



Cisco uMG9820 QAM Gateway Installation and Configuration Guide for Release 2.3

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- Move the equipment farther away from the television or radio.
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Preface

This preface explains the purpose, intended audience, and organization of the *Cisco uMG9820 QAM Gateway Installation and Configuration Guide for Release 2.3*. The preface also defines the conventions used to convey instructions and information, and the process for obtaining Cisco documentation and technical assistance.

This preface presents the following major sections:

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Purpose

This guide provides hardware installation and software configuration instructions for the Cisco uMG9820 QAM Gateway. The guide contains procedures for installing the Cisco uMG9820 hardware, starting up the QAM gateway, and troubleshooting any problems that might occur during installation.

For a list of companion publications, see [Related Documentation, page x](#).

Audience

To use this publication, you should be familiar not only with Cisco uMG9820 hardware and cabling but also with electronic circuitry and wiring practices. You should also have experience with the following:

- Electronic or electromechanical technology
- MPEG-2 protocol
- UDP/IP protocol
- RF cable plants (desirable)

**Warning**

Only trained and qualified personnel should be allowed to install, replace, or service this equipment.
Statement 1030

Organization

The major sections of this guide are as follows:

Chapter	Description
Chapter 1, “Product Overview”	Describes the Cisco uMG9820 QAM Gateway and its major features and interfaces.
Chapter 2, “Preparing for Installation”	Describes the steps required to prepare a site before installing the Cisco uMG9820.
Chapter 3, “Installing the Cisco uMG9820”	Provides instructions to install the Cisco uMG9820 and to connect its network interface cables.
Chapter 4, “Starting and Configuring the Cisco uMG9820”	Describes the procedure for the initial startup and configuration of the system.
Chapter 5, “Troubleshooting”	Provides basic troubleshooting procedures for the hardware installation.
Appendix A, “Cisco uMG9820 Technical Specifications”	Lists complete technical specifications for the Cisco uMG9820.

Related Documentation

Your Cisco uMG9820 and the Cisco command-line interface (CLI) software running on it contain extensive features and functionality, which are documented in the following resources:

- For this document and related documents, refer to Cisco uMG9820 QAM Gateway at the following URL:
<http://www.cisco.com/univercd/cc/td/doc/product/cable/vod/umg9820/index.htm>
- For international agency compliance and safety information for the Cisco uMG9820, refer to the *Cisco uMG9820 QAM Gateway Regulatory Compliance and Safety Information* document that shipped with your Cisco uMG9820.
- For a quick start guide providing basic instructions for rack-mounting the Cisco uMG9820, refer to *Quick Start Guide—Rack-Mounting the Cisco uMG9820 uMG9820 QAM Gateway*.
- For information on installing and replacing field-replaceable units on the Cisco uMG9820, refer to the documentation shipped with each field-replaceable unit:
 - *Removing and Replacing the Power Supply in the Cisco uMG9820 QAM Gateway*
 - *Removing and Replacing the Fan Assembly in the Cisco uMG9820 QAM Gateway*
 - *Removing and Replacing the Processor Card in the Cisco uMG9820 QAM Gateway*
 - *Removing and Replacing the QAM Card in the Cisco uMG9820 QAM Gateway*
- For the latest release information regarding the Cisco uMG9820, refer to *Release Notes for the Cisco uMG9820 QAM Gateway, Release 2.3* on Cisco.com.

- For information regarding the Cisco Gigabit-Ethernet Optimized VoD Solution, go to the following URL:
<http://www.cisco.com/univercd/cc/td/doc/solution/vodsols/index.htm>
- For information regarding Cisco QAM Gateway Manager, go to the following URL:
<http://www.cisco.com/univercd/cc/td/doc/product/cable/vod/cqgm/index.htm>

Conventions

This guide uses the following conventions for command syntax descriptions and textual emphasis:

Convention	Description
boldface font	Commands and keywords are in boldface .
<i>italic font</i>	Arguments for which you supply values are in <i>italics</i> .
[]	Elements in square brackets are optional.
{x y z}	Alternative, mutually exclusive, keywords are grouped in braces and separated by vertical bars.
[x y z]	Optional alternative keywords are grouped in brackets and separated by vertical bars.
string	A nonquoted set of characters. Do not use quotation marks around the string or the string will include the quotation marks.
screen font	Terminal sessions and information the system displays are in <i>screen font</i> .
boldface screen font	Information you must enter is in boldface screen font .
<i>italic screen font</i>	Arguments for which you supply values are in <i>italic screen font</i> .
^	The symbol ^ represents the key labeled Control—for example, the key combination ^D in a screen display means hold down the Control key while you press the D key.
<>	Nonprinting characters, such as passwords, are in angle brackets in contexts where italics are not available. Angle brackets are also used for variables.
[]	Default responses to system prompts are in square brackets.
!, #	An exclamation point (!) or a pound sign (#) at the beginning of a line of code indicates a comment line.



Note

Means *reader take note*. Notes contain helpful suggestions or references to materials not contained in this publication.



Timesaver

Means *the described action saves time*. You can save time by performing the action described in the paragraph.

**Caution**

Means *reader be careful*. In this situation, you might do something that could result in equipment damage or loss of data.

**Warning****IMPORTANT SAFETY INSTRUCTIONS**

This warning symbol means danger. You are in a situation that could cause bodily injury. Before you work on any equipment, be aware of the hazards involved with electrical circuitry and be familiar with standard practices for preventing accidents. Use the statement number provided at the end of each warning to locate its translation in the translated safety warnings that accompanied this device. Statement 1071

SAVE THESE INSTRUCTIONS**Waarschuwing****BELANGRIJKE VEILIGHEIDSINSTRUCTIES**

Dit waarschuwingssymbool betekent gevaar. U verkeert in een situatie die lichamelijk letsel kan veroorzaken. Voordat u aan enige apparatuur gaat werken, dient u zich bewust te zijn van de bij elektrische schakelingen betrokken risico's en dient u op de hoogte te zijn van de standaard praktijken om ongelukken te voorkomen. Gebruik het nummer van de verklaring onderaan de waarschuwing als u een vertaling van de waarschuwing die bij het apparaat wordt geleverd, wilt raadplegen.

BEWAAR DEZE INSTRUCTIES**Varoitus****TÄRKEITÄ TURVALLISUUSOHJEITA**

Tämä varoitusmerkki merkitsee vaaraa. Tilanne voi aiheuttaa ruumiillisia vammoja. Ennen kuin käsittelet laitteistoa, huomioi sähköpiirien käsittelemiseen liittyvät riskit ja tutustu onnettomuuksien yleisiin ehkäisytapoihin. Turvallisuusvaroitusten käännökset löytyvät laitteen mukana toimitettujen käännettyjen turvallisuusvaroitusten joukosta varoitusten lopussa näkyvien lausuntonumeroiden avulla.

SÄILYTÄ NÄMÄ OHJEET**Attention****IMPORTANTES INFORMATIONS DE SÉCURITÉ**

Ce symbole d'avertissement indique un danger. Vous vous trouvez dans une situation pouvant entraîner des blessures ou des dommages corporels. Avant de travailler sur un équipement, soyez conscient des dangers liés aux circuits électriques et familiarisez-vous avec les procédures couramment utilisées pour éviter les accidents. Pour prendre connaissance des traductions des avertissements figurant dans les consignes de sécurité traduites qui accompagnent cet appareil, référez-vous au numéro de l'instruction situé à la fin de chaque avertissement.

CONSERVEZ CES INFORMATIONS

Warnung	WICHTIGE SICHERHEITSHINWEISE Dieses Warnsymbol bedeutet Gefahr. Sie befinden sich in einer Situation, die zu Verletzungen führen kann. Machen Sie sich vor der Arbeit mit Geräten mit den Gefahren elektrischer Schaltungen und den üblichen Verfahren zur Vorbeugung vor Unfällen vertraut. Suchen Sie mit der am Ende jeder Warnung angegebenen Anweisungsnummer nach der jeweiligen Übersetzung in den übersetzten Sicherheitshinweisen, die zusammen mit diesem Gerät ausgeliefert wurden. BEWAHREN SIE DIESE HINWEISE GUT AUF.
Avvertenza	IMPORTANTI ISTRUZIONI SULLA SICUREZZA Questo simbolo di avvertenza indica un pericolo. La situazione potrebbe causare infortuni alle persone. Prima di intervenire su qualsiasi apparecchiatura, occorre essere al corrente dei pericoli relativi ai circuiti elettrici e conoscere le procedure standard per la prevenzione di incidenti. Utilizzare il numero di istruzione presente alla fine di ciascuna avvertenza per individuare le traduzioni delle avvertenze riportate in questo documento. CONSERVARE QUESTE ISTRUZIONI
Advarsel	VIKTIGE SIKKERHETSINSTRUKSJONER Dette advarselssymbolet betyr fare. Du er i en situasjon som kan føre til skade på person. Før du begynner å arbeide med noe av utstyret, må du være oppmerksom på farene forbundet med elektriske kretser, og kjenne til standardprosedyrer for å forhindre ulykker. Bruk nummeret i slutten av hver advarsel for å finne oversettelsen i de oversatte sikkerhetsadvarslene som fulgte med denne enheten. TA VARE PÅ DISSE INSTRUKSJONENE
Aviso	INSTRUÇÕES IMPORTANTES DE SEGURANÇA Este símbolo de aviso significa perigo. Você está em uma situação que poderá ser causadora de lesões corporais. Antes de iniciar a utilização de qualquer equipamento, tenha conhecimento dos perigos envolvidos no manuseio de circuitos elétricos e familiarize-se com as práticas habituais de prevenção de acidentes. Utilize o número da instrução fornecido ao final de cada aviso para localizar sua tradução nos avisos de segurança traduzidos que acompanham este dispositivo. GUARDE ESTAS INSTRUÇÕES
¡Advertencia!	INSTRUCCIONES IMPORTANTES DE SEGURIDAD Este símbolo de aviso indica peligro. Existe riesgo para su integridad física. Antes de manipular cualquier equipo, considere los riesgos de la corriente eléctrica y familiarícese con los procedimientos estándar de prevención de accidentes. Al final de cada advertencia encontrará el número que le ayudará a encontrar el texto traducido en el apartado de traducciones que acompaña a este dispositivo. GUARDE ESTAS INSTRUCCIONES

Varning! VIKTIGA SÄKERHETSANVISNINGAR

Denna varningssignal signalerar fara. Du befinner dig i en situation som kan leda till personskada. Innan du utför arbete på någon utrustning måste du vara medveten om farorna med elkretsar och känna till vanliga förfaranden för att förebygga olyckor. Använd det nummer som finns i slutet av varje varning för att hitta dess översättning i de översatta säkerhetsvarningar som medföljer denna anordning.

SPARA DESSA ANVISNINGAR**Figyelem FONTOS BIZTONSÁGI ELOÍRÁSOK**

Ez a figyelmeztető jel veszélyre utal. Sérülésveszélyt rejtő helyzetben van. Mielőtt bármely berendezésen munkát végezte, legyen figyelemmel az elektromos áramkörök okozta kockázatokra, és ismerkedjen meg a szokásos balesetvédelmi eljárásokkal. A kiadványban szereplő figyelmeztetések fordítása a készülékhez mellékelt biztonsági figyelmeztetések között található; a fordítás az egyes figyelmeztetések végén látható szám alapján kereshető meg.

ORIZZE MEG EZEKET AZ UTASÍTÁSOKAT!**Предупреждение ВАЖНЫЕ ИНСТРУКЦИИ ПО СОБЛЮДЕНИЮ ТЕХНИКИ БЕЗОПАСНОСТИ**

Этот символ предупреждения обозначает опасность. То есть имеет место ситуация, в которой следует опасаться телесных повреждений. Перед эксплуатацией оборудования выясните, каким опасностям может подвергаться пользователь при использовании электрических цепей, и ознакомьтесь с правилами техники безопасности для предотвращения возможных несчастных случаев. Воспользуйтесь номером заявления, приведенным в конце каждого предупреждения, чтобы найти его переведенный вариант в переводе предупреждений по безопасности, прилагаемом к данному устройству.

