



Avaya Solution & Interoperability Test Lab

Application Notes of Avaya and Polycom H.323 Video Solution Consisting of Polycom RMX® 2000 and RSS 2000 with Avaya Aura® Communication Manager R6.0.1 – Issue 1.0

Abstract

These Application Notes describe an interoperability tested solution comprised of Avaya Aura® Communication Manager, Polycom RMX® 2000 MCU, and RSS 2000 Recording System. The solution described in these Application Notes pertains only to H.323 interoperability between Avaya Aura® Communication Manager and the aforementioned Polycom MCU and recording system.

Testing was conducted at the Avaya Solution and Interoperability Test Lab at the request of the Solutions Marketing Team in support of the Video Collaboration Solution.

1. Introduction

These Application Notes describe an interoperability tested solution comprised of Avaya Aura® Communication Manager, Polycom RMX® 2000 MCU, and Polycom RSS 2000 Recording System. Connectivity between Polycom and Avaya devices is via H.323 signaling. This configuration provides multipoint Video/Audio conferencing capability using Polycom RMX 2000 and RSS 2000 through Avaya Aura® Communication Manager.

1.1. Support

Technical support on Polycom can be obtained through the following:

Web: <http://www.polycom.com/support/>

2. Network Topology

The configuration in **Figure 1** was used to test Polycom Video Solution interoperability with Avaya Video Solution where some of the Polycom video endpoints were registered to Avaya Aura® Communication Manager and the others were registered to the Polycom CMA. Various types of video and audio calls were tested across the H.323 trunk. The configuration in **Figure 2** was used to test a configuration with Avaya Aura® Communication Manager Neighbor Gateway where only the Avaya video endpoints (Avaya one-X® Communicator) were registered to Avaya Aura® Communication Manager and all the Polycom endpoints were registered to the Polycom CMA. Various types of video and audio calls were tested across the H.323 trunk.

The focus of these Application Notes is on the integration among the Avaya Aura® Communication Manager and RMX 2000 in the Avaya Domain and the RSS 2000 in the non-Avaya Domain.

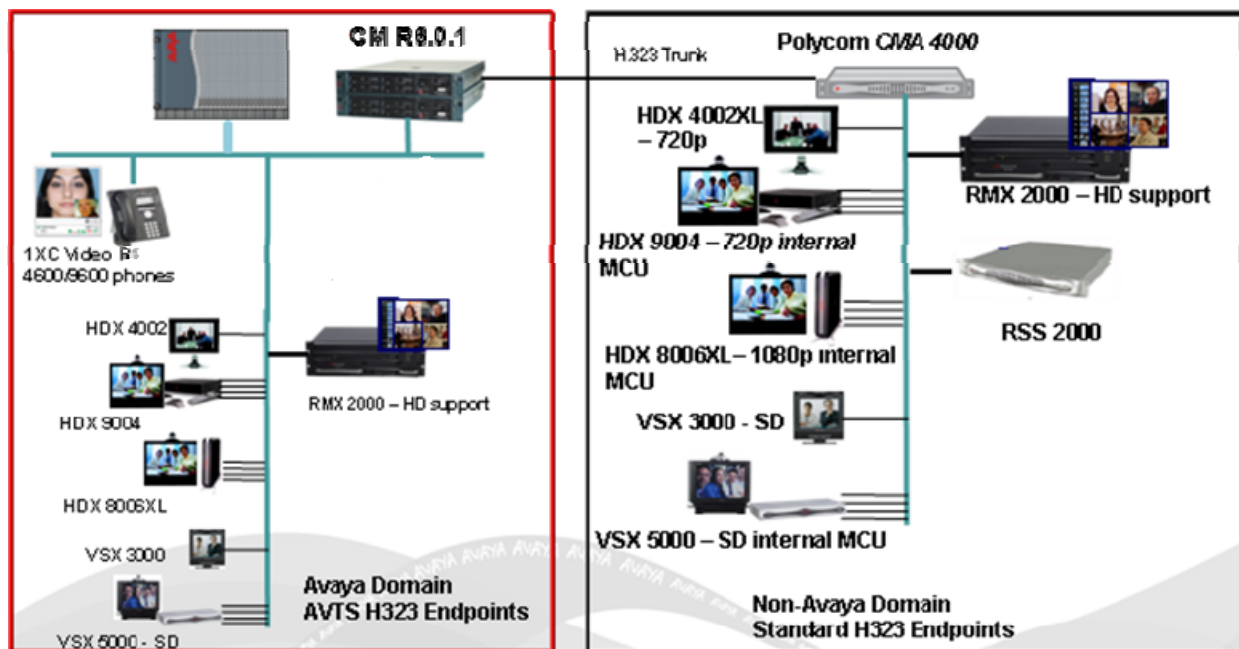


Figure 1: Communication Manager Integration & Communication Manager Neighbored Gatekeeper

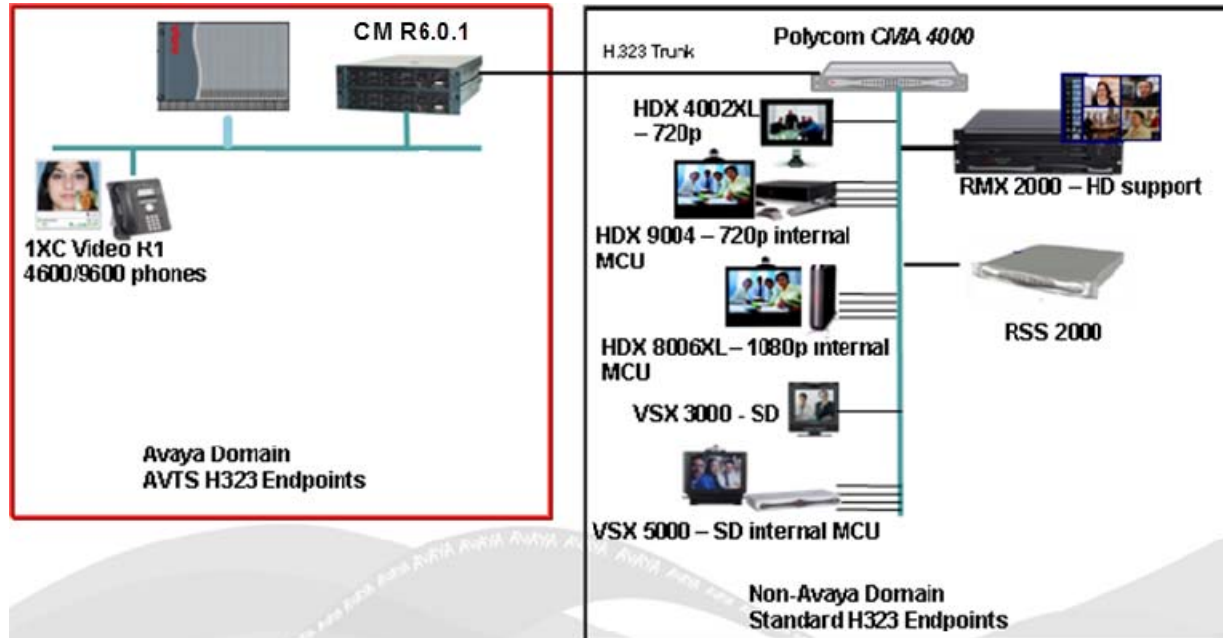


Figure 2 - Communication Manager Neighbored Gatekeeper

3. Equipment and Software Validated

The following equipment and software were used for the sample configuration provided:

Equipment	Software
Avaya Aura® Communication Manager	R016x.00.1.510.1-18777
Avaya Gateway G650 IPSI CONTROL-LAN Medpro (TN2602AP)	FW049 FW038 FW053
Avaya one-X® Communicator	R6.1
Polycom RMX® 2000	7.0.2.68
Polycom RSS 2000	4.0.0.001
Polycom HDX 4002 (h.323)	3.0.0.1-14006
Polycom HDX 8006 (h.323)	3.0.1-10519
Polycom HDX 9004 (h.323)	3.0.1-10519
Polycom VSX 3000 (h.323)	9.0.6.1
Polycom VSX 5000 (h.323)	9.0.6.1

4. Configuring Avaya Aura® Communication Manager for Polycom RMX® 2000

4.1. Administer IP Node Name for Avaya Aura® Communication Manager

Enter the **change node-names ip** command and add an entry for the Polycom RMX MCU as shown in the sample configuration screen below. The actual node name and IP address may vary. Submit these changes.

change node-names ip		Page 1 of 2
		IP NODE NAMES
Name	IP Address	
procr	135.9.88.13	
DefaultGW	135.9.88.245	
SQA_RMX1	135.9.88.42	
SQACMA_4000	135.9.88.45	
medpro	135.9.88.6	
video8730clan3B	135.9.88.5	

4.2. Administer Signaling Group and Trunk Group

Prior to configuring an h.323 trunk group for communication with Polycom RMX MCU, an h.323 signaling group must be configured. Enter the **add signaling-group 32** command and add an entry for Polycom RMX® as shown below. Submit these changes. **NOTE:** The field “Trunk Group for Channel Selection: ” cannot be populated with any number (32 in this case) until the trunk group on the next step is administered. Once the trunk group is added, return to the signaling-group form and populate this field with the appropriate trunk group.

add signaling-group 32		Page 1 of 5
SIGNALING GROUP		
Group Number: 32	Group Type: h.323	
SBS? n	Remote Office? n	Max number of NCA TSC: 0
Q-SIP? n		Max number of CA TSC: 0
IP Video? y	Priority Video? y	Trunk Group for NCA TSC:
Trunk Group for Channel Selection: 32		X-Mobility/Wireless Type: NONE
TSC Supplementary Service Protocol: a		Network Call Transfer? n
		T303 Timer(sec): 10
H.245 DTMF Signal Tone Duration(msec):		
Near-end Node Name: video8730clan3B	Far-end Node Name: SQA_RMX1	
Near-end Listen Port: 1720	Far-end Listen Port: 1720	
	Far-end Network Region: 1	
ARQ Required? y	Calls Share IP Signaling Connection? n	
RRQ Required? y		
	Bypass If IP Threshold Exceeded? n	
	H.235 Annex H Required? n	
DTMF over IP: out-of-band	Direct IP-IP Audio Connections? y	
Link Loss Delay Timer(sec): 90	IP Audio Hairpinning? n	
Enable Layer 3 Test? n	Interworking Message: PROgress	
H.323 Station Outgoing Direct Media? n	DCP/Analog Bearer Capability: 3.1kHz	

Enter the **add trunk-group 32** command and add an entry for the Polycom RMX MCU as shown in the sample configuration. Submit these changes.

add trunk-group 32		Page 1 of 21
TRUNK GROUP		
Group Number: 32	Group Type: isdn	CDR Reports: y
Group Name: SQA RMX1 TG	COR: 1	TN: 1 TAC: #032
Direction: two-way	Outgoing Display? y	Carrier Medium: H.323
Dial Access? y	Busy Threshold: 255	Night Service:
Queue Length: 0		
Service Type: tie	Auth Code? n	
	Member Assignment Method: auto	
	Signaling Group: 32	
	Number of Members: 32	

Enter the **change route-pattern 32** command and add an entry for Polycom RMX MCU as shown in the sample configuration section. Submit these changes.

change route-pattern 32													Page 1 of 3	
Pattern Number: 32 Pattern Name: SIL RMX1 Route														
SCCAN? n Secure SIP? n														
Grp	FRL	NPA	Pfx	Hop	Toll	No.	Inserted						DCS/	IXC
No			Mrk	Lmt	List	Del	Digits						QSIG	
							Dgts						Intw	
1:	32	0											n	user
2:											n	user		
3:											n	user		
4:											n	user		
5:											n	user		
6:											n	user		

BCC		VALUE		TSC	CA-TSC	ITC		BCIE	Service/Feature	PARM	No.	Numbering	LAR
0	1	2	M	4	W						Dgts	Format	
						Request							
										Subaddress			
1:	y	y	y	y	y	n	n	rest		none			
2:	y	y	y	y	y	n	n	rest		none			
3:	y	y	y	y	y	n	n	rest		none			
4:	y	y	y	y	y	n	n	rest		none			
5:	y	y	y	y	y	n	n	rest		none			
6:	y	y	y	y	y	n	n	rest		none			

Enter the **change aar analysis 0** command and add an entry for Polycom RMX MCU as shown in the sample configuration below. Submit these changes.

change aar analysis 0						Page	1 of	2
AAR DIGIT ANALYSIS TABLE								
Location: all						Percent Full:	1	
	Dialed	Total		Route	Call	Node	ANI	
	String	Min	Max	Pattern	Type	Num	Reqd	
2		7	7	999	aar		n	
3		7	7	999	aar		n	
4		5	5	33	aar		n	
5		7	7	999	aar		n	
6		7	7	999	aar		n	
7		7	7	999	aar		n	
81		5	5	33	lev0		n	
83334		5	5	32	lev0		n	

4.5. Administer Uniform Dial Plan

Enter the **change uniform-dialplan 8** command and add an entry for Polycom RMX MCU as shown in the sample configuration below. Submit these changes.

change uniform-dialplan 8					Page 1 of 2	
UNIFORM DIAL PLAN TABLE					Percent Full: 0	
Matching Pattern	Len	Del	Insert Digits	Net Conv	Node Num	
81	5	0		aar	n	
83334	5	0		aar	n	

4.6. Verify Ad-hoc Video Conferencing Ports

From the Avaya Aura® Communication Manager SAT interface use the **display system-parameters customer-options** command to verify the **Maximum Administered Ad-hoc Video Conferencing Ports** (page 2 of form). The maximum number of Ad-hoc video conferencing ports allowed is the sum of the ports on your RMX systems. For example, if you have an RMX2000 system the maximum number of ports is 2,000.

display system-parameters customer-options		Page 2 of 11	
OPTIONAL FEATURES			
IP PORT CAPACITIES		USED	
Maximum Administered H.323 Trunks:		12000	328
Maximum Concurrently Registered IP Stations:		18000	6
Maximum Administered Remote Office Trunks:		12000	0
Maximum Concurrently Registered Remote Office Stations:		18000	0
Maximum Concurrently Registered IP eCons:		414	0
Max Concur Registered Unauthenticated H.323 Stations:		100	0
Maximum Video Capable Stations:		18000	24
Maximum Video Capable IP Softphones:		18000	110
Maximum Administered SIP Trunks:		24000	14278
Maximum Administered Ad-hoc Video Conferencing Ports:		24000	130
Maximum Number of DS1 Boards with Echo Cancellation:		522	0
Maximum TN2501 VAL Boards:		128	1
Maximum Media Gateway VAL Sources:		250	0
Maximum TN2602 Boards with 80 VoIP Channels:		128	0
Maximum TN2602 Boards with 320 VoIP Channels:		128	9
Maximum Number of Expanded Meet-me Conference Ports:		300	0
(NOTE: You must logoff & login to effect the permission changes.)			

