



# Setting Up a Serial (SMDI, MCI, or MD-110) PIMG Integration with Cisco Unity Connection

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## Setting Up a Serial (SMDI, MCI, or MD-110) PIMG Integration

### Task List for Serial (SMDI, MCI, or MD-110) PIMG Integration

Before doing the following tasks to integrate Unity Connection with the Serial phone system using PIMG units (media gateways), confirm that the Unity Connection server is ready for the integration after completing the server installation, following the tasks in the “[Installing Cisco Unity Connection](#)” chapter of the Install, Upgrade, and Maintenance Guide for Cisco Unity Connection, Release 11.x, available at [https://www.cisco.com/c/en/us/td/docs/voice\\_ip\\_comm/connection/11x/install\\_upgrade/guide/b\\_11xcuciumg/b\\_11xcuciumg\\_chapter\\_00.html](https://www.cisco.com/c/en/us/td/docs/voice_ip_comm/connection/11x/install_upgrade/guide/b_11xcuciumg/b_11xcuciumg_chapter_00.html).

- 1 Review the system and equipment requirements to confirm that all phone system and Unity Connection server requirements have been met. See the [Requirements](#) section.
- 2 Plan how the voice messaging ports are used by Unity Connection. See the [Planning the Usage of Voice Messaging Ports](#) chapter.
- 3 Program the phone system and extensions. See the [Programming Phone System for a Serial Integration](#) section.
- 4 Set up the PIMG units. See the [Setting Up Analog PIMG Units for a Serial Integration](#) section.
- 5 Create the integration. See the [Configuring Unity Connection for Integration with the Phone System](#), on page 20 section.
- 6 Test the integration. See the [Testing the Integration](#) chapter.
- 7 If this integration is a second or subsequent integration, add the applicable new user templates for the new phone system. See the [Adding New User Templates for Multiple Integrations](#) chapter.

## Requirements

This integration supports configurations of the following components:

### Phone System

- A phone system that supports the SMDI, MCI, or MD-110 serial protocols.
- For a Centrex phone system only:
  - A Centrex service SMDI package, with one SMDI 4-wire private data link connected to the external modem.
  - A type 202T or 212A external modem, set to 1200 baud.
- One or more of the applicable PIMG units. For details, see the "[Introduction](#)" chapter.
- The serial data port on the phone system connected to the serial port on the master PIMG unit through an RS-232 serial cable (which is available from Cisco).

Specifications for the serial cable are in *Connecting PBX-IP Media Gateway (PIMG) to the Serial Port of a PBX* at <http://www.dialogic.com/support/helpweb/mg/tn117.htm>.

We recommend that the serial cable have the following construction:

- A maximum of 50 feet (15.24 m) in length
- 24 AWG stranded conductors
- Low capacitance—for example, no more than 12 pF/ft (39.4 pF/m) between conductors
- At least 65 percent braided shield over aluminized polymer sleeve around conductors
- UL-recognized overall cable jacket insulation with low dielectric constant
- Braided shield fully terminated to and enclosed by a metal connector backshell
- Gold-plated connector contacts
- The voice messaging ports in the phone system connected by analog lines to the ports on the PIMG units.

We recommend that you connect the voice messaging ports on the phone system to the ports on the PIMG units in a planned manner to simplify troubleshooting. For example, the first phone system voice messaging port connects to the first port on the first PIMG unit, the second phone system voice messaging port connects to the second port on the first PIMG unit, and so on.

- The PIMG units connected to the same LAN or WAN that Unity Connection is connected to.
- If the PIMG units connect to a WAN, the requirements for the WAN network connections are:
  - For G.729a codec formatting, a minimum of 32.76 Kbps guaranteed bandwidth for each voice messaging port.
  - For G.711 codec formatting, a minimum of 91.56 Kbps guaranteed bandwidth for each voice messaging port.

- No network devices that implement network address translation (NAT).
- A maximum 200 ms one-way network latency.

## Unity Connection Server

- Unity Connection installed following the tasks in the “[Installing Cisco Unity Connection](#)” chapter of the Install, Upgrade, and Maintenance Guide for Cisco Unity Connection, Release 11.x, available at [https://www.cisco.com/c/en/us/td/docs/voice\\_ip\\_comm/connection/11x/install\\_upgrade/guide/b\\_11xcuciumg.html](https://www.cisco.com/c/en/us/td/docs/voice_ip_comm/connection/11x/install_upgrade/guide/b_11xcuciumg.html).
- A license that enables the applicable number of voice messaging ports.

## Programming Phone System for a Serial Integration

If you use programming options other than those supplied in the following procedure, the performance of the integration may be affected.



### Caution

In programming the phone system, do not send calls to voice messaging ports in Unity Connection that cannot answer calls (voice messaging ports that are not set to Answer Calls). For example, if a voice messaging port is set only to Perform Message Notification, do not send calls to it.