СОХРАНИТЕ ЭТИ ИНСТРУКЦИИ**警告 重要的安全性说明**

此警告符号代表危险。您正处于可能受到严重伤害的工作环境中。在您使用设备开始工作之前，必须充分意识到触电的危险，并熟练掌握防止事故发生的标准工作程序。请根据每项警告结尾提供的声明号码来找到此设备的安全性警告说明的翻译文本。

请保存这些安全性说明

警告 安全上の重要な注意事項

「危険」の意味です。人身事故を予防するための注意事項が記述されています。装置の取り扱い作業を行うときは、電気回路の危険性に注意し、一般的な事故防止策に留意してください。警告の各国語版は、各注意事項の番号を基に、装置に付属の「Translated Safety Warnings」を参照してください。

これらの注意事項を保管しておいてください。

Obtaining Documentation

Cisco documentation and additional literature are available on Cisco.com. Cisco also provides several ways to obtain technical assistance and other technical resources. These sections explain how to obtain technical information from Cisco Systems.

Cisco.com

You can access the most current Cisco documentation at this URL:

<http://www.cisco.com/univercd/home/home.htm>

You can access the Cisco website at this URL:

<http://www.cisco.com>

You can access international Cisco websites at this URL:

http://www.cisco.com/public/countries_languages.shtml

Ordering Documentation

You can find instructions for ordering documentation at this URL:

http://www.cisco.com/univercd/cc/td/doc/es_inpck/pdi.htm

You can order Cisco documentation in these ways:

- Registered Cisco.com users (Cisco direct customers) can order Cisco product documentation from the Ordering tool:
<http://www.cisco.com/en/US/partner/ordering/index.shtml>
- Nonregistered Cisco.com users can order documentation through a local account representative by calling Cisco Systems Corporate Headquarters (California, USA) at 408 526-7208 or, elsewhere in North America, by calling 800 553-NETS (6387).

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Cisco Technical Support Website

The Cisco Technical Support Website provides online documents and tools for troubleshooting and resolving technical issues with Cisco products and technologies. The website is available 24 hours a day, 365 days a year at this URL:

<http://www.cisco.com/techsupport>

Access to all tools on the Cisco Technical Support Website requires a Cisco.com user ID and password. If you have a valid service contract but do not have a user ID or password, you can register at this URL:

<http://tools.cisco.com/RPF/register/register.do>

Submitting a Service Request

Using the online TAC Service Request Tool is the fastest way to open S3 and S4 service requests. (S3 and S4 service requests are those in which your network is minimally impaired or for which you require product information.) After you describe your situation, the TAC Service Request Tool automatically provides recommended solutions. If your issue is not resolved using the recommended resources, your service request will be assigned to a Cisco TAC engineer. The TAC Service Request Tool is located at this URL:

<http://www.cisco.com/techsupport/servicerequest>

For S1 or S2 service requests or if you do not have Internet access, contact the Cisco TAC by telephone. (S1 or S2 service requests are those in which your production network is down or severely degraded.) Cisco TAC engineers are assigned immediately to S1 and S2 service requests to help keep your business operations running smoothly.

To open a service request by telephone, use one of the following numbers:

Asia-Pacific: +61 2 8446 7411 (Australia: 1 800 805 227)

EMEA: +32 2 704 55 55

USA: 1 800 553 2447

For a complete list of Cisco TAC contacts, go to this URL:

<http://www.cisco.com/techsupport/contacts>

Definitions of Service Request Severity

To ensure that all service requests are reported in a standard format, Cisco has established severity definitions.

Severity 1 (S1)—Your network is “down,” or there is a critical impact to your business operations. You and Cisco will commit all necessary resources around the clock to resolve the situation.

Severity 2 (S2)—Operation of an existing network is severely degraded, or significant aspects of your business operation are negatively affected by inadequate performance of Cisco products. You and Cisco will commit full-time resources during normal business hours to resolve the situation.

Severity 3 (S3)—Operational performance of your network is impaired, but most business operations remain functional. You and Cisco will commit resources during normal business hours to restore service to satisfactory levels.

Severity 4 (S4)—You require information or assistance with Cisco product capabilities, installation, or configuration. There is little or no effect on your business operations.

Obtaining Additional Publications and Information

Information about Cisco products, technologies, and network solutions is available from various online and printed sources.

- Cisco Marketplace provides a variety of Cisco books, reference guides, and logo merchandise. Visit Cisco Marketplace, the company store, at this URL:
<http://www.cisco.com/go/marketplace/>
- The Cisco *Product Catalog* describes the networking products offered by Cisco Systems, as well as ordering and customer support services. Access the Cisco Product Catalog at this URL:
<http://cisco.com/univercd/cc/td/doc/pcat/>
- *Cisco Press* publishes a wide range of general networking, training and certification titles. Both new and experienced users will benefit from these publications. For current Cisco Press titles and other information, go to Cisco Press at this URL:
<http://www.ciscopress.com>
- *Packet* magazine is the Cisco Systems technical user magazine for maximizing Internet and networking investments. Each quarter, Packet delivers coverage of the latest industry trends, technology breakthroughs, and Cisco products and solutions, as well as network deployment and troubleshooting tips, configuration examples, customer case studies, certification and training information, and links to scores of in-depth online resources. You can access Packet magazine at this URL:
<http://www.cisco.com/packet>
- *iQ Magazine* is the quarterly publication from Cisco Systems designed to help growing companies learn how they can use technology to increase revenue, streamline their business, and expand services. The publication identifies the challenges facing these companies and the technologies to help solve them, using real-world case studies and business strategies to help readers make sound technology investment decisions. You can access iQ Magazine at this URL:
<http://www.cisco.com/go/iqmagazine>
- *Internet Protocol Journal* is a quarterly journal published by Cisco Systems for engineering professionals involved in designing, developing, and operating public and private internets and intranets. You can access the Internet Protocol Journal at this URL:
<http://www.cisco.com/ipj>
- World-class networking training is available from Cisco. You can view current offerings at this URL:
<http://www.cisco.com/en/US/learning/index.html>



Product Overview

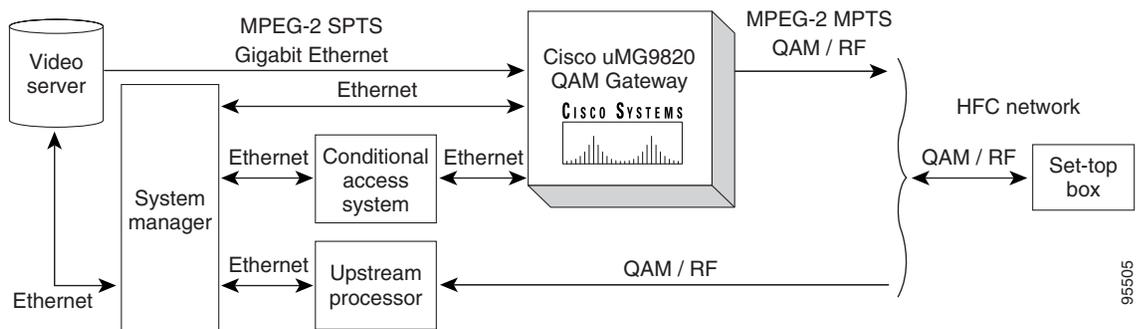
This chapter describes the Cisco uMG9820 QAM Gateway. The chapter contains the following major sections:

- [Product Description, page 1-1](#)
- [Features and Specifications, page 1-2](#)
- [Additional Features and Characteristics, page 1-4](#)
- [Next Steps, page 1-8](#)

Product Description

The Cisco uMG9820 QAM Gateway (referred to simply as the Cisco uMG9820) receives MPEG-2 single-program transport streams (SPTSs) encapsulated in user datagram protocol (UDP)/IP datagrams over Gigabit Ethernet (GE). The MPEG-2 SPTS packets are processed and remultiplexed into MPEG-2 multiprogram transport streams (MPTSs). The MPTS packets are in turn routed to QAM/RF cards for distribution over the cable television (CATV) network to downstream connected set-top boxes (STBs). (See [Figure 1-1](#).) The QAM cards accept up to four MPTSs, and output up to four QAM-modulated and RF-upconverted signals. The modulation can be set to either 64 or 256 QAM; there are two RF ports per QAM card, and two QAM channels per port.

Figure 1-1 Typical VOD Network using the Cisco uMG9820 QAM Gateway



95505

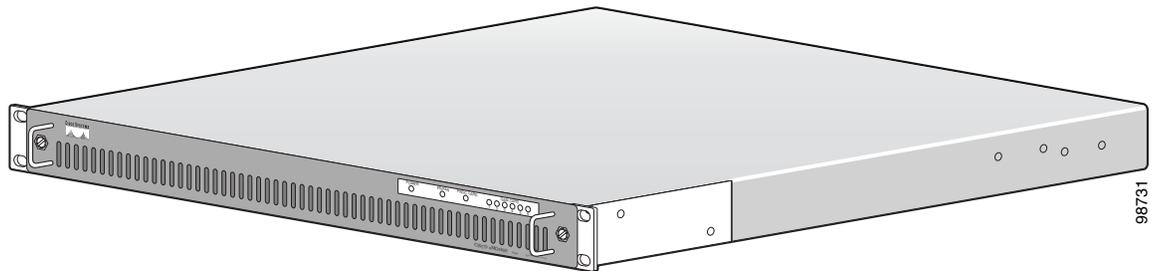
The Cisco uMG9820 incorporates a number of standard network protocols for management and control, including simple network management protocol (SNMP) for management and configuration, TFTP for firmware upgrades, dynamic host configuration protocol (DHCP) for dynamic address assignment, and Telnet for command-line configuration options.

**Note**

HTTP and conditional access system (CAS) are not supported in initial releases.

The Cisco uMG9820 is shown in [Figure 1-2](#).

Figure 1-2 Cisco uMG9820 QAM Gateway



Features and Specifications

Features

[Table 1-1](#) summarizes the key operational features of the Cisco uMG9820 QAM Gateway.

**Note**

The chassis is shipped with all components installed. Removal and replacement instructions for all replaceable components are shipped with those components, and are listed in [Related Documentation](#), [page x](#).

Table 1-1 Key Features of the Cisco uMG9820

Area	Feature	Comments
Operational	Modular single rack unit (1RU) chassis supporting online insertion and removal (OIR)	Allows addition, replacement, or removal of the QAM cards, power supplies, or fan assembly without interrupting the system.
	Field-upgradable software	Allows remote loading of new images into flash memory.
	Environmental monitoring and reporting functions	Allows maintenance of normal system operation by detecting adverse environmental conditions.
	Front-to-back airflow	Internal fans provide cooling.

