

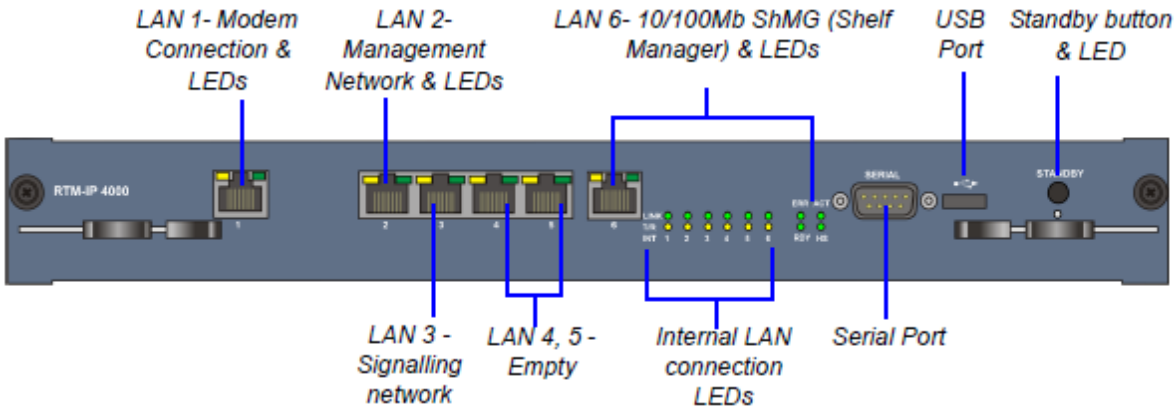
On the RMX 4000 when upgrading from MPM/MPM+ to MPMRx on the RTM-IP 4000 all connections require **Ferrite** cables.

The RTM-IP 4000 card connections include.

- 6 LAN ports
- 1 Serial port (Future Use)
- 1 USB port

- LAN 4, LAN 5 and the Serial ports are only for debugging and not for customer use.
- Do not remove the protective plastic caps from LAN 1, LAN 4 and LAN 5 ports.

RMX4000 RTM-IP Rear Panel



The following items appear on the RMX 4000 rear panel:

RMX 4000 Rear Panel - RTM-IP 4000 Component Description

Item	Description
LAN 1	Modem connection. **Note:** LAN 1 is covered with a plastic cap that should not be removed.
LAN 2 (CNTL 4000/CPU 1)	Management network/Web Client connection.
LAN 3 (CNTL 4000/CPU 1)	Signalling network, for Gatekeeper, Proxy or endpoint connections.
LAN 4-5 (CNTL 4000/ CPU 2)	Empty.
LAN 6	Shelf Manager connection.
Serial	A 10/100 ShMG Shelf Manager connection. For debugging purposes only.

RMX 4000 Rear Panel - RTM-IP 4000 Component Description

Item	Description
USB	USB key connection
Standby button	Toggle between ON/OFF and standby. Use this button to either perform Diagnostics or Software Recovery on the RMX after turning the system ON. Short press (2 seconds) - MPMx Diagnostics. Long press - (10 seconds) Media and RTM IP 4000 Software Recovery.

RTM ISDN

The RTM ISDN card connects directly to an MPMx/MPMRx. The RTM ISDN card routes data between the MPMx/MPMRx cards and components of the system, converts ISDN T1/E1 media to IP packets and provides connectivity to external ISDN networks.

The RTM ISDN card is installed on the rear panel of the RMX interfaces between the RMX unit and the ISDN/PSTN switch. In an RMX with a single MPMx/MPMRx card – the RTM ISDN card must be installed in the rear panel slot on the same level as the MPMx/MPMRx card. In an RMX with at least two MPMx/MPMRx cards – the RTM ISDN card can be installed in any two rear panel card slots.

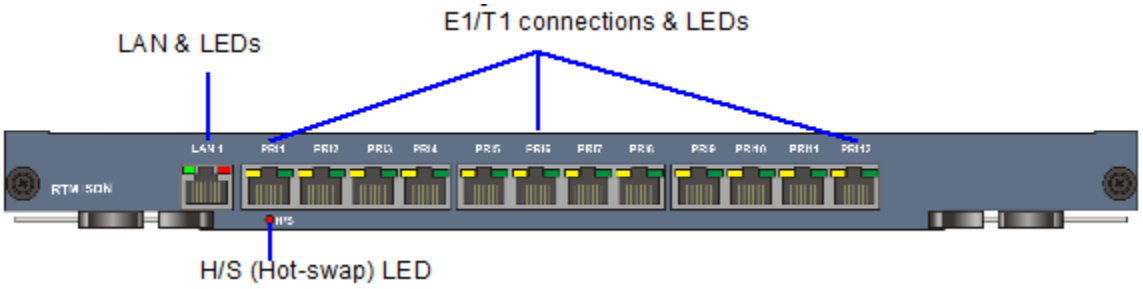
Up to two RTM ISDN cards can be installed in one RMX 4000. Up to a total of 14 E1 or 18 T1 PRI cables can be installed with two RTM ISDN cards.

Each RTM ISDN card includes the following connections:

- 1 LAN port
- 7 E1 or 9 T1 PRI lines that can be plugged into any of the 12 connections as shown in the figure below.

E1 and T1 spans cannot be connected simultaneously to the same card, therefore, it is not possible to have a mixed E1 and T1 ISDN Network Service.

RMX 4000 RTM ISDN Rear Panel Layout



ISDN/PSTN Clock Source

Each RTM ISDN card has its own primary and secondary clock source. The first span to synchronize becomes the primary clock source and the second span to synchronize becomes the secondary clock source. This clock is used to synchronize ISDN spans only (it is not the system clock).

A single clock source triggers an alarm that can be turned off by setting the appropriate flag in the system configuration.

RTM LAN Card - with 4 LAN Ports

The RTM LAN card routes data between the MPMx/MPMRx cards and components of the system, and sends media by IP packets and provides connectivity to external IP networks.

- An MPMx/MPMRx card on the front of the RMX must always be seated or connected opposite to either an RTM LAN - 4 ports or RTM ISDN card on the rear of the chassis.
- The RTM LAN type card is always required with Multiple Networks and LAN Redundancy configurations.

On RMX 4000 systems, RTM LAN cards with four 1 GB ports can be used with the MPMx/MPMRx card(s). However on systems with ISDN networks, the RTM ISDN can also be used instead of the RTM LAN.

An RTM LAN card must connect directly to an MPMx/MPMRx card. In an RMX with a single MPMx/MPMRx card, the RTM LAN card must be installed in the rear panel slot at the same level as the MPMx/MPMRx card.

On the RMX 4000, LAN port 2 is used to connect the LAN cable. Port 1 is the redundant port*.

- * When using an MPMx card with the RTM LAN - 4 ports card, connect the LAN cable to **LAN 4**. With Multiple Networks and LAN Redundancy configurations, connect to the **LAN 3** port.
- The RTM LAN type card is always required with Multiple Networks and LAN Redundancy configurations.

Ports on the RTM LAN - 4 card are:

- 1 Gb LAN ports No. 1-4
- DBG - Debug port, for internal use.
- ARM/CM - Switch, for internal use.

RTM LAN - 4 Ports



RTM LAN Card - with 2 LAN Ports

The RTM LAN card routes data between the MPMx/MPMRx cards and components of the system, and sends media by IP packets and provides connectivity to external IP networks.