Do the following steps to program the phone system for a serial integration with Unity Connection

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- Step 1** Program the analog lines connecting to the voice messaging ports on the PIMG units as a multiline hunt group. Make sure that the phone system sends calls only to Unity Connection voice ports that are set to Answer Calls. Calls sent to a voice port not set to Answer Calls cannot be answered by Unity Connection and may cause other problems.
  - Step 2** Enable hookflash transfer capability on each analog line that connects to the voice messaging ports on the PIMG units.
  - Step 3** Enable caller ID (via SMDI, MCI, or MD-110) on each subscriber extension.
  - Step 4** For each subscriber extension, set the call forwarding options to the following:
    - Unrestricted source
    - Forward when the extension is not answered
    - Forward when the extension is busy
- 

## Setting Up Analog PIMG Units for a Serial Integration

Do the following procedures to set up the analog PIMG units that are connected to the phone system for a serial integration using the SMDI, MCI, or MD-110 protocol.

These procedures require that the following tasks have already been completed:

- The phone system is connected to the PIMG units using analog lines and the applicable RS-232 serial cable.
- The PIMG units are ready to be connected to the LAN or WAN.
- The PIMG units are connected to a power source.

Fields that are not mentioned in the following procedures must keep their default values. For the default values of all fields, see the manufacturer documentation for the PIMG units.

## Downloading PIMG Firmware Update Files for Analog PIMG Units

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- Step 1** On a Windows workstation with a high-speed Internet connection that have access to the PIMG units, go to the Voice and Unified Communications Downloads page at <http://software.cisco.com/download/navigator.html?mdfid=280082558&i=rm>.
- Note** To access the software download page, you must be signed in to Cisco.com as a registered user.
- This procedure describes the steps when using Internet Explorer as your web browser. If you are using a different web browser, the steps may differ.
- Step 2** In the tree control on the Downloads Home page, expand Unified Communications> **Unified Communications Applications** > **Messaging** > **Cisco Unity** and select **Cisco Unity Telephony Integration**.
- Step 3** On the Log In page, enter your username and password, then select **Log In**.
- Step 4** On the Select a Release page, under Latest Releases, select the most recent release.
- Step 5** In the right column, select the version of the firmware for analog PIMG units.
- Step 6** On the Download Image page, select **Download**.
- Step 7** On the Supporting Document(s) page, select **Agree**.
- Step 8** In the File Download dialog box, select **Save**.
- Step 9** In the Save As dialog box, browse to the Windows workstation that have access the PIMG units, browse to a directory where you want to save the file, and select **Save**.
- Step 10** In the Download Complete dialog box, select **Open**. The window for extracting the PIMG firmware update files appears.
- Step 11** Select **Extract**.
- Step 12** In the Extract dialog box, browse to the directory where you want the extracted files, and select **Extract**.
- Step 13** Close the window for the extracting application.
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## Setting Up Analog PIMG Units (Firmware Version 6.x)

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- Step 1** On the Windows workstation, add a temporary route to enable access to the PIMG units.
- a) On the Windows Start menu, select **Run**.
  - b) Enter **cmd**, and press **Enter**. The Command Prompt window appears.
  - c) At the command prompt, enter **route add 10.12.13.74 <IP Address of Workstation>**, and press **Enter**.

For example, if the IP address of the workstation is 198.1.3.25, enter “route add 10.12.13.74<space>198.1.3.25” in the Command Prompt window.

d) Close the Command Prompt window.

**Step 2** Connect a PIMG unit to the network.

**Step 3** In the web browser, go to **http://10.12.13.74**.

**Step 4** To sign in, enter the following case-sensitive settings.

**Table 1: Sign-in Settings**

Field	Setting
Username	Enter <b>admin</b> .
Password	Enter <b>IpodAdmin</b> .

**Step 5** Select **OK**.

**Step 6** On the System menu, select **Upgrade**.

**Step 7** On the Upgrade page, select **Browse**.

**Step 8** In the Choose File dialog box, browse to the directory on the Windows workstation that has the extracted PIMG firmware update files.

**Step 9** Select **Ls\_<xx> .app** (where <xx> is multiple digits), and select **Open**.

**Step 10** On the Upgrade page, select **Install File**.

**Step 11** After the file is installed, a message prompting you to restart the PIMG unit appears. Select **Cancel**. Do not restart the PIMG unit until you are instructed to do so later in this procedure, even if the file installation fails. Restarting the PIMG unit at this step may prevent the PIMG unit from functioning correctly.

**Step 12** Repeat **Step 6** through **Step 11** for the file **Run\_<xx> .dsp**.

**Step 13** On the System menu, select **Upgrade**.

**Step 14** On the Upgrade page, under Import, select **Browse**.

**Step 15** In the Choose File dialog box, browse to the file **Ls\_<xx> .fsh**.

**Step 16** Select **Ls\_<xx> .fsh**, and select **Open**.

**Step 17** On the Upgrade page, select **Install File**.

**Step 18** After the file is installed, a message prompting you to restart the PIMG unit appears. Select **OK**.

**Step 19** In the web browser, go to **http://10.12.13.74**.

**Step 20** To sign in, enter the following case-sensitive settings.

**Table 2: Sign-in Settings**

Field	Setting
Username	Enter <b>admin</b> .
Password	Enter <b>IpodAdmin</b> .

**Step 21** Select **OK**.

**Step 22** If your Unity Connection system must have an RTP port range of 16384 to 32767, do the following substeps. Otherwise, continue to [Step 23](#).