4.7. Administer Class of Service

Use the **change cos-group 1** command to set **Ad-hoc Video Conferencing** (page 2 of the form) for the appropriate Class Of Service levels. It is necessary for each of the Avaya and Polycom video endpoints to be in a cos-group that has Ad-hoc Video Conferencing enabled in order to conduct an ad-hoc conference call and optionally **Priority Ip Video**.

change cos-group 1											Page 2 of 2					
CLASS OF SERVICE																
0123456789101112131415																
VIP Caller nnnnnnnnnnnnnnnnnn																
Masking CPN/Name Override nnnnnnnnnnnnnnnnnn																
Call Forwarding Enhanced nynnnnnnnnnnnnnnnn																
Priority Ip Video nynnnnnnnnnnnnnnnn																
Ad-hoc Video Conferencing nynnnnnnnnnnnnnnnn																

To identify which COS a video endpoint is in run the command **display station xxxxx** (see screen capture below).

display station 50081	Page 1 of 4
STATION	
Extension: 50081	Lock Messages? n BCC: M
Type: H.323	Security Code: 123456 TN: 1
Port: S01767	Coverage Path 1: COR: 1
Name: HDX8000-1	Coverage Path 2: COS: 1
	Hunt-to Station: 50082 Tests? y
STATION OPTIONS	
	Time of Day Lock Table:
Loss Group: 19	Message Waiting Indicator: none
	Authentication Required? y
Survivable COR: internal	
Survivable Trunk Dest? y	
DTMF over IP: in-band	IP Video? y

4.8. Administer Video Bridge for Ad-hoc Conferencing

Use the **add video-bridge** command to configure an Ad-hoc video bridge for the RMX system.

Set the following parameters:

- **Name** to the name for this video bridge
- **Max Ports** to the maximum number of Ad-hoc conferencing ports you want to assign to this bridge. (The minimum you can enter is 3.) This is equivalent to the number of ports for Ad-hoc use on the associated RMX. You can use Max Ports to limit the extent of Ad-hoc usage of an RMX and thereby reserve ports for scheduled usage.
- **Trunk Groups** to the administered two-way ISDN H.323 trunk groups you added. All entries must be of the same carrier type (that is, all H.323 trunks).
- **Far End Resource Info?** to y.
- **ID Range** to the range of conference IDs. The IDs you specify on this form must **NOT** be configured on the RMX. You must leave these IDs free for the factory to create its own conferences there. Note that AAR and UDP are not used to connect to these meeting room numbers. Conference IDs (and factory numbers) are completely independent of the dial plan.

- **Priority Factory Number.** This number represents the Entry Queue created on the RMX and corresponds to a priority conference service level. The Priority Factory Number must **NEVER** be in the conference ID range. If this field is left blank, all conferences can use the bridge. However, priority conferences will try to find a video bridge that has a priority factory number (if there is one).
- **Standard Factory Number.** This number represents the Entry Queue created on the RMX and corresponds to a standard conference service level. The Standard Factory Number must **NEVER** be in the conference ID range. If this field is left blank, non-priority conferences cannot use this video bridge. A conference started by a priority user with non-priority users may be moved to a priority bridge, and the non-priority users will connect to it and receive video. Note that you must specify either a **Priority Factory Number** or a **Standard Factory Number**. You cannot leave both fields blank.

add video-bridge 32		Page 1 of 1
VIDEO BRIDGE		
Bridge ID: 32		
Name: Ad-hoc Video Bridge - RMX		
Max Ports: 80		
Trunk Groups: (Must have at least one incoming and one outgoing, or a two-way)		
1: 32		
2:		
3:		
Far End Resource Info? y		
ID Range:	49000	to 49100
Priority Factory Number:	1001	
Standard Factory Number:	1000	

5. Configure and Register the Polycom RMX® 2000 MCU

This section describes the configuration of Polycom RMX® MCU and its registration to the Avaya Aura® Communication Manager.

For specific details refer to the **Polycom RMX 2000 Installation & Configuration Guide** that comes with the unit. Be certain to have retrieved the Product Registration and Activation Key from the Polycom Resource Center website <http://portal.polycom.com> before continuing.

5.1. Initial RMX Configuration

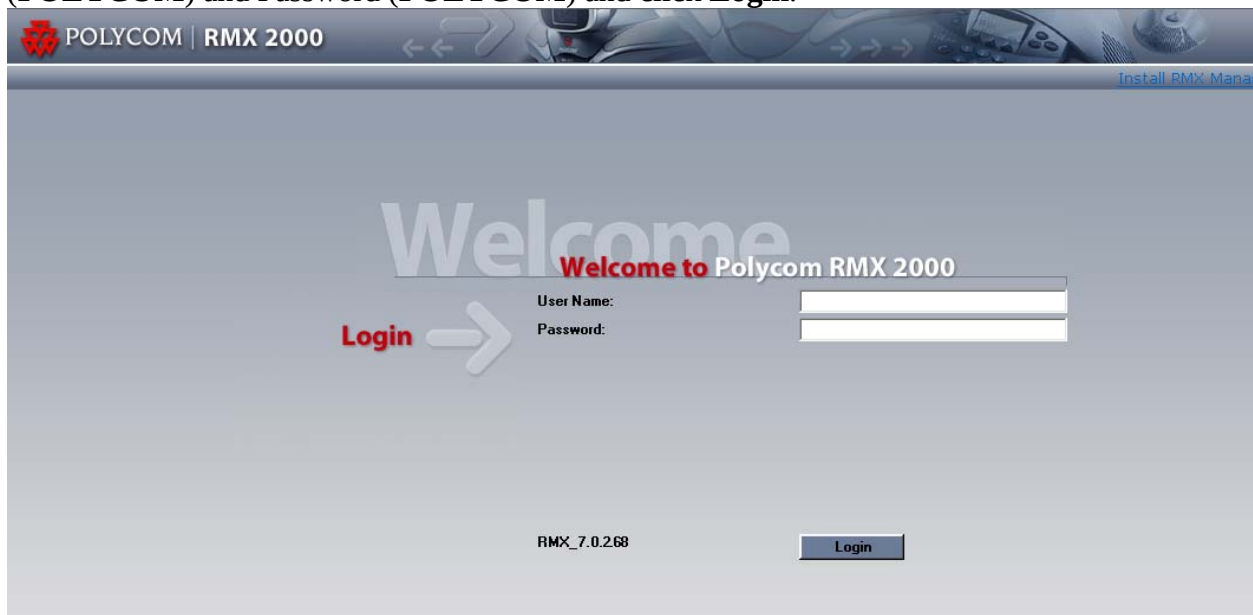
When the RMX is installed for the first time, you must change the default IP addresses to your local network settings. This can be done by modifying the default settings in the USB key shipped with the unit using the LAN Configuration Utility and uploading them to the RMX.

1. Insert the USB key into a PC.
2. Double-click **LanConfigUtility.exe** to start the utility.

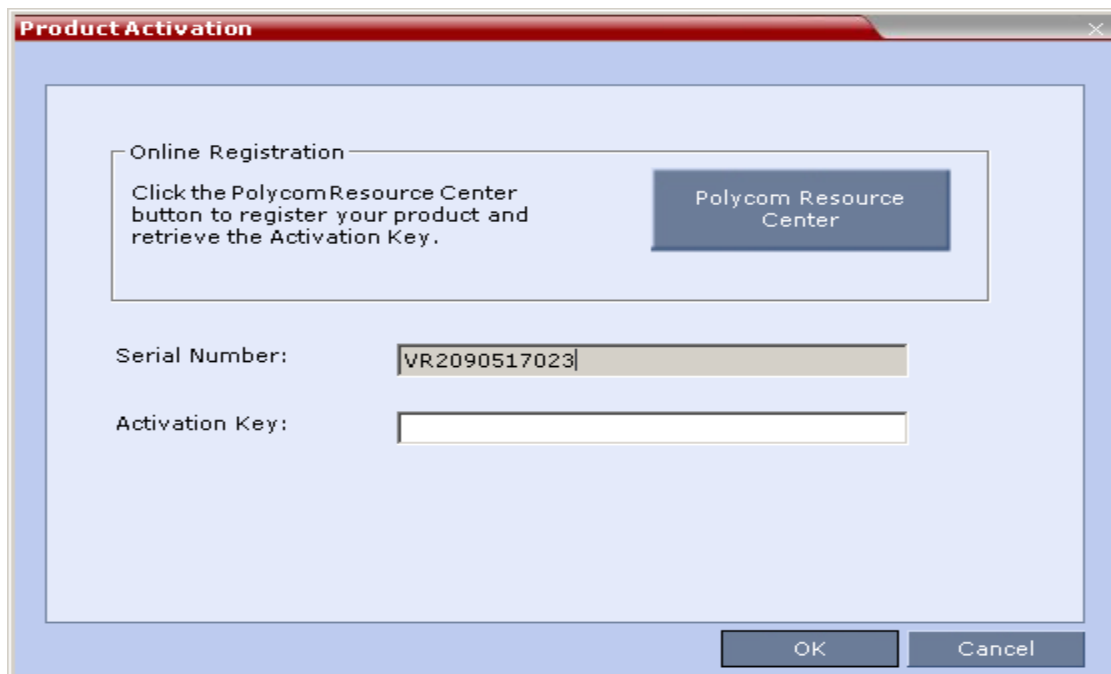
3. Modify the required network parameters in the utility's dialog box using the information supplied by your network administrator.
4. Click **OK**.
5. Insert the USB key with the modified IP addresses in the USB port on the back panel of the RMX.
6. Power the RMX **On**. System power-up sequence may take up to five minutes.
7. Once the RMX is powered up and loaded remove the USB key.

5.2. Registering RMX to Avaya Aura® Communication Manager Gatekeeper

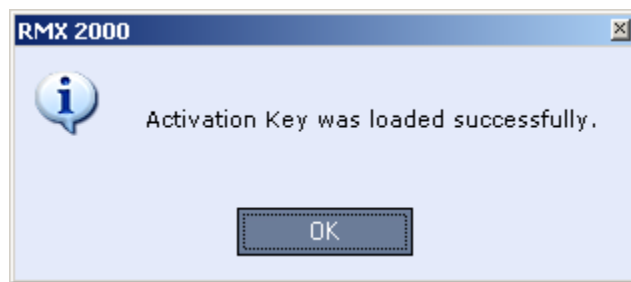
Start the RMX Web Client application by entering in the browser's address line the IP Address of the control unit as defined in the USB key in the format: `http://<Control Unit IP Address>` and press **Enter**. In the RMX Web Client Welcome Screen, enter the default Username (**POLYCOM**) and Password (**POLYCOM**) and click **Login**.



The Product Activation dialog box appears with the serial number filled in. In the Activation Key field, enter or paste the Product Activation Key retrieved earlier and click **OK**. If you do not have an Activation Key, click the **Polycom Resource Center** button to access the Service & Support page of the Polycom website.



After entering the correct Activation Key you will see the following:



After clicking **OK** the system automatically starts the Fast Configuration Wizard. You should have collected all of the Network information prior to running this Wizard.

Enter the appropriate information on the following FastConfiguration Wizard screens as shown in this sample configuration:

Field	Description
<i>Network Service Name</i>	The name <i>Default IP Service</i> is assigned to the IP Network Service by the Fast Configuration Wizard. This name can be changed. Note: This field is displayed in all IP Signaling dialog boxes and can contain character sets that use Unicode encoding.
<i>Signaling Host IP Address</i>	Enter the address to be used by IP endpoints when dialing in to the MCU. Dial out calls from the RMX are initiated from this address. This address is used to register the RMX with a Gatekeeper or a SIP Proxy server.
<i>MPM 1 IP Address</i> <i>MPM 2 IP Address</i>	Enter the IP address(es) of the media card (s) (MPM/MPM+ 1 and MPM/MPM+ 2 (if installed)) as provided by the network administrator. Endpoints connect to conferences and transmit call media (video, voice and content) via these addresses.
<i>Subnet Mask</i>	Enter the subnet mask of the MCU. Default value: 255.255.255.0.

Fast Configuration Wizard

- > IP Management Service
- > **IP Signaling**
- > Routers
- > DNS
- > Network Type
- > Gatekeeper
- > SIP Server
- > Security
- > ISDN/PSTN
- > PRI Settings
- > Span Definition
- > Phones
- > Spans
- > System Flags

Network Service Name:

Signaling Host IP Address:

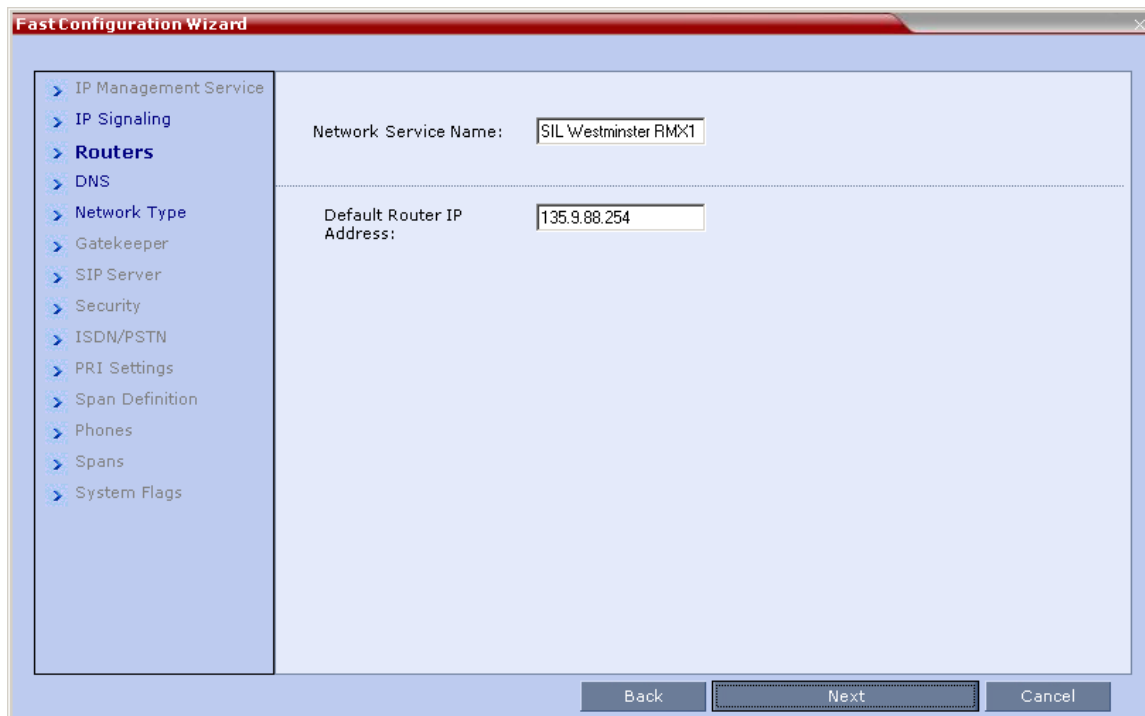
MPM 1 IP Address:

MPM 2 IP Address:

Subnet Mask:

Back Next Cancel

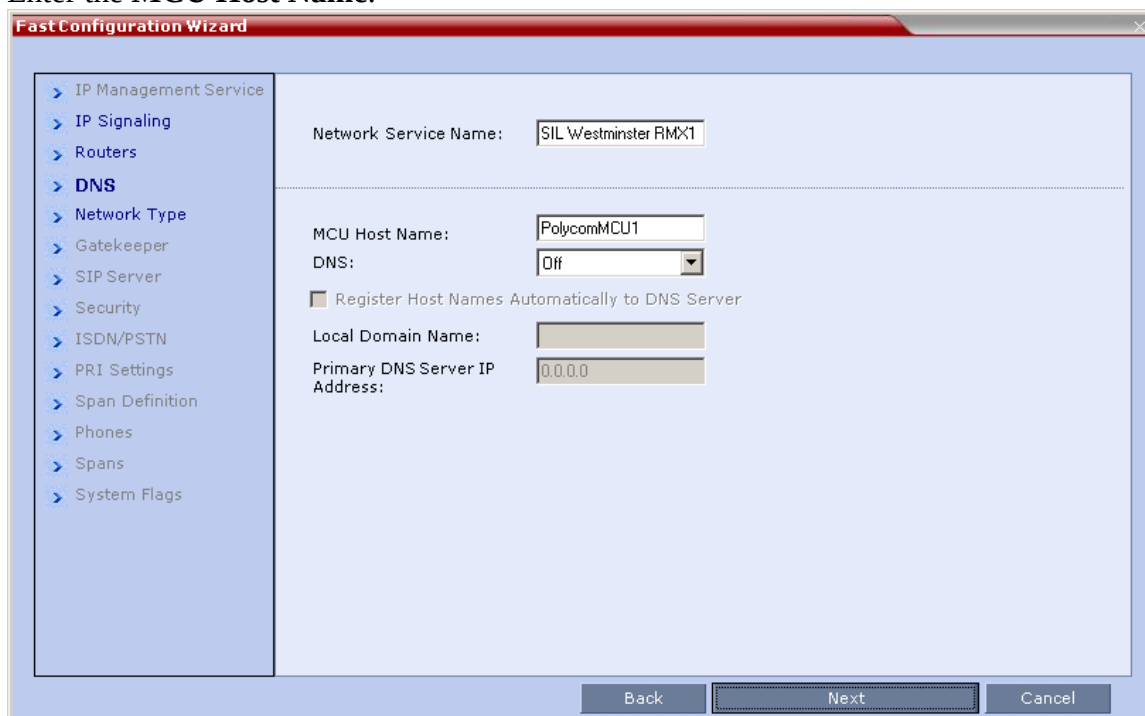
Click **Next**.
Enter the **Default Router IP Address**.



The screenshot shows the 'Fast Configuration Wizard' window. On the left is a tree view with the following items: IP Management Service, IP Signaling, **Routers** (highlighted), DNS, Network Type, Gatekeeper, SIP Server, Security, ISDN/PSTN, PRI Settings, Span Definition, Phones, Spans, and System Flags. The main area on the right contains two fields: 'Network Service Name' with the value 'SIL Westminster RMX1' and 'Default Router IP Address' with the value '135.9.88.254'. At the bottom are three buttons: 'Back', 'Next' (highlighted), and 'Cancel'.

Click **Next**.

Enter the **MCU Host Name**.



The screenshot shows the 'Fast Configuration Wizard' window with the 'DNS' option selected in the left tree view. The main area on the right contains the following fields: 'Network Service Name' (SIL Westminster RMX1), 'MCU Host Name' (PolycomMCU1), 'DNS' (Off), a checkbox for 'Register Host Names Automatically to DNS Server' (unchecked), 'Local Domain Name' (empty), and 'Primary DNS Server IP Address' (0.0.0.0). At the bottom are three buttons: 'Back', 'Next' (highlighted), and 'Cancel'.

Click **Next**.

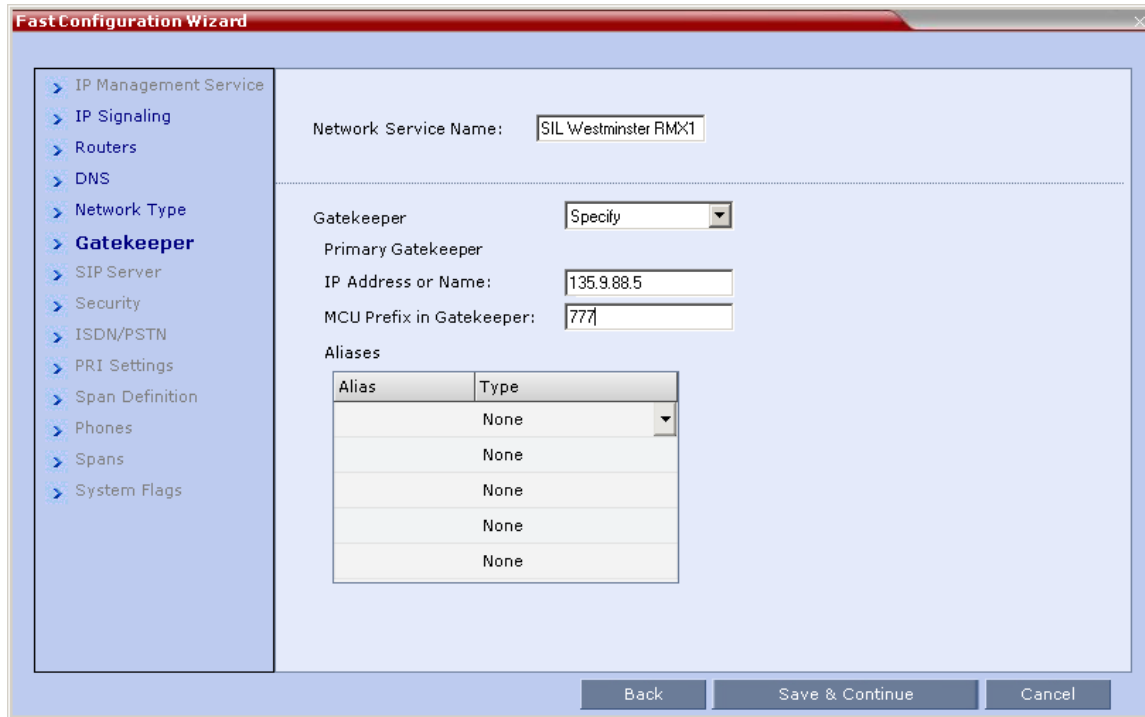
Select “H.323” for the **IP Network Type**.

The image shows a 'Fast Configuration Wizard' window. On the left is a tree view with the following items: IP Management Service, IP Signaling, Routers, DNS, **Network Type** (highlighted), Gatekeeper, SIP Server, Security, ISDN/PSTN, PRI Settings, Span Definition, Phones, Spans, and System Flags. The main area of the wizard is divided into two sections. The top section is labeled 'Network Service Name:' and contains a text box with the value 'SIL Westminster RMX1'. The bottom section is labeled 'IP Network Type:' and contains a dropdown menu with 'H.323' selected. At the bottom of the window are three buttons: 'Back', 'Next' (which is highlighted with a dashed border), and 'Cancel'.

Click **Next**.

In the **IP Address or Name** field enter the address of the Avaya Aura® Communication Manager Gatekeeper. The Gatekeeper can be either a CLAN or the processor Ethernet and in this example it is a CLAN.

In the **MCU Prefix in Gatekeeper** field enter an appropriate prefix. Consult with your System Administrator regarding this prefix.



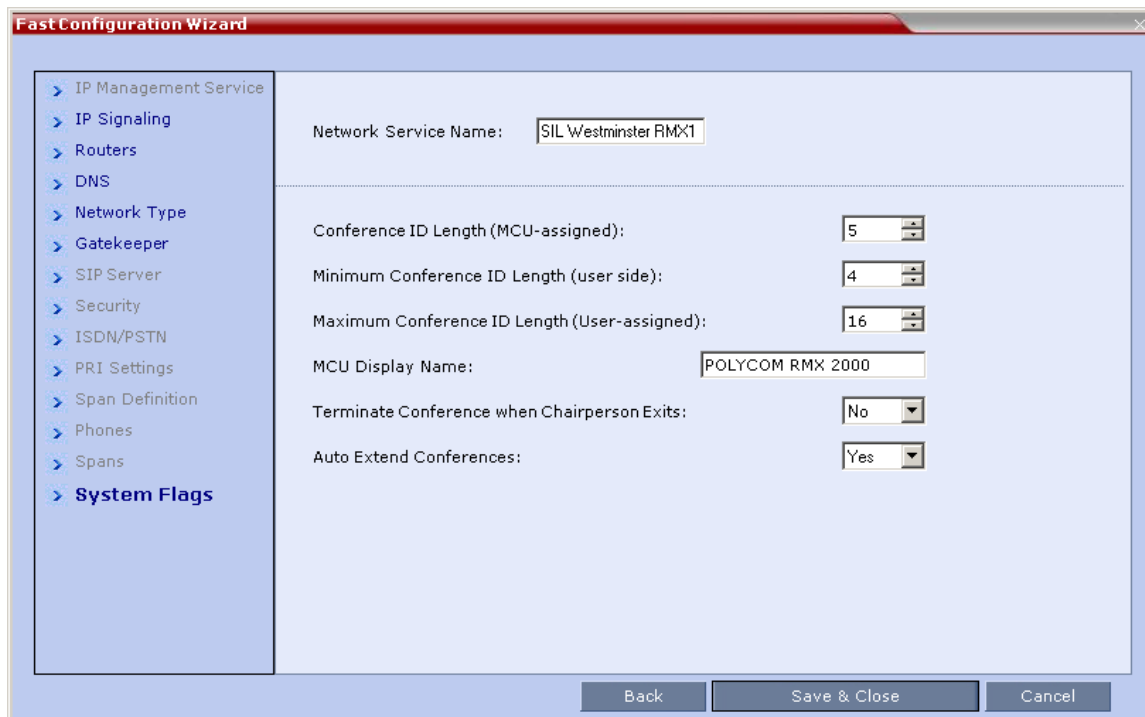
The screenshot shows the 'Fast Configuration Wizard' window. On the left is a navigation pane with a tree view containing the following items: IP Management Service, IP Signaling, Routers, DNS, Network Type, **Gatekeeper** (highlighted), SIP Server, Security, ISDN/PSTN, PRI Settings, Span Definition, Phones, Spans, and System Flags. The main area of the wizard is titled 'Gatekeeper' and contains the following fields and controls:

- Network Service Name:** A text box containing 'SIL Westminster RMX1'.
- Gatekeeper:** A dropdown menu currently showing 'Specify'.
- Primary Gatekeeper:** A label above the IP Address or Name field.
- IP Address or Name:** A text box containing '135.9.88.5'.
- MCU Prefix in Gatekeeper:** A text box containing '777'.
- Aliases:** A table with two columns: 'Alias' and 'Type'. The table contains five rows, each with an empty 'Alias' cell and a 'None' value in the 'Type' column.

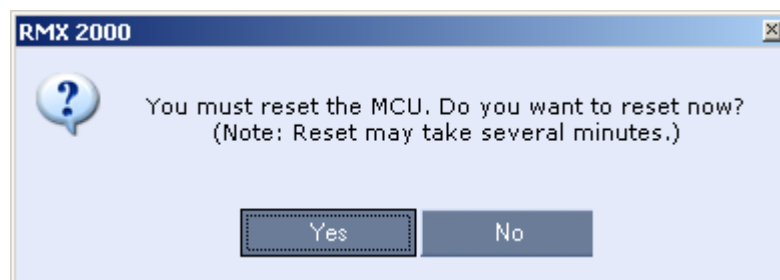
At the bottom of the wizard are three buttons: 'Back', 'Save & Continue', and 'Cancel'.

Alias	Type
	None
	None
	None
	None
	None

Click **Save & Continue**.



Click **Save & Close**. The RMX confirms successful configuration. Next you will be prompted to reset the MCU, Select **Yes**.



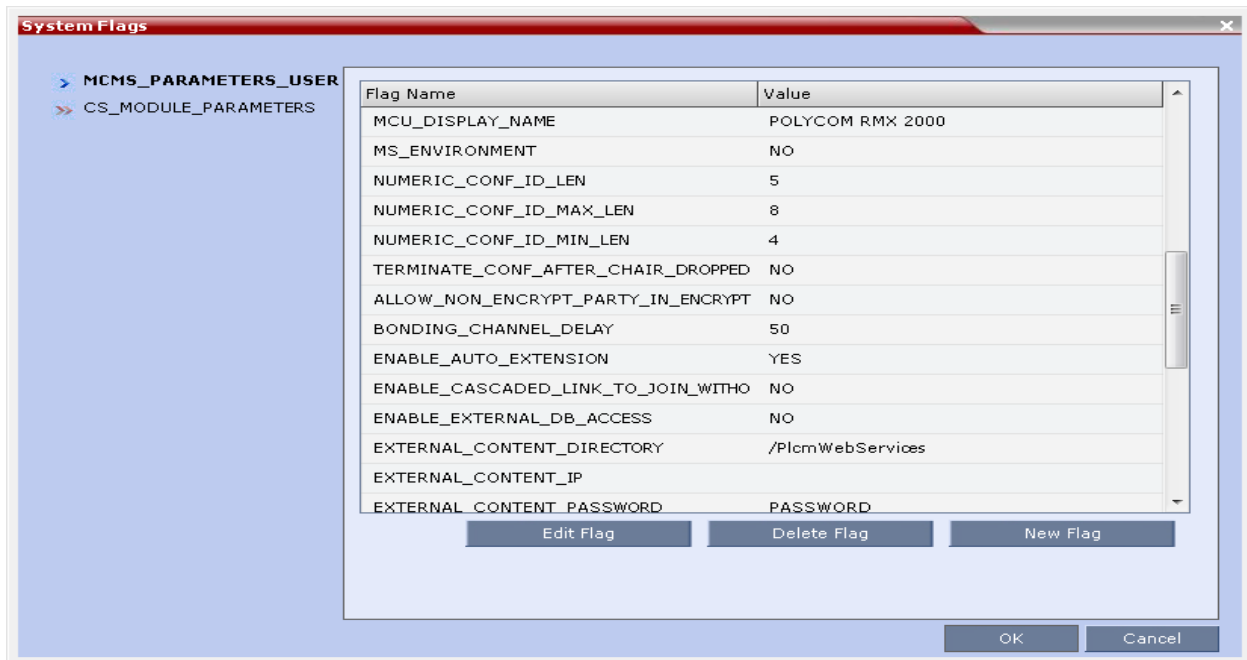
5.3. Configure System Configuration on Polycom RMX

Log in to the RMX web interface with the appropriate credentials. From the menu bar located at the top, select **Setup**, and then select **System Configuration**. This will open the System Flags window displayed in the screen capture below.