Table 1-1 Key Features of the Cisco uMG9820 (continued)

Area	Feature	Comments
Chassis	One processor card	Chassis stores CLEI (Common Language Equipment Identifier) code, system serial numbers, MAC addresses.
	From 2 (minimum) to 6 QAM cards	
	Two power supplies	
	One fan assembly (with two fans)	
Processor	Redundant 1+1 GE port configuration (one active, one backup)	
	One 10BASE-T/100BASE-TX Ethernet port for out-of-band management (NMS—network management system)	
	One 10BASE-T/100BASE-TX Ethernet port for CAS (conditional access system)	For future use.
	One RS-232 console port for direct serial communications with processor card	
	One DVB-ASI monitor port	
	Configurable user transport stream ID (TSID)	
QAM/RF	64QAM and 256QAM modulation	
	Two RF ports, two QAM channels per port	

Basic Technical Specifications

Table 1-2 lists the basic technical specifications for the Cisco uMG9820. For the complete technical specifications, see [Appendix A, “Cisco uMG9820 Technical Specifications.”](#)

Table 1-2 Basic Technical Specifications for the Cisco uMG9820

Characteristic	Value
Physical	
Dimensions	1.72 in. high x 18.98 in. wide x 21.41 in. deep (43.7 x 444.5 x 342.9 mm)
Mounting standard	1 RU, 19 in.
Weight	17.9 lbs (8.1 kg) typical (fully loaded)

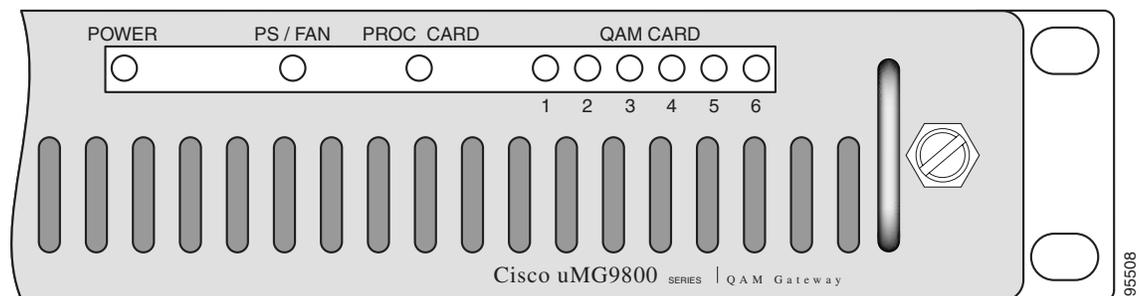
Table 1-2 Basic Technical Specifications for the Cisco uMG9820 (continued)

Characteristic	Value
Electrical	
Input voltage	100–240 VAC
Input frequency	50–60 Hz
Input current	3 A max. at 100 VAC input
AC power connector	IEC 320 standard 6.3-A power entry module, RFI filtered, with metric fuse holder (a spare 250-V, 6.3-A fuse is in the fuse compartment)
Environmental	
Temperature	Operating: 40–104°F (10–40°C)
	Nonoperating: –40–158°F (–40–70°C)
Humidity (relative, noncondensing)	Operating: 20 to 90%
	Nonoperating: 5 to 95%
Altitude	Operating: sea level to 6562 ft (2000 m)
	Nonoperating: sea level to 15,748 ft (4800 m)

Additional Features and Characteristics

Front Panel LEDs

The removable front panel of the Cisco uMG9820 contains status LEDs. [Figure 1-3 on page 1-4](#) highlights the LED section of the front panel. [Table 1-3 on page 1-4](#) describes the meaning of the LEDs.

Figure 1-3 Cisco uMG9820 Front Panel LEDs**Table 1-3 Front Panel LEDs**

LED Label	Color	State	Indication
POWER	Green	On	The chassis is powered.
		Off	The chassis is not powered.

Table 1-3 Front Panel LEDs (continued)

LED Label	Color	State	Indication
PS/FAN	Bi-color	Green	No error condition has been detected on the power supplies or the fan assembly.
		Yellow	Either (1) an error condition has been detected on one or both power supplies, (2) an error condition has been detected on the fan assembly, or (3) only one power supply is installed.
PROC CARD	Bi-color	Green	No error condition has been detected on the processor card.
		Yellow	An error condition has been detected on the processor card.
		Yellow, flashing	The fan assembly microcontroller has not detected the “heartbeat” signal from the processor card in the last 5 seconds. The processor card is either not installed or there is a communication error.
QAM CARD 1 - 6	Bi-color	Green	No error condition has been detected on the corresponding QAM card.
		Yellow	An error condition has been detected on the corresponding QAM card, or the corresponding QAM card is the only one installed.
		Off	No corresponding QAM card is installed.

Rear Panel Connectors and LEDs

The rear of the Cisco uMG9820 consists of two separate sections: the QAM modules and the processor module. The rear panel contains connection ports and LEDs, as illustrated below.

Connectors

[Figure 1-4](#) shows the connectors on rear panel of the Cisco uMG9820. The reference numbers in the illustration refer to the explanations in [Table 1-4](#). For slot and port numbering, see [Slot and Port Logical Interface Numbering](#), page 1-6.

Figure 1-4 Cisco uMG9820 Rear Panel

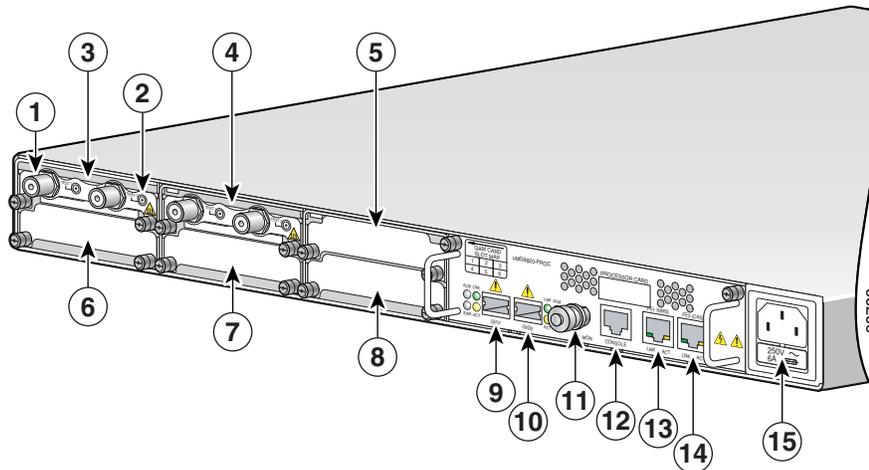


Table 1-4 Rear Panel Connectors

Ref. No.	Connector Label	Function
1	Various	RF output (downstream) cable interface, 75-ohm F-connector. There are two RF ports per QAM module, labeled DS1 and DS2. A label on the processor module identifies the locations of QAM module slots 1 through 6.
2	Various	RF monitor interface (MCX connector). The interface for RF port DS1 is labeled TEST 1, and the interface for DS2 is labeled TEST 2.
9, 10	GIG1, GIG2	Gigabit Ethernet (GE) ports 1 and 2, respectively, accept MPEG-2 SPTS from a VoD server. GIG1 (GE port 1) is the active port, and GIG2 (GE port 2) is standby with automatic failover. These ports share a common IP and MAC address. Each port uses an industry-standard small form-factor pluggable (SFP) module.
11	ASI MON	BNC connector with factory-installed cap.
12	CONSOLE	RJ-45 connector port—Provides direct serial communications with the processor card.
13	FE1 (NMS)	Network management system port, RJ-45 connector port—Provides a direct Fast Ethernet link for out-of-band management traffic.
14	FE2 (CAS)	Conditional access system port, RJ-45 connector port—Provides a direct Fast Ethernet link for conditional access traffic.
15	Power	AC power input

Slot and Port Logical Interface Numbering

Interfaces are addressed in the command-line interface (CLI) software by type, slot number, and port number. For the QAM interfaces, the QAM channel also is identified. The number of physical ports depends on the type of modular port adapter or fixed interface. For example, Fast Ethernet 0/1 indicates Fast Ethernet port 1 on the processor card in slot 0. For further information on interface addressing, see [Chapter 4, “Starting and Configuring the Cisco uMG9820.”](#)

Slots and ports in the Cisco uMG9820 are numbered as shown in [Table 1-5](#). The reference numbers in the table refer to [Figure 1-4 on page 1-6](#).

Table 1-5 Slot and Port Numbers

Ref. No.	Function
3, 4, 5, 6, 7, 8	Slot 1 through 6—QAM card interfaces
9	Gigabit Ethernet port 1
10	Gigabit Ethernet port 2
11	ASI port 1
12	Console port
13	Fast Ethernet port 1
14	Fast Ethernet port 2

LEDs

[Figure 1-5 on page 1-7](#) highlights the LED section of the rear panel of the Cisco uMG9820. [Table 1-6 on page 1-8](#) describes their meaning.



Note

For a detailed discussion of the behavior of some LEDs, see [Subsystem Troubleshooting Tips, page 5-4](#).

Figure 1-5 Cisco uMG920 Rear Panel LEDs

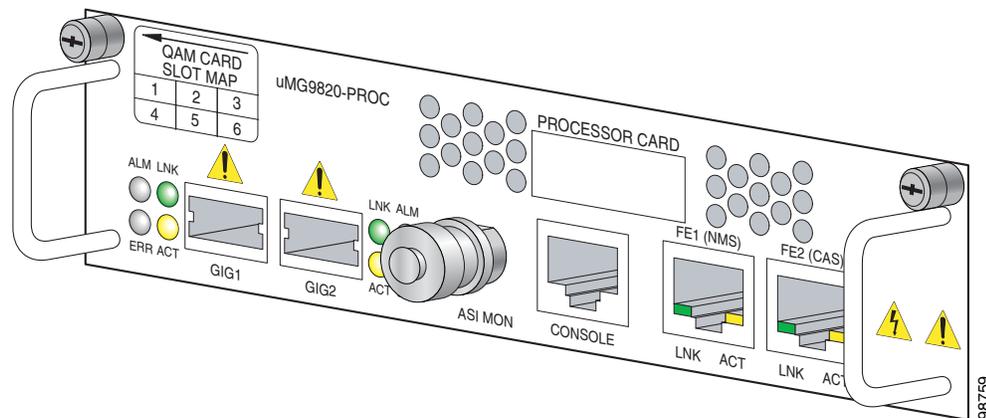


Table 1-6 Rear Panel LEDs

Port	LED Label	Color	State	Indication
GE	ALM	Red	On	Noncritical errors exist on the GE link: <ul style="list-style-type: none"> • Rate of PHY errors above threshold • Rate of CD errors above threshold • Rate of RX packets with errors above threshold • Rate of TX packets with errors above threshold Note PHY, CD, RX packet, and TX packet errors are defined in the IEEE 802.3z standard. The user cannot set the definitions and thresholds for these errors, as they are dictated by the standard.
	ERR	Red	On	Critical errors exist on the GE link: <ul style="list-style-type: none"> • TX underrun • RX overflow
	LNK	Green	On	The GE link is up.
	ACT	Yellow	On	There is activity on the GE link.
FE	LNK	Green	On	The 10BASE-T/100BASE-TX FE link is up.
	ACT	Yellow	On	There is activity on the 10BASE-T/100BASE-TX FE link.

Grounding

This product is grounded through the ground wire in the AC power cord. There is no separate ground connection.

Next Steps

After becoming familiar with the Cisco uMG9820, proceed as follows to prepare and complete the installation and startup of the unit:

1. Before installing the Cisco uMG9820, review [Chapter 2, “Preparing for Installation,”](#) to determine site-planning considerations and steps.
2. Install and cable the Cisco uMG9820, following the steps in [Chapter 3, “Installing the Cisco uMG9820.”](#)
3. Start up and use the CLI to configure the Cisco uMG9820, following the instructions in [Chapter 4, “Starting and Configuring the Cisco uMG9820.”](#)
4. If any problems are encountered during the installation, startup, or configuration of the Cisco uMG9820, consult [Chapter 5, “Troubleshooting.”](#)



Preparing for Installation

This chapter describes the tasks you must perform before beginning to install a Cisco uMG9820. The chapter includes the following major sections:

- [Safety Guidelines, page 2-1](#)
- [Site Requirement Guidelines, page 2-3](#)
- [Shipping Container Contents, page 2-7](#)
- [Tools and Parts Required, page 2-8](#)



Warning

Only trained and qualified personnel should be allowed to install, replace, or service this equipment. Statement 1030



Warning

Read the installation instructions before connecting the system to the power source. Statement 1004

Safety Guidelines

Any device that uses electricity must be handled carefully; follow these guidelines to ensure general safety:

- Keep the chassis area clear and dust-free during and after installation.
- Keep tools away from walk areas.
- Do not wear loose clothing, jewelry (including rings and chains), or other items that could get caught in the chassis. Fasten your tie or scarf and roll up your sleeves.
- Wear safety glasses if you are working under any conditions that might be hazardous to your eyes.
- Do not perform any action that creates a potential hazard to people or makes the equipment unsafe.
- Never attempt to lift an object that might be too heavy for you to lift by yourself.
- Make sure that all faceplates and cover panels are in place.

