Dunkin 1.1

Media Gateway Hardware Installation Manual

Part Number: B02200178, Release: 00

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1 Overview

1.1 Media Gateway overview

The Media Gateway allows traders to participate in calls that span the boundary between the Dunkin system and lines outside the system.

The Media Gateway converts Internet Protocol (IP) to both Time-Division Multiplexing (TDM) and analog signaling. And conversely converts TDM and analog to IP. Because the components inside the Dunkin system use IP, all TDM communications to these components must pass through the Media Gateway.

Lines outside Dunkin can include those outside your organization, such as the Public Switched Telephone Network (PSTN), and those within your organization, such as an internal Private Branch Exchange (PBX).

The Media Gateway converts the following common types digital and analog lines to IP:

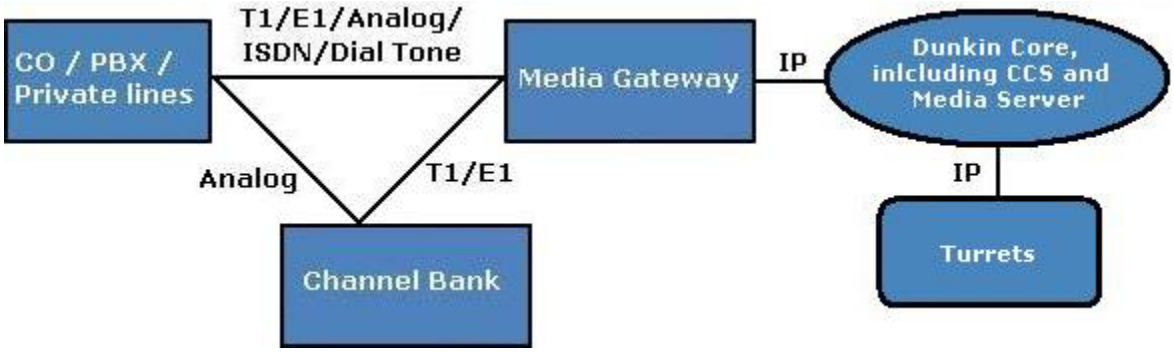
- T1, E1, and other types of digital lines

  A Media Gateway is configured for either T1 or E1, but not both.
- Analog 2-wire FXS (Foreign eXchange Station) lines and FXO (Foreign eXchange Office) lines

  The Media Gateway does not convert 2-Wire (Dry) MRD (Manual Ring Down) lines or 4-Wire (Dry) Hoot lines. For those, the Channel Bank is installed to first convert the lines to digital T1 or E1 before connecting them to the Media Gateway for conversion to IP.

The following simple diagram shows communication between non-Dunkin lines, the Media Gateway, the Dunkin system's Converged Communications Server (CCS), and the Dunkin system's Channel Bank.

Figure 1: Communication between the Media Gateway, lines, and Dunkin



The CCS determines what calls are sent to the Media Gateway and how to route them. The CCS exchanges only session information with the Media Gateway, not audio data. The CCS and the Media Gateway communicate through Session Initiation Protocol (SIP).

A CCS can communicate with multiple Media Gateways. This means a single zone within a Dunkin system can have multiple Media Gateways.

Once the Media Gateway receives the session information, the Media Gateway connects the line through Realtime Transport Protocol (RTP). RTP travels from peer-to-peer around the Dunkin system. The Media

Gateway supports various trunk protocols, including Integrated Services Digital Network (ISDN) and CAS (Channel Associated Signaling).

1.2 Interdependence between Media Gateway and Channel Bank

The Media Gateway and the Channel Bank work together to let your traders participate in calls where one or more connected parties are outside the Dunkin system.

The Media Gateway is the Dunkin system's interface between Internet Protocol (IP) and both Time-Division Multiplexing (TDM) and certain analog signaling. The Media Gateway handles these types of analog signaling: 2-wire FXS (Foreign eXchange Station) and 2-wire FXO (Foreign eXchange Office).

The Media Gateway is in the path for all inbound and outbound calls between the Dunkin system's IP-based turrets and all non-IP networks.

The Channel Bank is the Dunkin system's interface for those types of analog calls that the Media Gateway does not handle: 2-Wire (Dry) MRD (Manual Ring Down) lines and 4-Wire (Dry) Hoot lines. The Channel Bank converts those types of analog calls to digital and then connects them to the Media Gateway as digital T1 or E1 calls.

Each Media Gateway and Channel Bank must be configured for either T1 or E1, but not both. For a Media Gateway and Channel Bank to work together, they must both be configured for T1 or both be configured for E1.

