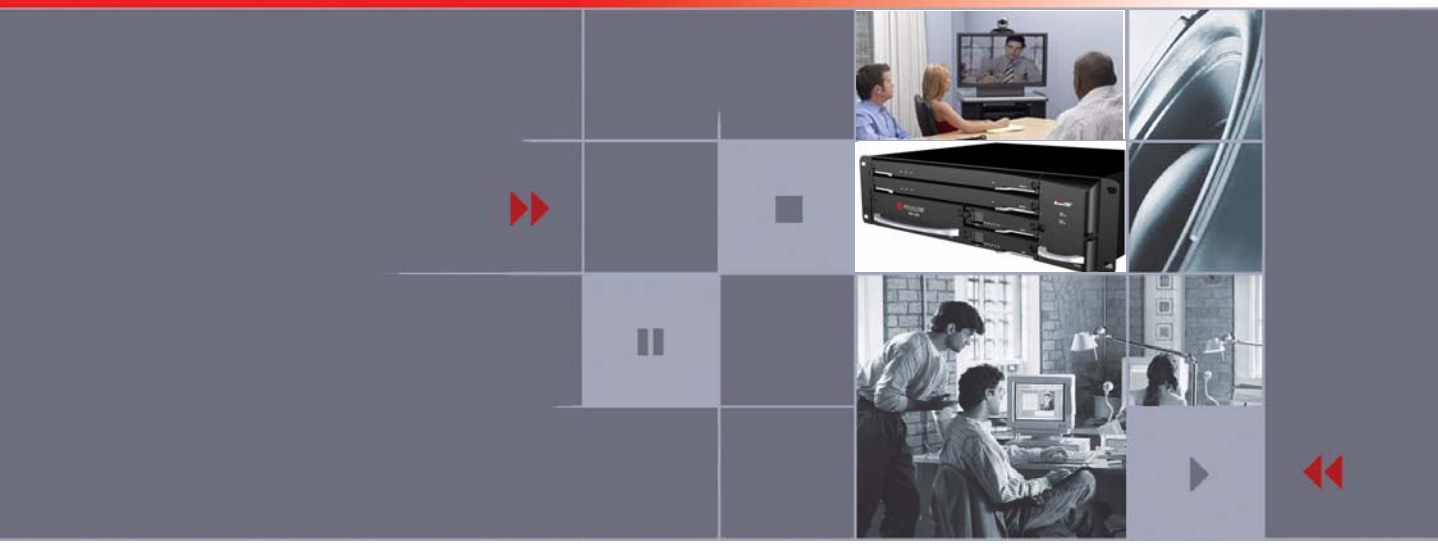


Polycom RMX 2000 Hardware Guide

Version 2.0.2

POLYCOM®

Catalog No. DOC2184B
Version **2.0.2**

Regulatory Notices

United States Federal Communication Commission (FCC)

Part 15: Class A Statement. This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. Test limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses and can radiate radio-frequency energy and, if not installed and used in accordance with the instruction manuals, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference, in which case the user will be required to correct the interference at his or her own expense.

Part 68: Network Registration Number. This equipment is registered with the FCC in accordance with Part 68 of the FCC Rules. This equipment is identified by the FCC registration number.

If requested, the FCC registration Number and REN must be provided to the telephone company.

Any repairs to this equipment must be carried out by Polycom Inc. or our designated agent. This stipulation is required by the FCC and applies during and after the warranty period.

United States Safety Construction Details:

- All connections are indoor only.
- Unit is intended for RESTRICTED ACCESS LOCATION.
- Unit is to be installed in accordance with the National Electrical Code.
- The branch circuit overcurrent protection shall be rated 20 A for the AC system.
- This equipment has a maximum operating ambient of 40°C, the ambient temperature in the rack shall not exceed this temperature.

To eliminate the risk of battery explosion, the battery should not be replaced by an incorrect type. Dispose of used batteries according to their instructions.

CE Mark R&TTE Directive

Polycom Inc., declares that the Polycom RMX 2000 is in conformity with the following relevant harmonized standards:

EN 60950-1:2001

EN 55022: 1998+A1:2000+A2:2003 class A

EN 300 386 V1.3.3: 2005

Following the provisions of the Council Directive 1999/CE on radio and telecommunication terminal equipment and the recognition of its conformity.

Canadian Department of Communications

This Class [A] digital apparatus complies with Canadian ICES-003.

Notice: The Industry Canada label identifies certified equipment. This certification means that the equipment meets telecommunication network protective, operational and safety requirements as prescribed in the appropriate Terminal Equipment Technical Requirements document(s). The Department does not guarantee the equipment will operate to the user's satisfaction.