**Warning**

Blank faceplates and cover panels serve three important functions: they prevent exposure to hazardous voltages and currents inside the chassis; they contain electromagnetic interference (EMI) that might disrupt other equipment; and they direct the flow of cooling air through the chassis. Do not operate the system unless all cards, faceplates, front covers, and rear covers are in place. Statement 1029

- Use caution when installing or modifying network cables.
- Always unplug the power cable before installing or removing a chassis.
- The AC-powered Cisco uMG9820 ships with a three-wire electrical grounding-type plug, which only fits into a grounding-type power outlet. This is a safety feature. The equipment should be grounded in accordance with local and national electrical codes.

**Warning**

This equipment must be grounded. Never defeat the ground conductor or operate the equipment in the absence of a suitably installed ground conductor. Contact the appropriate electrical inspection authority or an electrician if you are uncertain that suitable grounding is available. Statement 1024

- Install the Cisco uMG9820 in compliance with national and local codes: in the United States, National Fire Protection Association (NFPA) 70, United States National Electrical Code; in Canada, Canadian Electrical Code, part I, C22.1.

Electrical Equipment Guidelines

**Warning**

Do not work on the system or connect or disconnect cables during periods of lightning activity. Statement 1001

Follow these guidelines when you work on equipment powered by electricity:

**Warning**

The plug-socket combination must be accessible at all times, because it serves as the main disconnecting device. Statement 1019

- Locate the emergency power-off switch for the room in which you are working. Then, if an electrical accident occurs, you can act quickly to turn off the power.
- Disconnect all power before installing or removing a chassis.
- Do not work alone if potentially hazardous conditions exist.
- Never assume that power is disconnected from a circuit. Always check.
- Look carefully for possible hazards in your work area, such as moist floors, ungrounded power extension cables, frayed power cords, and missing safety grounds.
- A battery is soldered onto the processor card. Do not attempt to replace the battery. Handle the card carefully, and ensure the proper disposal of the card and battery should that be necessary.

**Warning**

Ultimate disposal of this product should be handled according to all national laws and regulations. Statement 1040

- If an electrical accident occurs, proceed as follows:
 - Use caution; do not become a victim yourself.
 - Turn off power to the system.
 - If possible, send another person to get medical aid. Otherwise, assess the condition of the victim and then call for help.
 - Determine whether the person needs rescue breathing or external cardiac compressions; then take appropriate action.

**Warning****Class 1 laser product.** Statement 1008

Chassis Lifting Guidelines

A fully configured Cisco uMG9820 weighs approximately 17.5 pounds (7.9 kg). The chassis is not intended to be moved frequently. Before you install the Cisco uMG9820, ensure that your site is properly prepared so you can avoid having to move the chassis later to accommodate power sources and network connections.

Whenever you lift the chassis or any heavy object, follow these guidelines:

- Always disconnect all external cables before lifting or moving the chassis.
- Ensure that your footing is solid, and balance the weight of the object between your feet.
- Lift the chassis slowly; never move suddenly or twist your body as you lift.
- Keep your back straight and lift with your legs, not your back. If you must bend down to lift the chassis, bend at the knees, not at the waist, to reduce the strain on your lower back muscles.
- Lift the chassis from the bottom; grasp the underside of the chassis exterior with both hands.

Site Requirement Guidelines

**Warning****This unit is intended for installation in restricted access areas. A restricted access area can be accessed only through the use of a special tool, lock and key, or other means of security.**

Statement 1017

**Warning****To prevent the system from overheating, do not operate it in an area that exceeds the maximum recommended ambient temperature of: 32 to 104°F (0 to 40°C)** Statement 1047

The environmental monitoring functions of the Cisco uMG9820 protect the system and components from potential damage from overvoltage and overtemperature conditions. To ensure normal operation and avoid unnecessary maintenance, plan your site configuration and prepare your site before installation. After installation, make sure that the site maintains an ambient temperature of 32 to 104°F (0 to 40°C), and keep the area around the chassis as free from dust as is practical.

Planning a proper location for the Cisco uMG9820 and the layout of your equipment rack or wiring closet is essential for successful system operation. Equipment placed too close together or inadequately ventilated can cause system overtemperature conditions. In addition, chassis panels made inaccessible by poor equipment placement can make system maintenance difficult. The following precautions can help prevent problems during installation and ongoing operation:

- Keep the Cisco uMG9820 off the floor and out of any area that tends to collect dust.
- Ensure that the room where the chassis operates has adequate ventilation. Remember that electrical equipment generates heat. Ambient air temperature may not cool equipment to acceptable operating temperatures without adequate ventilation.
- Plan for access to both front and rear panels of the chassis.
- Use the **show env all** command regularly to check the internal system status (operating temperature, operating voltages, and so on). If warning messages are displayed, take immediate action to identify the cause and correct the problem.
- Follow ESD prevention procedures to avoid damage to equipment. Damage from static discharge can cause immediate or intermittent equipment failure.

Rack-Mounting Guidelines

The Cisco uMG9820 can be mounted in two ways:

- In a standard 19-inch rack
- In a four-post rack having a depth of 23 to 25 inches.

For the first option, simply use the front rack-mount brackets integrated into the front of the unit. For the second option, use the rear rack-mount kit included with the unit, to secure the back of the chassis to the rack.

As an alternative, you can mount the chassis on an equipment shelf—provided that the rack dimensions allow you to secure the Cisco uMG9820 to the shelf, and the overall configuration permits safe installation and access. However, we recommend rack-mounting the Cisco uMG9820.



Warning

To prevent bodily injury when mounting or servicing this unit in a rack, you must take special precautions to ensure that the system remains stable. The following guidelines are provided to ensure your safety:

- This unit should be mounted at the bottom of the rack if it is the only unit in the rack.
- When mounting this unit in a partially filled rack, load the rack from the bottom to the top with the heaviest component at the bottom of the rack.
- If the rack is provided with stabilizing devices, install the stabilizers before mounting or servicing the unit in the rack. Statement 1006

When rack-mounting the Cisco uMG9820, consider the following guidelines:

- When mounting the chassis between two posts or rails, the inner clearance (the width between the inner sides of the two posts or rails) must be at least 17.70 inches (45.0 cm).
- The height of the chassis is 1.72 inches (4.37 cm).
- It is necessary to secure only the front of the chassis to a 19-inch rack. When mounting the chassis in a four-post rack that is between 23 and 25 inches deep, use the supplied rear rack-mount kit to secure the back of the chassis to the rack.

- If you plan to use an equipment shelf, ensure that the shelf is constructed to support the weight and accommodate the dimensions of the chassis.

When planning your rack installation, consider the following guidelines:

- Install the QAM gateway in an open rack whenever possible. If installation in an enclosed rack is unavoidable, ensure that the rack has adequate ventilation.

**Caution**

To prevent chassis overheating, never install the chassis in an enclosed rack or room that is not properly ventilated or air conditioned. An enclosed rack should have louvered sides and a fan to provide cooling air, because heat generated by equipment near the bottom of the rack can be drawn upward into the intake ports of the equipment above.

- Ensure that the rack is not congested, because each unit in the rack generates heat. To allow for adequate airflow, maintain a minimum clearance of 3 inches (7.6 cm) in front of and behind the chassis, for the cooling air inlet and exhaust ports, respectively.

**Caution**

Do not place the chassis where heated exhaust air from other systems could enter the air intake at the front of the chassis. This could cause the system to overheat.

- Baffles can isolate exhaust air from intake air, which also helps to draw cooling air through the chassis. The best placement of the baffles depends on the airflow patterns in the rack, which can be found by experimenting with different configurations.
- When equipment installed in a rack (particularly in an enclosed rack) fails, try operating the equipment by itself, if possible. Power off other equipment in the rack to allow the unit under test a maximum of cooling air and clean power.
- Allow sufficient clearance around the rack for maintenance. If the rack is mobile, you can push it back near a wall or cabinet for normal operation and pull it out for maintenance, such as installing or replacing a QAM card, or connecting cables. If the rack is stationary, allow 3 to 4 feet (0.9 to 1.2 m) of clearance in front of and behind the chassis.
- Install the chassis, and external devices to which it will connect, in a contiguous stack.
- To maintain a low center of gravity and prevent the rack from falling over, always install heavier equipment in the lower half of a rack.
- If you use telco-type racks, be sure that the rack is bolted to the floor and secured, because in these types of installations only the front of the chassis mounts to the two rack posts. Ensure that the weight of the chassis does not make the rack unstable.

Temperature and Humidity Requirements

Table 1-2 on page 1-3 lists operating and nonoperating environmental site requirements. The ranges listed are those within which the Cisco uMG9820 continues to operate; however, a measurement approaching the minimum or maximum of a range indicates a potential problem. You can maintain normal operation by anticipating and correcting environmental anomalies before they approach a minimum or maximum operating threshold.

Power Connection Guidelines

Follow these precautions and recommendations when planning power connections to a Cisco uMG9820:

- Make sure that the plug-socket combination is accessible.



Warning

The plug-socket combination must be accessible at all times, because it serves as the main disconnecting device. Statement 1019

- To ensure that you are receiving clean power, install a power conditioner if necessary.



Warning

Take care when connecting units to the supply circuit so that wiring is not overloaded. Statement 1018

- To avoid damage from lightning and power surges, use a grounded AC power outlet and install proper grounding.
- To prevent thermal buildup, keep the Cisco uMG9820 off the floor and out of any area that tends to collect dust.



Warning

This equipment must be grounded. Never defeat the ground conductor or operate the equipment in the absence of a suitably installed ground conductor. Contact the appropriate electrical inspection authority or an electrician if you are uncertain that suitable grounding is available. Statement 1024

- The AC-input power supply operates on input voltage and frequency within the ranges of 100 to 240 VAC and 50–60 Hz without the need for operator adjustments. This power supply also incorporates an active power-factor corrector that minimizes the unwanted generation of line current harmonics, which can cause overloading of site electrical distribution systems.

Plant Wiring Guidelines

The following are guidelines for setting up the plant wiring and cabling at your site. When planning the location of the new system, consider the distance limitations for signaling, EMI, and connector compatibility, as described in the following sections:

- [Interference Considerations](#)
- [Distance Limitations and Interface Specifications](#)

Interference Considerations

When wires extend for any significant distance in an electromagnetic field, interference can occur between the field and the signals on the wires. This has two implications for the construction of plant wiring:

- Bad wiring can result in radio interference emanating from the plant wiring.
- Strong electromagnetic interference (EMI), especially when it is caused by lightning or radio transmitters, can destroy the signal drivers and receivers in the Cisco uMG9820, and can even create an electrical hazard by conducting power surges through lines and into equipment. (Review the safety warnings in the [Electrical Equipment Guidelines, page 2-2](#).)

**Note**

To predict and remedy strong EMI, you may also need to consult experts.

If you use twisted-pair cable in your plant wiring with a good distribution of grounding conductors, the plant wiring is unlikely to emit radio interference. If you exceed the recommended distances, use a high-quality twisted-pair cable with one ground conductor for each data signal.

If wires exceed recommended distances, or if wires pass between buildings, give special consideration to the effect of a lightning strike in your vicinity. The electromagnetic pulse caused by lightning or other high-energy phenomena can easily couple enough energy into unshielded conductors to destroy electronic devices. If you have had problems of this sort in the past, you may want to consult experts in electrical surge suppression and shielding.

Distance Limitations and Interface Specifications

The size of your networks and the distances between connections depend on the type of signal, the signal speed, and the transmission media (the type of cabling used to transmit the signals).

**Note**

We recommend that you do not exceed specified transmission rate and distance limits.

When preparing your site for network connections to a Cisco uMG9820, you must consider a number of factors related to each type of interface:

- The type of cabling required for each type (fiber, thick or thin coaxial, foil-twisted pair [FTP], or unshielded twisted-pair [UTP] cabling)
- Distance limitations for each signal type
- The specific cables you need to connect each interface
- Any additional interface equipment you need
- Cable pinouts if you plan to build your cables

**Note**

The specific interface information you need is contained in the documentation that is shipped with each field-replaceable unit.

Shipping Container Contents

To ensure its safety during shipping and handling, the Cisco uMG9820 comes in a specially designed shipping container.