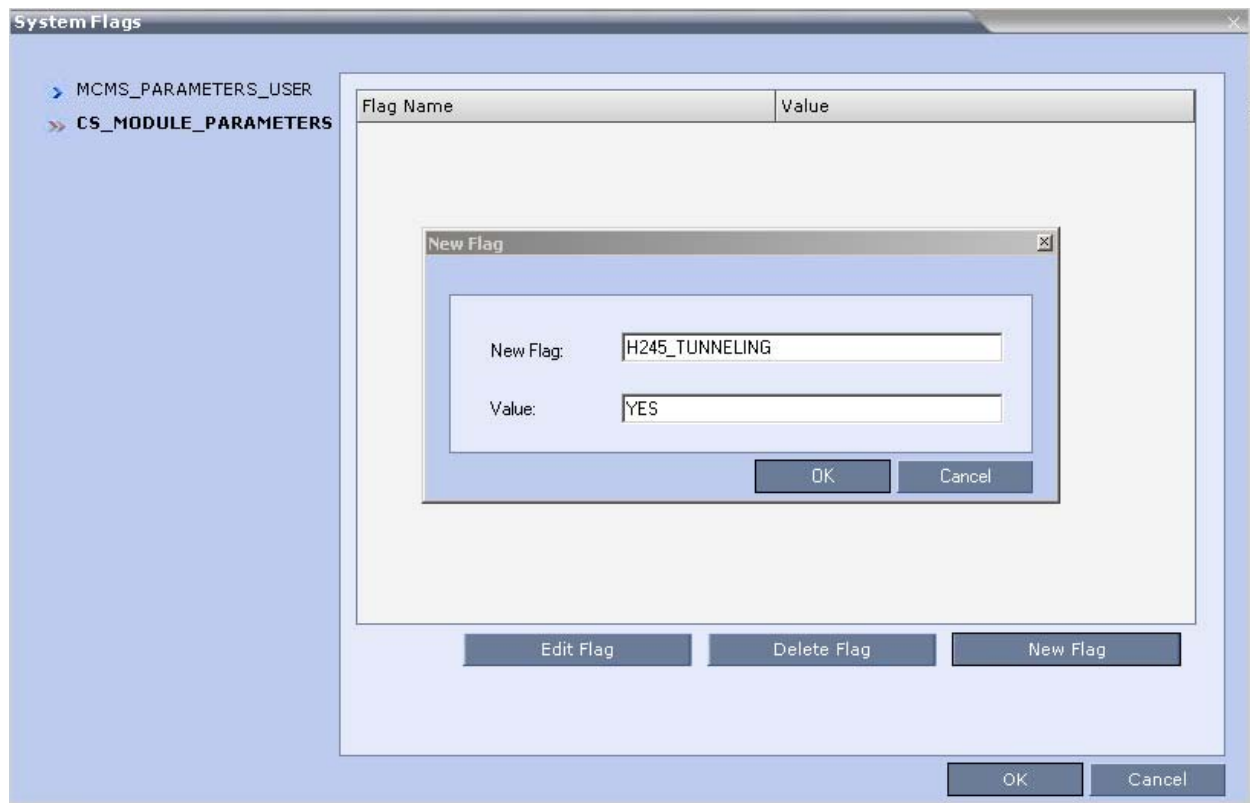
Under the MCMS_PARAMETERS_USER, configure the following settings:

- MCU_DISPLAY_NAME = POLYCOM RMX 2000
- NUMERIC_CONF_ID_LEN = 5
- NUMERIC_CONF_ID_MAX_LEN = 8
- NUMERIC_CONF_ID_MIN_LEN = 4
- ENABLE_AUTO_EXTENSION = YES

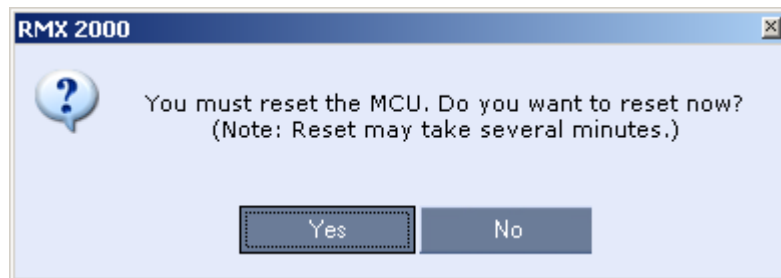
- TERMINATE_CONF_AFTER_CHAIR_DROP = NO (Not displayed)
- H323_FREE_VIDEO_RESOURCES = NO (Not displayed)



Under the CS_MODULE_PARAMETERS, add a new flag by selecting **New Flag**. Once the New Flag window opens enter the following: New Flag: **H245_TUNNELING** Value: **YES**



Then select **OK** from the New Flag window and then **OK** again in the System Flags window. You will then be prompted to reset the MCU. Select **Yes**. After the RMX has reset you can log back in to confirm the Flag values have been administered.

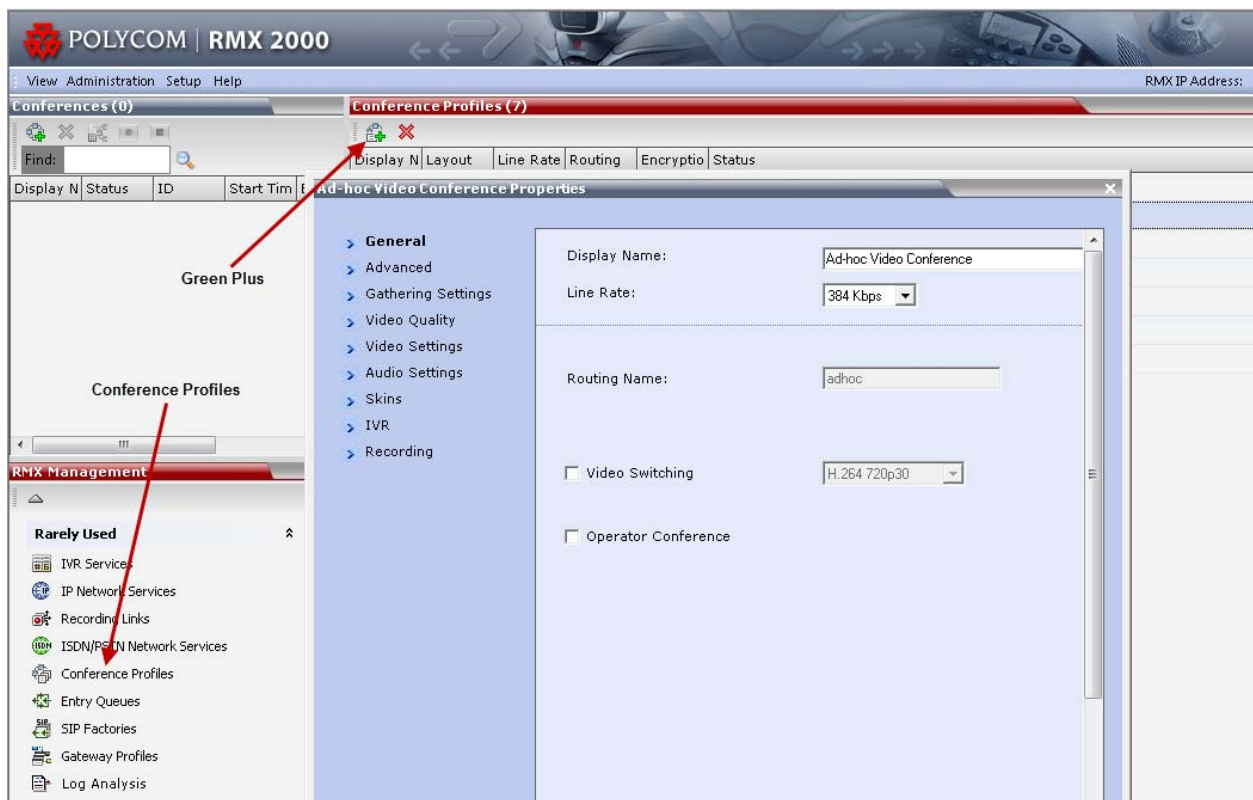


5.4. Create Conference Profile on Polycom RMX

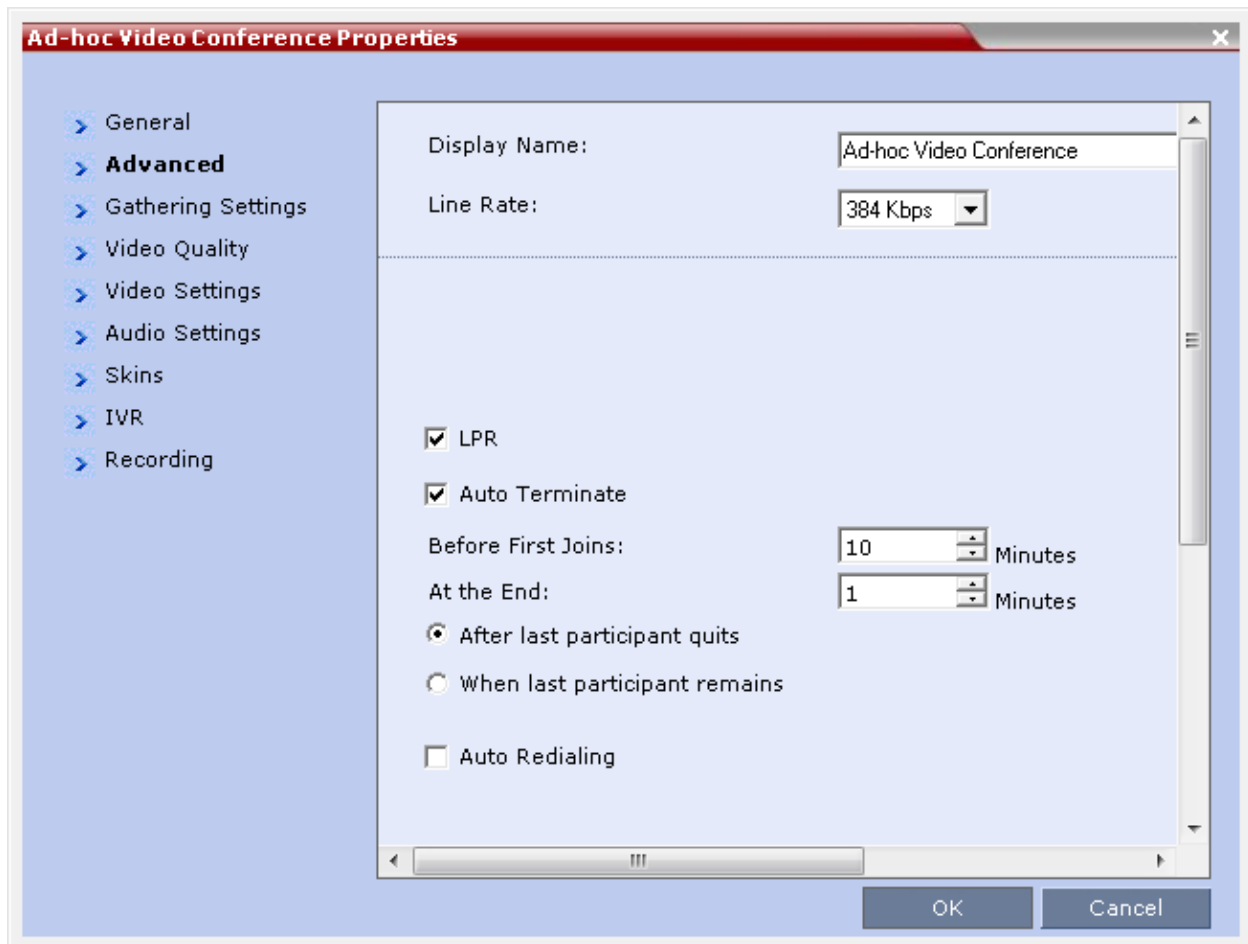
Log in to the Polycom RMX web interface. Under the **RMX Management** section of the interface locate **Conference Profiles** beneath the **Rarely Used** section and click on it. Click on the green plus to add a new entry to the table.

The following is a sample showing how a Conference Profile can be setup. The **General** and **Advanced** items in the New Profile list below are two of the main screens that need to be configured. The default values can be used for the **Gathering Settings, Video Quality, Video Settings, Audio Settings, Skins, IVR, and Recording**. Customize as necessary.

The Conference Profiles are used on the entry queues.



On the **Advanced** item it is important to check the **LPR** (Lost Packet Recovery) box. LPR protects IP video calls from the impact of packet loss by temporarily allocating a small portion of the call bandwidth to be used for forward error correction (FEC). The theory behind LPR's operation is that it is better to provide a solid video call at a slightly lower call speed than a video call plagued by video and audio issues (blocking, freezing, hiccups, etc.).



5.5. Create Entry Queues on Polycom RMX

Locate and click on **Entry Queues** under the **RMX Management, Rarely Used** section. Click on the green plus to add a new entry.

POLYCOM | RMX 2000

View Administration Setup Help RMX IP Address: 135.9.88.40 Signaling Host: 135.9.88.42 MCU Prefix in GK: 777 Logout

Conferences (0) **Entry Queues (4)** **Address Book (5)**

Green Plus

RMX Management

Frequently Used

- Connections
- Users
- Signaling Monitor
- Hardware Monitor
- Meeting Rooms
- Reservations

Rarely Used

- IVR Services
- IP Network Services
- Recording Links
- ISDN/PSTN Network Services
- Conference Profiles
- Entry Queues**