Before installing this equipment, users should ensure that it is permissible to be connected to the facilities of the local telecommunications company. The equipment must also be installed using an acceptable method of connection. The customer should be aware that compliance with the above conditions may not prevent degradation of service in some situations. Repairs to certified equipment malfunctions, may give the telecommunications company causes to request the user to disconnect the equipment.

Users should ensure for their own protection that the electrical ground connections of the power utility, telephone lines and internal metallic water pipe system, if present, are connected together. This precaution may be particularly important in rural areas.

Caution: Users should not attempt to make such connections themselves, but should contact the appropriate electric inspection authority, or electrician, as appropriate.

Regulatory Notices

Chinese Communication Certificate

声　明

此为 A 级产品，在生活环境中，该产品可能会造成无线电干扰。在这种情况下，可能需要用户对其干扰采取切实可行的措施。

Singapore Certificate

RMX 2000 complies with IDA standards G0916-07

Table of Contents

1

Hardware Description

This Hardware Guide provides information on the RMX 2000 and its components. This system utilizes a modular "universal slot" platform, whose components are designed for high performance, capacity and reliance.

Main Features

The Polycom RMX 2000 offers the following features:

- Linux® based
- Chassis based on the ATCA standard
- Support for standard network interfaces (IP, ISDN and LAN) and large number of ports
- H.323, SIP video & PSTN
- New hardware technologies
- Telco grade 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

RMX 2000 Specifications

Table 1-1 *Polycom RMX 2000 Specifications*

Physical	
Height	3U (13.28 cm.)
Width	19” (48.26 cm.)
Depth	15.74” (40 cm.)
Weight	Up to 16.5 Kg.
Free space above MCU	3” standard installation.
IP Protocols	
Audio	G.711, G.722, G.722.1, G.729A, G.723.1, Siren14.
Video	H.263, H.264.
Network Interfaces	
IP, ISDN, PSTN and LAN	H.323, PSTN, LAN and SIP.
Power Supply	
AC Input	100-240 VAC, 4-2 AMP, 50/60 Hz.
Power Consumption	
AC Maximum Power consumption	AC Voltage–up to 7 AMP at 110 VAC, and 4 AMP 220 VAC protected by a 10 Amp circuit breaker.
Environment	
Operating temperature	0°– 40°C (22°– 104°F).
Storage temperature	-30°– 70°C (40°– 158°F).
Relative humidity	15% - 90% no condensing.
Operating altitude	Up to 3,000 m (10,000 ft.).
Operating ESD	4 kV.

Site Requirements

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

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 cord supplied with the system.
- The power cord should only be connected to a power outlet that has a protective ground contact.
- Ensure that the power cord is 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 2000 unit.
- Do not use liquids around your equipment.

Rack Mount Safety Precautions

The following precautions should be followed with regards to rack mount safety:

- Keep the area around the RMX 2000 clean and free of clutter.
- Decide on a suitable location for the equipment rack that will hold the RMX 2000 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.
- 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.
- Allow the power supply units to cool before touching them.
- Always keep the rack's trays and board's closed when not servicing, to maintain proper cooling.

Installation Precautions

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 RMX2000

The following precautions should be followed with regards to installation of the RMX 2000:

- Use a regulating uninterruptable power supply (UPS) to protect the RMX 2000 from power surges and voltage spikes, to keep your MCU operating in case of a power failure.
- Place the RMX 2000 on a hard, flat surface such as a desktop or mount it on 19" rack.
- The airflow of the RMX 2000 is from right to left. Be sure that the areas in the left and right side of the system are clear for proper ventilation.

RMX 2000 Components

On the RMX 2000 modules are located on both the front and rear of the MCU as listed in Table 1-2, "*Polycom RMX 2000 Component Description*". For more information see the descriptions of the "*RMX 2000 Front Panel*" on page **1-5** and "*RMX 2000 Rear Panel*" on page **1-7**.

RMX 2000 Front Panel

Figure 1-1 shows the front panel of the RMX 2000. The front panel provides access to the RMX 2000 main CNTL modules, MPM modules, Power Supply drawer, Status LEDs, and Fans.