**Caution**

To avoid damaging the Cisco uMG9820, unpack the container carefully.

The shipping container includes the following items:

- One Cisco uMG9820 QAM gateway with two to six QAM cards installed. The number of QAM cards installed depends upon the configuration ordered.
- One accessory kit (System D —74-3343-01 Accessory Kit), to include the following:
 - One left-rear (with respect to the front) rack extension (labeled Part #1)

- One right-rear rack extension (labeled Part #2)
- Two rear rack-mount brackets (labeled Part #3)
- Four 6–32 x 1/4-inch pan-head Phillips screws
- Four 6–32 x 1/4-inch flat-head Phillips screws
- Eight 10–32 x 5/8-inch oval-head Phillips screws
- Eight black-plastic cup washers
- One RF-monitor port-adapter cable (MCX to F-connector female, for use with optional RF test equipment)
- RJ-45 to RJ-45 rollover cable
- RJ-45 to DB-9 female DTE adapter (labeled TERMINAL)
- One 7/64-inch hex key (required to remove the hex-head retaining screw on the power supply module, if removal is necessary)
- Electrostatic discharge (ESD)-preventive wrist strap
- Documentation Set:
 - *Quick Start Guide—Rack-Mounting the Cisco uMG9820 uMG9820 QAM Gateway*
 - *Cisco uMG9820 QAM Gateway Regulatory Compliance and Safety Information*

Keep the shipping container in case you must return the Cisco uMG9820 to the factory.

Tools and Parts Required

The Cisco uMG9820 is fully assembled at the factory; no additional assembly is required prior to installing the unit. In addition to the accessory kit that is provided, the following items are recommended:

- Number 2 Phillips screwdriver
- Torque wrench (to ensure that F-connectors on RF ports are tightened to 15 inch-pounds)



Installing the Cisco uMG9820

This chapter explains how to mount and physically install a Cisco uMG9820 QAM Gateway. Before performing any of the procedures in this chapter, read Chapter 2 of the *Cisco uMG9820 QAM Gateway Installation and Configuration Guide for Release 2.3* to ensure that you understand all the tools required and safety guidelines. This chapter includes the following major sections:

- [Installing the Cisco uMG9820 in a Rack, page 3-1](#)
- [Connecting to QAM and RF Monitor Ports, page 3-5](#)
- [Connecting to the Network, page 3-6](#)
- [Connecting to the Console Port, page 3-10](#)
- [Connecting to the ASI Monitor Port \(Optional\), page 3-11](#)
- [Connecting the Power, page 3-11](#)



Warning

Read the installation instructions before you connect the system to its power source. Statement 1004



Caution

The Cisco uMG9820 does not have a power switch. The AC power cord is used to connect and disconnect power. Ensure that the socket-outlet is located or installed near the equipment and is easily accessible.

Before you start the Cisco uMG9820, ensure the following:

- All network interface cables are connected.
- The console terminal is connected and powered on.



Warning

Only trained and qualified personnel should be allowed to install, replace, or service this equipment. Statement 1030

Installing the Cisco uMG9820 in a Rack

The Cisco uMG9820 can be installed in a standard 19-inch mounting rack by securing the front mounting brackets to the equipment rack. The front rack-mount brackets will support the weight of a fully loaded chassis—17.9 lbs (8.1 kg).

If the equipment rack has four posts and has a rack depth of 23 to 25 inches, you can use the rear rack-mount kit that shipped with your Cisco uMG9820 to secure the rear of the chassis to the rack posts.

**Warning**

To prevent bodily injury when mounting or servicing this unit in a rack, you must take special precautions to ensure that the system remains stable. The following guidelines are provided to ensure your safety:

- This unit should be mounted at the bottom of the rack if it is the only unit in the rack.
- When mounting this unit in a partially filled rack, load the rack from the bottom to the top with the heaviest component at the bottom of the rack.
- If the rack is provided with stabilizing devices, install the stabilizers before mounting or servicing the unit in the rack. Statement 1006

Rack-Mounting the Chassis

This section describes how to rack-mount the chassis in a standard 19-inch equipment rack. Rear mounting, with its associated hardware, is optional.

Rack-Mount Items

Use the following items in the Cisco uMG9820 accessory kit to rack-mount the chassis:

- One left-rear (with respect to the front) rack extension (labeled Part #1) (optional)
- One right-rear rack extension (labeled Part #2) (optional)
- Two rear rack-mount brackets (labeled Part #3) (optional)
- Four 6–32 x 1/4-inch pan-head Phillips screws (for use with optional rear brackets)
- Four 6–32 x 1/4-inch flat-head Phillips screws (for use with optional rear brackets)
- Eight 10–32 x 5/8-inch oval-head Phillips screws (four for front brackets, four for optional rear brackets)
- Eight black-plastic cup washers (four for front brackets, four for optional rear brackets)

**Caution**

To prevent stripping the screw heads, use a number 2 Phillips screwdriver.

Installing the Chassis in the Rack Without Rear Rack-Mounts

This procedure is recommended if your installation does not require the additional support provided by the rear rack-mounts.

**Caution**

You need two people to install the chassis in the rack—one person to hold the chassis and one person to secure it to the rack.

To install the chassis without using rear rack-mounts:

Step 1

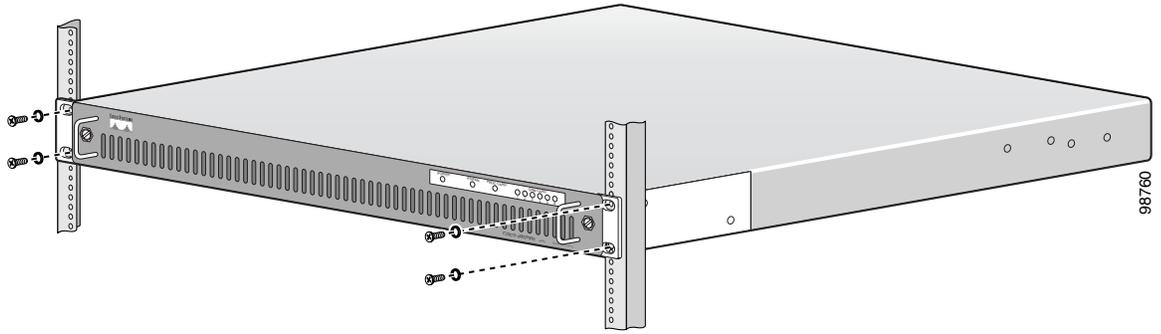
Use two people to install the chassis in the rack: one to hold the chassis, one to secure the front of the chassis to the front rack posts.

- Step 2** Using the 10–32 x 5/8-inch, oval-head Phillips screws and black-plastic cup washers, attach the chassis to the front rack posts as shown in [Figure 3-1](#).

**Caution**

To minimize stress on the front rack-mount brackets, install the bottom screws first. Also, to ensure both proper support and grounding, be sure to use two screws on each side.

Figure 3-1 Attaching the Front of the Chassis to the Rack



Attaching the Rear Rack Extensions to the Chassis (Optional)

If the rear of the chassis is to be secured to the rack to provide additional support, then you must attach the left- and right-rear rack extensions (labeled Part #1 and Part #2, respectively) to the chassis before mounting the Cisco uMG9820 in the rack.

To attach rear rack extensions to the chassis:

- Step 1** Mount the chassis by means of its built-in front rack-mount brackets, as in [Installing the Chassis in the Rack Without Rear Rack-Mounts](#), page 3-2.

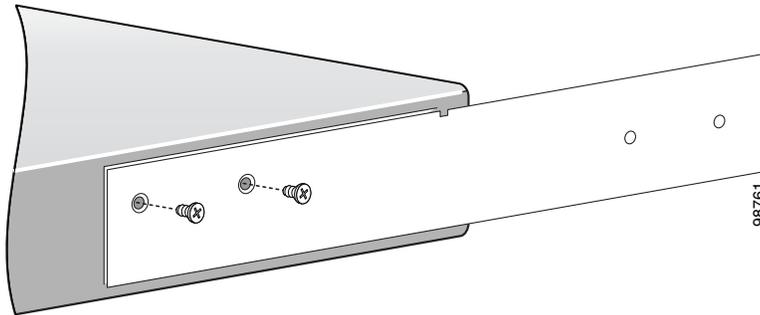
**Caution**

Do not attach the rear rack-mount brackets until the chassis has been mounted in the rack and the front rack-mount brackets have been secured to the rack posts. Otherwise, the rear rack-mount brackets will prevent the chassis from sliding into the rack.

- Step 2** Attach the rear rack extensions to the left- and right-rear sides of the chassis, as follows:
- Refer to [Figure 3-2](#). Using the 6–32 x 1/4-inch flat-head Phillips screws, attach the right-rear rack-mounting bracket to the right side of the chassis, as seen from the front.

**Tip**

The chassis-side mounting holes on each extension are closer to the top of the bracket, with the large end of the countersunk holes on the outside.

Figure 3-2 Attaching the Rear Rack Extension and Rear Rack-Mounting Brackets: Right-Side View

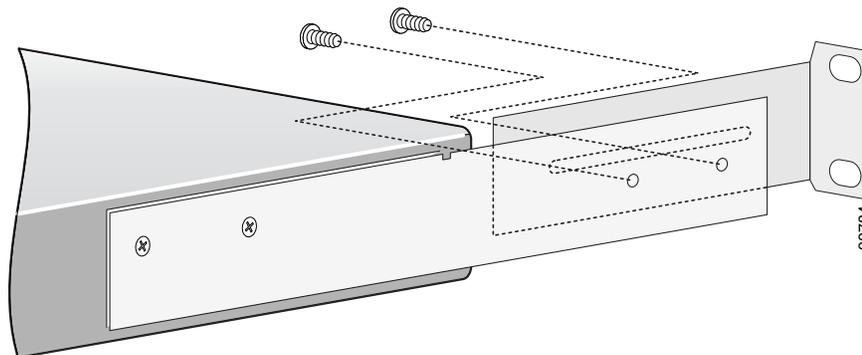
b. Similarly, attach the left-rear rack-mounting bracket to the left side of the chassis.

Step 3 Refer to [Figure 3-3](#). Using the 6–32 x 1/4-inch pan-head Phillips screws, attach the right-rear rack-mount bracket to the right-rear rack post, inserting the screws through the washer and into the threaded holes in the rear rack extension.



Tip

Do not tighten the screws completely until you have adjusted the rear rack-mount brackets to fit.

Figure 3-3 Attaching a Rear Rack-Mount Bracket to a Rear Rack Extension: Right-Side View

Step 4 Similarly, attach the left-rear rack-mount bracket to the left side of the chassis.

Step 5 Refer to [Figure 3-4](#). Using the 10–32 x 5/8-inch oval-head Phillips screws, attach the right-rear rack-mount bracket to the right-rear rack post as follows:

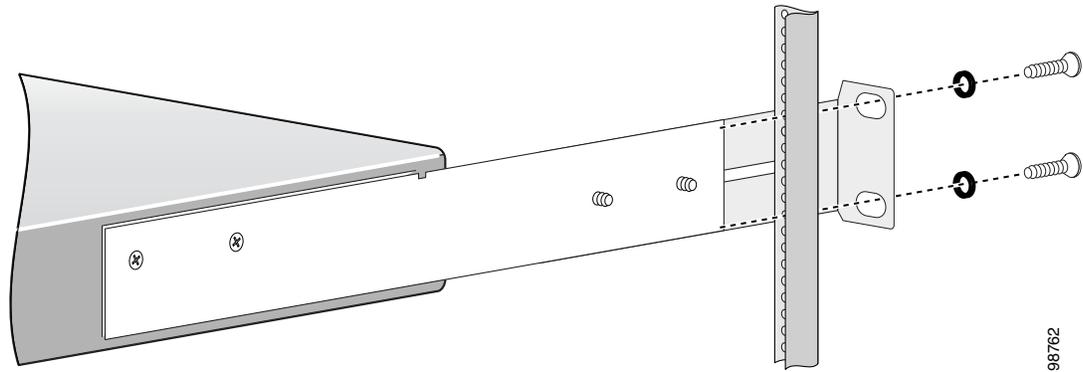
- a. Slide the rack-mount bracket so that it fits against the rear rack post.
- b. Insert the narrow ends of the black-plastic cup washers in the slot in the rear rack-mount bracket.
- c. Insert the screws through the washers and into the threaded holes in the rear rack post.