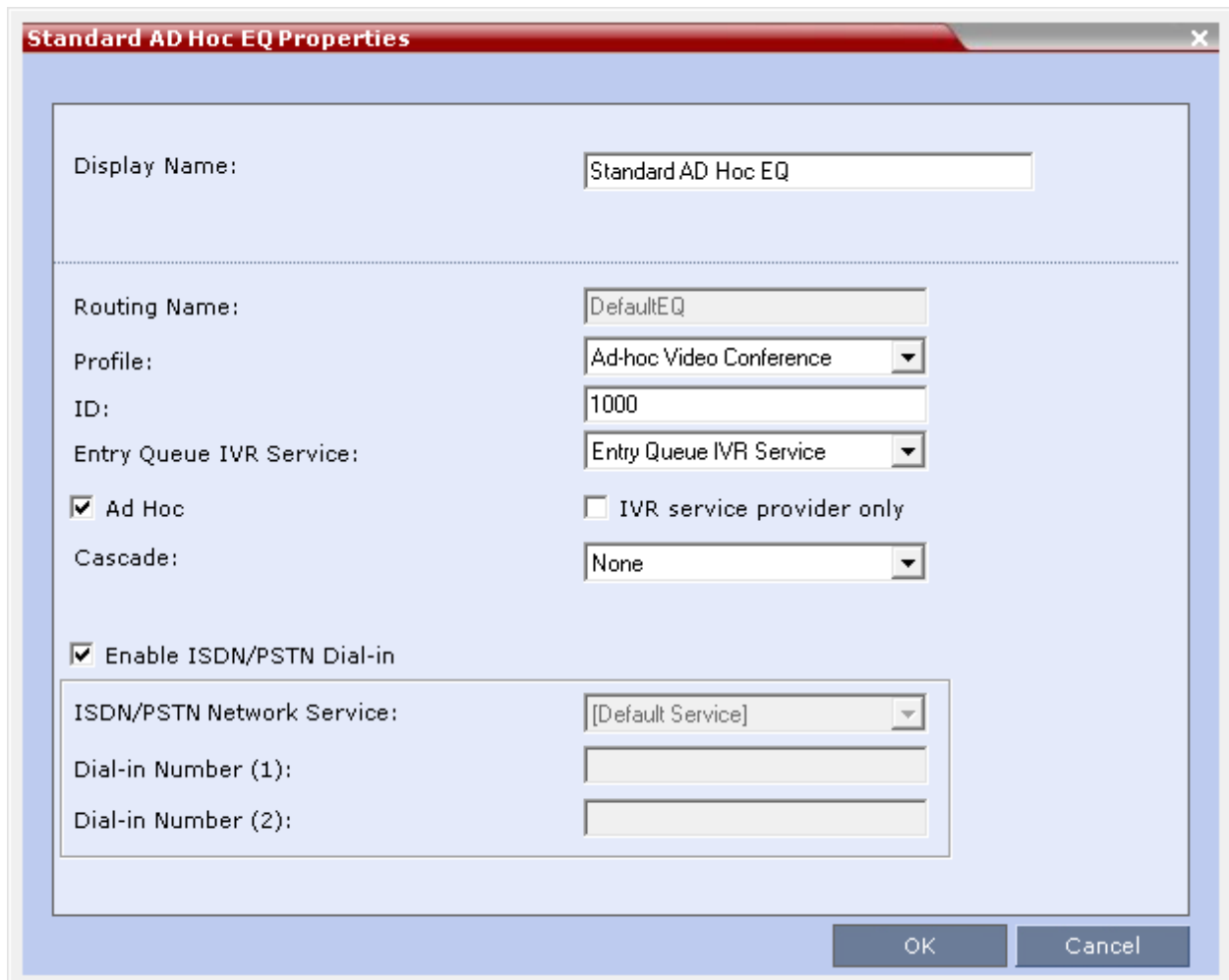
Display Name	ID	Profile	Dial-in Number(1)
SD Entry Queue	83333	SD 384	
Priority Ad Hoc EQ	1001	High Def	
HD Entry Queue	83232	Ad-hoc	
Standard AD Hoc EQ	1000	Ad-hoc	

Address Book (5)

Type	Name	Dialing Direc
	HDX4006	Dial out
	HDX8000	Dial out
	HDX9004	Dial out
	JD Test	Dial out
	VSX5k	Dial out

Conference Templates (0)

This is an example of a standard entry queue. Select the **Profile** that was configured in the previous step. Note the **ID: 1000** is the ID used by Avaya Aura® Communication Manager as the **Standard Factory Number** administered in Section 4.8. Since this is an Ad Hoc entry queue be certain to check the **Ad Hoc** box. Click **OK**.



The image shows a Windows-style dialog box titled "Standard AD Hoc EQ Properties". The dialog has a light blue background and a red title bar. It contains several fields and checkboxes for configuring an entry queue. The fields are arranged in a grid-like fashion. The "Display Name" field is at the top, followed by "Routing Name", "Profile", "ID", "Entry Queue IVR Service", "Ad Hoc" (checked), "IVR service provider only" (unchecked), "Cascade", "Enable ISDN/PSTN Dial-in" (checked), "ISDN/PSTN Network Service", "Dial-in Number (1)", and "Dial-in Number (2)". The "OK" and "Cancel" buttons are at the bottom right.

Display Name:	Standard AD Hoc EQ
Routing Name:	DefaultEQ
Profile:	Ad-hoc Video Conference
ID:	1000
Entry Queue IVR Service:	Entry Queue IVR Service
☒ Ad Hoc	☐ IVR service provider only
Cascade:	None
☒ Enable ISDN/PSTN Dial-in	
ISDN/PSTN Network Service:	[Default Service]
Dial-in Number (1):	
Dial-in Number (2):	

OK Cancel

Click on the green plus again to add a second entry for a priority entry queue. This is an example of a priority entry queue. Select the appropriate **Profile**. In this example a High Def profile was selected. Note the **ID: 1001** is the ID used by Avaya Aura® Communication Manager as the **Priority Factory Number** administered in Section 4.8. Since this is an Ad Hoc entry queue be certain to check the **Ad Hoc** box. Click **OK**.

Priority Ad Hoc EQ Properties

Display Name: Priority Ad Hoc EQ

Routing Name: 1001

Profile: High Def 1920

ID: 1001

Entry Queue IVR Service: Entry Queue IVR Service

☒ Ad Hoc ☐ IVR service provider only

Cascade: None

☒ Enable ISDN/PSTN Dial-in

ISDN/PSTN Network Service: [Default Service]

Dial-in Number (1):

Dial-in Number (2):

OK Cancel

5.6. Create Meeting Rooms on Polycom RMX

Add a Meeting Room by selecting **Meeting Rooms** under **RMX Management** → **Frequently Used**. Then select the green plus to create a **New Meeting Room**. (See screen capture below).

The screenshot displays the Polycom RMX 2000 web interface. The top navigation bar includes 'View', 'Administration', 'Setup', and 'Help'. The main header shows 'RMX IP Address: 135.9.88.40', 'Signaling Host: 135.9.88.42', 'MCU Prefix in GK: 777', and a 'Logout' link. The interface is divided into three main sections: 'Conferences (0)', 'Meeting Rooms (2)', and 'Address Book (5)'. The 'Meeting Rooms (2)' section is active, showing a table with two entries: 'Test' and 'SIL Meeting Room1'. A red arrow points to a green plus icon in the top left of the 'Meeting Rooms (2)' section, labeled 'Green Plus'. The left sidebar contains a navigation menu with 'RMX Management' highlighted. Under 'RMX Management', the 'Frequently Used' section is expanded, showing 'Connections', 'Users', 'Signaling Monitor', 'Hardware Monitor', 'Meeting Rooms', and 'Reservations'. The 'Meeting Rooms' option is circled in red. The 'Address Book (5)' section on the right shows a table with five entries: 'HDx4006', 'HDx8000', 'HDx9004', 'JD Test', and 'VSX5k', all with a 'Dial out' status.

Display Name	ID	Duration	Conferen	Chairpers	Profile
Test	1234	1:00			SD 384
SIL Meeting Room1	83334	1:00	123456	123456	SD192

Type	Name	Dialing Direc
	HDx4006	Dial out
	HDx8000	Dial out
	HDx9004	Dial out
	JD Test	Dial out
	VSX5k	Dial out

The following is a sample showing how a Meeting Room can be setup. The **General** item in the New Meeting Room list below is the main screen that needs to be configured. The default values can be used for the **Participants** and **Information** options. Customize as necessary. The **ID: 83334** is the number that the endpoints registered with the Avaya Aura® Communication Manager Gatekeeper and Polycom CMA Gatekeeper will dial to access this RMX bridge.

The screenshot shows a Windows-style dialog box titled "SIL Meeting Room1 Properties". On the left is a sidebar with three expandable sections: "General" (selected), "Participants", and "Information". The main area contains the following fields:

- Display Name:** A text box containing "SIL Meeting Room1".
- Duration:** Two spinners for minutes and seconds, set to "1" and "00" respectively. To the right is a checkbox labeled "Permanent Conference" which is unchecked.
- Routing Name:** A text box containing "83334".
- Profile:** A dropdown menu showing "HD 4096".
- ID:** A text box containing "83334".
- Conference Password:** A text box containing "123456".
- Chairperson Password:** A text box containing "123456".
- Reserve Resources for Video Participants:** A spinner set to "0".
- Reserve Resources for Voice Participants:** A spinner set to "0".
- Maximum Number of Participants:** A dropdown menu showing "Automatic".
- Enable ISDN/PSTN Dial-in:** A checked checkbox.
- ISDN/PSTN Network Service:** A dropdown menu showing "[Default Service]".
- Dial-in Number (1):** An empty text box.
- Dial-in Number (2):** An empty text box.

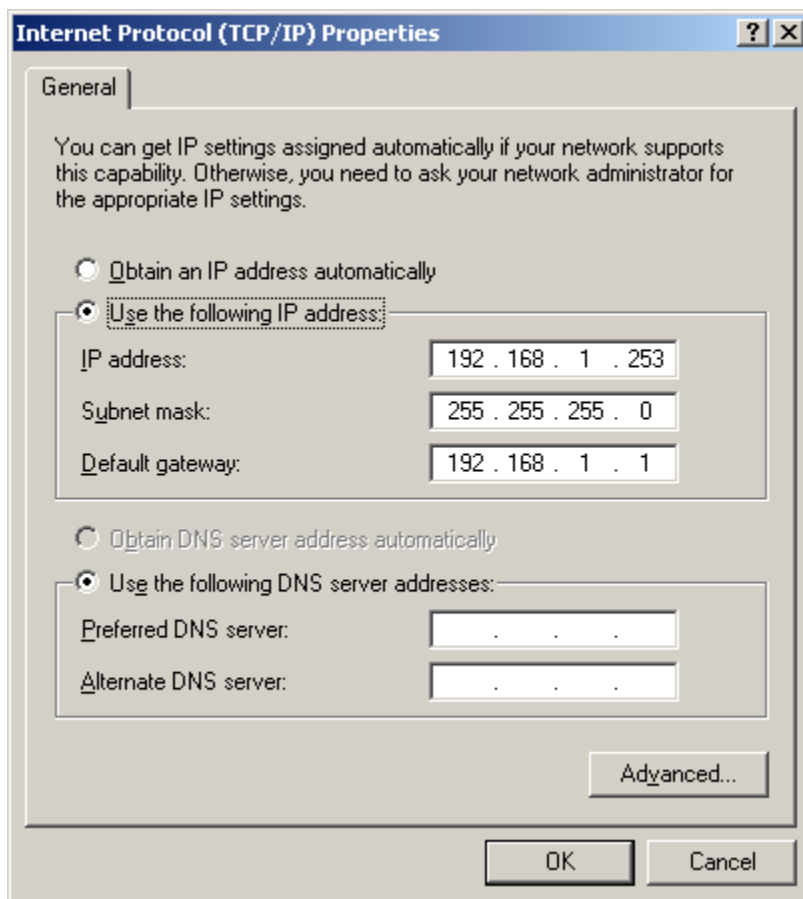
At the bottom right of the dialog are "OK" and "Cancel" buttons.

6. Configure the Polycom RSS 2000

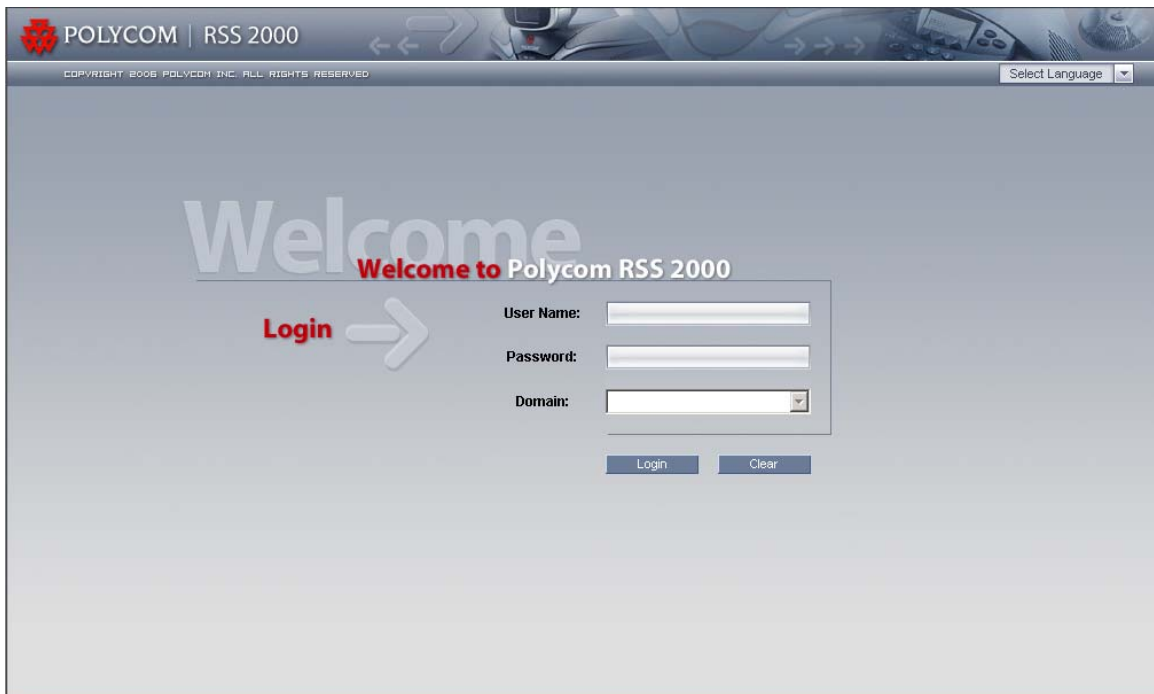
The RMX enables audio and video recording of conferences using Polycom RSS 2000 recording system. The recording system can be installed at the same site as the conferencing MCU or at a remote site. Several MCUs can share the same recording system.

The following are the steps to configure the RSS 2000 as a new installation.

1. Plug a crossover LAN cable to LAN1 on the back of the RSS unit. Plug into laptop and set IP settings to:

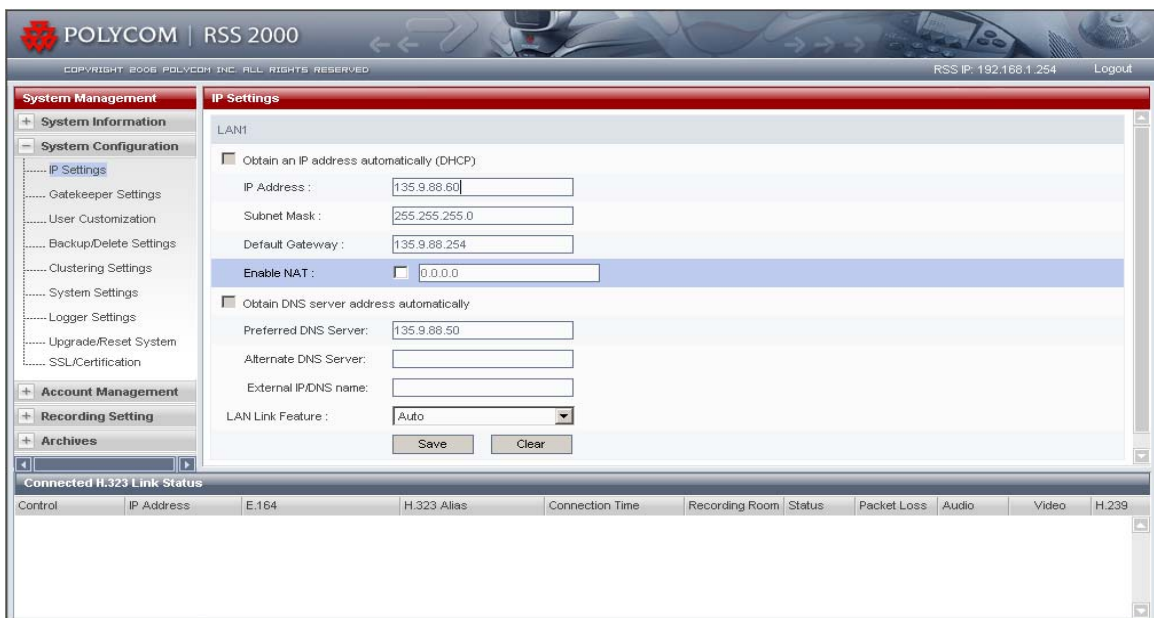


2. Open a browser and go to: <http://192.168.1.254>
There are two default accounts:
administrator/polycom and POLYCOM/POLYCOM



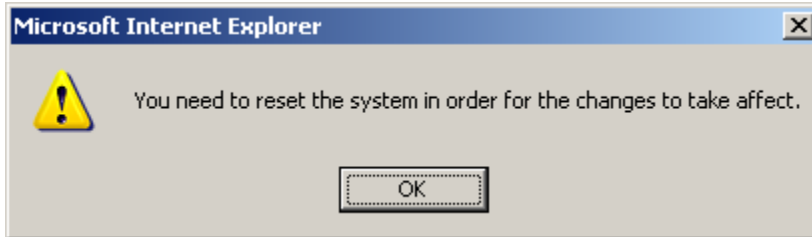
The image shows the login page of the Polycom RSS 2000 web interface. At the top, there is a header with the Polycom logo and 'RSS 2000'. Below the header, a large 'Welcome' message is displayed. To the right of the welcome message, there is a login form with fields for 'User Name', 'Password', and 'Domain'. Below these fields are 'Login' and 'Clear' buttons. A 'Select Language' dropdown menu is located in the top right corner.