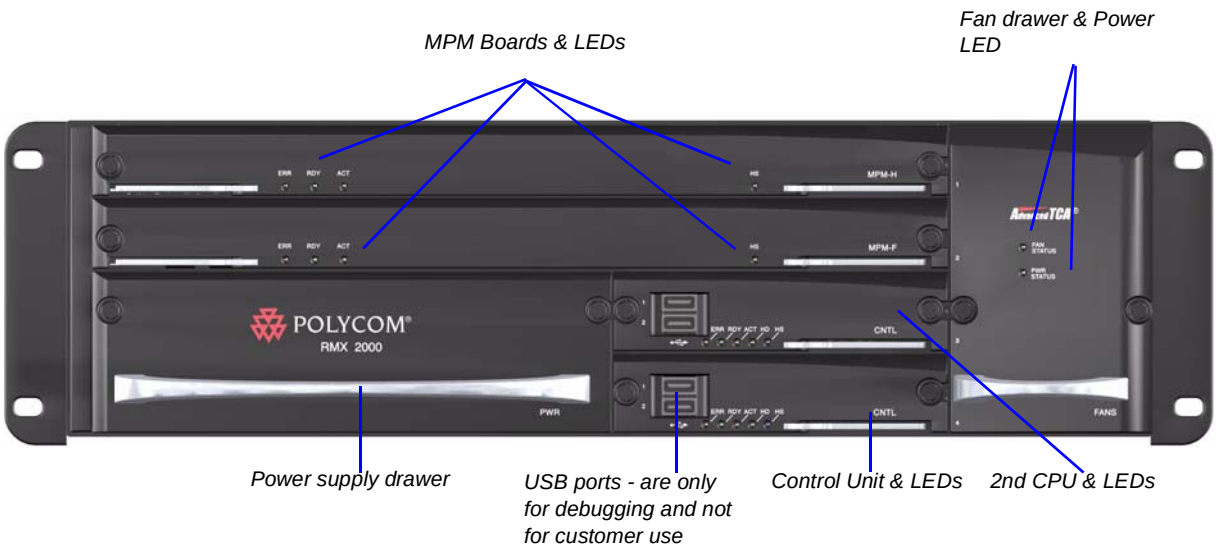


Figure 1-1 *RMX 2000 Front Panel*

Table 1-2 *Polycom RMX 2000 Component Description*

Component	Description
CPU (CNTL) Module	The CPU Module controls and manages the RMX 2000. The CPU Module has an ComExpress Pentium-M 1.4 GHz processor, a 40GB hard disk drive, 1GB Compact Flash and 512MB of DDR RAM. The Operating System is Linux.
Power Supply Drawer	The Power Supply Module is housed in a drawer and located below the MPM Modules. The Power Supply drawer is connected to the backplane by means of a power connector. Operates at 100-240 volts AC 50/60 Hz, and provides +48VDC 700W output with built-in load sharing capabilities.
Fan Drawer	Three fans are mounted sideways in the right front panel. Three fans are mounted in the drawer. Airflow is from right to left, and out the side of the MCU. The drawer is connected to the back plane by a connector.
Multi Processor Module (MPM) Board	The MPM Boards, perform the various RTP, audio and video processing functions on the RMX 2000 unit. Boards are based on the ATCA standard, with a card manager (CM) and up to 26 720Mhz TI DSP's. Two types are available: • MPM - F - 26 DSP's • MPM - H - 13 DSP's

RMX 2000 Rear Panel

The RMX 2000 rear panel contains the RTM IP board and optionally, the RTM ISDN board. In addition, the rear panel houses the main power switch, AC inlet, a circuit breaker, and additional communications ports.

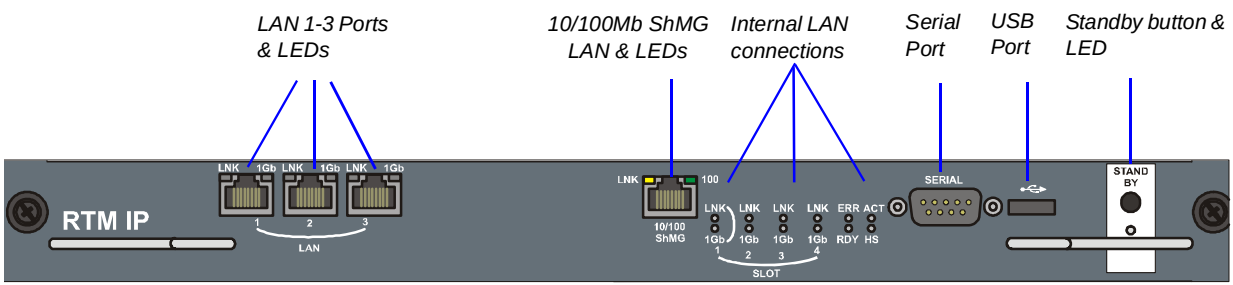
RTM IP

The RTM IP board provides system shelf management based on the ATCA standard and connects to the backplane. It controls and monitors fans on the system and regulates power supply. This board contains an Ethernet Switch managing the network of the system and routing traffic. This board routes data between the boards and components of the system, and provides connectivity to external IP networks.