Caution

Be sure to use two screws on each side.

Figure 3-4 Attaching a Rear Rack-Mount Assembly to a Rear Rack Post: Right Side View



Step 6 Similarly, attach the left-rear rack-mount bracket to the left-rear rack post.

Step 7 With both rear rack-mount assemblies secured to the rear rack posts, tighten the screws holding the rear rack extensions to the rack-mount brackets.

Connecting to QAM and RF Monitor Ports

This section describes how to connect cables to the QAM output and RF monitor ports with F-connectors and MCX connectors, respectively.



Caution

Do not simply hand-tighten the F-connectors. If they are too loose, RF leakage can result. If they are too tight, the port electronics can be damaged. Always use a torque wrench to set the tightness to 15 inch-lbs.



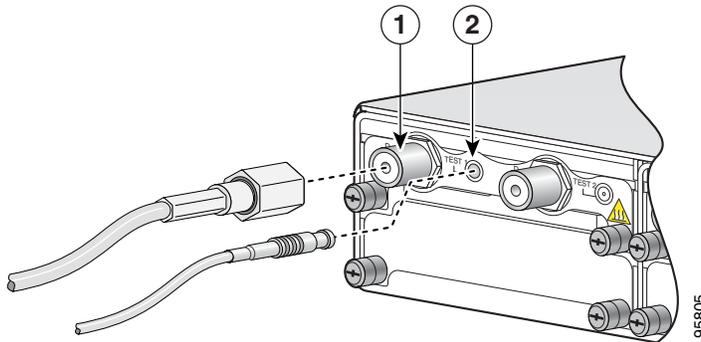
Note

The use of the RF monitor port is optional. The RF output can be monitored continuously, or on an as-needed basis. Each monitor port provides the same output as the RF port, but at lower power.

To connect cables to QAM and RF monitor ports:

Step 1 See [Figure 3-5](#).

Figure 3-5 Connecting Cables to QAM and RF Monitor Ports



1	QAM output port	2	RF monitor port
----------	-----------------	----------	-----------------

- Step 2** Attach a cable with an F-connector to each QAM port (Item 1 in the figure). Attach the other end as appropriate for hybrid fiber-coax (HFC) distribution.
- Step 3** (Optional) Attach a cable with an MCX connector to the RF monitor port that is immediately adjacent to the QAM output to be monitored. (Item 2 in the figure.) Attach the other end to appropriate test equipment.

Connecting to the Network

This section describes how to connect the Cisco uMG9820 to your network. The cables required to connect the gateway to a network are not provided. For ordering information, contact customer service (see [Obtaining Additional Publications and Information](#), page xvii).



Warning

Do not work on the system or connect or disconnect cables during periods of lightning activity.
Statement 1001

Connecting the Gigabit Ethernet Ports

The Gigabit Ethernet ports support IEEE 802.3z specifications for 1000-Mbps transmission over fiber-optic cables. These ports also support autosensing and autonegotiation of the proper transmission mode (half duplex or full duplex) with an attached device. Cables connect to the GE ports by means of small form-factor pluggable (SFP) modules.

Installing SFP Modules

Each GE port requires an SFP module. See [Figure 3-6](#). The following warnings apply to fiber-optic SFPs.



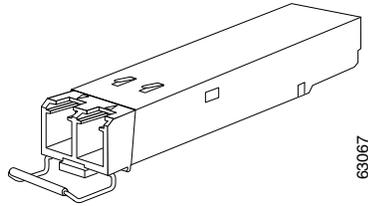
Warning

Class 1 laser product. Statement 1008

**Warning**

Invisible laser radiation may be emitted from disconnected fibers or connectors. Do not stare into beams or view directly with optical instruments. Statement 1051

Figure 3-6 Fiber-Optic SFP Module

**Caution**

Use only SFP modules supplied by Cisco, which have Class 1 Laser Product and FDA 21 CFR certifications. Class 1 Laser Product modules are safe for the eyes when operated within the limits of the device specification. For more information, see the specification of the SFP module that you are installing.

**Caution**

The use of controls or adjustments, or performance of procedures, other than those specified herein may result in hazardous radiation exposure.

To insert an SFP module into the SFP module slot:

Step 1

Use an ESD-preventive wrist strap, grounding the strap to bare metal on the rack or chassis.

**Caution**

You must be properly grounded before handling this ESD-sensitive product.

Step 2

Find the transmit (TX) and receive (RX) markings that identify the top side of the SFP module.

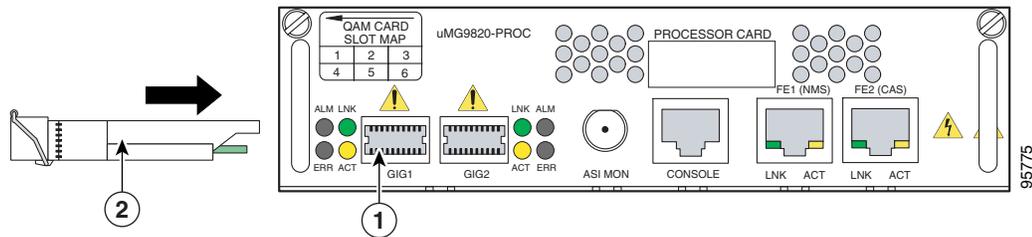
**Note**

On some modules, the TX and RX markings might be replaced by arrowheads. These point out of the module connector to signify the transmit direction, and into the connector to indicate the receive direction.

Step 3

See [Figure 3-7 on page 3-8](#). Aligning the back (receive) end of the module in front of the processor card port labeled “GIG1,” insert the module into the port until you feel the connector snap into place.

Figure 3-7 Connecting the Gigabit Ethernet Port



Step 4 Remove the dust plugs from the optical ports, and store them for later use.



Caution

Do not remove the dust plugs from a module's fiber-optic port, or the rubber caps from a fiber-optic cable, until you are ready to connect the cable. The plugs and caps provide protection from contamination and ambient light.

Step 5 Insert the cable into the front (transmit) end of the SFP module.

Step 6 Where a second GE port is used for redundancy, repeat Step 1 through Step 5 to insert another SFP module in the port labeled "GIG2."



Note

The port labeled "GIG2" is for redundancy. GIG1 and GIG2 share a common IP and MAC address to support failover.

Removing SFP Modules

To remove an SFP module:

Step 1 Remove cable from the front end of the SFP module.

Step 2 To release the lock, pull the SFP module release lever down until it stops.

Step 3 Slide the module out of the receptacle.

Connecting the Ethernet Ports to NMS and CAS Services

To support out-of-band management (network management system, or NMS) and conditional access system (CAS) traffic, the 10BASE-T/100BASE-TX Ethernet ports support IEEE 802.3 and IEEE 802.3u specifications for 10 Mbps and 100 Mbps transmission over unshielded twisted-pair (UTP) cables. These ports also support autosensing and autonegotiation of the proper transmission mode (half duplex or full duplex) with an attached device.



Note CAS is not supported in initial releases of the Cisco uMG9820.

Each Ethernet port has an RJ-45 connector that supports standard straight-through and crossover Category 5 UTP cable:

- Use Category 5 UTP straight-through cables when connecting to a hub.
- Use Category 5 UTP crossover cables when connecting to a PC or other Ethernet device.

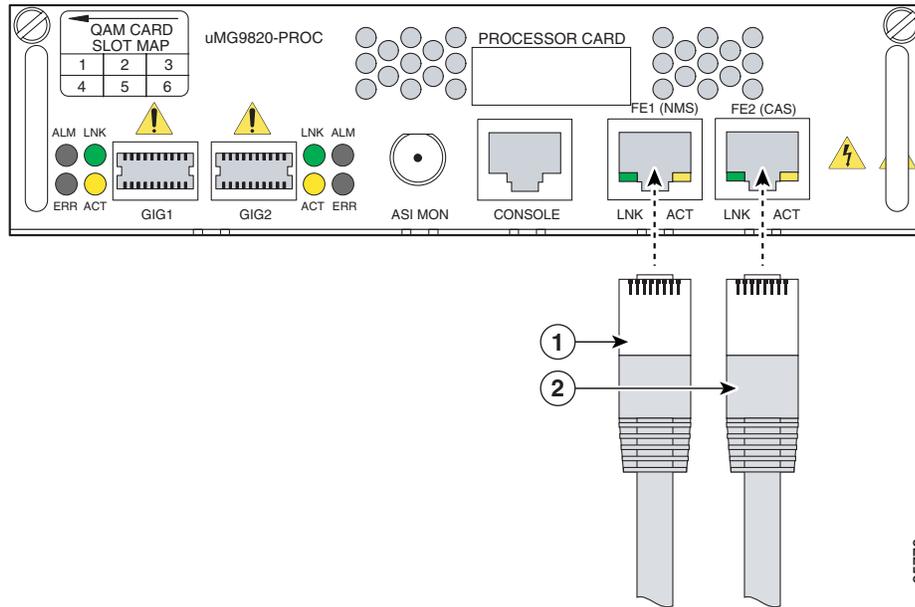


Note The Cisco uMG9820 does not come with Category 5 UTP RJ-45 cables. These cables are available commercially.

To connect the Fast Ethernet ports to an Ethernet network in support of NMS and CAS services:

- Step 1** See [Figure 3-8 on page 3-9](#).
- Step 2** Attach the appropriate type of cable directly from the NMS port to the local area network from which computer access to the web-based control interface is done. See Item 1 in [Figure 3-8 on page 3-9](#).
- Step 3** Attach the appropriate type of cable directly from the CAS port to the local area network from which the conditional access is done. See Item 2 in [Figure 3-8 on page 3-9](#).

Figure 3-8 Connecting the NMS and CAS Ports to the Network



95776

1	NMS cable to FE port 1	2	CAS cable to FE port 2
----------	------------------------	----------	------------------------

Connecting to the Console Port

The Cisco uMG9820 is shipped with a console cable kit, which contains the cable and adapters you need to connect a console (an ASCII terminal or PC running terminal emulation software) to the Cisco uMG9820. The console cable kit includes the following:

- RJ-45 to RJ-45 rollover cable
- RJ-45 to DB-9 female DTE adapter (labeled TERMINAL)

Use the console terminal for local administrative access to the Cisco uMG9820. You can connect a terminal to the console port only.

To connect the console port to a terminal (an ASCII terminal or a PC running terminal emulation software):

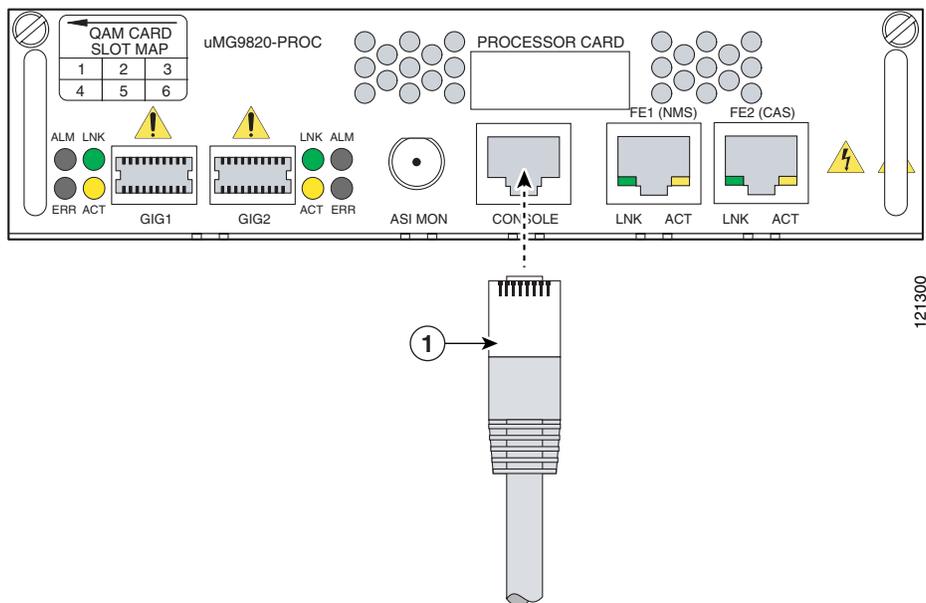
-
- Step 1** See [Figure 3-9 on page 3-10](#).
- Step 2** Connect one end of the RJ-45 rollover cable to the RJ-45-to-DB-9 adapter (labeled TERMINAL).
- Step 3** Connect the other end of the rollover cable directly to the console port on the processor card.
- Step 4** Attach the DB-9 connector to the appropriate serial connector on the PC or terminal.