3. Go to **System Management** → **System Configuration** → **IP settings** and modify the IP address, Subnet Mask, and Default Gateway. The user has the option of setting a static IP or choosing DHCP. Click the **Save** button.

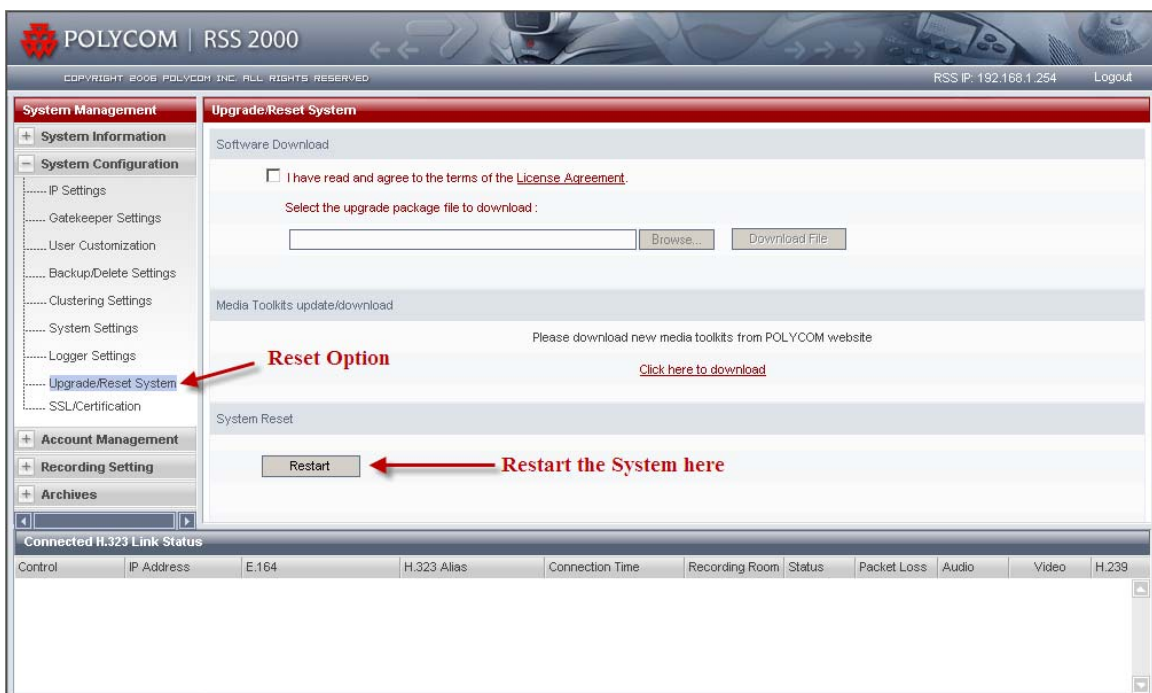


The image shows the 'IP Settings' page within the Polycom RSS 2000 web interface. The left sidebar contains a tree view with 'System Management' expanded, showing 'System Information', 'System Configuration', 'Account Management', 'Recording Setting', and 'Archives'. Under 'System Configuration', 'IP Settings' is selected. The main content area shows settings for 'LAN1'. There are checkboxes for 'Obtain an IP address automatically (DHCP)' and 'Obtain DNS server address automatically'. Below these are input fields for 'IP Address', 'Subnet Mask', 'Default Gateway', 'Preferred DNS Server', 'Alternate DNS Server', and 'External IP/DNS name'. There is also a section for 'Enable NAT' with a checkbox and an input field. At the bottom, there is a 'LAN Link Feature' dropdown menu. 'Save' and 'Clear' buttons are at the bottom right. A status bar at the very bottom shows 'Connected H.323 Link Status' with a table of columns: Control, IP Address, E.164, H.323 Alias, Connection Time, Recording Room, Status, Packet Loss, Audio, Video, and H.239.

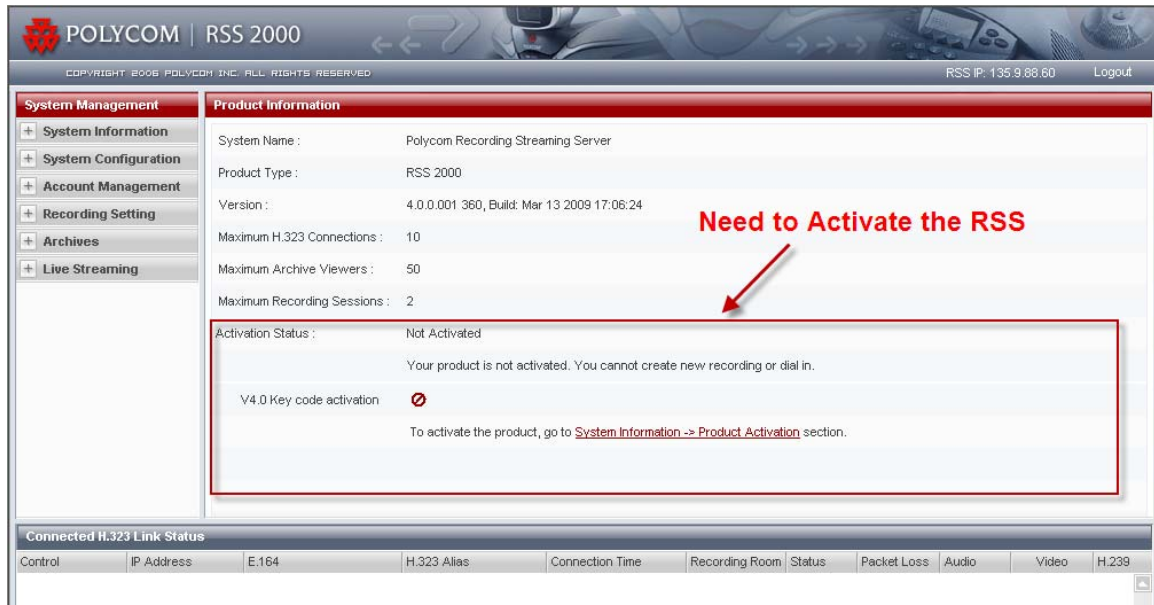
After clicking the **Save** button you will see the following reset message:



4. In order to reset the system go to **System Configuration → Upgrade/Reset System** and select **Restart**.



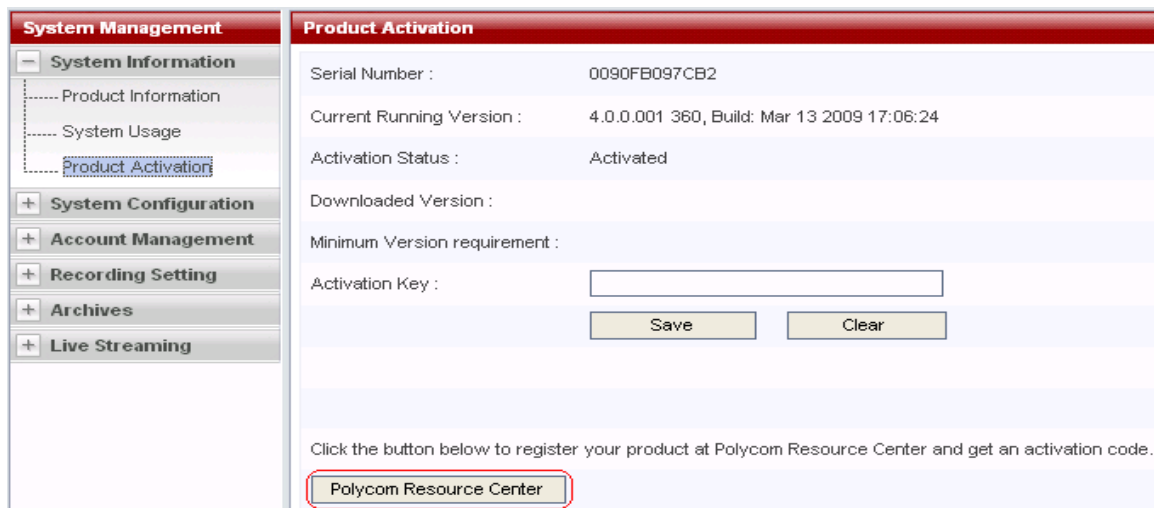
5. Once the RSS 2000 has restarted log in and activate the RSS with the correct Key codes. From the **System Management → System Information → Product Information** section you will be able to identify the Activation Status. The screen capture below is an example of an RSS 2000 that is Not Activated.



6. For new installations, an activation keycode must be entered before attempting to use the RSS 2000. The following are two types of keycodes.

Package Name	Description
K-keycode	Option Activation (Basic, Multicast, Clustering , Encryption)
U-keycode	New Version activation (Will not affect the current installed options)

From the **System Information → Product Activation** section click on **Polycom Resource Center**.



Go to the PRC and under product activation select the following:

The screenshot shows the Polycom Partner Resource Center (PRC) website. The Polycom logo is at the top left. The navigation bar includes links for Solutions, Products, Pricing & Promotions, Sales Certification & Training, Service & Support, and Sales & Marketing Tools. The 'Service & Support' link is circled in blue. A dropdown menu is open under 'Service & Support', showing options: Overview, Polycom Services, Product Support, Product Registration, Product Activation (circled in blue), RMA, Service Tools & Resources, Service Partner Programs, and Polycom Learning Center. An arrow points from 'Product Activation' to a sub-menu where 'Overview' is circled in blue. Below the navigation bar, there is a banner for 'Welcome to the NEW Partner Resource' and a 'Lead Stories' section titled 'Announcing the Introduction of the VVX™ 1500 Business Media Phone'. Below the banner, there are two main sections: 'Software Upgrade Key Code' and 'Single License Number'. The 'Software Upgrade Key Code' section has a 'Retrieve Software Key Code' button. The 'Single License Number' section has input fields for 'License Number', 'Serial Number', and 'Key Code', and a 'Generate' button.

Software Upgrade Key Code

To upgrade your software, please retrieve your software Key Code.

[Retrieve Software Key Code](#)

To generate a Key Code for enabling system options, follow the directions below.

Single License Number

Please enter the License Number and Serial Number of your product to generate a Key Code. To retrieve a previously enabled Key Code, please enter the product's serial number and leave License Number blank.

License Number:

Serial Number:

Key Code:

[Generate](#)

7. For a new installation, the system will be shipped with a K License. This K License will be used by the user to go to the PRC and receive a K Keycode from the Single License number screen as shown in the screenshots. Do not click 'Retrieve Software Key Code' in this step.

Single License Number

Please enter the License Number and Serial Number of your product to generate a Key Code. To retrieve a previously enabled Key Code, please enter the product's serial number and leave License Number blank.

License Number:

Serial Number:

Key Code:

—This license number is provided on a single piece of paper shipped with the system. Enter the number here.

8. The user will receive a K Keycode with the purchased, enabled options (Multicast, Clustering, and Encryption). Keep this keycode in your records. After entering the option activation K Keycode in the RSS 2000 web UI activation screen, the user will need to go back to the PRC and generate a U Keycode to permit a software upgrade. This is done in the Single Upgrade Key Code page shown below, accessed by clicking the Retrieve Software Key Code button.

To install the U-keycode:

- a. Enter 4.0 in the Version field and enter the RSS 2000 Serial Number in the Serial Number field.

The user will receive a U-Keycode permitting activation of Version 4.x software. This keycode will also need to be entered in the product activation section on the RSS 2000 Web UI):

Single Upgrade Key Code

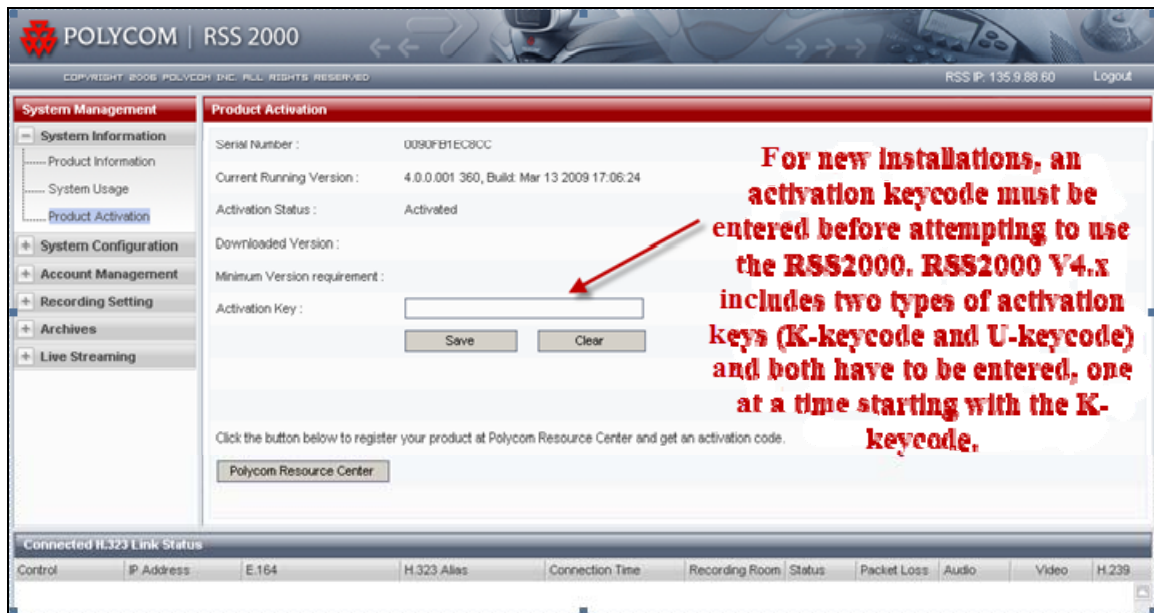
To retrieve the latest software upgrade Key Code for your system, please enter the complete system Serial Number, the Version Number that you want to install and then click **Retrieve**.