The Channel Bank connects directly to the Media Gateway. The two communicate through a channelized CAS-based T1 or E1 port. CAS is Channel Associated Signaling.

1.3 Physical interfaces on the Media Gateway

The Media Gateway provides up to four modules for connecting to digital line, analog lines, and the Dunkin Ethernet network. The following image and table describe the modules that can come with the Media Gateway.

Figure 2: Media Gateway modules

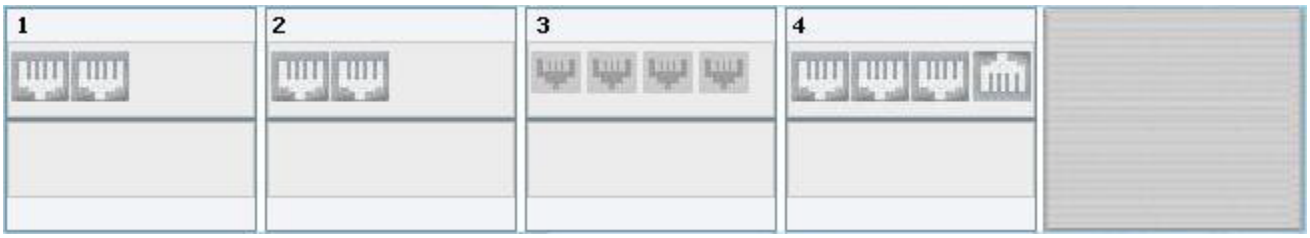


Table 1: Modules installed in the Media Gateway

Module	Ports	Description
1 and 2	Each module provides two T1 or two E1 ports, for a total of four ports. Once you plug a T1 or E1 cable into one of these modules, the Media Gateway becomes dedicated to protocol you chose, either T1 or E1, but not both. The ports on modules 1 and 2 become all T1 or all E1.	Connects the Media Gateway to T1/E1 trunks. For more information, see *TRUNKS module (E1/T1 interface)* on page 7.
3	Four RJ11 ports for 2-wire FXO (Foreign eXchange Office) lines, 2-wire FXS (Foreign eXchange Subscriber) lines, or a mixture of the two. This module provides up to 24 lines.	Connects the Media Gateway to analog lines, including lines from a carrier, service provider, or analog PBX. For more information, see *FXO module (FXS telephony interface)* on page 8.
4	Three 10/100/1000 Base-T Gigabit Ethernet RJ45 ports, of which the Dunkin system uses just one.	Connects the Media Gateway to the Converged Communications Server CCS. For more information, see *CRMX module (data routing interface)* on page 8.

Note: The Media Gateway requires an AC power source that meets the electrical requirements described in the table in *Rack and stack the Media Gateway* on page 11.

1.4 TRUNKS module (E1/T1 interface)

The Media Gateway can provide either one or two TRUNKS modules. Each module provides two RJ45 ports for connection to channelized T1 or E1 lines. A Media Gateway is configured either for T1 or for E1, but not both. If two modules are included, both use the same protocol.

The T1 or E1 ports can be configured to support many different types of ISDN protocols, CAS protocols, and other protocols.

If you connect the Media Gateway to a Channel Bank, the Channel Bank must be dedicated to the same protocol—T1 or E1—as the Media Gateway.

The following picture shows the ports on the TRUNKS module.

Figure 3: Ports on the TRUNKS module

The following table describes the LED indication for an RJ45 port on the TRUNKS module.

Table 2: LED indication for an RJ45 port on the TRUNKS module

Color	State	Description
Green	On	Trunk is synchronized (normal operation)
Red	On	Loss because of any of the following signals:

Color	State	Description
		• LOS - Loss of Signal • LOF - Loss of Frame • AIS - Alarm Indication Signal (the Blue Alarm) • RAI - Remote Alarm Indication (the Yellow Alarm)
no light	Off	Failure or disruption in the AC power supply or the power is currently not being supplied to the device through the AC power supply entry

1.5 FXO module (FXS telephony interface)

The Media Gateway's FXO module provides four RJ11 ports for 2-wire FXO (Foreign eXchange Office) lines, 2-wire FXS (Foreign eXchange Subscriber) lines, or a mixture of the two.

The Media Gateway's FXO module connects the Media Gateway to external analog lines, including lines from a carrier, service provider, or analog PBX.

The following picture shows the FXO module's ports.

Figure 4: Ports on the FXO module

The following table describes the LED indication for an RJ11 port on the FXO module.

Table 3: LED indication for an RJ11 port on the FXO module

Color	State	Description
Green	On	• FXS: phone is off-hooked • FXO: off-hooks the line toward the PBX
	Blinking	• FXS: rings the extension line • FXO: detects a ring signal from the PBX
Red	On	Error. Malfunction in the line.