You must set the RTP port range for the PIMG units if your system uses an RTP port range of 16384 to 32767. Otherwise, Unity Connection cannot answer calls and callers hear ringing or silence.

**Note** The default RTP port range for PIMG units is 49000 to 50000. Some Unity Connection configurations require a different RTP port range.

- a) On the Configuration menu, select **Import/Export**.
- b) On the Import/Export page, under Export Files, select **Export All Settings**.
- c) In the File Download dialog box, select **Save**.
- d) In the Save As dialog box, browse to the Windows workstation that has access to the PIMG units, browse to a directory where you want to save the file, and select **Save**.
- e) In the Download Complete dialog box, select **Open**. Notepad opens the file Config.ini that you saved.
- f) Locate the line with the following parameter:

```
gwRTPStartPort
```

- g) Change the value of the parameter to **16384** so that the line reads as follows:

```
gwRTPStartPort = 16384
```

- h) Locate the line with the following parameter:

```
gwRTPEndPort
```

- i) Change the value of the parameter to **32767** so that the line reads as follows:

```
gwRTPEndPort = 32767
```

- j) Save the file, and exit Notepad.
- k) On the Configuration menu of the PIMG unit, select **Import/Export**.
- l) On the Import/Export page, under Browse for Import File, select **Browse**.
- m) In the Choose File dialog box, browse to the file Config.ini that you saved.
- n) Select **Config.ini**, and select **Open**.
- o) On the Import/Export page, select **Import File**.
- p) When prompted to restart the PIMG unit, select **OK**.
- q) When the PIMG unit has restarted, in the web browser, go to **http://10.12.13.74**.
- r) To sign in, enter the following case-sensitive settings.

**Table 3: Sign-in Settings**

Field	Setting
Username	Enter <b>admin</b> .
Password	Enter <b>IpodAdmin</b> .

s) Select **OK**.

**Step 23** On the System menu, select **Password**.

**Step 24** On the Change Password page, enter the following settings.

**Table 4: Change Password Page Settings**

Field	Setting
Old Password	Enter <b>IpodAdmin</b> . (This setting is case sensitive.)
New Password	Enter your new password. (This setting is case sensitive.)
Confirm Password	Enter your new password. (This setting is case sensitive.)

**Step 25** Select **Change**.

**Step 26** On the Configuration menu, select **Mgmt Protocols**.

**Step 27** On the Management Protocols page, enter the following settings.

**Table 5: Management Protocols Page Settings**

Field	Settings
E-mail Alarms Enabled	Select <b>No</b> .
SNMP Traps Enabled	Select <b>No</b> .

**Step 28** Select **Submit**.

**Step 29** On the Configuration menu, select **Routing Table**.

**Step 30** On the Routing Table page, under Router Configuration, select **VoIP Host Groups**.

**Step 31** Under VoIP Host Groups, enter the following settings for the first VoIP Host Group.

**Table 6: First VoIP Host Group Settings**

Field	Settings
Name	Accept the default or enter another descriptive name of the VoIP host group.
Load-Balanced	<i>(Unity Connection without a cluster)</i> Select <b>False</b> . <i>(Unity Connection with a cluster configured)</i> Select <b>False</b> .
Fault-Tolerant	<i>(Unity Connection without a cluster)</i> Select <b>False</b> . <i>(Unity Connection with a cluster configured)</i> Select <b>True</b> .

- Step 32** For Unity Connection without a cluster, under Host List, enter the host name or IP address of the Unity Connection server and the server port in the format <host name or IP address>:5060.  
For Cisco Unity Connection with a cluster configured, under Host List, enter the host name or IP address of the subscriber server (the second Unity Connection server that you installed) and the server port in the format <host name or IP address>:5060.
- Step 33** For Unity Connection without a cluster, continue to [Step 35](#). For Unity Connection with a cluster configured, select **Add Host**.
- Step 34** In the second field, enter the host name or IP address of the publisher server (the first Unity Connection server that you installed) and the server port in the format <host name or IP address>:5060.  
Do not add a third host under Host List or a second host group under VoIP Host Groups. Otherwise, the Unity Connection cluster may not function correctly.
- Step 35** Select **Submit**.
- Step 36** Under Router Configuration, select **TDM Trunk Groups**.
- Step 37** Under TDM Trunk Groups, select **Add Trunk Group**.
- Step 38** Under TDM Trunk Groups, enter the following settings for the first TDM trunk group.

**Table 7: First TDM Trunk Group Settings (All Calls)**

Field	Settings
Name	Enter <b>All_Calls</b> or another unique name. This TDM trunk group handles all calls to and from the phone system.
Selection Direction	Select <b>Ascending</b> .
Selection Mode	Select <b>Linear</b> .
Port/Channel Content	Enter the numbers of the PIMG ports that handle all calls. For example, enter "*" for all PIMG ports, or enter "1-6" for the first six PIMG ports.

- Step 39** Select **Submit**.
- Step 40** Under Router Configuration, select **Inbound VoIP Rules**.
- Step 41** Under Inbound VoIP Rules, uncheck the **Enabled** check box for the default rule.
- Step 42** Select **Add Rule**.
- Step 43** Under Inbound VoIP Rules, enter the following settings for the first new inbound VoIP rule.