Note The RS-232 port parameters are fixed and cannot be edited. The parameters are as follows:

9600 bits per second, 8 data bits, no parity, 1 stop bit

Figure 3-9 Connecting to the Console Port



-
- 1** RJ-45 cable to console port
-

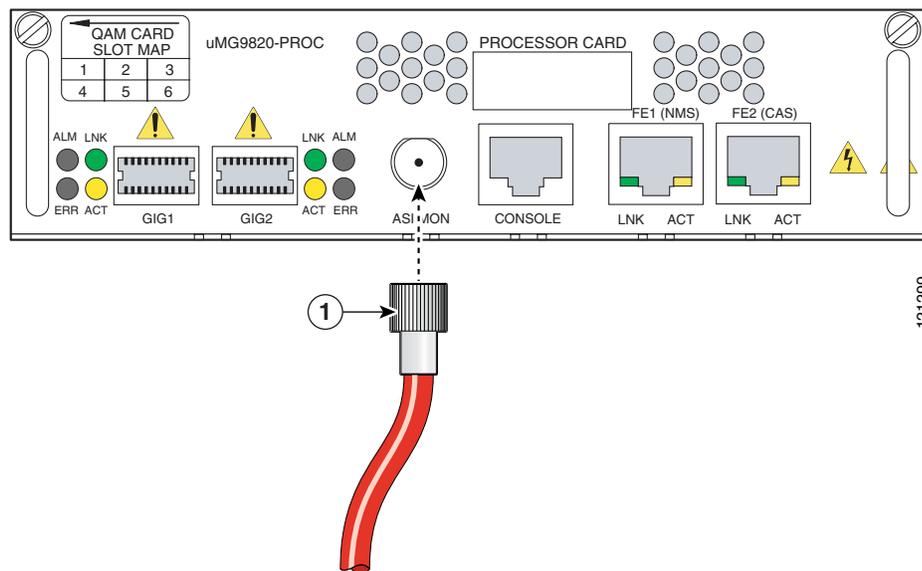
Connecting to the ASI Monitor Port (Optional)

You can route the input of a single QAM channel to the asynchronous serial interface (ASI) port, in order to monitor the channel on appropriate test equipment. A cable with a male BNC connector (not supplied) is required to connect to the port labeled ASI MON.

To connect to the ASI monitor port:

- Step 1** See [Figure 3-10](#) on page 3-11.
- Step 2** Screw the barrel of the male BNC connector to the port labeled ASI MON. The connection should be snug but not overly tight.
- Step 3** Connect the other end of the cable to the test equipment according to instructions for that equipment.
- Step 4** For information on configuring the ASI port for monitoring, see [Configuring the ASI Port](#), page 4-9.

Figure 3-10 Connecting to the ASI Monitor Port



- 1 ASI monitor cable to ASI MON port

Connecting the Power

The Cisco uMG9820 features two AC power supplies that provide power factor correction and regulated outputs.


Warning

Read the installation instructions before connecting the system to the power source. Statement 1004


Warning

Take care when connecting units to the supply circuit so that wiring is not overloaded. Statement 1018

**Caution**

The Cisco uMG9820 does not have a power switch. The AC power cord is used to connect and disconnect power. Ensure that the socket-outlet is located or installed near the equipment and is easily accessible.

Before you start the Cisco uMG9820, ensure the following:

- All network interface cables are connected.
- The console terminal is connected and powered on.

To connect the AC power to the Cisco uMG9820, use the following procedure:

Step 1

Connect one end of the power cord to the AC power receptacle on the back to the chassis.

Step 2

Connect the other end of the AC power cord to the power outlet.

**Caution**

The Cisco uMG9820 is powered immediately and begins to boot up as soon as the power connection is completed.



Starting and Configuring the Cisco uMG9820

This chapter describes how to start the system and initially configure your Cisco uMG9820. The chapter presents the following major topics:

- [Checking Conditions Prior to System Startup, page 4-1](#)
- [Starting the System, page 4-2](#)
- [Configuration Tasks, page 4-3](#)

In addition, for a sample running configuration file, see the following:

- [Sample Configuration, page 4-43](#)



Note

The initial configuration of the Cisco uMG9820 is done from a console. Connect a terminal to the Cisco uMG9820's console port using the adapter cable kit provided. See [Connecting to the Console Port, page 3-10](#).

Checking Conditions Prior to System Startup

Ensure the following before you start your Cisco uMG9820:

- The processor card is inserted securely in its slot.
- The primary Video on Demand (VoD) network feed has been connected to the GIG1 port.
- (Optional) A redundant VoD network feed (if redundancy is required) has been connected to the GIG2 port.
- The small form-factor pluggable (SFP) modules used in the GIG1 and GIG2 ports are compatible with the physical interface to the VoD network.
- The network management system (NMS) port is connected to the LAN that accesses the web-based control interface.
- The conditional access system (CAS) port is connected to the LAN that supports conditional access.
- A terminal is connected to the Cisco uMG9820's console port, using the adapter cable kit provided. The console port is accessed through a terminal emulation package such as HyperTerminal. Use the setting shown in [Connecting to the Console Port, page 3-10](#).

Starting the System

After installing the Cisco uMG9820 and connecting required cables, start the Cisco uMG9820 as follows:

Step 1 At the back of the Cisco uMG9820, insert one end of the power cord into the AC-input receptacle, then insert the other end into the power outlet.

The green power (POWER) LED on the Cisco uMG9820 comes on.

Step 2 Listen for the fans. You should immediately hear them operating.

Step 3 During the boot process, observe the system LEDs.

The front panel LEDs (PS/FAN, PROC, and QAM 1 through 6) transition from off to yellow, then to green, and then to the functionality as described in [Table 1-2 on page 1-3](#). If the processor card is not installed on power-up, all LEDs (except the POWER LED) default to off.



Note If the processor card is removed after power-up, all LEDs maintain their current state, except that the PROC CARD LED goes off.

Step 4 Observe the initialization process. When the system boot is complete (after a few seconds), the processor card begins to initialize the interfaces. During this initialization, the LEDs on each port behave differently (most flash on and off).

The LNK LED on each processor card interface comes on when initialization is completed, and the console screen displays a system banner similar to the following:

```
Enter <CTRL D> to stop Operating System auto-boot:
..... 1

Uncompressing Operating System kernel image file...
.....done
Starting kernel .....
RAMDISK: gzip compressed image found at block 0
Thu Apr  8 12:36:52 2004
Bootloader Image File Version : 0.0.12
Ramdisk Image File Version    : 1.3.0
Ramdisk Build Date           : Thu Apr  1 14:09:19 CST 2004
Kernel Image File Version    : 0.2.10
Initializing system
.....done
Starting automatic software upgrade
...Available software upgrade does not differ from previous upgrade
...No action taken

% Shell v1.3.0
uMG9820>
```

Step 5 If the system completes all the above steps successfully, proceed to [Configuration Tasks](#), for initial software configuration procedures.

Step 6 If the system does not complete each of the steps in the startup procedure, proceed to [Chapter 5, "Troubleshooting,"](#) for troubleshooting recommendations and procedures.

Configuration Tasks

This section presents the following:

- [Command Syntax](#)
- [Configuring Passwords](#)
- [Configuring SNMP](#)
- [Configuring Logging](#)
- [Configuring the Clock](#)
- [Executing Enable Mode Commands from Configuration Mode or Submode](#)
- [Configuring the ASI Port](#)
- [Configuring GE Ports](#)
- [Using GE Session Commands](#)
- [Configuring FE Management Ports](#)
- [Configuring the Transport Stream](#)
- [Configuring and Monitoring QAM Service](#)
- [Upgrading Software](#)
- [Managing Configurations](#)
- [Using the Terminal \(Console\) Port](#)

Command Syntax

General syntax and the basic provisioning areas are discussed below:

- [Syntax Overview](#)
- [Ethernet Interfaces](#)
- [QAM Channels](#)
- [ASI Interface](#)

Syntax Overview

Commands use the following general syntax, where variables are in *italics* and command names and keywords are in **bold**:

Hostname(mode)# [**no**] **keyword** {*keyword1 argument1* | *keyword2 argument2* | ...} [*keyword1 argument1* | *keyword2 argument2* | ...], where *Hostname* and *mode* are variables, as follows:

Hostname—Is the User-settable name for the unit. In this document, uMG9820 is used in all examples.

- *(mode)#*— Describes the current provisioning mode, such as the following:
 - **uMG9820#**—Indicates Enable mode
 - **uMG9820(config)#**—Indicates Configuration mode
 - **uMG9820(config-if)#**—Interface mode
 - **uMG9820(config-subif)#**—Subinterface mode

- **no**—Some commands have an option to remove the previous configuration using the **no** prefix. In most cases this restores default settings.
- *keyword*—Describes each command, as in the following examples:
 - **gigabitethernet** and **fastethernet**—Configures the Ethernet ports
 - **qam**—Configures the RF QAM channel
 - **show**—Retrieves configuration data and statistics
 - **video**—Defines video-related parameters

Ethernet Interfaces

Ethernet interfaces are addressed as follows:

slot/port

where *slot* is always zero (0) for Ethernet interface ports. The keywords for Ethernet interface ports are as follows:

- **gigabitethernet**—Gigabit Ethernet port (see [Configuring GE Ports, page 4-10](#))
- **fastethernet**—Fast Ethernet (see [Configuring FE Management Ports, page 4-28](#))

QAM Channels

The QAM channels are addressed by means of subinterface notation, as follows (see [Configuring and Monitoring QAM Service, page 4-34](#)):

slot/port.qam

with the variables defined below:

- *slot* addresses slots from 1 through 6
- *port* addresses the output ports 1 or 2, counting from left to right (looking at the rear of the unit)
- *qam* addresses the QAM channels 1 or 2, within each port

ASI Interface

The ASI output interface is configured by means of the keyword **asi**. See [Configuring the ASI Port, page 4-9](#).

Configuring Passwords

This section covers commands for the following operations:

- [Enabling and Disabling Passwords for Configuration Mode](#)
- [Configuring a Telnet Password](#)

Enabling and Disabling Passwords for Configuration Mode

To specify and enable or disable the configuration mode password:

```
uMG9820# configure terminal
uMG9820(config)# [no] enable password password
```

where

password = Text string for the password

Example—Set password for entering terminal configuration mode to “cisco”:

```
uMG9820# configure terminal
uMG9820(config)# enable password cisco
```

Example—Disable password requirement for entering terminal configuration mode:

```
uMG9820# configure terminal
uMG9820(config)# no enable password
```

Configuring a Telnet Password

To specify and enable or reset the system Telnet password:

```
uMG9820# configure terminal
uMG9820(config)# [no] line vty password password
```

where

password = Text string for the password



Note The default Telnet password is **cisco**.

Example—Set the password for entering configuration mode when using Telnet to “cisco”

```
uMG9820# configure terminal
uMG9820(config)# line vty password cisco
```

Example—Set the password for entering configuration mode when using Telnet to the default value

```
uMG9820# configure terminal
uMG9820(config)# no line vty password
```



Note There are no other **line vty** commands for the Cisco uMG9820.

