CISCO SYSTEMS

Quick Start Guide

Cisco 6920 RateMux Multiplexer

1 Introduction

This quick start guide provides basic installation and configuration instructions that can make your Cisco 6920 RateMux multiplexer operational in a short period of time.

These instructions include a basic configuration using some default settings. To use advanced configuration options, refer to the *Cisco 6920 RateMux Multiplexer Installation and Configuration Guide.* For the latest information regarding software releases, refer to the *Release Notes for the Cisco 6920 RateMux Multiplexer.*

2 Installation Notes

- Rack-mount the Cisco 6920 in a standard 19-inch rack. Allow a 1 RU space (1.75 in.) above and below the unit to allow for convection cooling.

- The power supply is auto-sensing from 100 to 240V.

Note Cards in the Cisco 6920 chassis are not hot-swappable. The Cisco 6920 must be powered down before cards are removed and replaced.

3 Cabling

Slot and Connector Identification

The eight card slots on the Cisco 6920 chassis are addressed from 0 to 7, starting from the left side of the chassis. The connectors for inputs and outputs are addressed when using the RateMux Manager GUI from the top of the card to the bottom of the card starting with 0 (see Figure 1).

For example, a complete address of an input might be Slot 2, Module 1, which identifies the second connector from the top of the card located in the third card slot in the chassis.
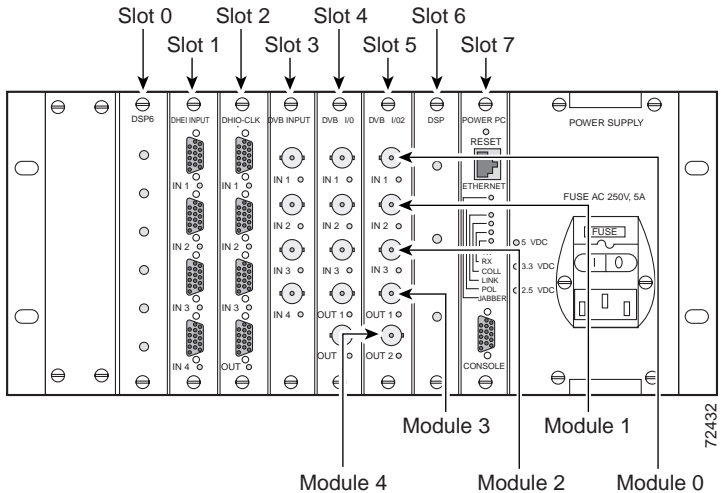

Note This convention, rather than the labeling on the cards, must be used to address specific slots and connectors.
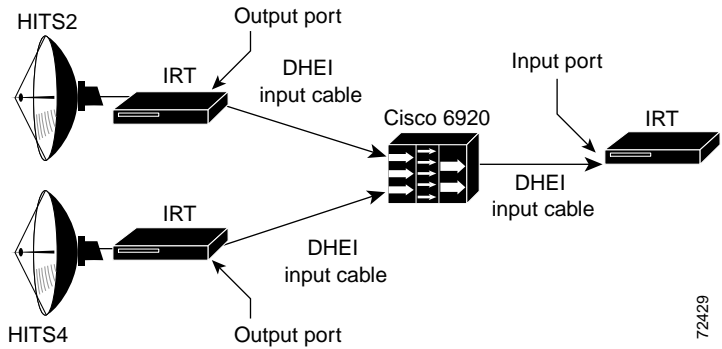

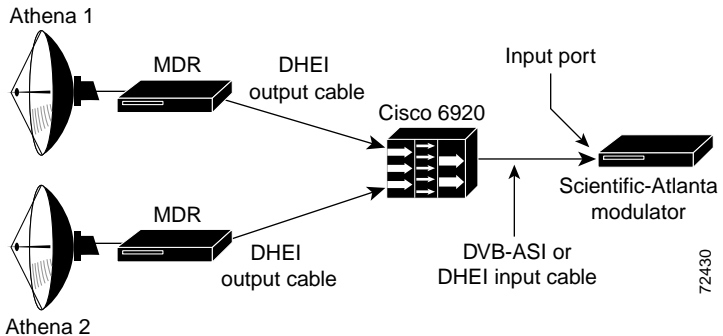*Figure 1   Cisco 6920 Chassis Slots and Connectors*

Cabling Guidelines

Figure 2   Cabling Diagram 1

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Figure 3   Cabling Diagram 2

Athena 1

MDR

DHEI
output cable

Cisco 6920

Input port

Scientific-Atlanta
modulator

MDR

DHEI
output cable

DVB-ASI or
DHEI input cable

Athena 2

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4 Accessing the Cisco 6920

There are three primary ways to access the Cisco 6920. Each has a different purpose.