**Table 8: First New Inbound VoIP Rule Settings (All Calls)**

Field	Settings
Enable	Check this check box.



Field	Settings
Rule Label	<p>Do one of the following:</p> <ul style="list-style-type: none"> <li>If you use CPID manipulation, enter <b>All_UC_Calls</b> or another name.</li> </ul> <p>This inbound VoIP rule handles all outbound calls from Unity Connection.</p> <ul style="list-style-type: none"> <li>If you cannot use CPID manipulation, enter <b>UC_Calls_and_Messages</b> or another name.</li> </ul> <p>This inbound VoIP rule handles all outbound calls and MWI calls from Unity Connection.</p>
Request Type	<p>Do one of the following:</p> <ul style="list-style-type: none"> <li>If you use CPID manipulation, select <b>Call</b>.</li> <li>If you cannot use CPID manipulation, select <b>Any</b>.</li> </ul>
Originating VoIP Host Address	Enter *.

- Step 44** Under Inbound VoIP Request Matching, enter the following settings. The rule that you created in [Step 43](#) must be selected. Otherwise, any changes you make apply to another rule.

**Table 9: Inbound VoIP Request Matching Settings**

Field	Settings
Calling Number	Enter the applicable matching rule used. For example, enter "*" for all.
Calling Name	Enter the applicable matching rule used. For example, enter "*" for all.
Called Number	Enter the applicable matching rule used. For example, enter "*" for all.
Called Name	Enter the applicable matching rule used. For example, enter "*" for all.
Redirect Number	Enter the applicable matching rule used. For example, enter "*" for all.
Redirect Name	Enter the applicable matching rule used. For example, enter "*" for all.

- Step 45** Under Outbound Routes, enter the following settings. The rule that you created in [Step 43](#) must be selected. Otherwise, any changes you make apply to another rule.

**Table 10: Outbound Routes Settings**

Field	Settings
<b>Device Selection</b>	
Outbound Destination	Select <b>TDM</b> .
Trunk Group	Select the name of the TDM trunk group that you created for outbound calls in <a href="#">Step 38</a> . For example, select "All_Calls."
<b>CPID Manipulation</b>	
Calling Number	Enter <b>S</b> .
Calling Name	Enter <b>S</b> .
Called Number	Enter <b>D</b> .
Called Name	Enter <b>D</b> .
Redirect Number	Enter <b>R</b> .
Redirect Name	Enter <b>R</b> .
<b>Select Primary/Alternate Route</b>	
Primary	Select <b>Primary</b> .

**Step 46** If you cannot use CPID manipulation, skip to [Step 50](#). Otherwise, under Inbound VoIP Rules, select **Add Rule**.

**Step 47** Under Inbound VoIP Rules, enter the following settings for the second new inbound VoIP rule.

**Table 11: Second New Inbound VoIP Rule Settings (MWIs)**

Field	Settings
Enable	Check this check box.
Rule Label	Enter UC_MWIs or another name. This inbound VoIP rule handles all MWIs from Unity Connection.
Request Type	Select <b>Message</b> .
Originating VoIP Host Address	Enter *.

- Step 48** Under Inbound VoIP Request Matching, enter the following settings.  
The rule that you created in [Step 47](#) must be selected. Otherwise, any changes you make apply to another rule.

**Table 12: Inbound VoIP Request Matching Settings**

Field	Settings
Calling Number	Enter the applicable matching rule used. For example, enter "*" for all.
Calling Name	Enter the applicable matching rule used. For example, enter "*" for all.
Called Number	Enter the applicable matching rule used. For example, enter "*" for all.
Called Name	Enter the applicable matching rule used. For example, enter "*" for all.
Redirect Number	Enter the applicable matching rule used. For example, enter "*" for all.
Redirect Name	Enter the applicable matching rule used. For example, enter "*" for all.

- Step 49** Under Outbound Routes, enter the following settings.  
The rule that you created in [Step 47](#) must be selected. Otherwise, any changes you make apply to another rule.

**Table 13: Outbound Routes Settings**

Field	Settings
<b>Device Selection</b>	
Outbound Destination	Select <b>TDM</b> .
Trunk Group	Select the name of the TDM trunk group that you created for outbound calls in <a href="#">Step 38</a> . For example, select "All_Calls."
<b>CPID Manipulation</b>	
Calling Number	Enter <b>S</b> .
Calling Name	Enter <b>S</b> .
Called Number	Enter <b>D</b> .
Called Name	Enter <b>D</b> .
Redirect Number	Enter <b>R</b> .
Redirect Name	Enter <b>R</b> .
<b>Select Primary/Alternate Route</b>	

Field	Settings
Primary	Select <b>Primary</b> .