Connections include:

- 3 LAN ports
- 10/100Mb ShMG port (Future Use)
- 1 Serial port (Future Use)
- 1 USB port

LAN1, LAN3 and the 10/100Mb ShMG ports shall not be used and the plastic caps covering those ports should not be removed.



LAN1, LAN 3, ShMG and the Serial ports are only for debugging and not for customer use

Figure 1-2 *RMX 2000 RTM IP Rear Panel Layout*

The following items appear on the RMX 2000 rear panel:

Table 1-3 *RMX 2000 Rear Panel - RTM IP Component Description*

Item	Description
LAN 1	NA - Disconnected. **Note:** LAN 1 is covered with a plastic cap that should not be removed.
LAN 2	Used for the Network connection.
LAN 3	For Remote Access only using the *Permanent Management Network*. For more information, see the *RMX 2000 Administrator's Guide*, *Appendix F: "Alternate Management Network"* on page **G-1**. **Note:** When not in use, LAN 3 is covered with a plastic cap that should not be removed.
10/100 ShMG	NA - For debugging purposes only. **Note:** 10/100 ShMG is covered with a plastic cap that should not be removed.
Serial	NA - For debugging purposes only.
USB	USB key connection. For more information, see the *RMX 2000 Getting Started Guide, "First Time Installation and Configuration"* on page **2-1**.
Standby button	Toggle between CPU activation and standby.

RTM ISDN

The RTM ISDN card connects directly to an MPM card. The RTM ISDN card routes data between the MPM 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. Up to two RTM ISDN cards can be installed in one RMX 2000.

An RTM ISDN card must connect directly to an MPM board:

- In an RMX with a single MPM board – the RTM ISDN card must be installed in the rear panel slot on the same level as the MPM board
- In an RMX with two MPM boards – the RTM ISDN card can be installed in either of the two rear panel card slots

Each RTM ISDN card includes the following connections:

- 12 E1/T1 PRI lines available for connecting 7 E1 and 9 T1 PRI lines
- 1 LAN port

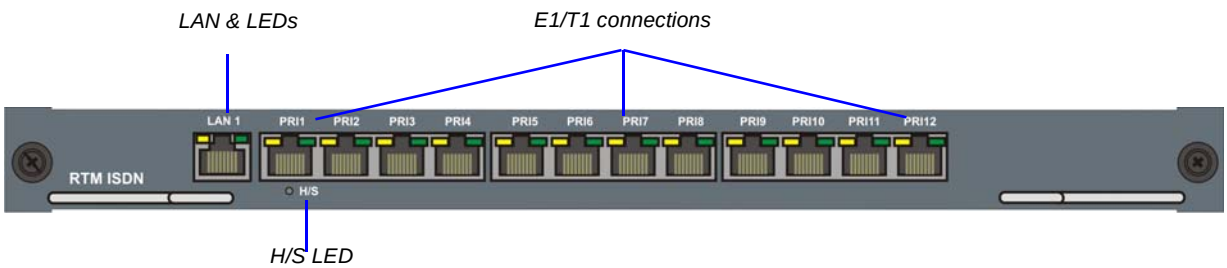


Figure 1-3 *RMX 2000 RTM ISDN Rear Panel Layout*

The RTM-ISDN card supports 200 participants, regardless of whether the spans are T1 or E1.

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.

Cables Connected to the RTM IP & ISDN Boards

All external connectors are located on the rear panel.

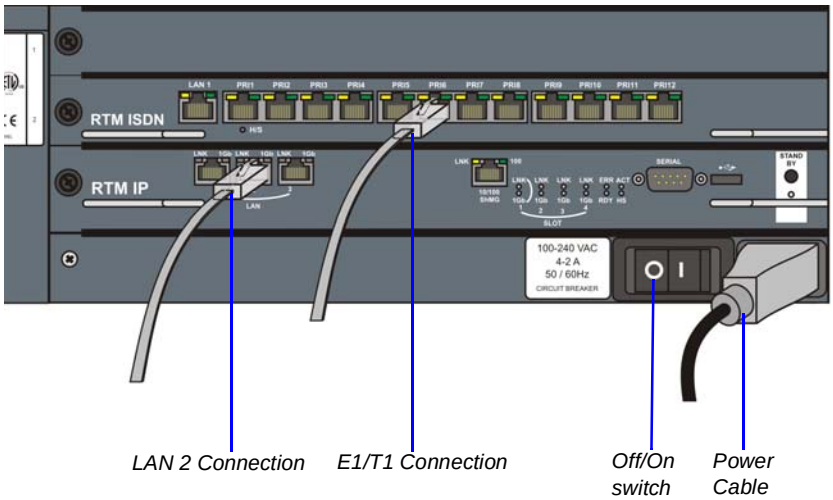


Figure 1-4 *RMX 2000 Rear Panel View with Cables*

Do not remove the protective caps from LAN1, LAN3 and ShMG ports.