1. The serial connection uses HyperTerminal and is required when the IP address of the Cisco 6920 is unknown.

2. Connect.exe is an application file included with the Cisco 6920 software bundle. It uses Ethernet and requires an IP address to connect. Connect.exe allows access to the

diagnostic menus similar to those seen when using HyperTerminal. Connect.exe is primarily used for software upgrades and environmental parameter changes and is not required for quick start.

3. Web-based configuration requires an Ethernet connection and uses Netscape Communicator or Microsoft Internet Explorer to connect to the Cisco 6920 using its IP address. The browser connects to the RateMux Manager GUI and is the usual mode for configuring and monitoring the Cisco 6920.

> **Note** A Dynamic Host Configuration Protocol (DHCP) server also can be used. Refer to the *Cisco 6920 RateMux Multiplexer Installation and Configuration Guide* for further information.

The following sections provide details on how to connect to the Cisco 6920 using each of the three methods.

> **Tip** If the IP address is unknown, you can try the default address 10.0.0.200.

HyperTerminal Serial Connection—Diagnostic Mode

Connect a regular 9-pin serial cable from the serial communications port of the connecting computer to the debug connector on the PowerPC card in the Cisco 6920. This is a straight-through cable, also referred to as an extension serial cable.

✎

Note Do not use a null modem cable or you will not be able to connect.

Step 1 Configure a HyperTerminal session for the following: 57,600, 8 bits, no parity, 1 stop bit, flow control = none.

Step 2 Power on the Cisco 6920 and use the Call option in HyperTerminal to start the session within 10 seconds.

Step 3 After starting the session, press Enter on the connecting computer until the Cisco 6920 screen dump appears (5 to 60 seconds) and the IP address of the Cisco 6920 is visible.

Step 4 While connected in HyperTerminal, you can change the IP address and the name of the Cisco 6920.

Changing the IP Address

Step 1 Connect to the Cisco 6920 using HyperTerminal or connect.exe.

Step 2 From the menu, choose C Environmental Parameters and FLASH Partitions.

Step 3 Choose B Environmental Parameters.

Step 4 Choose B Change Environmental Parameters.

Step 5 You will be prompted for each parameter. Press Enter to skip any parameters that do not need to be changed. When the IP Address parameter appears, enter the new IP address and press Enter.

Step 6 After skipping over the remaining options, press S then press Enter to save the changes.

Step 7 Power cycle the Cisco 6920 and use the new IP address.

Changing the Name of the Cisco 6920

Step 1 Follow Step 1 through Step 5 above for changing the IP address.

Step 2 When the Host Name option appears, enter the new name.

Step 3 After skipping over the remaining options, press S then press Enter to save the changes.

Step 4 Power cycle the Cisco 6920.

connect.exe Ethernet Connection—Diagnostic Mode (Optional)

Step 1 If the Cisco 6920 IP address is unknown, use HyperTerminal to find it.

Step 2 Make sure that the connecting computer's IP domain matches that of the Cisco 6920.

Step 3 Connect an Ethernet cable from the Cisco 6920 to the connecting computer. Use a crossover cable if you are connecting directly.

> ✎
> **Note**   Shielded Ethernet cables must be used for FCC compliance.

Step 4   Locate the application file connect.exe included in the software bundle and launch it.

Step 5   Click Connection on the pull-down menu, then click connect.

Step 6   Enter the Cisco 6920 IP address in the window. *Don't* click OK.

Step 7   Power on the Cisco 6920. Within 10 seconds, click OK. Connection should occur in 5 to 60 seconds.

Web-Based Ethernet Connection—Operator Mode

Step 1   If the Cisco 6920 IP address is unknown, use HyperTerminal to find it.