**Step 50** Select **Submit**.

**Step 51** Under Router Configuration, select **Inbound TDM Rules**.

**Step 52** Under Inbound TDM Rules, enter the following settings for the first inbound TDM rule.

**Table 14: First Inbound TDM Rule Settings**

Field	Settings
Enable	Check this check box.
Rule Label	Enter <b>Inbound_Rule_1</b> or another name. This inbound TDM rule handles all incoming calls from the phone system.
Request Type	Select <b>Call</b> .
Trunk Group	Select the name of the TDM trunk group that you created for incoming calls from the phone system in <a href="#">Step 38</a> . For example, select "All_Calls."

**Step 53** Under Inbound TDM Request Matching, enter the following settings.

The rule that you created in [Step 52](#) must be selected. Otherwise, any changes you make apply to another rule.

**Table 15: Inbound TDM Request Matching Settings**

Field	Settings
Calling Number	Enter the applicable matching rule used. For example, enter "*" for all.
Calling Name	Enter the applicable matching rule used. For example, enter "*" for all.
Called Number	Enter the applicable matching rule used. For example, enter "*" for all.
Called Name	Enter the applicable matching rule used. For example, enter "*" for all.
Redirect Number	Enter the applicable matching rule used. For example, enter "*" for all.
Redirect Name	Enter the applicable matching rule used. For example, enter "*" for all.

**Step 54** Under Outbound Routes, enter the following settings.

The rule that you created in [Step 52](#) must be selected. Otherwise, any changes you make apply to another rule.

**Table 16: Outbound Routes Settings**

Field	Settings
<b>Device Selection</b>	
Outbound Destination	Select <b>VoIP</b> .
Host Group	Select the name of the VoIP host group that you created for Unity Connection in <a href="#">Step 31</a> .
<b>CPID Manipulation</b>	
Calling Number	Enter <b>S</b> .
Calling Name	Enter <b>S</b> .
Called Number	Enter <b>D</b> .
Called Name	Enter <b>D</b> .
Redirect Number	Enter <b>R</b> .
Redirect Name	Enter <b>R</b> .
<b>Select Primary/Alternate Route</b>	
Primary	Select <b>Primary</b> .

**Step 55** If you want to create more Inbound TDM rules, under Inbound TDM Rules, select **Add Rule**. Otherwise, continue to [Step 57](#).

Note that additional Inbound TDM rules are not necessary if you cannot use CPID manipulation.

**Step 56** Repeat [Step 52](#) through [Step 55](#) for all remaining inbound TDM rules that you want to create.

**Step 57** Select **Submit**.

**Step 58**

**Step 59**

**Step 60**

**Step 61** On the Configuration menu, select **TDM > General**.

**Step 62** On the TDM General Settings page, enter the following settings.

**Table 17: TDM General Settings Page Settings**

Field	Settings
PCM Coding	Select <b>uLaw</b> .

Field	Settings
Minimum Call Party Delay (ms)	Enter <b>500</b> .
Maximum Call Party Delay (ms)	Enter <b>2000</b> .
Dial Digit on Time (ms)	Enter <b>100</b> .
Dial Inter-Digit Time (ms)	Enter <b>100</b> .
Dial Pause Time (ms)	Enter <b>2000</b> .
Turn MWI On FAC	Leave this field blank.
Turn MWI Off FAC	Leave this field blank.
Outbound Call Connect Timeout (ms)	Enter <b>10000</b> .
Wait for Ringback/Connect on Blind Transfer	Select <b>Yes</b> .
Hunt Group Extension	Enter the pilot number of the Unity Connection voice messaging ports.

**Step 63** Select **Submit**.

**Step 64** On the Configuration menu, select **TDM > Port Enable**.

**Step 65** On the TDM Port Enabling page, select **No** for the ports that you want to disable on the PIMG unit.

**Step 66** Confirm that **Yes** is selected for all other ports on the PIMG unit.

**Step 67** Select **Submit**.

**Step 68** On the Configuration menu, select **VoIP > General**.

**Step 69** On the VoIP General Settings page, enter the following settings.

**Table 18: VoIP General Settings Page Settings**

Field	Setting
<b>User-Agent</b>	
Host and Domain Name	Enter the host and domain name of the PIMG unit.
Transport Type	Select <b>UDP</b> .
Call as Domain Name	Select <b>No</b> .

<b>Field</b>	<b>Setting</b>
Invite Expiration (sec)	Enter <b>120</b> .
<b>Server</b>	
DNS Server Address	Enter the IP Address of the Domain Name Server that the PIMG unit uses.
Registration Server Address	Leave this field blank.
Registration Server Port	Enter <b>5060</b> .
Registration Expiration (sec)	Enter <b>3600</b> .
<b>TCP/UDP</b>	
UDP/TCP Transports Enabled	Select <b>Yes</b> .
TCP/UDP Server Port	Enter <b>5060</b> .
<b>Proxy</b>	
Primary Proxy Server Address	Leave this field blank.
Primary Proxy Server Port	Not applicable. Leave the default setting.
Backup Proxy Server Address	Not applicable. Leave the default setting.
Backup Proxy Server Port	Not applicable. Leave the default setting.
Proxy Query Interval	Enter <b>10</b> .
<b>Timing</b>	
T1 Time (ms)	Enter <b>400</b> .
T2 Time (ms)	Enter <b>3000</b> .
<b>Monitoring</b>	
Monitor Call Connections	Select <b>No</b> .