RMX 2000 LEDs

The RMX includes LEDs located on the front panel and rear panel. In the front panel, the LEDs reflect the state of the module. The LEDs on the rear panel indicate the state of the external connections and the status of the RTM IP board.

RMX 2000 Front Panel LEDs

The following items appear on the RMX 2000 front panel:

Table 1-4 *RMX 2000 Front Panel LED's*

Component	LED ID	LED Color	Description
Fan Status		Green	OK.
		Red	Warning - Fan failure.
Power Status		Green	OK.
		Red	Error - Problem with power supply.
CNTL	ERR	Red	ON - Major system error.
	RDY	Green	ON - CPU board has successfully completed startup.
	ACT	Amber	ON - At least one endpoint is connected to the system.
	HD	Red	OFF - Normal.
			Flashes - Hard disk is active.
	HS	Blue	Flashes - Indicates when the power down process is initiated on an MPM board. This Led flashes in synchronization with the MPM's boards HS Led.
			ON - CPU may be removed.

Table 1-4 RMX 2000 Front Panel LED's (Continued)

Component	LED ID	LED Color	Description
MPM	ERR	Red	ON - Major error on board.
	RDY	Green	ON - The board has completed startup successfully.
	ACT	Amber	ON - At least one participant is connected to a conference.
	HS	Blue	Flashes - Shut down process initiated by lightly pulling the CPU ejector levers. This Led flashes in synchronization with the CNTL's board's HS Led.
			ON - The card can be removed safely once the CPU ejector levers are fully open.

RMX 2000 Rear Panel LEDs

RTM IP

The following items appear on the RTM IP board:

Table 1-5 RMX 2000 RTM IP LEDs

Component	LED Name	LED Color	Description
LAN LEDs (1-3)	LNK	Green	Lit with active network connection, flickers with Packet activity.
	1 Gb	Amber	Lit when 1Gb connection online, flickers with Packet activity

Table 1-5 *RMX 2000 RTM IP LEDs (Continued)*

Component	LED Name	LED Color	Description
10/100 ShMG LEDs	LNK	Green	Lit with active network connection, flickers with Packet activity.
	100	Amber	Lit when active network is 10/100Mb, flickers with Packet activity.
SLOT (1-4) LEDs	LNK (1-4)	Green	Lit with active network connection, flickers with Packet activity.
	1Gb (1-4)	Amber	Lit when 1Gb connection online, flickers with Packet activity.
ShMG LEDs	ERR	Red	ON - Major error on RTM board.
	ACT	Red	ON - Packet flow to and from the MCU chassis.
	RDY	Green	ON - RTM IP board has successfully completed startup.
	HS	Blue	OFF - Normal.
			Flashes - During power down process.
			ON - RTM IP board may be removed.
Standby LED		Red	ON - CPU & System are in a standby (OFF) mode.

RTM ISDN

The following items appear on the RTM ISDN rear panel:

Table 1-6 *RMX 2000 RTM ISDN Rear Panel LEDs*

Function Name	LED Name	LED Color	Description
LAN LED (1)	LNK	Green	Lit with active network connection, flickers with Packet activity.
	1 Gb	Amber	Lit when 1Gb connection online, flickers with Packet activity
ShMC LEDs	H/S	Blue	OFF - Normal.
			Flashes - This Led is activated when the MPM card Hot Swap functionality initiates a power off routine on the MPM and RTM ISDN boards.
			ON - Power on the RTM ISDN board has been switched OFF. This Led is activated by the MPM board when the MPM's card Hot Swap functionality powers off the MPM and RTM ISDN boards.

Component Replacement

The RMX 2000 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 following components can be replaced when they are faulty:

- CPU (CNTL) Module
- Multi Processor Module (MPM) Board(s) - This board is Hotswap enabled
- Power Supply Module
- Fan Drawer
- RTM IP Board

Warning!

- 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.

Hot Swappable MPM Boards

All MPM Boards can be installed or removed while the RMX 2000 is powered on and operating.

The RTM IP and RTM ISDN Card are not Hotswappable. System shutdown is required when replacing the ISDN or IP RTM card.