On RMX 4000 systems, RTM LAN cards with two 1 GB ports can be used with the MPMx/MPMRx card(s). However on systems with ISDN networks, the RTM ISDN can also be used instead of the RTM LAN.

- An MPMx/MPMRx card on the front of the RMX must always be seated or connected opposite to either an RTM LAN or RTM ISDN card on the rear of the chassis.
- The RTM LAN type card is always required with Multiple Networks and LAN Redundancy configurations.

An RTM LAN card must connect directly to an MPMx/MPMRx card. In an RMX with a single MPMx/MPMRx card, the RTM LAN card must be installed in the rear panel slot at the same level as the MPMx/MPMRx card.

Ports on the RTM LAN - 2 card are:

- 1 Gb LAN ports No. 1-2

RTM LAN - 2 Ports



DC Power Rail Module

A DC power rail module includes a power inlet, circuit breaker, EMI filter and backplane connectors. Power input to the system is fed via a power rail through backplane into the power supply. Each DC power rail has its own dedicated power cable. The circuit switch on the rear of the RMX activates independently any power rail installed on the RMX. An DC system has two DC rails, one for each power rail. On failure, a DC power rail is field replaceable and the RMX must be switched OFF from the two circuit switches and the mains.

Component Slot Allocation

On the RMX 4000, components have been assigned dedicated slots as defined in the following table. Slot numbers are located on both the front and rear of the RMX 4000.

RMX 4000 Slot Numbering

Slot ID/No.	Card/Component	Requirement
1-4	MPMx/MPMRx Cards	Mandatory: At least 1 MPMx/MPMRx card is required. Each media card also requires either an RTM ISDN or an RTM LAN card.
5	Fabric Switch Module (FSM 4000)	Mandatory
6	CPU 2	Not Available (NA)
7	Logo Panel	Not Available (NA)
8	CTNL 4000 unit (CPU 1)	Mandatory
9-11	AC Power Supply	An RMX with AC power has 3 power supplies installed. A 3rd power supply is redundant (n+1). **Note:** Not used with DC powered systems. DC powered systems receive Direct Current from the power rail.
12	Fan Drawer	Mandatory
13-16	RTM ISDN/RTM LAN	Either an RTM ISDN or an RTM LAN card is mandatory in combination with a Media card. The RTM ISDN/RTM LAN board must be inserted in a slot opposite any MPMx/MPMRx card.

RMX 4000 Slot Numbering

Slot ID/No.	Card/Component	Requirement
17	RTM-IP 4000	Mandatory
18	Blank Panel	Not Available (NA)
19-21	Power Modules	Mandatory: With AC power, three power supplies are installed, with the 3rd redundant. With DC power, two power supplies are installed with the 2nd redundant. The center slot (#20) on the rear of the RMX 4000 is disabled and is fitted with blank panel. **Note:** Protective bonding conductor size is 14AWG (1.5mm) within the Power Entry Model.

RealPresence Collaboration Server (RMX) 4000 LEDs

The RMX includes LEDs located on the front panel and rear panel. In the front panel, the LEDs reflect the state of the components. The LEDs on the rear panel indicate the state of the external connections and the status of the RTM-IP 4000 card.

RealPresence Collaboration Server (RMX) 4000 Front Panel LEDs

The following items appear on the RMX 4000 front panel.

RMX 4000 Front Panel LEDs

Component	LED ID	LED Color	Description
Fan Status		Green	OK.
		Red	Warning - Fan or power failure.
Power Module/Rail Status (AC only)	AC	Green	OK.
		Red	Error - Problem with power supply. When the power cable is unplugged, the FAIL LED is lit 2-3 seconds before turning OFF.
	DC (OK)	Green	OK.
	DC (FAIL)	Red	Error - Problem with power supply. When the power cable is unplugged, the FAIL LED is lit 2-3 seconds before turning OFF.
		OFF - all LED's	In case of a power failure (main/cable/module) all LED's are OFF.
Fabric Switch Module (FSM 4000)	ERR	Red	ON - Major error on card. Flashes - During card startup.
	RDY	Green	ON - The card has completed startup successfully. Flashes - During card startup.
	ACT	Orange	Not in use.

RMX 4000 Front Panel LEDs

Component	LED ID	LED Color	Description
MPMx/MPMRx Card	ERR	Red	ON - Major error on card. Flashes - During card startup.
	RDY	Greenish Yellow	ON - The card has completed startup successfully, after the ERR, RDY & ACT LED's have stopped flashing. Flashes - During card startup.
	ACT	Amber	ON - At least one participant is connected to a conference. Flashes - During card startup.
	HS	Blue	Flashes - Shut down process initiated by lightly pulling the CPU ejector levers. This LED flashes in synchronization with the CNTL 4000's card's HS LED. ON - Card is in a power down mode. **Card removal Initiated** - The card can be removed safely once the CPU ejector levers are fully open. **Card Insertion Initiated** - If during the startup phase the blue HS LED remains lit, please ensure that the card is properly seated in the chassis. If this problem persists, contact your next level of support.
CNTL 4000 Unit	ERR	Red	ON - Major system error. In case of an active alarm this light is ON, and the RDY green is OFF.
			OFF - Normal.
			Flashes - During system startup.
	RDY	Green	ON - CPU card has successfully completed startup. This light turns green after completing the entire system configuration.
			OFF - Turns OFF when the ERR red LED is activated.
			Flashes - During system startup.
	ACT	Maroon	ON - At least one endpoint is connected to the system. Flashes - During system startup.
	HD	Red	OFF - Normal.
			Flashes - Hard disk is active.

RMX 4000 Front Panel LEDs

Component	LED ID	LED Color	Description
CNTL 4000 Unit (continued)	HS	Blue/Red	Flashes - Indicates when the power down process is initiated on an MPMx/MPMRx card. This LED flashes in synchronization with the MPMx/MPMRx's cards HS LED. OFF - Normal
			ON - CPU may be removed.

RealPresence Collaboration Server (RMX) 4000 Rear Panel LEDs

RTM-IP 4000

The following LEDs appear on the RTM-IP 4000 card.

RTM-IP 4000 LEDs

Component	LED Name	LED Color	Description
LAN 1 LEDs	LNK	Green	ON with an active network connection, flickers with Packet activity.
	1Gb	Green	ON with a 1Gb online connection, flickers with Packet activity.
LAN 2-5 LEDs	LNK	Amber	ON with a 100Mb online connection.
	ACT	Green	ON with network connection, flickers with Packet activity. OFF-1Gb or no connection.
LAN 6 LEDs 10/100Mb ShMG	LNK	Amber	ON - online connection, flickers with Packet activity. OFF - No Link.
	100	Green	ON - Connection 100Mb. OFF - Connection is not 100Mb or No Link.
INT LEDs (No.) 1-6	LINK	Green	ON with an active network connection, flickers with Packet activity.
	T/R	Amber	ON with a 1Gb online connection, flickers with Packet activity.
STANDBY LED		Green	When the user in the RMX Manager/Client presses the *System Shut Down* (red) button in the H*ardware Monitor* tool bar, the system should enter a standby mode and the LED turns ON. Only the media and control unit cards are in a standby mode. Shelf Manager remains active. Turn the system OFF/ON to exit the standby mode.