**Step 70** Select **Submit**.

**Step 71** On the Configuration menu, select **VoIP > Media**.

**Step 72** On the VoIP Media Settings page, enter the following settings.

**Table 19: VoIP Media Settings Page Settings**

Field	Settings
<b>Audio</b>	
Audio Compression	Select the preferred codec for audio compression.
RTP Digit Relay Mode	Select <b>RFC2833</b> .
Signaling Digit Relay Mode	Select <b>Off</b> .
Voice Activity Detection	Select <b>Off</b> .
Frame Size	Select the applicable setting: <ul style="list-style-type: none"> <li>• G.711—<b>20</b></li> <li>• G.729AB—<b>10</b></li> </ul> Failure to use the correct setting results in recorded messages containing nothing but silence.
Frames Per Packet	Select the applicable setting: <ul style="list-style-type: none"> <li>• G.711—<b>1</b></li> <li>• G.729AB—<b>2</b></li> </ul> Failure to use the correct setting results in recorded messages containing nothing but silence.

**Step 73** Select **Submit**.

**Step 74** On the Configuration menu, select **VoIP > QOS**.

**Step 75** On the VoIP QOS Configuration page, enter the following settings.

**Table 20: VoIP QOS Configurative Page Settings**

Field	Settings
Call Control QOS Byte	Enter <b>104</b> .
RTP QOS Byte	Enter <b>184</b> .



- Step 76** Select **Submit**.
- Step 77** On the Configuration menu, select **IP**.
- Step 78** On the IP Settings page, enter the following settings.

**Table 21: IP Settings Page Settings**

Field	Settings
Client IP Address	Enter the new IP address you want to use for the PIMG unit. (This is the IP address that you enter in Cisco Unity Connection Administration when you create the integration.)
Client Subnet Mask	Enter the new subnet mask, if the subnet mask is different from the default IP address.
Default Network Gateway Address	Enter the IP address of the default network gateway router that the PIMG units use.
BOOTP Enabled	Select <b>No</b> .

- Step 79** Select **Submit**.
- Step 80** On the Configuration menu, select **Serial > General**.
- Step 81** On the Serial Port, COM 1 page, enter the following settings.

**Table 22: Serial Port, COM 1 Page Settings**

Field	Settings
Serial Port Baud Rate	Select the setting that is configured on the phone system. The default setting is 9600.
Serial Port Parity	Select the setting that is configured on the phone system. The default setting is None.
Serial Port Data Bits	Select the setting that is configured on the phone system. The default setting is 8.
Serial Port Stop Bits	Select the setting that is configured on the phone system. The default setting is 1.

- Step 82** Select **Submit**.
- Step 83** On the Configuration menu, select **Serial > Switch Protocol**.
- Step 84** On the Switch Protocol page, enter the following settings.

**Table 23: Switch Protocol Page Settings**

Field	Settings
<b>Serial Port, COM 1</b>	
Serial Mode	Select the applicable setting: <ul style="list-style-type: none"> <li>• <b>Master</b>—Select this setting when this PIMG unit is connected to the data link serial cable from the phone system. There can be only one master PIMG unit in a phone system integration.</li> <li>• <b>Slave</b>—Select this setting when this PIMG unit is not connected to the data link serial cable from the phone system. There can be multiple slave PIMG units in a phone system integration.</li> </ul>
Serial Interface Protocol	Select the serial protocol that your phone system uses: <ul style="list-style-type: none"> <li>• <b>SMDI</b></li> <li>• <b>MCI</b></li> <li>• <b>MD-110</b></li> </ul>
Cpid Len	Select the applicable setting. Typically, the settings are 7 or 10.
Cpid Padding String	Enter the applicable string or leave this field blank. Typically, the setting is one of the following: <ul style="list-style-type: none"> <li>• A string of zeros, where the number of zeros matches the setting of the Cpid Len field.</li> <li>• A prefix that is provided by the Centrex service.</li> </ul>
Voice Mail Port Len	If the setting of the Serial Interface Protocol field is MD-110, enter <b>2</b> . Otherwise, accept the default of <b>7</b> .
System Number	Enter the applicable setting. Typically, the setting is 1.
MWI Response Timeout	Enter <b>2000</b> .
IP Address of Serial Server	If the PIMG unit is the master, this field is for display only. If the PIMG unit is a slave, enter the IP address of the master PIMG unit (the PIMG unit that is connected to the data link serial cable from the phone system).
Serial Cpid Expiration	Enter <b>2000</b> .
<b>Logical Extension Number</b>	

Field	Settings
1	If the setting of the Serial Interface Protocol field is MCI or MD-110, enter the extension number for each port on the PIMG unit.  If the setting of the Serial Interface Protocol field is SMDI, enter the logical port number. Typically, the setting is 1 for port 1, 2 for port 2, and so on beginning with the master PIMG unit and continuing through each of the slave PIMG units.
2	
3	
4	
5	
6	
7	
8	

**Step 85** Select **Submit**.

**Step 86** On the Configure menu, select **Tone Detection**.

**Step 87** On the Tone Detection page, under Call Progress Tone - Learn, in the Learn Tone Event field, select **Busy** and do the following substeps to verify that the tone is correct.