1.6 CRMX module (data routing interface)

The Media Gateway's CRMX module provides the three 10/100/1000 Base-T Gigabit Ethernet RJ45 ports for connection to a Local Area Network (LAN). The Dunkin system uses just one connection on the CRMX module. In the Dunkin system, the Media Gateway uses one LAN port to connect the gateway to the Converged Communications Server (CCS), for HTTP; also to the SIP end points and Media Server for RTP.

The Media Gateway connects to the Dunkin system through a Category 5 cable for SIP, HTTP, and RTP communications to the CCS and the SIP endpoints. The cable connects from a network card on the Media Gateway to an Ethernet switch on the Dunkin system.

The following picture shows the CRMX module's ports.

Figure 5: Ports on the CRMX module

The following table describes the LED indication for a LAN port on the CRMX module.

Table 4: LED indication for an RJ45 LAN port on the CRMX module

Color	State	Description
Green	On	Ethernet link established
	Flashing	Data is being received or transmitted
No light	Off	No Ethernet link

7 Install the Media Gateway

7.1 Rack and stack the Media Gateway

You install the Media Gateway to 1U (1.75", or 44.4 mm) in a standard 19" (482.6 mm) rack in your network. To secure the Media Gateway to the rack you need a Phillips-head ("crosshead") screwdriver.

The Media Gateway must have access to an AC power source able to provide at least 1 amp at 100-240V. The Media Gateway must be connected to a socket-outlet with a protective earthing connection.

The Media Gateway has an AC power supply with universal AC input capability 100-240 VAC, 50/60 Hz and the maximum input current of 1.5 amps.

The Media Gateway can house up to two extractable power supply modules, each providing an AC power connector on the Media Gateway's rear panel. The dual-power option provides the Media Gateway with power supply redundancy. If both power units are used, the load is shared between them.

If both power units are used, you can plug the power supplies into the same power source, in which case you have the same power supply but not redundant power protection. Or you can plug each power supply into a different AC power source, for redundant power protection. The two AC power sources must have the same ground potential.

The following picture and table describe the power supply module.

Figure 6: Media Gateway power supply module

1	Protective earthing screw.
2	Electrostatic Discharge (ESD) socket.
3	Dual AC Power Supply Entries, with the right entry capped.

Before you install, prepare a place on your rack that meets the following requirements:

- Provides 1U for holding the Media Gateway
- Allows access to the front and rear of the Media Gateway
- Allows sufficient air flow around the system and does not block the ventilation holes on the Media Gateway

- Has access to the telecommunications lines
- Has access to an AC power source described above.

1. Place the Media Gateway in a single open unit in the rack.
2. Secure the Media Gateway by screwing it into the rack.

7.2 Power up the Media Gateway

Before powering up the Media Gateway, ensure the Media Gateway meets the following prerequisites:

- Has access to an AC power source that meets the electrical requirements described in *Rack and stack the Media Gateway* on page 11.
- Is secured in its rack.

  Connect the supplied AC power cord from the left power socket on the Media Gateway's back panel to a standard electrical outlet that meets the requirements described in *Rack and stack the Media Gateway* on page 11.

  The front panel of the power supply module provides an LED labeled POWER that is lit green when the Media Gateway is powered up. If this LED is off, a power supply problem might be present.

7.3 Connect a PC to the Media Gateway

The following procedure describes how to connect a PC to the Media Gateway's CRMX module in order to configure an IP address to put the Media Gateway on the Dunkin network. For information on the CRMX module, see *CRMX module (data routing interface)* on page 8.

1. Connect one end of a straight-through RJ45 Ethernet cable to the left-most LAN port on the CRMX module of the Media Gateway using the pinout described here.

Figure 7: RJ45 Connector on the CRMX module

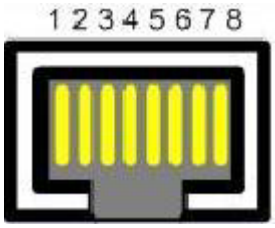


Table 5: RJ45 Pin Assignments on the CRMX module

Name	Description
1	Tx+
2	Tx-
3	Rx+
4	not connected
5	not connected
6	Rx-

Name	Description
7	not connected
8	not connected

2. Connect the other end of the cable to the PC's network interface card.
3. To configure the IP address, see *Edit the Media Gateway's default LAN IP addresses* on page 13.

7.4 Edit the Media Gateway's default LAN IP addresses

This topic describes how to configure the IP address of the Media Gateway to put the Media Gateway on the Dunkin network.