RTM-IP 4000 LEDs

Component	LED Name	LED Color	Description
ShMG (Shelf Manager) LEDs	ERR	Red	ON - Major error on RTM-IP 4000 card. Flashes - During system startup.
	ACT	Amber	ON - Packet flow to and from the MCU chassis. Flashes - During system startup.
	RDY	Green	ON - RTM-IP 4000 card has successfully completed startup. Flashes - During system startup.
	HS	Blue	Hot Swap not supported. OFF - Normal. Flashes for a second during initial power up.

RTM LAN LEDs - with 4 LAN Ports



The following LEDs appear on the RTM LAN - 4 ports:

Function Name	LED Name	LED Color	Description
LAN 1-4 LEDs	1 Gb	Amber	ON when 1Gb connection is online, flickers with Packet activity.
	LNK	Green	ON with an active network connection, flickers with Packet activity.
HS LED		Blue	OFF - Normal.
			Flashes - During the startup of a media card and control unit. Also flashes when the RTM LAN card is powered down.
			ON - RTM LAN card may be removed.

RTM LAN LEDs - with 2 LAN Ports



The following LEDs appear on the RTM LAN - 2 ports:

Function Name	LED Name	LED Color	Description
LAN 1-2 LEDs	1 Gb	Green	ON with an active network connection, flickers with Packet activity.
	LNK	Amber	ON when 1Gb connection is online, flickers with Packet activity.
HS LED		Blue	OFF - Normal.
			Flashes - During the startup of a media card and control unit. Also flashes when the RTM LAN card is powered down.
			ON - RTM LAN card may be removed.

RTM ISDN

The following LEDs appear on the RTM ISDN.

RMX 4000 RTM ISDN LEDs

Function Name	LED Name	LED Color	Description
LAN 1 LEDs	1 Gb	Amber	ON when 1Gb connection is online, flickers with Packet activity.
	LNK	Green	ON with an active network connection, flickers with Packet activity.
PRI LEDs		OFF	Span x not in use.
		Green	Span x is OK.
		Red	Span x red alarm (LOS - Loss of Signal)
ShMC LED	HS	Blue	OFF - Normal.
			Flashes - During the startup of a media card and control 4000 unit. This LED is activated when the MPMx/MPMRx card Hot Swap functionality initiates a power off routine on the MPMx/MPMRx cards.
			ON - Power on the RTM ISDN card has been switched OFF. This LED is activated by the card when the MPMx/MPMRx's card Hot Swap functionality powers off the MPMx/MPMRx cards.

DC Power Rail LEDs

The following LEDs appear on the DC Power Rail.

RMX 4000 DC Power Rail LEDs

Function Name	LED Name	LED Color	Description
DC Power	POWER OK	Green	ON - Power input is within required voltage specifications: -38.5V to -70V
		Not lit	OFF - No LED indication, Power supply or power failure.
	POLARITY ERROR	Red	Polarity Error. Switch the polarity of the two cables connected to the DC power supply!

RealPresence Collaboration Server (RMX) 4000 Component Replacement

The RMX 4000 is designed with ease of maintenance in mind. Most components are swappable and are accessible directly via the front panel or the rear panel.



The MPMx/MPMRx power supplies and Fan tray are Hot Swappable. The Fan tray must be replaced immediately or the temperature spike in the RMX will initiate a shutdown. The RTM-IP 4000, RTM ISDN, RTM LAN, Fabric Switch Module (FSM) 4000 and the CTNL 4000 **are not** Hot Swappable. System shutdown is required when replacing the RTM-IP 4000, RTM ISDN, RTM LAN, FSM 4000 and the CTNL 4000.

The following components can be replaced when they are faulty:

- CNTL 4000 Module, see Replacing the CNTL 4000 Module.
- AC Power Supply Modules, see Replacing an AC Power Supply Module.
- AC Power Entry Modules, see Replacing an AC Power Entry Module (PEM).
- DC Power Rail Modules, see Replacing a DC Power Rail Module (PRM).
- Fan drawer, see Replacing the Fan Drawer.
- Adding an Air Filter, see Inserting an Air Filter (Optional) in the Fan Drawer.
- MPMx/MPMRx card. This card is hot-swap enabled. See Removing a Faulty MPMx/MPMRx Card.
- RTM ISDN card, see *Installing or Replacing the RTM ISDN Card.*
- RTM-IP 4000 card, see Replacing the RTM-IP 4000 Card.
- RTM LAN card, Replacing the RTM LAN.
- Replacing the Fabric Switch Module (FSM 4000), Replacing the Fabric Switch Module (FSM 4000).



- All maintenance tasks are to be performed by qualified, authorized personnel.
- Use only replacement parts supplied by your dealer.
- Follow all procedures. Do not skip any steps.

Before replacing parts:

- To ensure a part needs replacing, complete the troubleshooting procedures.
- Identify exactly which part needs replacing.
- Make sure you have the correct replacement part on hand.
- Make sure you are using proper ESD equipment, to prevent damage to the system



On all cards, if during the startup phase the blue HS LED remains lit, please make sure that the card is properly seated in it's slot. If this problem persists, contact your next level of support.

Using the Modified PMC Compatible Ejector Lever

On the RMX 4000 most components are fitted with identical ejector levers that are used to release or fasten the components to their slot.

The ejector levers can be moved to three positions:

1 **Closed/Locked** - The ejector levers are pushed up against the card's panel and the lock catch is in the standard closed position (as shown below).

In this position the card is locked in the MCU housing and cannot be removed.



2 **Partially Open** - The ejector levers are partially open and the blue *HS* LEDs on the card and the *Control Unit* are flashing. When the blue LEDs are constantly lit the card is in a powered-down mode and can be safely removed.

3 **Fully Open** - The ejector levers are in the fully open position. In this position the card is released from the MCU housing and can be removed.



To open and close the ejector levers:

- **Unlocking the Lock Catch** - With your thumb on the handle (**2**) and your index finger on the lock catch (**1**), pinch thumb and finger together while lifting the handle away from the chassis.



Once the removal sequence is initiated the process cannot be terminated and the HS led flashes when activated.

- **Closing the Lever** - With your thumb on the handle (**2**) and press the lever against the panel until it clicks into place.

Replacing the CNTL 4000 Module

The CPU module is the management system of the RMX 4000. Use the following procedure to replace a CNTL 4000 Module.