- a) From a available phone, call a second phone.
- b) Answer the second phone when it rings, and leave both handsets off so that both phones are busy.
- c) From a third phone, dial one of the busy phones.
- d) Confirm that you hear a busy tone.
- e) Hang up the third phone but leave the handsets for the other two phones off.

**Step 88** Under Call Progress Tone - Learn, in the Dial String field, enter the extension that you dialed in [Step 87c](#). from the third phone.

**Step 89** Select **Learn**.

**Step 90** On the Tone Detection page, under Call Progress Tone - Learn, in the Learn field, select **Error** and do the following substeps to verify that the tone is correct.

- a) From an available phone, dial an extension that does not exist.
- b) Confirm that you hear the reorder or error tone.
- c) Hang up the phone.

**Step 91** Under Call Progress Tone - Learn, in the Dial String field, enter the extension that you dialed in [Step 90a](#).

**Step 92** Select **Learn**.

**Step 93** On the Tone Detection page, under Call Progress Tone - Learn, in the Learn field, select **Ringback** and do the following substeps to verify that the tone is correct.

- a) From an available phone, dial an extension that does exist.
- b) Confirm that you hear the ringback tone.

c) Hang up the phone.

- Step 94** Under Call Progress Tone - Learn, in the Dial String field, enter the extension that you dialed in [Step 93a](#).
- Step 95** Select **Learn**.
- Step 96** Select **Submit**.
- Step 97** Hang up the phones that you used in [Step 87](#).
- Step 98** On the System menu, select **Restart**.
- Step 99** On the Restart page, select **Restart Unit Now**.
- Step 100** Repeat [Step 2](#) through [Step 99](#) on all remaining PIMG units.

## Configuring Unity Connection for Integration with the Phone System

After ensuring that the phone system, the PIMG units, and Unity Connection are ready for the integration, do the following procedure to set up the integration and to enter the port settings.

### Creating an Integration

- Step 1** In Cisco Unity Connection Administration, expand **Telephony Integrations**, then select **Phone System**.
- Step 2** On the Search Phone Systems page, under Display Name, select the name of the default phone system.
- Step 3** On the Phone System Basics page, in the Phone System Name field, enter the descriptive name that you want for the phone system.
- Step 4** If you want to use this phone system as the default for TRaP connections so that administrators and users without voicemail boxes can record and playback through the phone in Unity Connection web applications, check the **Default TRAP Switch** check box. If you want to use another phone system as the default for TRaP connections, uncheck this check box.
- Step 5** Under Message Waiting Indicator Settings, select **Use Same Port for Enabling and Disabling MWIs**.
- Step 6** Select **Save**.
- Step 7** On the Phone System Basics page, in the Related Links drop-down box, select **Add Port Group** and select **Go**.
- Step 8** On the New Port Group page, enter the applicable settings and select **Save**.

**Table 24: Settings for the New Port Group Page**

Field	Setting
Phone System	Select the name of the phone system that you entered in <a href="#">Step 3</a> .
Create From	Select <b>Port Group Template</b> and select <b>SIP to DMG/PIMG/TIMG</b> in the drop-down box.
Display Name	Enter a descriptive name for the port group. You can accept the default name or enter the name that you want.

Field	Setting
SIP Security Profile	Select <b>5060</b> .
SIP Transport Protocol	Select the SIP transport protocol that Unity Connection uses.
IP Address or Host Name	Enter the IP address of the PIMG unit that you are integrating with Unity Connection.
Port	Enter the SIP port of the PIMG unit that Unity Connection connects to. We recommend that you use the default setting.  This name must match the setting in the TCP/UDP Server Port field on the Configuration > VoIP > General page of the PIMG unit. Otherwise, the integration cannot function correctly.

**Step 9** On the Port Group Basics page, under Message Waiting Indicator Settings, uncheck the **Enable Message Waiting Indicators** check box and select **Save**.

**Step 10** In the Related Links drop-down box, select **Add Ports** and select **Go**.

**Step 11** On the New Port page, enter the following settings and select **Save**.

**Table 25: Settings for the New Port Page**

Field	Considerations
Enabled	Check this check box.
Number of Ports	Enter <b>8</b> .  (If you want to use fewer than eight voice messaging ports, enter the number of voice messaging ports that you want to use on this PIMG unit.)  <b>Note</b> For a Unity Connection cluster, the server must have the number of voice messaging ports that are set up on the phone system for the PIMG integration so that this server can handle all voice messaging traffic for the cluster if one of the servers stops functioning. For example, if the phone system is set up with 16 voice messaging ports, this server must have 16 voice messaging ports.
Phone System	Select the name of the phone system that you entered in <a href="#">Step 3</a> .
Port Group	Select the name of the port group that you added in <a href="#">Step 8</a> .

**Step 12** On the Search Ports page, select the display name of the first voice messaging port that you created for this phone system integration.

**Note** By default, the display names for the voice messaging ports are composed of the port group display name followed by incrementing numbers.

**Step 13** On the Port Basics page, set the voice messaging port settings as applicable. The fields in the following table are the ones that you can change.