***Serial Number:**

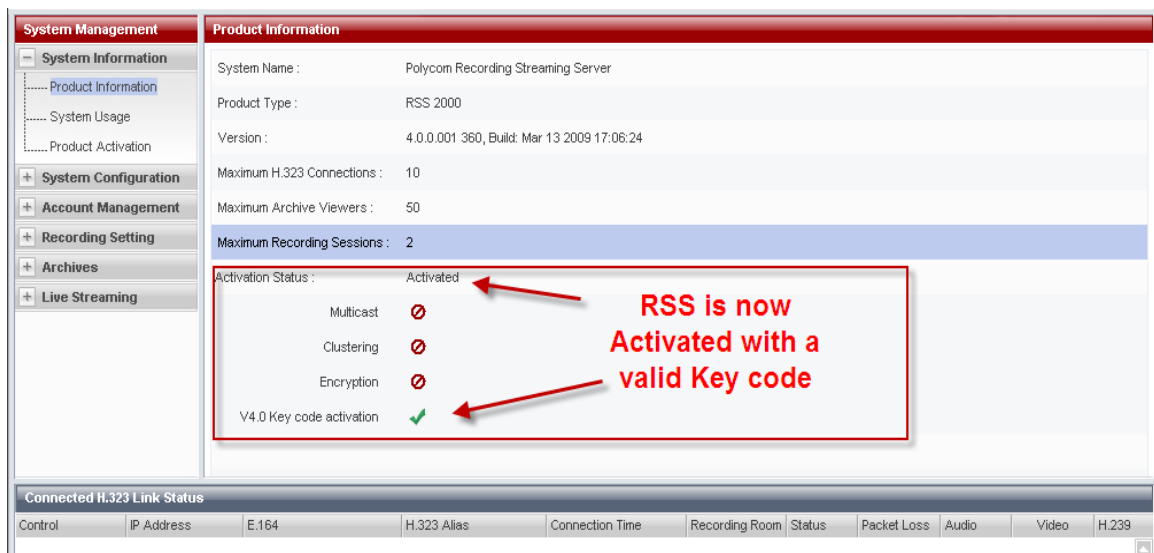
***Version:**

4.0
Need Help?

Model:



After entering the correct K keycode and U keycode the **System Information** → **Product Information** section will display Activation Status: Activated. The Key code activation will also have a green check mark next to it as well as any of the other features (Multicast, Clustering, and Encryption) that were ordered and paid for. The Multicast, Clustering, and Encryption features were not purchased so they will display a “not” type symbol and will not be activated. The RSS 2000 will be ready for use.



- Go to **System Management** → **System Configuration** → **Gatekeeper Settings** and define the Gatekeeper Settings as necessary. In this case the Gatekeeper is the Polycom

CMA. In the screen capture below the RSS 2000 is already registered with the Polycom CMA, **Registered** is displayed in green.

POLYCOM | RSS 2000

Copyright 2006 Polycom Inc. All Rights Reserved. RSS IP: 135.9.88.60 Logout

System Management

- System Information
- System Configuration**
 - IP Settings
 - Gatekeeper Settings**
 - User Customization
 - Backup/Delete Settings
 - Clustering Settings
 - System Settings
 - Logger Settings
 - Upgrade/Reset System
 - SSL/Certification
- Account Management
- Recording Setting
- Archives

Gatekeeper Settings

☒ Register to Gatekeeper **Registered**

Gatekeeper IP Address : 135.9.88.45

System Prefix/E.164 : 81888

Recording without H.239 Prefix : 6

Play Prefix : 5

Recording with H.239 Prefix : 4

System H.323 Alias : RSS-SIL

Gatekeeper Port : 1719

Gatekeeper Registration mode : Others—No hunting

Save Clear

Connected H.323 Link Status

Control	IP Address	E.164	H.323 Alias	Connection Time	Recording Room	Status	Packet Loss	Audio	Video	H.239
---------	------------	-------	-------------	-----------------	----------------	--------	-------------	-------	-------	-------

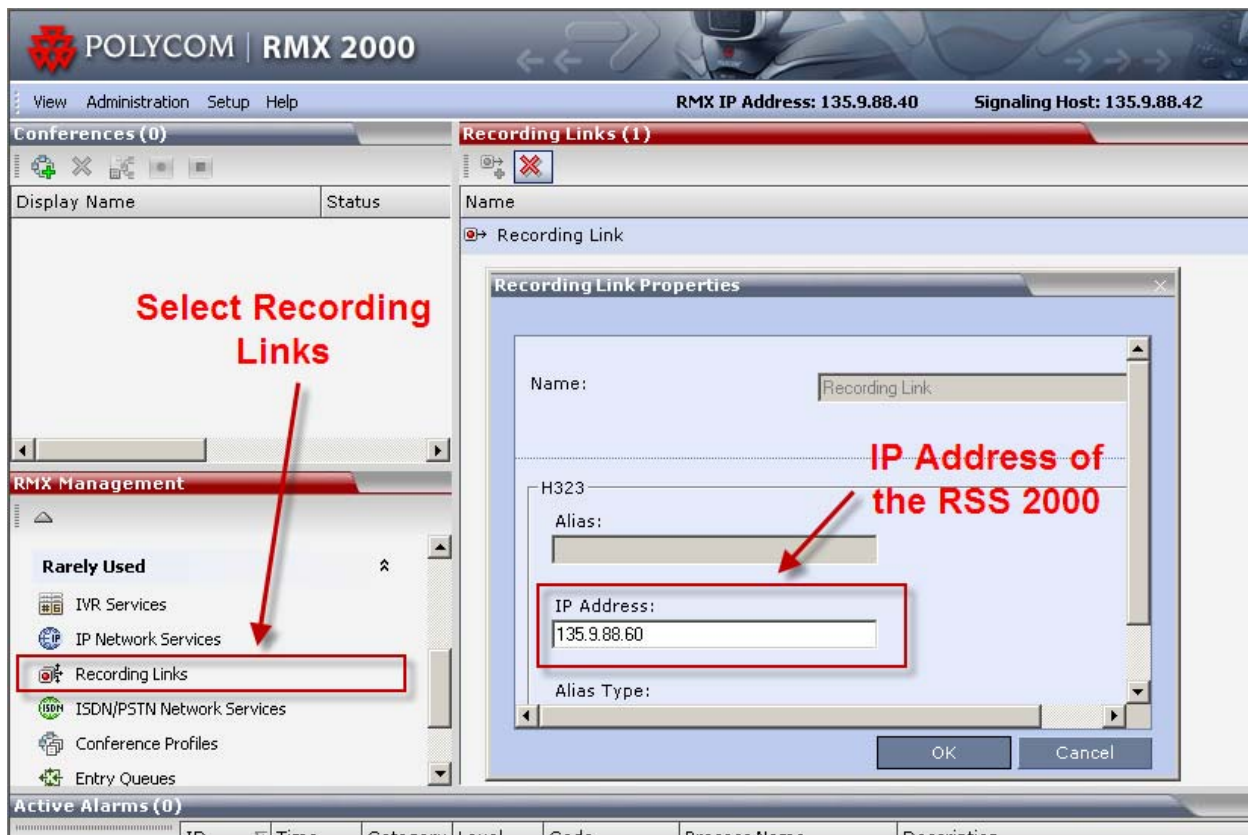
10. Define the rest of the System Management options in the list as deemed necessary.

7. Configuring the RMX to Enable Recording

Recording conferences is enabled via a Recording Link on the RMX, which is a dial-out connection from the conference to the recording system. Recording can start automatically, when the first participant connects to a conference, or on request, when the RMX user or conference chairperson initiates it.

Use the RMX's Recording Link function to initiate a recording connection with the RSS 2000 and record RMX conferences, or add the RSS as a participant in an RMX conference.

Before using the RMX to perform recording, you must first set Recording Link parameters and the address of the RSS 2000 server on the RMX. Select **Recording Links** from the **Rarely Used** section and click on the green plus (New Recording Link). Enter an appropriate **Name**, an **Alias** if desired, and the **IP Address** of the RSS 2000. Also enter an Alias Type if desired.



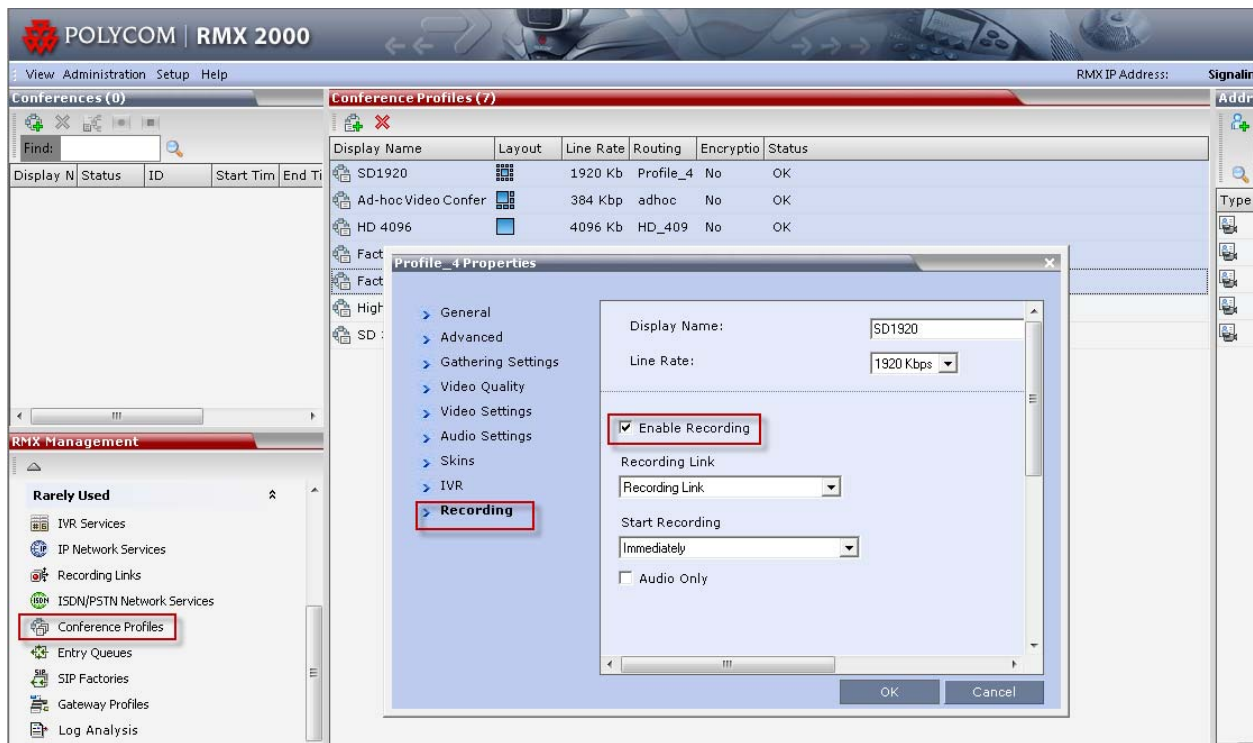
The RMX will then establish a connection to the desired RSS 2000 when a conference is started. Depending on the RMX's settings, the RSS 2000 can support two types of recording methods: automatically activated conference recordings, or recordings initiated by MCU operators and conference chairperson participants. The RSS 2000 records the audio/video bit streams transmitted by the RMX. It should be noted that RMXs are used to perform H.239 dual-stream recording. By default, all conferences, Entry Queues, and Meeting Rooms launched on the RMX 2000 have H.239 capabilities. The RMX supports only H.239, so this is not a concern for recording RMX conferences. Other devices, like the Media Gateway Controller and many Polycom endpoints, support H.239 and the proprietary People + Content standard. In these cases, ensure that the device has H.239 enabled as the RSS cannot record the proprietary People + Content protocol.

When an RMX is used to perform a recording, the resulting files will be named according to the following rule: the RMX's Recorded Conference Name + Recording time stamp (Date & Time). For instance, if a conference from the RMX is being recorded and the conference name is set to 'Demo' performs a recording at 10:15 on August 01, 2011, the resulting file will have the name "Demo_AUG_01_2011_10:15".

7.1. Enabling the Recording in the Conference Profile

In the **RMX Management** pane, click the **Conference Profiles** button. The **Conference Profiles** list is displayed. Create a new profile by clicking the green plus button (**New Profile**) or

modify an existing profile by double-clicking or right-clicking an existing profile and then selecting **Profile Properties**. In the **Profile Properties** dialog box, click the **Recording** tab. Select the **Enable Recording** check box and select desired Start Recording option. Click **OK**.



7.2. Managing the Recording Process

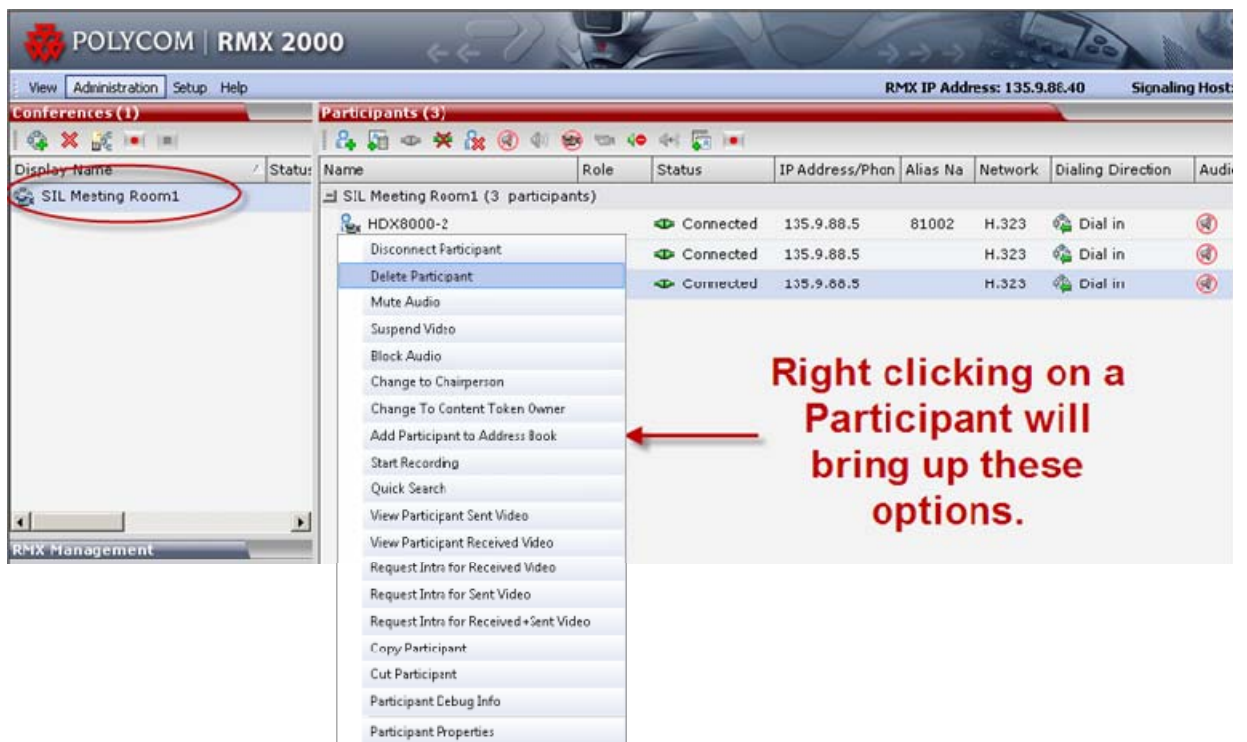
When a conference is started and recording is enabled in its Profile, the system will automatically start the recording if the **Start Recording** parameter is set to **immediately**. If it is set to **Upon Request**, the system waits for the chairperson or RMX user's request. Once the recording is initiated for a conference, the RMX connects to the Recording device (RSS 2000) using the default Recording Link. The connection that is created between the conference and the recording device is represented as a special participant (Recording) which represents the Recording Link. Once the recording has started, the recording process can be stopped and restarted from the Chairperson's endpoint (using DTMF codes) or from the RMX Web Client. After the recording process has finished, the recording can be identified in the RSS 2000 by its RMX conference name.