Prior to removing an MPM board the captive screws must be unscrewed and the ejector levers must be used to "power down" the card. Powering down of the card by lightly pulling on the MPM card's ejector mechanism. Once the ejector levers have been pulled a removal sequence is initiated and the process cannot be terminated. When present, the HS LED flash on the MPM and Control Unit. When the HS led is constantly lit the card is powered down, you can remove the card. Power up is achieved when the card is re-inserted and the ejector levers are pushed against the board's cage.

Installing an new MPM card in a powered On RMX2000:

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 fully closed position and tighten the captive screws on each side of the card, securing the MPM RTM card to the RMX.

   The blue HS LEDs on the MPM 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 ports on the RMX is increased to the current CFS license level

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

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

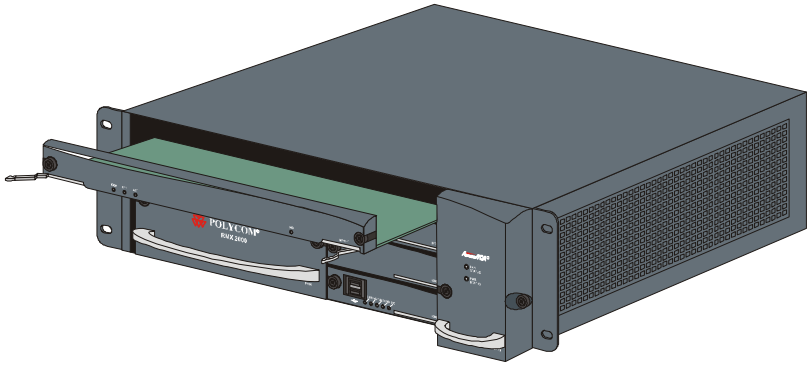
Replacing a powered On (hot) MPM card

1. Loosen the captive screws that fasten the card to the MCU.
2. Pull the ejector levers on the sides of the card forward and slightly outward until the blue *HS* LED on the card and the *Control Unit* start to flash.

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

3. The power off sequence for the MPM and RTM ISDN boards are initiated as follows:
   - All participants 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 MPM card it is also powered off and all PSTN participants are disconnected
   - When an RTM ISDN card is removed, its resources are deducted from the Resource Report
   - A *Log File* entry is written indicating MPM card removal
   - Port usage is re-calculated and the *Port Gauges* and *Video/Voice Port Configuration* dialog box are updated
4. When the blue *HS* LEDs on the MPM, RTM and Control Unit stop flashing and remain lit, move the ejector levers to their fully open position and remove the MPM card.

5 Carefully slide the MPM Module out through the front panel.



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

7 Slide in the replacement MPM Module.

8 Push the MPM Module firmly into the Backplane, making sure it is properly seated in its slot.

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

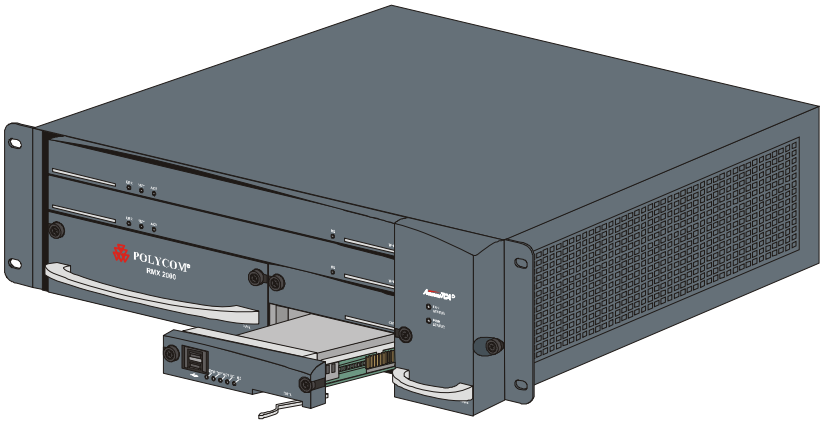
10 Tighten the captive screws on the front panel of the RMX that secure the MPM Module.

1

Replacing the CPU (CNTL) Module

The CPU module is the management system of the RMX 2000. Use the following procedure to replace a CPU (CNTL) Module:

1. Ensure that power switch to the RMX 2000 is turned OFF (O).
2. Unscrew the captive screws on the front panel of the RMX 2000 that secure the CPU (CNTL) Module.
3. Use the metal ejector levers to pull the CPU (CNTL) Module out of its slot in the Backplane.
4. Carefully slide the CPU (CNTL) Module out through the front panel.