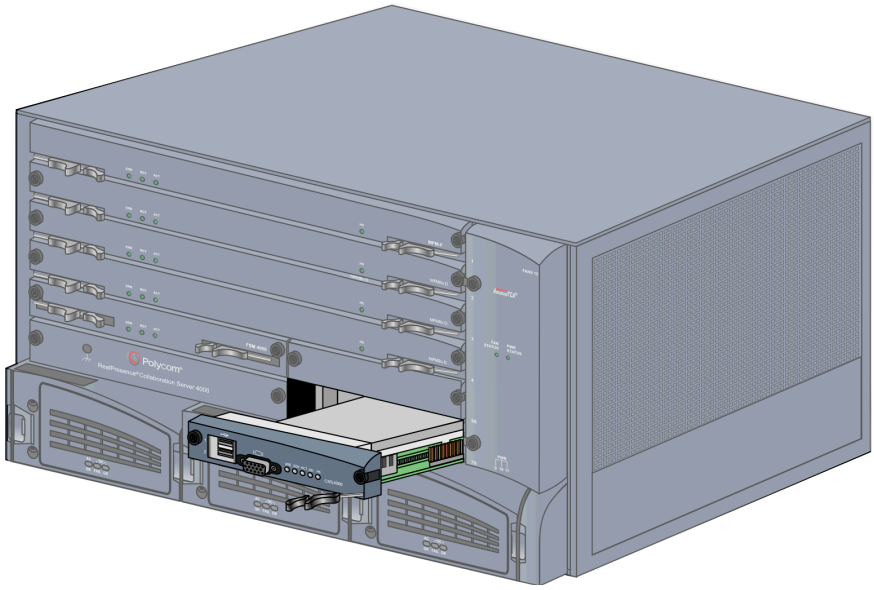
To replace the CNTL 4000 module:

1 Ensure that the power switch/circuit switch on the RMX 4000 is turned OFF (O).

2 Unscrew the captive screws on the front panel of the CNTL 4000 Module that secure the module to the chassis.

3 Use the metal ejector lever to pull the CNTL 4000 Module out of its slot in the Backplane.

4 Carefully slide the CNTL 4000 Module out through the front panel.



5 On the CNTL 4000 Module to be installed, move the ejector lever to the fully open position.

6 Slide in the replacement CNTL 4000 Module.

7 Push the CNTL 4000 Module firmly into the Backplane, making sure it is properly seated in its slot.

8 Ensure that the metal ejector lever is fully retracted into it's housing.

9 Tighten the captive screws on the front panel of the CNTL 4000 Module that secure the CNTL 4000 Module to the chassis.

10 Turn ON the RMX 4000.

Replacing an AC Power Supply Module

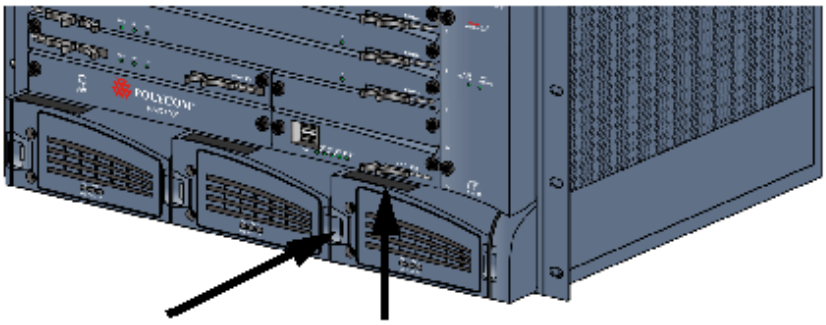
Two units supply power to the RMX 4000 (3rd optional - AC only), each unit with its own power cord. Use the following procedure to replace a Power Supply unit.

Please verify the type of power supply used on your RMX 4000. Do not insert a different type of power supply than the current type installed on your system.

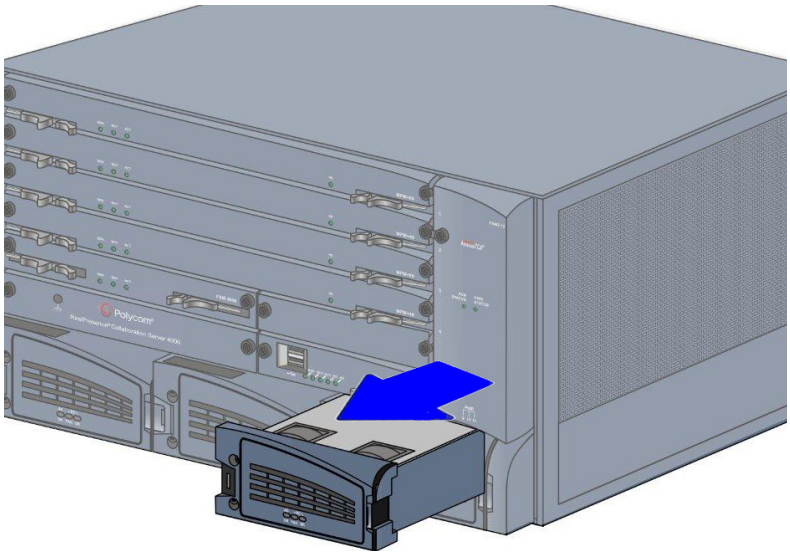
To replace an AC power supply module:

1 Unscrew the captive screws on the front panel of the Power Supply unit that secures the unit to the chassis.

2 Using your right hand, press your thumb on the pressure latch and with your fingers inserted in the hand grip (on top), pull the Power Supply unit out.



3 Carefully slide the Power Supply unit out from the front slot.



4 Slide in the replacement Power Supply unit.

5 Push the Power Supply unit firmly into the Backplane, making sure it is properly seated in its slot, and that the latch is in a locked position.

6 Tighten the captive screws on the front panel of the Power Supply unit to the chassis.

Replacing an AC Power Entry Module (PEM)

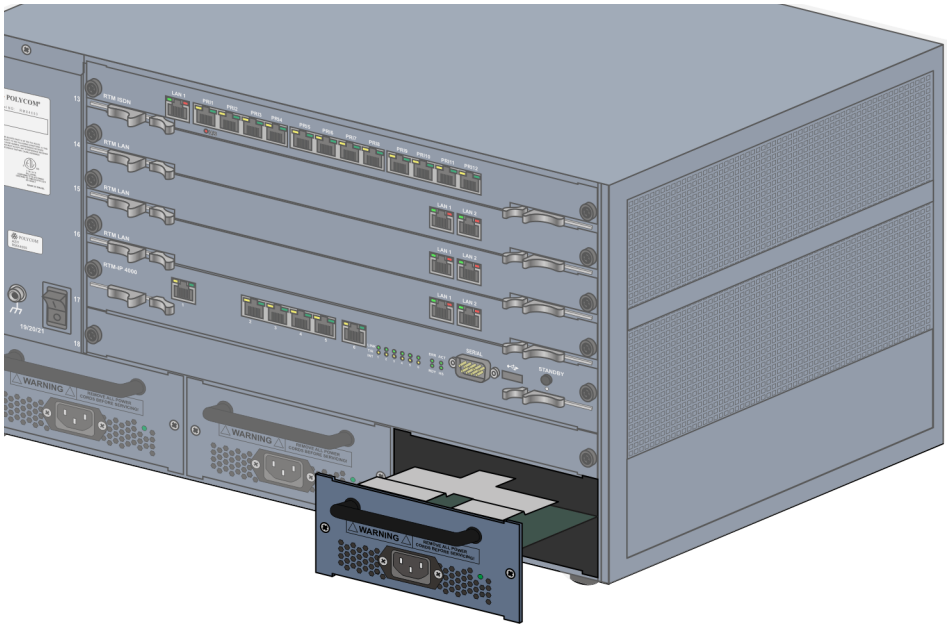
On the rear of the RMX three AC PEM's are fitted, each with their own power cord.

Use the following procedure to replace a Power Entry Module (PEM).

Please verify the type of PEM used on your RMX 4000. Do not insert a PEM of a different type on your system.

To replace an AC power entry module (PEM):

1. Unplug the Power cord connected to the failed PEM unit.
2. Unscrew the captive screws on the rear panel of the PEM unit that secures the unit to the chassis.
3. Using the handle fitted to the PEM, pull the PEM unit out.