**Table 26: Settings for the Voice Messaging Ports**

Field	Considerations
Enabled	Check this check box to enable the port. The port is enabled during normal operation. Uncheck this check box to disable the port. When the port is disabled, calls to the port get a ringing tone but are not answered. Typically, the port is disabled only by the installer during testing.
Extension	Enter the extension for the port as assigned on the phone system.
Answer Calls	Check this check box to designate the port for answering calls. These calls can be incoming calls from unidentified callers or from users.
Perform Message Notification	Check this check box to designate the port for notifying users of messages. Assign Perform Message Notification to the least busy ports.
Send MWI Requests	(Serial integrations only) Uncheck this check box. Otherwise, the integration may not function correctly.  (Digital and analog integrations only) Check this check box to designate the port for turning MWIs on and off. Assign Send MWI Requests to the least busy ports
Allow TRAP Connections	Check this check box so that users can use the port for recording and playback through the phone in Unity Connection web applications. Assign Allow TRAP Connections to the least busy ports.
Outgoing Hunt Order	Enter the priority order in which Unity Connection uses the ports when dialing out (for example, if the Perform Message Notification, Send MWI Requests, or Allow TRAP Connections check box is checked). The highest numbers are used first. However, when multiple ports have the same Outgoing Hunt Order number, Unity Connection uses the port that has been idle the longest.

**Step 14** Select **Save**.

**Step 15** Select **Next**.

**Step 16** Repeat [Step 13](#) through [Step 15](#) for all remaining voice messaging ports for the phone system.

**Step 17** In Cisco Unity Connection Administration, expand **Telephony Integrations**, then select **Phone System**.

**Step 18** On the Search Phone Systems page, under Display Name, select the name of the phone system that you entered in [Step 3](#).

**Step 19** Repeat [Step 7](#) through [Step 18](#) for each remaining PIMG unit integrated with Unity Connection.

**Note** Each PIMG unit is connected to one port group with the applicable voice messaging ports. For example, a system that uses five PIMG units requires five port groups, one port group for each PIMG unit.

**Step 20** To create a port group for MWIs, do the following substeps.

**Note** All MWI requests are handled by the master PIMG unit and sent to the phone system over the RS-232 serial cable (without using voice messaging ports). So the following substeps create a separate port group without voice messaging ports and enable the port group for MWIs that are "not port specific" (they do not use ports).

- In Cisco Unity Connection Administration expand **Telephony Integration** then select **Port Group**.
- On the Search Port Groups page, select **Add New**.

- c) On the New Port Group page, enter the applicable settings and select **Save**.

**Table 27: Settings for the New Port Group Page (MWIs)**

Field	Setting
Phone System	Select the name of the phone system that you entered in Step 3.
Create From	Select Port Group Template and select <b>SIP to DMG/PIMG/TIMG SIP</b> to in the drop-down box.
Display Name	Enter a <b>MWI Port Group</b> or another descriptive name for the port group.
SIP Security Profile	Select <b>5060</b> .
SIP Transport Protocol	Select the SIP transport protocol that Unity Connection uses.
IPv4 Address or Host Name	Enter the IP address of the master PIMG unit.
IPv6 Address or Host Name	Do not enter a value in this field. IPv6 is not supported for PIMG integrations.
IP Address or Host Name	Enter the IP address of the master PIMG unit.
Port	Enter the SIP port of the master PIMG unit. <b>Caution</b> This name must match the setting in the TCP/UDP Server Port field on the Configuration > VoIP > General page of the PIMG unit. Otherwise, the integration cannot function correctly.

- d) On the Port Group Basics page, on the Edit menu, select **Advanced Settings**.
- e) On the Edit Advanced Settings page, under SIP MWI Requests, select **Not Port Specific** then select **Save**.
- f) On the Edit menu, select **Port Group Basics**.
- g) Under Port Group, select **Reset**.
- h) Under Message Waiting Indicator Settings, confirm that the **Enable Message Waiting Indicator** check box is checked and select **Save**.

**Step 21** If another phone system integration exists, in Cisco Unity Connection Administration, expand **Telephony Integrations**, then select **Trunk**. Otherwise, skip to [Step 25](#).

**Step 22** On the Search Phone System Trunks page, on the Phone System Trunk menu, select **New Phone System Trunk**.

**Step 23** On the New Phone System Trunk page, enter the following settings for the phone system trunk and select **Save**.

**Table 28: Settings for the Phone System Trunk**

Field	Setting
From Phone System	Enter the display name of the phone system that you are creating a trunk for.
To Phone System	Enter the display name of the previously existing phone system that the trunk connects to.

Field	Setting
Trunk Access Code	Enter the extra digits that Unity Connection must dial to transfer calls through the gateway to extensions on the previously existing phone system.

**Step 24** Repeat [Step 22](#) and [Step 23](#) for all remaining phone system trunks that you want to create.

**Step 25** In the Related Links drop-down list, select **Check Telephony Configuration** and select **Go** to confirm the phone system integration settings.

If the test is not successful, the Task Execution Results displays one or more messages with troubleshooting steps. After correcting the problems, test the connection again.

**Step 26** In the Task Execution Results window, select **Close**.

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