Step 2   Make sure the connecting computer's IP domain matches that of the Cisco 6920.

Step 3 Connect an Ethernet cable from the Cisco 6920 to the connecting computer. Use a crossover cable if you are connecting directly.

> **Note** Shielded Ethernet cables must be used for FCC compliance.

Step 4 If the Cisco 6920 is not running, power it on and wait for 3 to 5 minutes for it to initialize.

Step 5 Launch Netscape or Microsoft Internet Explorer and enter the Cisco 6920 IP address. The RateMux Manager GUI appears.

5 Chassis Configuration

Step 1 Access RateMux Manager using a web browser.

Step 2 Click Chassis Configuration and verify the Cisco 6920 name and IP address

Step 3 Scroll to Board Type and verify that all the hardware is present.

Step 4 In the Software Modules section, verify that the software on all boards is the same version and is current.

Step 5 In the Stream Type section, select the Output Video Stream Type:

- Default = same output as input
- MPEG = output is DVB type 2
- DCII = output is type 80 for GI

6 Digital Signal Processor Allocation

Digital Signal Processor (DSP) allocation must be performed before selecting channels.

Step 1 Access RateMux Manager using a web browser.

Step 2 Click Chassis Configuration.

Step 3 Scroll to the System DSP CPU Bandwidth Allocation section. (See Figure 4.)

Figure 4 **DSP Allocation Window**

System DSP CPU Bandwidth Allocation

Enable	Output	Auto	Number of Programs			DSP CPU Allocation
			Maximum	Recommended	Running	
☑	DVB I/O (slot 1 mod 3)	☑	6	4	0	22 %
☑	DHEI I/O (slot 3 mod 3)	☑	6	4	0	22 %
☑	DHEI I/O (slot 5 mod 3)	☑	6	4	0	22 %
☑	DVB I/O 2 (slot 6 mod 3)	☑	6	4	0	22 %
☑	DVB I/O 2 (slot 6 mod 4)	☑	3	2	0	11 %
	Percentage NOT used					0 %

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Apply

Step 4   Use the Enable check boxes to designate which output ports will be used and will require DSPs. All outputs are enabled (checked) by default, and DSPs are assigned evenly among all of them.

Note   Outputs that have programs assigned to them cannot be disabled (unchecked). Clear the configuration before disabling them.

Step 5 DSPs for disabled outputs become available for allocation and are moved to the "Percentage NOT used" row. Use the up arrows in the far right column to move unused DSPs to outputs. Click Apply to make the changes.

Note The output DSP also is available as a demux DSP in the pool of available DSPs.

Step 6 Check the Auto check box to automatically allocate programs to DSPs assigned to that output when a configuration is applied.

Note Service is disrupted on this output when the DSP calculation is applied.

If the Auto check box is not checked, the programs may be manually allocated to DSPs assigned to the output using the Advanced page. Service is not disrupted on this output when the DSP calculation is applied.

DSP to output assignments can be viewed on the table directly below the DSP Allocation window. (See Figure 5.)

Figure 5   *DSP Assignments Display*

Reserved DSPs		Outputs				
		DVB I/O (slot 1 mod 3)	DHEI I/O (slot 3 mod 3)	DHEI I/O (slot 5 mod 3)	DVB I/O 2 (slot 6 mod 3)	DVB I/O 2 (slot 6 mod 4)
DSP3 (slot 0)	dsp #0				✔	
	dsp #1			✔		
	dsp #2		✔			
DVB I/O (slot 1)	dsp #3					
DSP3 (slot 2)	dsp #0	✔				
	dsp #1					✔
	dsp #2				✔	
DHEI I/O (slot 3)	dsp #3					
DSP3 (slot 4)	dsp #0			✔		
	dsp #1		✔			
	dsp #2	✔				
DHEI I/O (slot 5)	dsp #3					
DVB I/O 2 (slot 6)	dsp #3					
	dsp #5					

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Assigning Programs to Outputs

Step 1 Access RateMux Manager using a web browser.

Step 2 Click Program Select Output Config and scroll to the Edit Output Configuration section. (See Figure 6.)