4. Carefully slide the PEM unit out from the rear slot.
5. Slide in the replacement PEM unit.
6. Push the PEM unit firmly into the Power Supply, making sure it is properly seated in its slot.
7. Tighten the captive screws on the rear panel of the PEM unit to the rear chassis.

Replacing a DC Power Rail Module (PRM)

On the rear of the RMX 4000 two DC Power Rail Modules are fitted, each with their own power cord.

Use the following procedure to replace a DC Power Rail Module.

- Please verify the type of PRM used on your RMX 4000. Do not insert a Power Rail Module of a different type on your system.
- When replacing a DC Power Rail Module:
  On the Mains, disconnect the electricity that supplies direct current running through the power cable to the failed DC PRM.

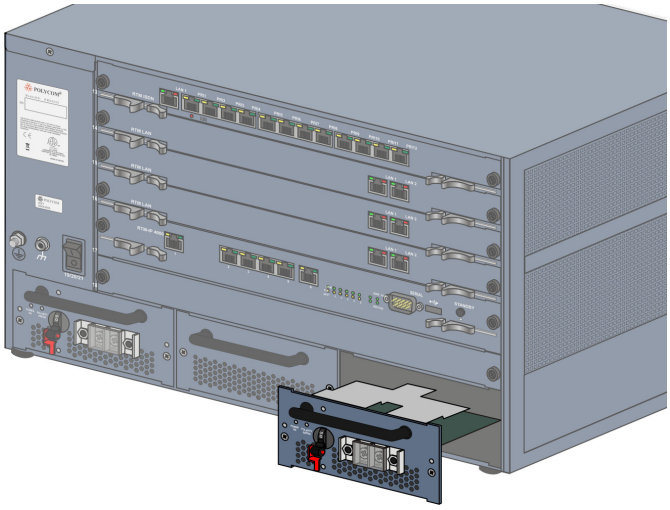
To replace an AC power entry module (PRM):

1. Turn OFF the circuit switch on the each of the DC PRMs and from the Mains.
2. Verify that DC PRM unit you are about to replace on the RMX 4000 is not HOT or has any Live current feeds.
3. Remove the plastic cap fitted to the Terminal block that protects the direct current connections.

4 Using a star screw driver, disconnect the two wires connected to the Terminal block (-48 VDC & RTN) of the failed DC PRM unit.

5 Unscrew the captive screws on the rear panel of the PRM unit that secures the unit to the chassis.

6 Using the handle fitted to the DC PRM, pull and slide the PRM unit out.



7 Slide in the replacement PRM unit.

8 Push the PRM unit firmly into the chassis, making sure it is properly seated in its slot.

9 Tighten the captive screws on the rear panel of the PRM unit to the rear chassis.

10 Connect the black wire into the -48 VDC terminal block and the red wire to the RTN terminal block and tighten the two screws.

11 Replace the transparent plastic cap on the terminal block.

12 Turn ON the Main that supplies power to the RMX.

13 Turn ON the circuit breaker on each of the DC Power Rail Modules.

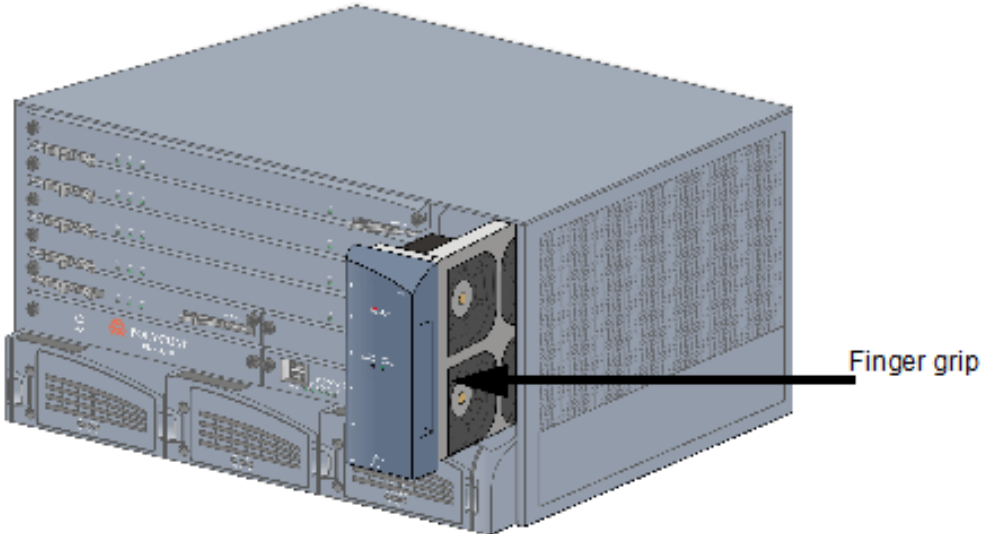
Replacing the Fan Drawer

Eight fans are mounted in the Fan drawer, where the airflow is from right to left. Should one of these fans fail as indicated by a Fan LED, you are required to replace the Fan drawer.

To replace the fan drawer:

1 Unscrew the captive screws on the front panel of the Fan drawer secured to the Fan chassis.

2 Use the finger grip, pull the Fan drawer out of its slot in the Backplane.



3 Carefully slide the Fan drawer out through the front panel.

Warning!
The Fan drawer can be replaced when the RMX unit is ON, but a replacement drawer must be inserted immediately. The temperature increase is detected by the system, and when critical, a system shutdown is initiated.

4 Slide in the replacement Fan drawer.

5 Push the Fan drawer firmly into the Backplane, making sure it is properly seated in its slot.

6 Tighten the captive screws on the front panel of the Fan drawer to the chassis.

Inserting an Air Filter (Optional) in the Fan Drawer

In the fan drawer, an Air Filter can be added as an option. You must order this part through your next level of support.

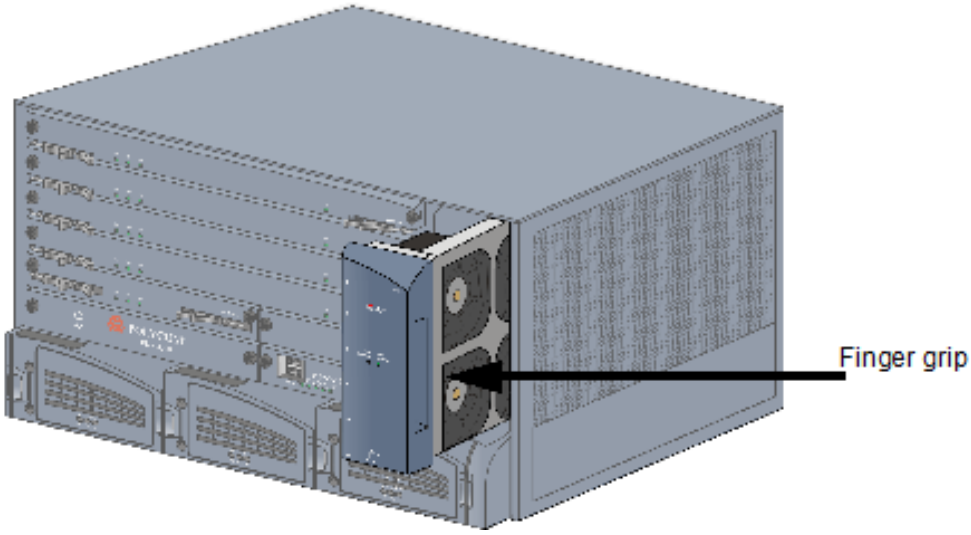
To insert an air filter in the fan drawer:

1 Ensure that the power switch/circuit switch on the RMX 4000 is turned OFF (O).

Warning!
The air filter cannot be replaced when the RMX 4000 unit is ON.