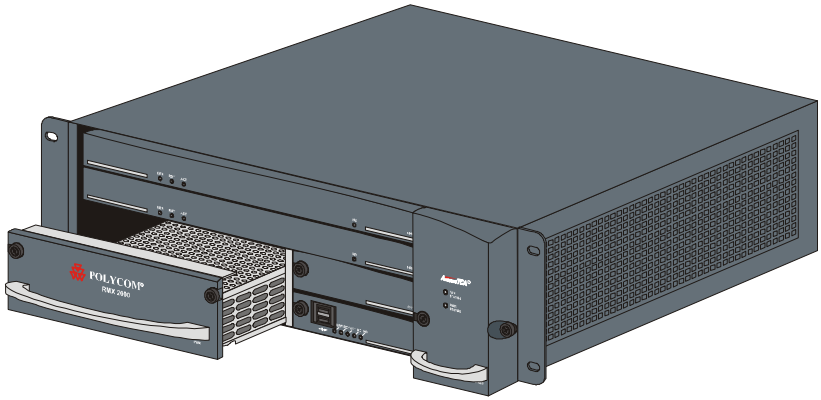


5. On the CPU (CNTL) Module to be installed, move the ejector lever to the fully open position.
6. Slide in the replacement CPU (CNTL) Module.
7. Push the CPU (CNTL) Module firmly into the Backplane, making sure it is properly seated in its slot.
8. Ensure that the metal ejector levers are fully retracted into their housings.
9. Tighten the captive screws on the front panel of the RMX 2000 that secure the Functional CPU (CNTL) Module.
10. Turn ON the RMX 2000.

Replacing the Power Supply Drawer

A single supply unit powers the RMX 2000. Use the following procedure to replace a Power Supply:

1. Ensure that power switch to the RMX 2000 is turned OFF (O).
2. Unscrew the captive screws on the front panel of the RMX 2000 that secure the Power Supply.
3. Use the metal ejector levers to pull the Power Supply Module out of its slot in the Backplane.
4. Carefully slide the Power Supply Module out through the front panel.



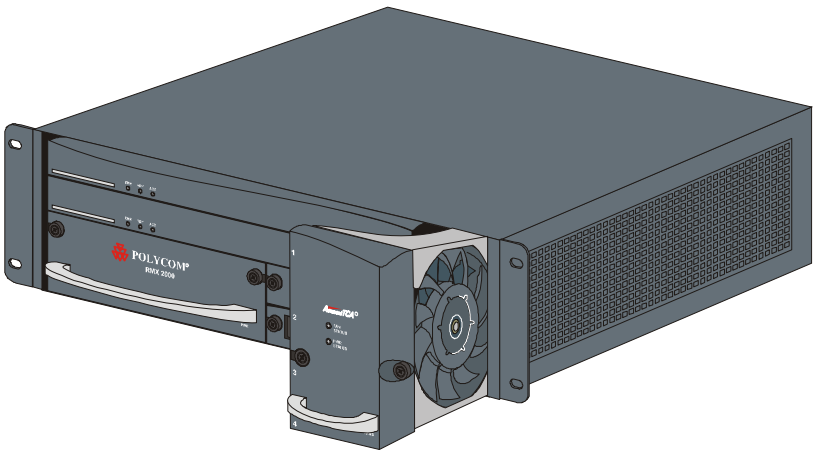
5. Slide in the replacement Power Supply Module.
6. Push the Power Supply Module firmly into the Backplane, making sure it is properly seated in its slot.
7. Ensure that the metal ejector levers are fully retracted into their housings.
8. Tighten the captive screws on the front panel of the RMX 2000 that secure the Power Supply Module.
9. Turn ON the RMX 2000.

Replacing the Fan Drawer

Three 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.

1. Unscrew the captive screws on the front panel of the RMX 2000 that secure the Fan Drawer.
2. Use the metal ejector levers to pull the Fan Drawer out of its slot in the Backplane.
3. Carefully slide the Fan Drawer out through the front panel.

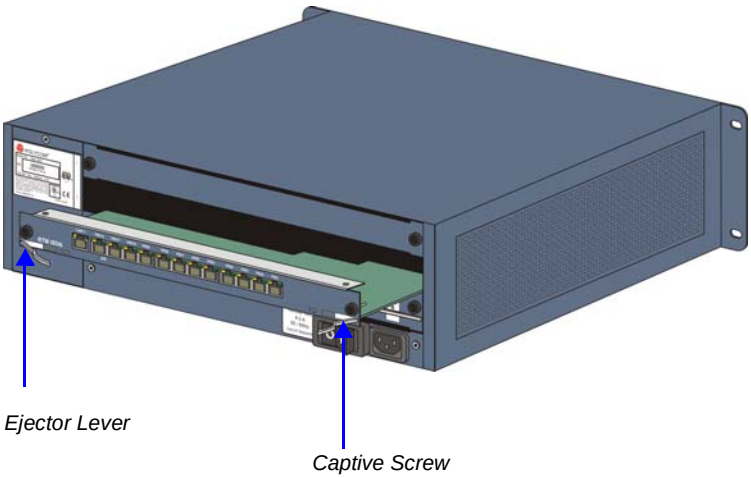
Warning!
The Fan drawer can be replaced when the RMX unit is ON, however a replacement drawer must be inserted immediately. The temperature increase is detected by the system, when critical, a system shutdown is initiated.