Figure 6   *Edit Output Configuration*

Edit Output Configuration			
Select Output	Slot 3,Module 3	Transport Stream ID	0x3d33
PSI Insertion Interval (ms)	500	**Automatic** DSP Allocation	--
CA System ID (Hex)	--	Null Bitrate (Reserve Bandwidth)	0
Attached Modulator Type	QAM64	Restore Default QAM Setting	Default
Output Bitrate	26970350	DHEI Packet Gap (bytes/packet)	16
Clock source	Int 29.2657M	Total Pass Thru Bitrate	0
Edit Other Output Properties	Remap	Advanced	PID Pass Thru	Prog Select

Clear / Apply Program Selections	Clear	**Apply**

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Step 3 The Select Output field displays the slot and connector of the output. Use the pull-down menu to select the proper card for your configuration.

Step 4 The Transport Stream ID field is filled in automatically. If you have specific requirements for a transport stream ID, leave this field blank or use any value that was previously automatically entered,

Step 5 The PSI Insertion Interval field indicates the rate (in milliseconds) at which PSI data is being injected into the video stream. Enter the desired rate.

Note The recommended PSI Rate is 200. This conforms to Motorola PSI requirements.

Step 6 The CA System ID field displays (in hexadecimal) the Conditional Access System ID descriptor needed by the Conditional Access vendor. Change this value by entering a new value (such as AB 34) in the field. Entering two dashes (--) indicates that the original setting should be kept. To delete the CA descriptor, enter either del or Del, then click Apply.

Step 7 The Null Bitrate (Reserve Bandwidth) field indicates the number of NULL packets (in bits per second) being inserted into the video stream. Enter the bandwidth needed for any data insertion downstream from the Cisco 6920.

> **✎**
> **Note** The recommended Null rate is 300000 for systems that have Conditional Access systems on the output of the Cisco 6920.

Step 8 Use the Attached Modular Type pull-down menu to choose either quick configuration option (QAM64 or QAM256). For each selection, the Output Bitrate and Byte Gap are automatically calculated and the values inserted into their fields.

> **✎**
> **Note** Analog channel bandwidth is assumed to be a default of 6 MHz.

Step 9 If any of the automatically calculated fields are changed after the quadrature amplitude modulation (QAM) setting is selected, click Restore Default QAM Setting to return the values to the default settings.

Step 10 If audio-only programs (such as DMX or Music Choice) are to be passed through, calculate the peak bit rate of the sum of all these programs selected for passthrough and enter it in the Total PassThru Bitrate field.

Note Music Choice recommends a PassThru Bitrate of 13,500,000 when configuring all Music Choice programs in a single output. If the Music Choice programs (with still-frame video) are split between outputs, then use 257 kbps for each program plus 2.3 Mbps for the video stream maximum burst rate.

Step 11 Click Apply to make changes or Clear to clear program selections.

Program Select

Step 1 Click Prog Select. The Program Select page is displayed. This page displays the current configuration.

Step 2 Select programs to be included in the output.

Note Click Clear to deselect all programs in the list.
Clicking clear does not restore default output
parameters or original packet identifier (PID) and
program numbers for each input.

Step 3 To resolve PID conflicts, click Force Map.

Step 4 If Music Choice programs are selected, click Advanced
to display the Advanced page.

Step 5 Modify the quality of service (QoS) for each Music
Choice program to pass through as shown in Figure 7.

Figure 7   Modifying QoS

Advanced				DSP Allocation (by location or group)		Resolve PID conflicts	Force Map
Select	PSI Omit	Prog#	QOS	Slot & Module	Group	Max Bitrate	Source
☑	☐	1	Medium ▼	0	0	--	Slot 4,Module 0
☑	☐	2	Medium ▼	0	2	--	Slot 4,Module 0
☑	☐	3	VeryLow	1	1	--	Slot 4,Module 0
☑	☐	4	Low Medium	2	0	--	Slot 4,Module 0
☑	☐	5	High VeryHigh	2	2	--	Slot 4,Module 0
☑	☐	6	NoRateRed PassThru	0	0	--	Slot 4,Module 0
☑	☐	7	Medium ▼	0	2	--	Slot 4,Module 0
☑	☐	8	Medium ▼	1	1	--	Slot 4,Module 0
☑	☐	9	Medium ▼	2	0	--	Slot 4,Module 0
☑	☐	10	Medium ▼	2	2	--	Slot 4,Module 0

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Step 6   Click Apply to save the configuration.