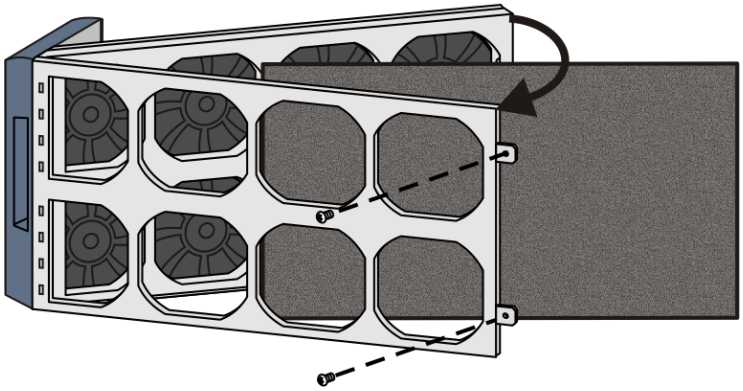
2 Unscrew the captive screws on the front panel of the Fan drawer secured to the Fan chassis.

3 Use the finger grip, pull the Fan drawer out of its slot in the Backplane.



4 Carefully slide the Fan drawer out through the front panel.

5 Open the filter tray, by unscrewing two screws on the tray.



6 Remove the existing air filter.

7 Insert a new or cleaned air filter into the filter tray.

8 Close the filter tray by tightening the two screws on the tray.

9 Insert and slide in the Fan drawer.

10 Push the Fan drawer firmly into the Backplane, making sure it is properly seated in its slot.

11 Tighten the captive screws on the front panel of the Fan drawer to the chassis.

12 Turn ON the RMX 4000.

It is recommended that the air filter be replaced or cleaned every six months.

Removing a Faulty MPMx/MPMRx Card

When upgrading from MPM+ to MPMrx, all connections to the RTM-IP 4000 require Ferrite cables.

All MPMx/MPMRx cards can be installed or removed while the RMX 4000 is powered on and operating.

Prior to removing an MPMx/MPMRx card the captive screws must be unscrewed and the ejector levers must be opened to initiate a “power down” on the card.

To remove a faulty MPMx/MPMRx card:

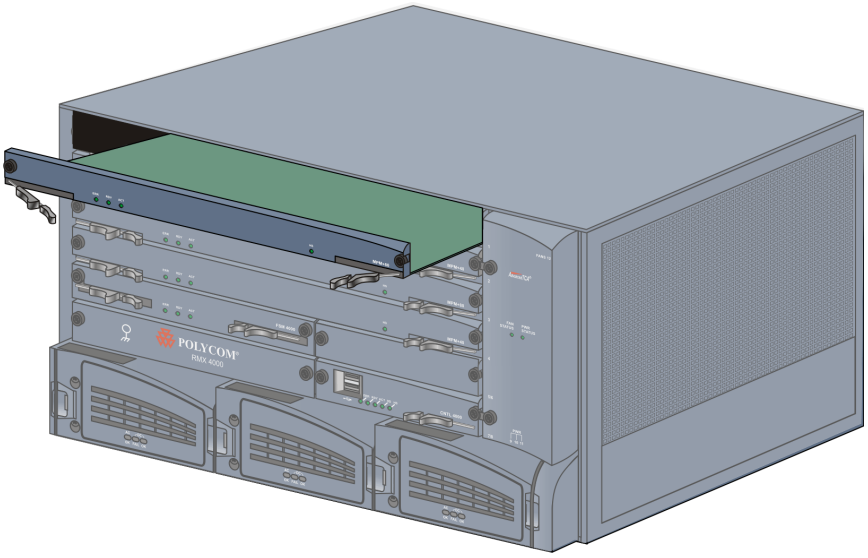
1. If applicable, loosen the captive screws and remove the slot cover.
2. Power down the card by partially opening the ejector levers until the blue *HS* LED on the card and the *Control Unit* start to flash.

   Once the removal sequence is initiated the process cannot be terminated and the *HS* LED flashes.

3. The power off sequence for the interconnected MPMx/MPMRx and RTM ISDN cards are initiated as follows:
   - All participant connections on the card are disconnected.
   - A fault is generated on the system.
   - For each disconnected participant, a participant disconnection event is written to the CDR with the disconnection cause *Disconnected by Operator.*
   - New participant connections are blocked when the card is removed.
   - If an RTM ISDN card is connected to the MPMx/MPMRx card it is also powered off and all ISDN and PSTN participants are disconnected.
   - When an RTM ISDN card is removed, its resources are deducted from the system Resources list.
   - A *Log File* entry is written indicating MPMx/MPMRx card removal.
   - Port usage is re-calculated and the *Port Gauges* and *Video/Voice Port Configuration* dialog boxes are updated.

4 When the blue *HS* LEDs on the MPMx/MPMRx, RTM ISDN and Control Unit stop flashing and remain lit, unscrew the captive screws and move the ejector levers to their fully open position and remove the MPMx/MPMRx card.

5 Carefully slide the MPMx/MPMRx card out through the front panel.



Installing or Replacing MPMx/MPMRx Card on the RealPresence Collaboration Server (RMX) 4000

All MPMx/MPMRx cards can be installed or removed while the RMX 4000 is powered on and operating.

When upgrading from MPM/MPM+ to MPMRx, all connections to the RTM-IP 4000 require Ferrite cables.

If only one media card is installed in the system, it must be inserted in the top slot of the RMX chassis.

To remove a faulty MPMx/MPMRx card:

1 If applicable, loosen the captive screws and remove the slot cover.

2 On the card to be installed, move the ejector levers to their full open position.

3 Insert the card into the slot until the ejector levers touch the front edge of the card cage.

4 Push the ejector levers to their closed position and tighten the captive screws on each side of the card, securing the MPMx/MPMRx card to the RMX.

The blue HS LEDs on the MPMx/MPMRx card and the *Control Unit* start flashing and the power on cycle for the card is initiated:

- The card's resources are added to the system resources list
- The number of available resources on the RMX is usually increased to the current CFS license level

- Port usage is re-calculated and the *Port Gauges* and *Video/Voice Port Configuration* are updated

When the power on cycle of the MPMx/MPMRx card is completed, the blue HS LEDs will turn OFF. The green RDY LED on the MPMx/MPMRx card switches on and remains lit.

Installing or Replacing the RTM ISDN Card

The RTM ISDN card must be seated opposite to an MPMx/MPMRx card located in the top slot on the front of the RMX.

Removing the RTM LAN or Existing ISDN Card from the RealPresence Collaboration Server (RMX) 4000

Carry out the following procedures to remove a RTM LAN or existing ISDN card, or install a new or replacement RTM ISDN card on the RMX 4000.