Before you enter the default addresses, you must have two valid Network IP addresses for the Media Gateway: one for VoIP and Management, and the other for Data (the LAN Switch VLAN 1 IP address).

1. On the PC that is to be used to connect to the Media Gateway, reset the IP address as follows:

   IP Address: 192.168.0.4

   Subnet Mask: 255.255.255.0
2. Connect a straight-through Ethernet cable from the PC's network interface to the LAN port on the CRMX module of the Media Gateway, as described in *Connect a PC to the Media Gateway* on page 12.
3. On the PC connected to the Media Gateway, open a standard Web browser.
4. In the Web browser's Uniform Resource Locator (URL) field, enter the Media Gateway's default IP address, which is the following: http://192.168.0.2
   The **Enter Network Password** dialog box displays.
5. Enter the Media Gateway's default login information, which is shown here, and then click **OK**. Note that the default login information is case-sensitive:

   User Name: Admin

   Password: Admin

   The Media Gateway's Web-interface home page displays.
6. To change the Media Gateway's default VoIP-and-Management IP address, do the following:
   a) Click the **Configuration** tab.
   b) Click **Network Settings ➢ IP Settings** .
   c) Enter the following so that they correspond to your network IP scheme: the VoIP-and-Management IP address, the prefix length, and the default Gateway IP address.
7. To change the Media Gateway's LAN Switch VLAN 1 IP address, do the following:
   a) Click the **Configuration** Tab.
      The **Data Systems Connections** page displays.
   b) Click **Data Settings ➢ Data System ➢ Connections**).
   c) Click **LAN Switch VLAN 1**.
   d) Click the **Settings** tab.
   e) Change the **IP Address** and **Subnet Mask** to one that fits on your network.
   f) Scroll to the bottom of the page and click **Submit**.
8. To disable the DHCP Server, do the following:
   a) Click the **Configuration** tab, then click the **Full** radio button, and then click the **Data Settings ➢ DHCP Server** .

The DHCP Server page displays.

b) Ensure that the selection for **IP Address Distribution** is marked **Disabled**.

c) Click **Apply**.

d) Click **OK**.

9. For the Media Gateway to route back to your network, you must configure a route for your network and configure the Default Gateway to your network. To do so, do the following:

a) Click the **Configuration** tab, then click the **Full** radio button, then click **VoIP ➤ Network Settings** . The **IP Routing Table** page displays.

b) Add a new table entry for your network. For example, if your network is 10.205.202.0, you would make a Destination IP Address of 10.0.0.0, a Destination Mask of 255.0.0.0, and a proper Gateway IP Address.

c) To save your settings to the flash memory, click **Burn**.

d) To reboot the Media Gateway, click **Device Actions** and then click **Reset**.

10. Disconnect your PC from the Media Gateway.

7.5 Connect lines to the Media Gateway

To connect lines to the Media Gateway, perform the appropriate procedure from the table below.

Connect Media Gateway to the following:	See the following:
The Dunkin network or directly to the Converged Communications Server CCS	*Connect the Media Gateway to the Dunkin network* on page 14
Channel Bank	*Install T1 TDM ISDN lines* on page 15, or *Install E1 TDM ISDN lines* on page 16
T1/E1 ISDN lines	*Install T1 TDM ISDN lines* on page 15, or *Install E1 TDM ISDN lines* on page 16
T1/E1 TDM dial tone and private lines	*Install T1 TDM dial tone and private lines* on page 16, or *Install E1 TDM dial tone and private lines* on page 17
FXO (Foreign eXchange Office) or FXS (Foreign eXchange Subscriber) lines	*Install analog dial tone and private lines* on page 18

7.6 Connect the Media Gateway to the Dunkin network

The following procedure describes how to connect the Media Gateway's CRMX module to the Dunkin network. For information on the CRMX module, see *CRMX module (data routing interface)* on page 8.

1. Connect one end of a straight-through RJ45 Ethernet cable to the left-most LAN port on the CRMX module of the Media Gateway using the pinout described here.

Figure 8: RJ45 Connector on the CRMX module

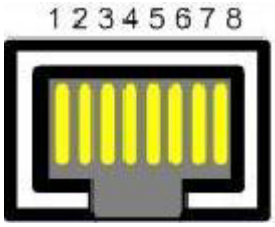


Table 6: RJ45 Pin Assignments on the CRMX module

Name	Description
1	Tx+
2	Tx-
3	Rx+
4	not connected
5	not connected
6	Rx-
7	not connected
8	not connected

2. Connect the other end of the cable to the Dunkin network. You can connect to a network hub or straight to the Converged Communications Server CCS.