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. Ensure that the metal ejector levers are fully retracted into their housings.
7. Tighten the captive screws on the front panel of the RMX 2000 that secure the Fan Drawer.

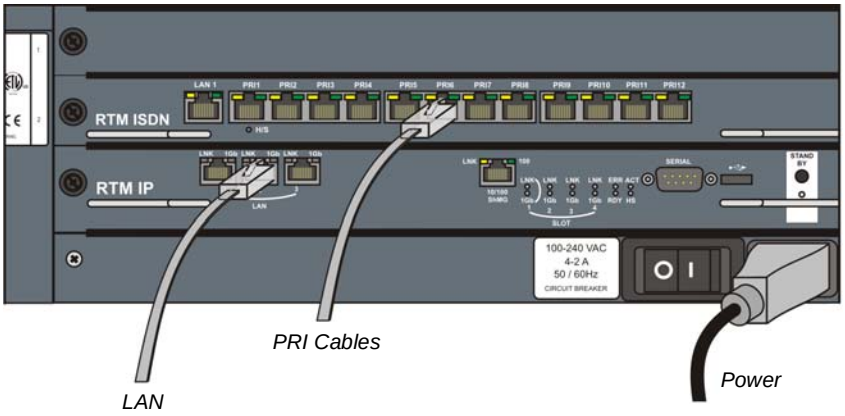
Replacing a RTM ISDN card

1. Ensure that power switch to the RMX 2000 is turned OFF (O).
2. Loosen the captive screws that fasten the card to the MCU.
3. Remove the RTM ISDN board. Use the metal ejector levers to pull the RTM ISDN Module out of its slot in the Backplane.
4. Carefully slide the RTM ISDN Module 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 RTM ISDN Module.
7. Insert the card into the slot until the ejector levers touch the front edge of the card cage.
8. Push the ejector levers to their fully closed position.
9. Tighten the captive screws on each side of the rear panel of the card, securing the RTM ISDN card to RMX.
10. Turn ON the RMX 2000.

11 Connect the RJ-45 terminated PRI cables into any of the slots labeled PRI1 - PRI12:

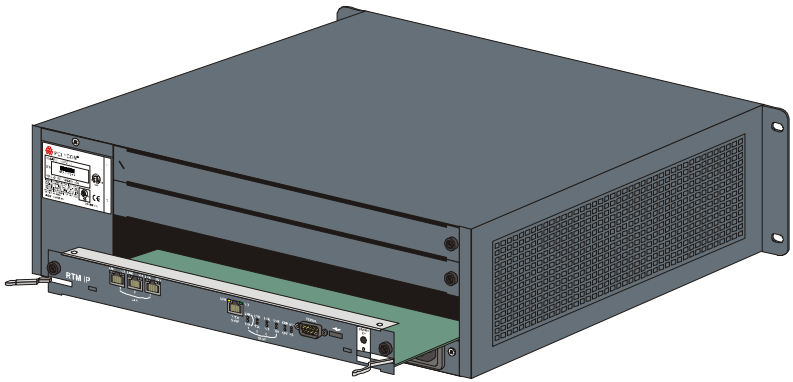


Up to 9 PRI cables can be connected to an RTM ISDN card, with each card providing connection for up to 7 E1 or 9 T1 PRI lines. When two RTM ISDN cards are installed, up to a total of 18 PRI cables can be connected.

Replacing the RTM IP Board

The RTM IP board on the rear of the RMX 2000 provides connectivity to all the MCU modules. Use the following procedure to replace the RTM IP board:

1. Ensure that power switch to the RMX 2000 is turned OFF (O).
2. Unscrew the captive screws on the rear panel of the RMX 2000 that secure the RTM IP board.
3. Use the metal ejector levers to pull the RTM IP board out of its slot in the Backplane.



4. Carefully slide the RTM IP board out through the rear panel.
5. On the card to be installed, move the ejector levers to their fully open position.
6. Slide in the replacement RTM IP board.
7. Push the RTM IP board 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 2000 that secure the RTM IP board.
10. Turn ON the RMX 2000.