To remove an RTM LAN or existing ISDN card:

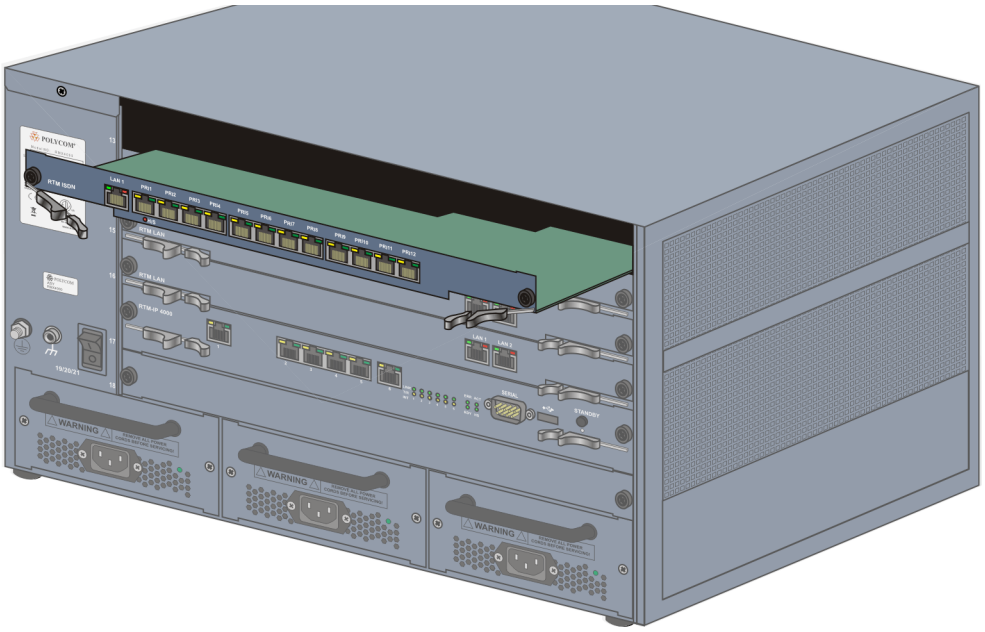
1. Ensure that the power switch on the RMX 4000 is turned OFF (O).
2. Remove the RTM LAN or RTM ISDN card by unscrewing the captive screws that fasten the card to the RMX. When removing a card, use the metal ejector levers to pull the RTM LAN or RTM ISDN card out of its slot from the backplane.
3. Slide out the RTM LAN or RTM ISDN card.

To install a new or replacement RTM ISDN card:

1. On the RTM ISDN card move the ejector levers to their fully open position.
2. Slide the new RTM ISDN card into its slot.



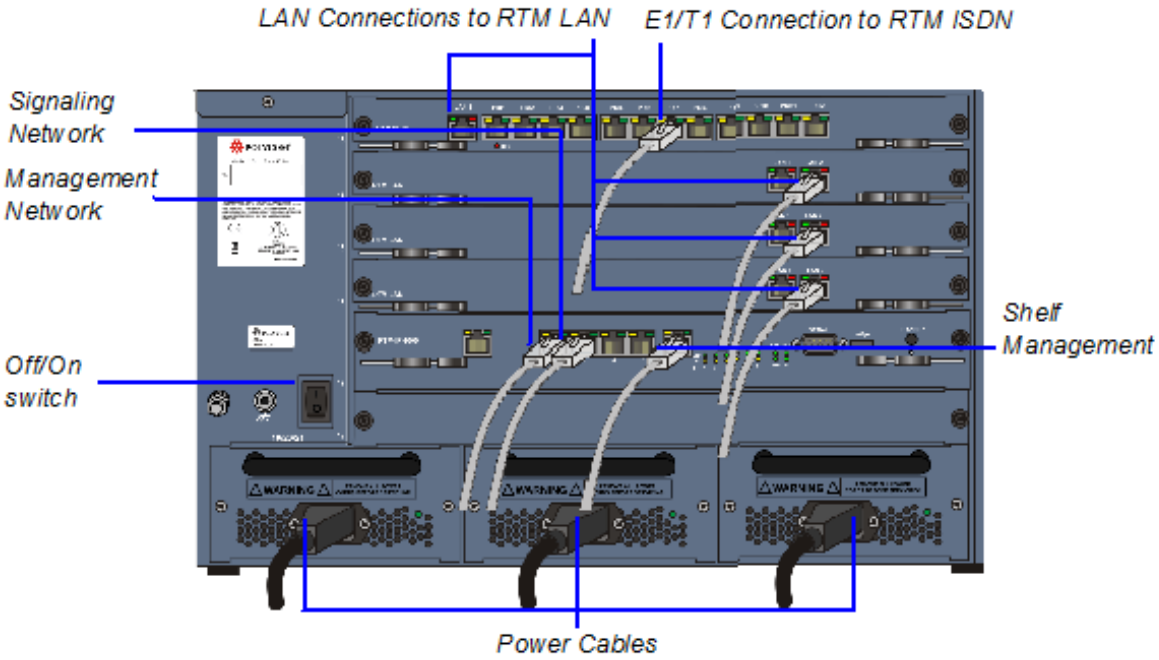
An RTM ISDN card must connect directly to an MPMx/MPMRx card in the opposite facing front slot.



3 Push the card into the slot until the ejector levers touch the front edge of the card cage. Push the ejector levers to their fully closed position.

4 Tighten the captive screws on each side of the rear panel of the card, securing the RTM ISDN card to the MCU.

5 Connect the RJ-45 terminated PRI cables into any of the slots labeled PRI1 - PRI12.



7 E1 or 9 T1 cables can be connected to each RTM ISDN card, up to a total of 14 E1 or 18 T1 PRI cables when a maximum of two RTM ISDN cards are installed.

6 Turn ON the RMX 4000.

7 Login on to the RMX Web Client. When a new ISDN card is installed you are required to do the following:

   a Update your licence. For more information see, *RealPresence Collaboration Server 1500/2000/4000 GettingStarted Guide,* Chapter 4: Product Registration.

   b In the *ISDN/PSTN Network Services* define a **New ISDN Network Service**. For more information see, *RMX 1500/2000/4000 Administrator's Guide,* Adding/Modifying ISDN/PSTN Network Services.

Replacing the RTM-IP 4000 Card

RTM-IP 4000 connections require **Ferrite** cables when connecting to MPMx/MPRx cards.

The RTM-IP 4000 card on the rear of the RMX 4000 provides connectivity to all the MCU modules. Use the following procedure to replace the RTM-IP 4000 card.