7.7 Install T1 TDM ISDN lines

This topic describes how to install a T1 TDM ISDN line to a TRUNKS module on the Media Gateway. The TRUNKS module provides RJ45 ports for the connection.

A Media Gateway can be configured for T1 or E1 but not both.

1. Connect one end of the RJ45 cable to the T1 port on the Media Gateway using the pinout described here.

Figure 9: RJ45 Connector on the TRUNKS module

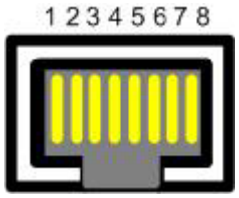


Table 7: RJ45 Pin Assignments on the TRUNKS module

Name	Description
1	Rx RING
2	Rx TIP
3	not connected
4	Tx RING
5	Tx TIP
6	not connected
7	not connected
8	not connected

2. Connect the other end of the cable to the designated demarcation point using the appropriate pinout.

7.8 Install E1 TDM ISDN lines

This topic describes how to install an E1 TDM ISDN line to a TRUNKS module on the Media Gateway. The TRUNKS module provides RJ45 ports for the connection.

A Media Gateway can be configured for T1 or E1 but not both.

1. Connect one end of the RJ45 cable to the E1 port on the Media Gateway using the pinout described here.

Figure 10: RJ45 Connector on the TRUNKS module

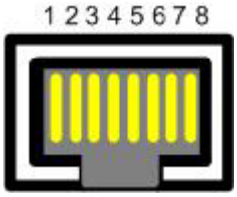


Table 8: RJ45 Pin Assignments on the TRUNKS module

Name	Description
1	Rx RING
2	Rx TIP
3	not connected
4	Tx RING
5	Tx TIP
6	not connected
7	not connected
8	not connected

2. Connect the other end of the cable to the designated demarcation point using the appropriate pinout.

7.9 Install T1 TDM dial tone and private lines

This topic describes how to install a T1 TDM dial tone or private line to a TRUNKS module on the Media Gateway. The TRUNKS module provides RJ45 ports for the connection.

Each Media Gateway must be configured for T1 or E1, but not both.

1. Connect one end of the RJ45 cable to the T1 port on the Media Gateway using the pinout described here.

Figure 11: RJ45 Connector on the TRUNKS module

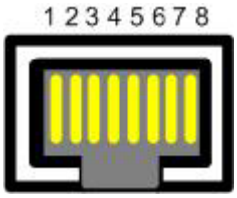


Table 9: RJ45 Pin Assignments on the TRUNKS module

Name	Description
1	Rx RING
2	Rx TIP
3	not connected
4	Tx RING
5	Tx TIP
6	not connected
7	not connected
8	not connected

2. Connect the other end of the cable to the designated demarcation point using the appropriate pinout.

7.10 Install E1 TDM dial tone and private lines

This topic describes how to install a E1 TDM dial tone or private line to a TRUNKS module on the Media Gateway. The TRUNKS module provides RJ45 ports for the connection.

A Media Gateway can be configured for T1 or E1 but not both.

1. Connect one end of the RJ45 cable to the E1 port on the Media Gateway using the pinout described here.

Figure 12: RJ45 Connector on the TRUNKS module

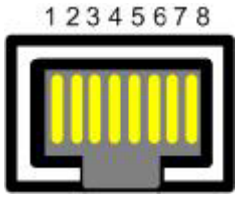


Table 10: RJ45 Pin Assignments on the TRUNKS module

Name	Description
1	Rx RING
2	Rx TIP
3	not connected
4	Tx RING
5	Tx TIP
6	not connected
7	not connected
8	not connected

2. Connect the other end of the cable to the designated demarcation point using the appropriate pinout.

7.11 Install analog dial tone and private lines

This topic describes how to install an analog dial tone or private line to the FXO module on the Media Gateway. The FXO module provides four RJ11 ports for 2-wire FXO (Foreign eXchange Office) lines, 2-wire FXS (Foreign eXchange Subscriber) lines, or a mixture of the two.

1. Connect one end of the RJ11 cable to the left-most FXO port or FXS port, as appropriate, on the Media Gateway using the pinout described here.

Figure 13: RJ11 Connector for both FXO and FXS

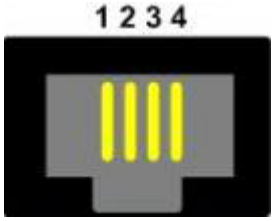


Table 11: RJ11 Pin Assignments for both FXO and FXS

Name	Description
1	not connected
2	Tip
3	Ring
4	not connected

2. Connect the other end of the cable to the designated demarcation point using the appropriate pinout.

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