Configuring High-Definition Programs

Each high-definition (HD) program needs a DSP assigned to it. If any other programs are sharing the same DSP as the HD program, unexpected results can occur. Follow these steps to configure an HD program:

Step 1   Click Chassis Configuration.

Step 2 Scroll to the System DSP CPU Bandwidth Allocation window.

Step 3 Determine which output the HD program will use and be sure that Enabled is selected and Auto is not selected.

Step 4 Click Program Select Output Config, and scroll to the Program Select display. Be sure that Select Output is set to the output the HD program will be on.

Step 5 Click Advanced.

Step 6 Locate the HD program. In the QOS column, use the pull-down menu and select NoRateRed (no rate reduction).

Step 7 Assign the HD program a unique group number under the Group column (see Figure 8).

Figure 8 **High-Definition Program Configuration**

Advanced				DSP Allocation (by location or group)		Resolve PID conflicts	Force Map
Select	PSI Omit	Prog#	QOS	Slot & Module	Group	Max Bitrate	Source
☑	☐	1	Medium ▼	0	0	--	--	Slot 4,Module 0
☑	☐	2	Medium ▼	0	2	--	--	Slot 4,Module 0
☑	☐	3	Medium ▼	1	1	--	--	Slot 4,Module 0
☑	☐	4	Medium ▼	2	0	--	--	Slot 4,Module 0
☑	☐	5	NoRateRed ▼	2	2	1	--	Slot 4,Module 0
☑	☐	6	Medium ▼	0	0	--	--	Slot 4,Module 0
☑	☐	7	Medi...	0	0			Slot 4,Module 0

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Step 8 Click Apply to save the configuration.

✎

Note In Figure 8, the HD program is Program 5 set to NoRateRed in DSP Group 1.

Additional Configuration Notes

- Do not use saved configuration files from earlier versions of software.

- The Total PassThru Bitrate must be configured to support audio-only programs (such as DMX) even if they are not configured for Program PassThru mode. The average audio-only program consumes about 300 kbps.

- To clear Cisco 6920 configurations, click Utilities and click Erase Stored Configuration. All stored configurations are removed and the Cisco 6920 is reset.

7 Connector Pin Assignments

DigiCable Headend Expansion Interface (DHEI) Input Connector

Figure 9   DHEI Input Connector
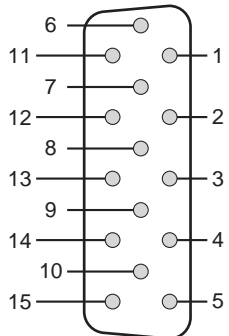
Pin	Signal
1	SHLDGND
2	RSVD
3	RSVD
4	RSVD
5	SIGND
6	SenseL
7	PSync+
8	PDat+
9	PClk+
10	RefClk+
11	SenseR
12	PSync-
13	PDat-
14	PClk-
15	RefClk-
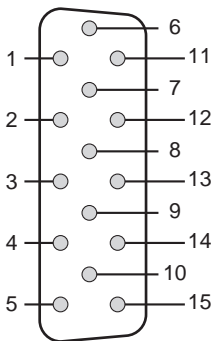
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DHEI Output Connector

Figure 10   DHEI Output Connector

Pin	Signal
1	SHLDGND
2	RSVD
3	RSVD
4	RSVD
5	SIGND
6	SenseL
7	PSync+
8	PDat+
9	PClk+
10	RefClk+
11	SenseR
12	PSync-
13	PDat-
14	PClk-
15	RefClk-

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Ethernet Crossover Cable

Table 1   Ethernet Crossover Cable

Signal	Pin	Pin	Signal
Transmit Data (TxD+)	1	3	Receive Data (RxD+)
Transmit Data (TxD−)	2	6	Receive Data (RxD−)
Receive Data (RxD+)	3	1	Transmit Data (TxD+)
–	4	4	–
–	5	5	–
Receive Data (RxD−)	6	2	Transmit Data (TxD−)
–	7	7	–
–	8	8	–