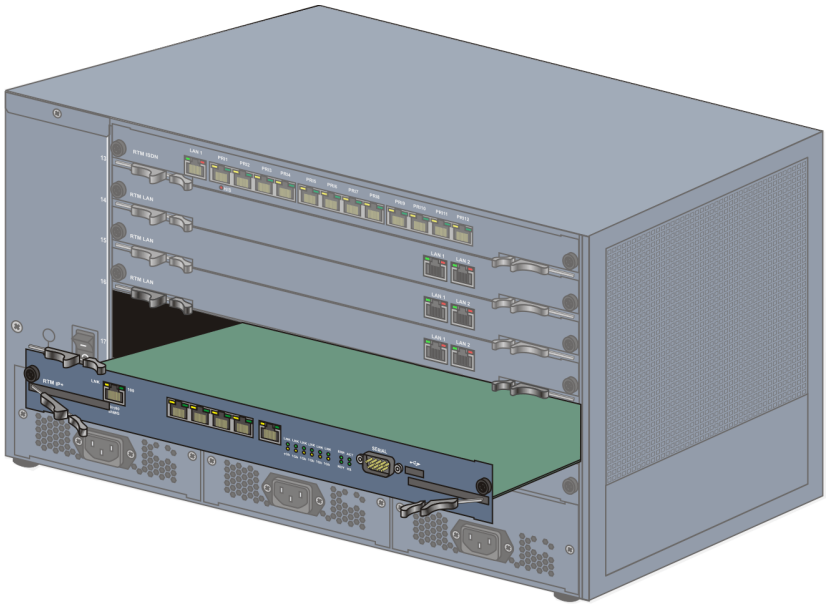
To replace the RTM-IP 4000 card:

1 Ensure that the power switch/circuit switch on the RMX 4000 is turned OFF (O).

2 Remove the cables connected to the card.

3 Unscrew the captive screws on the rear panel of the RMX 4000 that secure the RTM-IP 4000 card.

4 Use the metal ejector levers to pull the RTM-IP 4000 card out of its slot in the backplane.



5 Carefully slide the RTM-IP 4000 card out through the rear panel.

6 On the card to be installed, move the ejector levers to their fully open position.

7 Slide in the replacement RTM-IP 4000 card.

8 Push the RTM-IP 4000 card firmly into the backplane, making sure it is properly seated in its slots.

9 Ensure that the metal ejector levers are fully retracted into their housings.

10 Tighten the captive screws on the rear panel of the RMX 4000 that secure the RTM-IP 4000 card.

11 Reconnect the cables.

12 Turn ON the RMX 4000.

Replacing the RTM LAN

The RTM LAN card on the rear of the RMX 4000 provides connectivity to all the MCU modules. Use the following procedure to replace the RTM LAN card.

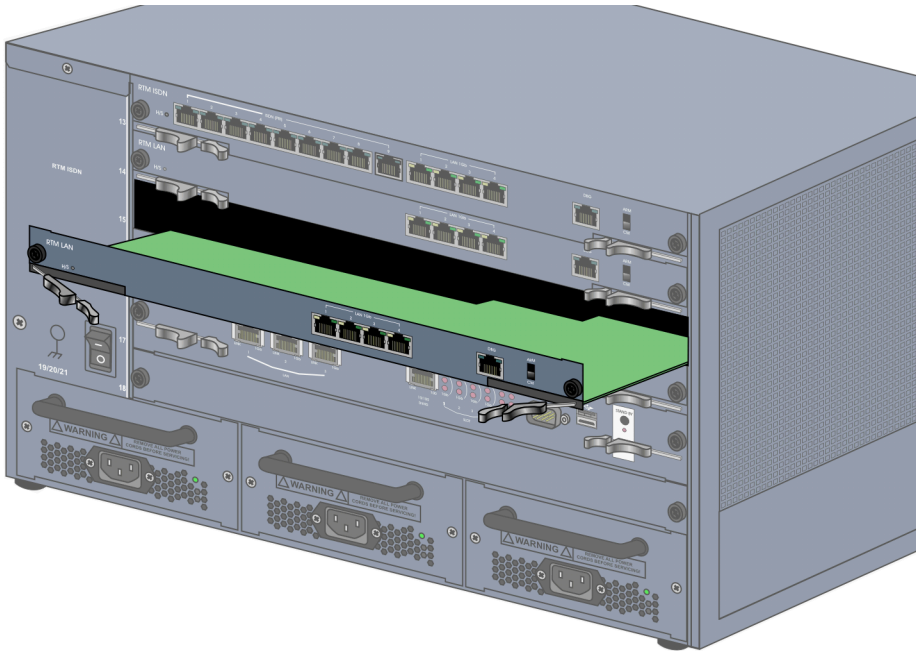
To replace the RTM- LAN card:

1 Ensure that the power switch/circuit switch on the RMX 4000 is turned OFF (O).

2 Remove the cables connected to the card.

3 Unscrew the captive screws on the rear panel of the RMX 4000 that secure the RTM LAN card.

4 Use the metal ejector levers to pull the RTM LAN card out of its slot in the backplane.



5 Carefully slide the RTM LAN card out through the rear panel.

6 On the card to be installed, move the ejector levers to their fully open position.

7 Slide in the replacement RTM LAN card.

8 Push the RTM LAN card firmly into the backplane, making sure it is properly seated in its slots.

9 Ensure that the metal ejector levers are fully retracted into their housings.

10 Tighten the captive screws on the rear panel of the RMX 4000 that secure the RTM LAN card.

11 Reconnect the cables.

12 Turn ON the RMX 4000.

Replacing the Fabric Switch Module (FSM 4000)

This procedure replaces the FSM 4000 from the RMX 4000.

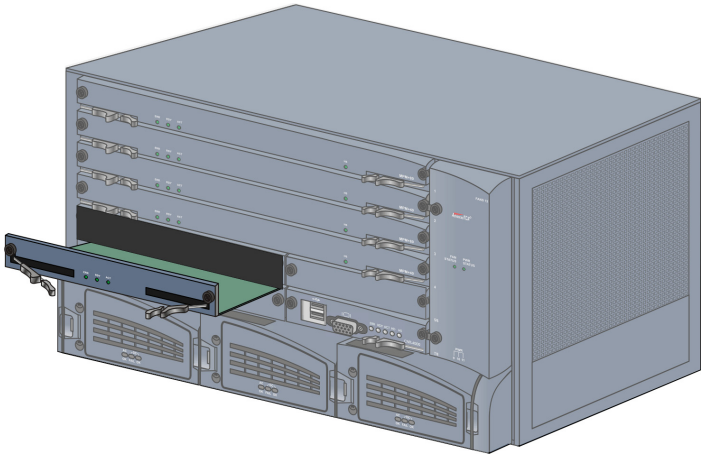
To replace the Fabric Switch Module:

1 Ensure that the power switch/circuit switch on the RMX 4000 is turned OFF (O).

2 Loosen the captive screws that fasten the module to the MCU.

3 Remove the Fabric Switch Module (FSM 4000). Use the metal ejector levers to pull the Fabric Switch Module (FSM 4000) out of its slot in the backplane.

4 Carefully slide the Fabric Switch Module (FSM 4000) out through the front panel.



5 On the card to be installed, move the ejector levers to their fully open position.

6 Slide in the replacement Fabric Switch Module (FSM 4000).

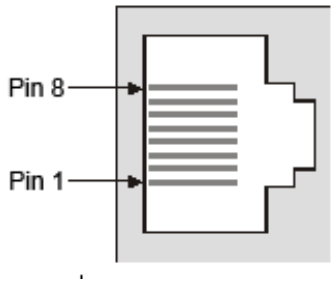
7 Push the Fabric Switch Module (FSM 4000) firmly into the backplane, making sure it is properly seated in its slots.

8 Ensure that the metal ejector levers are fully retracted into their housings.

9 Tighten the captive screws on the rear panel of the RMX 4000 that secure the Fabric Switch Module (FSM 4000).

10 Turn ON the RMX 4000.

PRI Port Assignment



Pin	Signal Name
1	Receive Ring
2	Receive Tip
3	No connection
4	Transmit Ring
5	Transmit Tip
6	No connection
7	No connection
8	No connection

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