7.2.1. Using the RMX Web Client to Manage the Recording Process

When logged into the RMX and a conference is active you will see under Display Name the name of the conference(s). In this case it is SIL Meeting Room1. Click on it once. This will bring up the participants that are in this conference.

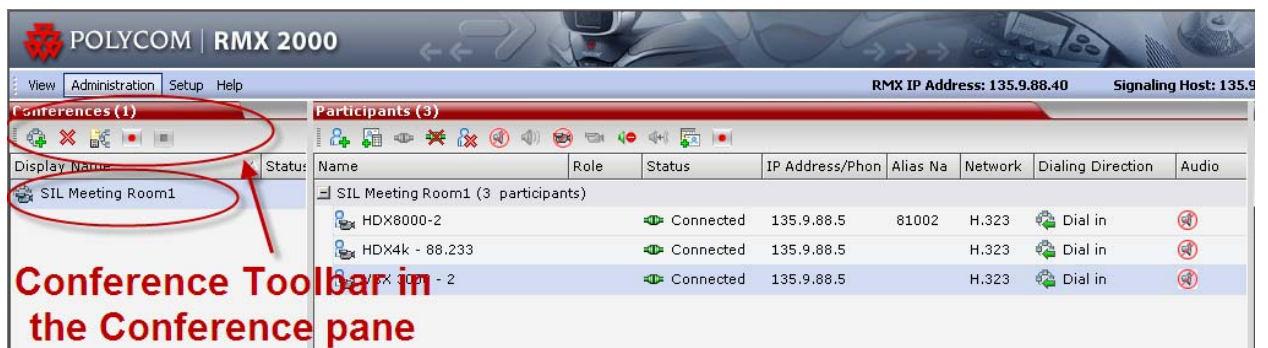
To manage the recording process using the right-click menu:

Right-click the **Recording** participant in the conference and select one of the options.



To manage the recording process using the Conference toolbar:

In the **Conferences** pane, click one of the buttons (explained below) in the Conference toolbar. **Note:** The recording buttons will only be displayed in the conference toolbar for an RMX that is recording-enabled.



Button	Description
	Start/Resume recording. This button toggles with the <i>Pause</i> button.
	Stop recording.
	Pause recording. This button toggles with the <i>Start/Resume</i> button.

Conferences List - Recording Toolbar buttons

To Manage the Recording Process using DTMF Codes:

By entering the appropriate DTMF code on the endpoint, the chairperson can **Stop** the recording (*74), **Pause** it (*75), or **Start/Resume** the recording (*73). For more information on managing the recording process via DTMF codes, see the *RSS 2000 User's Guide*.

For additional details please refer to the Polycom product users guides concerning how to set up an RSS 2000 and RMX 2000 Recording Link.

8. General Test Approach and Test Results

Interoperability testing included making point-to-point and multipoint calls. In addition, various features including hold, transfer and conference were tested on these calls. The testing was successfully concluded and it was not necessary to correct equipment deficiencies or failures.

9. Verification

This section provides the tests that can be performed to verify proper configuration of Avaya Aura® Communication Manager and Polycom RMX 2000 and RSS 2000.

9.1. Interoperability Testing

The interoperability testing included basic feature and serviceability testing.

Feature tests focused on:

- Multipoint audio and video calls
- Ad-hoc Conference calls
- Polycom RMX Conference

9.2. Verify Avaya Aura® Communication Manager

This is an example of the status of the H.323 signaling group and trunk group defined on Avaya Aura® Communication Manager. The status is **in-service** for the signaling group and **in-service/idle** for the trunk group. If the interface between the Avaya Aura® Communication Manager and RMX was incorrectly administered or if there is a network problem the status would be **out-of-service**.

```
status signaling-group 32
```

STATUS SIGNALING GROUP

```
Group ID: 32
Group Type: h.323
```

```
Active NCA-TSC Count: 0
Active CA-TSC Count: 0
```

```
Group State: in-service
```

```
status trunk 32
```

Page 1

TRUNK GROUP STATUS

Member	Port	Service State	Mtce Connected Ports Busy
0032/001	T00350	in-service/idle	no
0032/002	T00351	in-service/idle	no
0032/003	T00352	in-service/idle	no
0032/004	T00353	in-service/idle	no
0032/005	T00354	in-service/idle	no
0032/006	T00355	in-service/idle	no
0032/007	T00356	in-service/idle	no
0032/008	T00357	in-service/idle	no
0032/009	T00358	in-service/idle	no
0032/010	T00359	in-service/idle	no
0032/011	T01039	in-service/idle	no
0032/012	T01040	in-service/idle	no
0032/013	T01041	in-service/idle	no
0032/014	T01042	in-service/idle	no

9.2.1. Verify Ad-hoc Video

Validate that there are **Ad-hoc Video Conferencing Ports** available.

display capacity			Page	7 of	13
SYSTEM CAPACITY					
		Used	Available	System Limit	

TRUNKS					
DS1 Circuit Packs:	2	520	522		
DS1 With Echo Cancellation:	0	522	522		
ICHT For ISDN/SIP Trunks:	13	9986	9999		
ISDN CBC Service Selection Trunks:	0	200	200		
Trunk Groups:	88	1912	2000		
Trunk Ports:	14653	9347	24000		
H.323 Trunks (included in 'Trunk ports'):	328	11672	12000		
Remote Office Trunks (included in 'Trunk ports'):	0	12000	12000		
SBS Trunks (included in 'Trunk ports'):	0	1000	1000		
SIP Trunks (included in 'Trunk ports'):	14278	9722	24000		
Ad-hoc Video Conferencing Ports:	130	23870	24000		

Verify the **video-bridge** is in-service (**in-svc**).

list video-bridge					
VIDEO BRIDGES					
No.	Name	Ports	Type	Status	Network Region
32	Ad-hoc Video Bridge - RMX	80	H.323	in-svc	1

Verify the **PRIORITY CONFERENCE STATUS** and **STANDARD CONFERENCE STATUS**. This screen will help identify some issues with Ad-hoc conference calls by displaying pertinent data including **Call Rate**, **Conferences Available**, **Ports Available**, etc....

status video-bridge 32					
VIDEO BRIDGE STATUS					
Name: Ad-hoc Video Bridge - RMX			Ports Used: 0 of 80		
Bridge Status: in-service			Network Region: 1		
PRIORITY CONFERENCE STATUS					
Call Rate: 1920 Kbits Maximum			Ports Available: 40 of 40		
Conferences Available: 40 of 400			Ports Rsvd per Conf: 1		
Conference Failure Rate: 0 of 0			Participant Failure Rate: 0 of 0		
STANDARD CONFERENCE STATUS					
Call Rate: 384 Kbits Maximum			Ports Available: 40 of 40		
Conferences Available: 40 of 400			Ports Rsvd per Conf: 1		
Conference Failure Rate: 0 of 0			Participant Failure Rate: 0 of 0		

9.3. Verify Polycom RMX

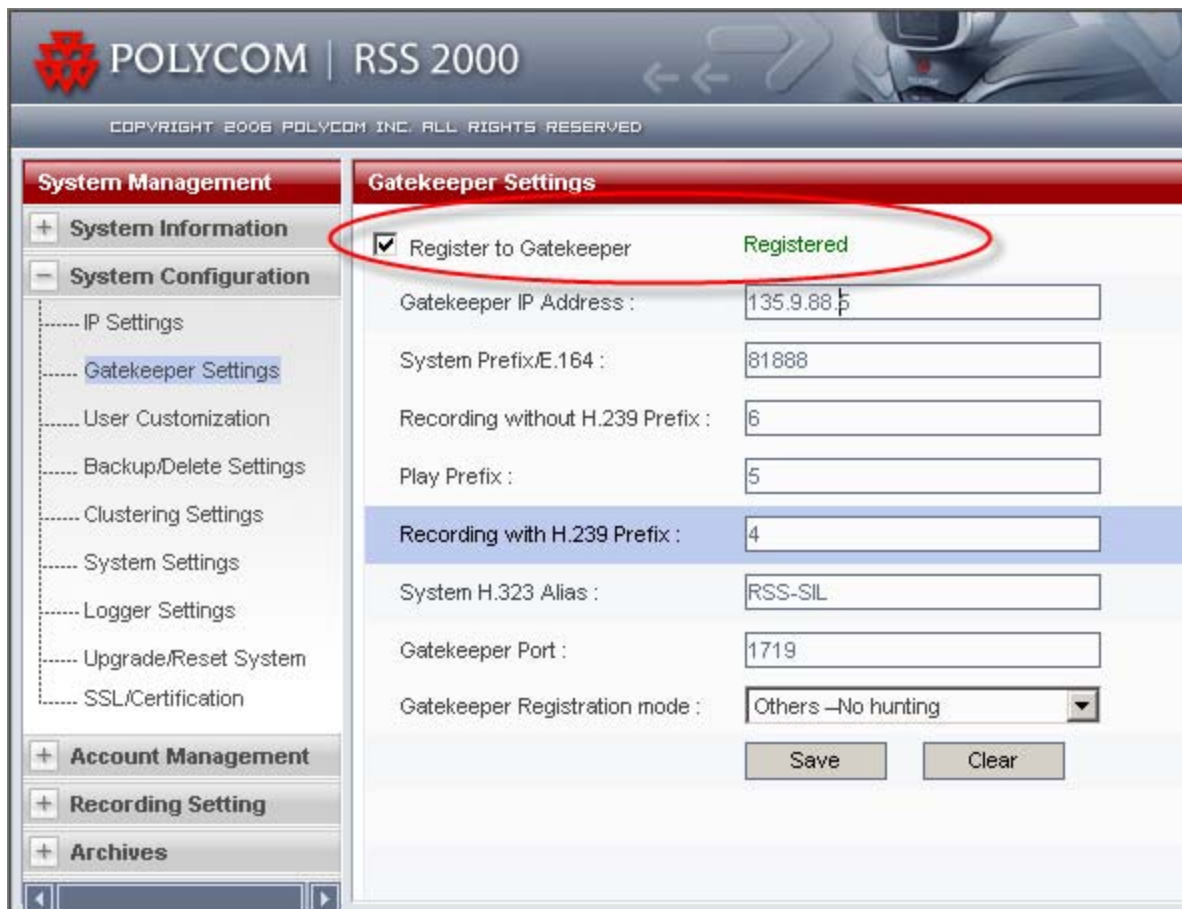
Below is an example of the RMX interface properly configured with the Avaya Aura® Communication Manager Gatekeeper. Log in to the RMX web interface and select the **Signaling Monitor** option under **RMX Management**. Then double click on the Signal Monitor of choice in the list. After double clicking the Properties window will open. The **Connection State** will display **GK_Registered** if connected properly with the Avaya Aura® Communication Manager otherwise the **Connection State** will be blank.

The screenshot displays the Polycom RMX 2000 web interface. The top navigation bar includes 'View', 'Administration', 'Setup', and 'Help'. The main content area is divided into several sections. On the left, the 'RMX Management' sidebar is visible, with 'Signaling Monitor' highlighted. The main panel shows a table of signaling monitors. A red box highlights the 'SIL Westminster' entry. A red arrow points from this entry to the 'Properties' window that opens. The 'Properties' window shows the 'Connection State' as 'GK_Registered'. Below this, a table lists gatekeepers with their roles and IP addresses.

Role	ID	Name	IP Address
Active			135.9.88.5
Backup			135.9.88.2
Backup			0.0.0.0
Backup			0.0.0.0
Backup			0.0.0.0

9.4. Verify Polycom RSS

Log in to the RSS web interface and go to **System Management** → **System Configuration** → **Gatekeeper Settings** to check the status of the registration. In this example the Gatekeeper is the Avaya Aura® Communication Manager and the RSS 2000 is **registered**. If the RSS is not registered the field next to Register to Gatekeeper would be blank.



The screenshot displays the Polycom RSS 2000 web interface. The top header shows the Polycom logo and 'RSS 2000'. Below the header, a navigation menu on the left includes 'System Management' and 'System Configuration'. The 'System Configuration' section is expanded, showing various settings like IP Settings, Gatekeeper Settings, User Customization, Backup/Delete Settings, Clustering Settings, System Settings, Logger Settings, Upgrade/Reset System, and SSL/Certification. The 'Gatekeeper Settings' page is active, showing a list of settings. The 'Register to Gatekeeper' checkbox is checked, and the status is 'Registered'. Other settings include Gatekeeper IP Address (135.9.88.5), System Prefix/E.164 (81888), Recording without H.239 Prefix (6), Play Prefix (5), Recording with H.239 Prefix (4), System H.323 Alias (RSS-SIL), Gatekeeper Port (1719), and Gatekeeper Registration mode (Others -No hunting). There are 'Save' and 'Clear' buttons at the bottom.

Setting	Value
Register to Gatekeeper	☒ Registered
Gatekeeper IP Address :	135.9.88.5
System Prefix/E.164 :	81888
Recording without H.239 Prefix :	6
Play Prefix :	5
Recording with H.239 Prefix :	4
System H.323 Alias :	RSS-SIL
Gatekeeper Port :	1719
Gatekeeper Registration mode :	Others -No hunting

10. Conclusion

The H.323 Video interoperability between Avaya Aura® Communication Manager Gatekeeper, Polycom RMX® 2000, and Polycom RSS 2000 has been tested and passed.

11. Additional References

Avaya references are available at <http://support.avaya.com>

Polycom references are available at <http://www.polycom.com/support/>

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