Configuring SNMP

This section covers commands for the following operations:

- [Setting SNMP Community Strings](#)
- [Setting Up SNMP Hosts](#)

Setting SNMP Community Strings

To set the SNMP server community strings:

```
uMG9820# configure terminal
uMG9820(config)# snmp-server community community-string {RO | RW}
```

where

- *community-string* **RO** = Read-only community string
- *community-string* **RW** = Read-write community string

Example—Set the read-only community string to “public”

```
uMG9820# configure terminal
uMG9820(config)# snmp-server comm public ro
```



Caution

Avoid using the well-known defaults of “public,” “private,” “secret,” or “cisco.” These strings are easily guessed and make your device vulnerable to malicious or inadvertent access. In addition, SNMP community strings are sent across the network in clear text. The best way to protect the device from unauthorized SNMP management is to build a standard IP access list that includes the source address of the management station. Multiple access lists can be defined and tied to different community strings.

Setting Up SNMP Hosts

To set up the SNMP hosts information:

```
uMG9820# configure terminal
uMG9820(config)# [no] snmp-server host IP-address {informs [version 2c] | traps
[versions { 1 | 2c}] community-string}
```

where

- *IP-address* = Valid host IP address
- *community-string* = Valid community string

Example—Set up an SNMP host on 192.168.145.10 to use traps version 2c

```
uMG9820# configure terminal
uMG9820(config)# snmp-server host 192.168.145.10 traps version 2c public
```

Configuring Logging

This section covers commands for the following operations:

- [Setting the Severity Level of Messages Displayed to the Console](#)
- [Setting the Severity Level of syslog Messages](#)

**Note**

For an example of log output, see the **show logging lines** command in [Retrieving Entries in the Local Log File, page 5-14](#).

Setting the Severity Level of Messages Displayed to the Console

To set the severity level of messages displayed to the console:

```
uMG9820# configure terminal
uMG9820(config)# [no] logging console [emergencies | alerts | critical | error | warning |
notifications | informational | debugging]
```

Example—Set the severity level for console logging to “emergencies”

```
uMG9820# configure terminal
uMG9820(config)# log console emerg
```

Example—Set the severity level for console logging to the default

```
uMG9820# configure terminal
uMG9820(config)# no logging console
```

Setting the Severity Level of syslog Messages

To set the severity level of local syslog messages:

```
uMG9820# configure terminal
uMG9820(config)# [no] logging level [emergencies | alerts | critical | error | warning |
notifications | informational | debugging]
```

Example—Set the severity level for syslog messages to “emergencies”

```
uMG9820# configure terminal
uMG9820(config)# log level emerg
```

Example—Set the severity level for syslog messages to the default

```
uMG9820# configure terminal
uMG9820(config)# no logging level
```

Configuring the Clock

This section covers commands for the following operations:

- [Setting the Real-Time Clock](#)
- [Updating the System Clock](#)

Setting the Real-Time Clock

To set the real-time system clock:

```
uMG9820# clock set time date month year
```

where

- *time* = Current time in *hh:mm:ss* format (24-hour clock)
- *date* = Current date of the month (1 through 31)

- *month* = Current month of the year (January through December)
- *year* = Current year (2003 to 2099)

Example—Set the real-time clock to 11:30:00 a.m. on January 1, 2004

```
UMG9820# clock set 11:30:00 1 January 2004
```

Updating the System Clock

To set the system clock to the real-time clock:

```
UMG9820# clock update
```

Example—Set the system clock to the real-time clock

```
UMG9820# clock update
```

Executing Enable Mode Commands from Configuration Mode or Submode

To execute enable mode commands while still in the configuration mode or submode prompt, enter the **do** command along with the required enable mode command. The entered command is executed at the enable mode level and the prompt resumes its current mode level.



Note

Not every enable mode command can be executed in every submode. [Table 4-1](#) shows which commands can be executed this way.

Table 4-1 Enable Mode Options

Command	Description
clear	Clears all system counters.
clock	Sets real-time clock.
copy	Copies running configuration to startup configuration.
hostname	Sets hostname to default.
reload	Resets the system.
show	Shows information.
upgrade	Sets the upgrade filename.

To execute an enable mode command while still in the configuration mode or submode prompt:

```
uMG9820# do enable-mode-command
```

Example—Execute “show running-configuration” while still in subinterface configuration mode

```
uMG9820(config-subif)# do show running-config
```

Configuring the ASI Port

This section covers commands for the following operations on the ASI port:

- [Enabling and Disabling the ASI Port](#)
- [Routing a Video Stream to the ASI Port](#)
- [Retrieving ASI Statistics](#)

Enabling and Disabling the ASI Port

The ASI port is always addressed as slot 0, port 1.

To enable and disable the ASI port:

```
uMG9820(config-if)# [no] shut
```

Example—Enable the ASI port

```
uMG9820# configure terminal
uMG9820(config)# interface asi 0/1
uMG9820(config-if)# no shut
```

Example—Disable the ASI port

```
uMG9820# configure terminal
uMG9820(config)# interface asi 0/1
uMG9820(config-if)# shut
```

Routing a Video Stream to the ASI Port

To select a video stream to route to the ASI port:

```
uMG9820(config-if)# video route slot/port.qam
```

where

slot = 1, 2, 3, 4, 5, or 6

port = 1 or 2

qam = 1 or 2

Example—Route QAM channel 1/1.1 to the ASI port

```
uMG9820# configure terminal
uMG9820(config)# interface asi 0/1
uMG9820(config-if)# video route 1/1.1
uMG9820(config-subif)#
```

**Note**

Routing the input of a QAM channel to the ASI port does not disrupt the RF output.

Retrieving ASI Statistics

To display interface statistics for the ASI port:

```
uMG9820# show interface asi 0/1
```

Example—Show ASI statistics

```
uMG9820# show interface asi 0/1
```

```
ASI 0/1 is down
174575007 packets input, 2057030232 bytes input
```

Configuring GE Ports

This section covers commands for the following operations on the ports labeled GIG1 and GIG2:

- [Enabling and Disabling a GE Port](#)
- [Setting the IP Address and Subnet Mask for a GE Port](#)
- [Setting the MAC Address for a GE Port](#)
- [Providing Redundancy for Failover](#)
- [Enabling and Disabling Autonegotiation](#)
- [Retrieving GE Statistics](#)
- [Retrieving IP Status](#)

Enabling and Disabling a GE Port

To enable and disable a GE port:

```
uMG9820(config-if)# [no] shut
```

Example—Enable GE port 1

```
uMG9820# configure terminal
uMG9820(config)# interface gigabitethernet 0/1
uMG9820(config-if)# no shut
```

Example—Switch active GE port from 1 to 2**Note**

To enable GE port 2, first disable GE port 1 (GIG1), then enable GE port 2 (GIG2).

```
uMG9820# configure terminal
uMG9820(config)# interface gigabitethernet 0/1
uMG9820(config-if)# shut
uMG9820(config-if)# exit
uMG9820(config)# interface gigabitethernet 0/2
uMG9820(config-if)# no shut
```

**Note**

Only one GE port can be active at a time. If **no shut** is applied to GE port 1 and GE 2 is active, **shut** is applied automatically to GE 2. See [Providing Redundancy for Failover, page 4-11](#). However, both GE ports can be inactive at the same time.

Setting the IP Address and Subnet Mask for a GE Port

To set the IP address and subnet mask for a GE port:

```
uMG9820(config-if)# ip address IP-address subnet-mask
```

where

IP-address = Text string for standard IP address

subnet-mask = Text string for standard subnet mask

Example—Set IP address to 192.168.0.10 and subnet mask to 255.255.255.0 for GE port 1

```
uMG9820# configure terminal
uMG9820(config)# interface gigabitethernet 0/1
uMG9820(config-if)# ip address 192.168.0.10 255.255.255.0
```



Note

The IP address and subnet mask applied to one GE port is automatically applied to both GE ports. See [Providing Redundancy for Failover, page 4-11](#).

Setting the MAC Address for a GE Port

To set the IP address for a GE port:

```
uMG9820(config-if)# mac-address MAC-address
```

where

MAC-address = Text string for standard MAC address in H.H.H format

Example—Set the MAC address to 0000.0123.5678 for GE port 1

```
uMG9820# configure terminal
uMG9820(config)# interface gigabitethernet 0/1
uMG9820(config-if)# mac-address 0000.0123.5678
```



Note

The MAC address applied to one GE port is automatically applied to both GE ports. See [Providing Redundancy for Failover](#), below.

Providing Redundancy for Failover

Both GE ports share the same IP and MAC addresses. This facilitates failover in scenarios requiring 1+1 redundancy. To provide for failover between a VoD server and the Cisco uMG9820, you need to split the VoD content stream into two identical streams and feed each stream to a GE port.

Enabling and Disabling Autonegotiation

To enable or disable the autonegotiation feature of the specified GE port:

```
uMG9820(config-if)# [no] negotiation auto
```

Example—Enable autonegotiation on GE port 1

```
uMG9820# configure terminal
uMG9820(config)# interface gigabitethernet 0/1
uMG9820(config-if)# negotiation auto
```

Example—Disable autonegotiation on GE port 1

```
uMG9820# configure terminal
uMG9820(config)# interface gigabitethernet 0/1
uMG9820(config-if)# no negotiation auto
```

**Note**

For the above to take effect, you must either reboot or execute a **shut/no shut** on the port.

Retrieving GE Statistics

You can retrieve packet and buffer statistics, as well as IP status, as discussed in the following sections:

- [Retrieving Packet and Buffer Statistics](#)
- [Retrieving IP Status](#)

**Note**

To retrieve video statistics on a GE port, see [Retrieving Input Session Data, page 4-22](#), and [Retrieving Input Session PSI Data, page 4-23](#).

Retrieving Packet and Buffer Statistics

To display packet and buffer statistics for the specified GE port:

```
uMG9820# show interface gigabitethernet slot/port
```

where

slot = 0

port = 1 or 2

Example—Show the SFP module and hardware data for GE port 1

```
uMG9820# show interface gigabitethernet 0/1
```

```
GigabitEthernet 0/1 is up, line state is link up.
Hardware is Gigabit Ethernet Port, address is 0050.c206.c0aa
MTU 1518 bytes, BW 1000000 Kbit
Encapsulation ARPA, loopback not set
Full-duplex, 1000Mb/s
input flow-control is off, output flow-control is off
ARP type: ARPA
Input rate 925 Mbits/sec,    0 packets/sec
Output rate  0 Mbits/sec,    0 packets/sec
 528594523 packets input, 24118760666785 bytes
 Received 0 broadcasts (108436 multicast)
 0 runts, 0 giants
 2475 input errors, 1 CRC, 2473 overrun
 0 lost carrier, 0 no carrier
```

Retrieving IP Status

To display the IP status of the specified GE port:

- Link status (up or down)
- Packet and buffer counters

```
uMG9820# show ip interface [brief] gigabitethernet slot/port
```

where

brief = Optional keyword to display link status only

slot = 0

port = 1 or 2

Example—Show the status of GE port 1

```
uMG9820# show ip interface gigabitethernet 0/1
```

```
GigabitEthernet 0/1 is down, line state is no module installed.
Inbound access list is not set
```

Example—Show only the link status of GE port 1

```
uMG9820# show ip interface brief gigabitethernet 0/1
```

```
Interface IP-address OK Method Status Protocol
GigabitEthernet0/1 192.168.1.34 NO Manual Up Down
```

Example—Show the status of all Ethernet ports

```
uMG9820# show ip interface
```

```
FastEthernet 0/1 is Up
  Internet address is 192.168.145.130, subnet mask is 255.255.255.0
  Broadcast address of 192.168.145.255 is valid
  MTU is 1500 bytes, Metric is 1
FastEthernet 0/2 is Up
  Internet address is 64.13.20.160, subnet mask is 64.13.20.160
  Broadcast address of 64.13.20.160 is valid
  MTU is 1500 bytes, Metric is 1
GigabitEthernet 0/1 is up, line state is cable not installed.
  Inbound access list is not set
GigabitEthernet 0/2 is down, line state is no module installed.
  Inbound access list is not set
```

Example—Show only the link status of all Ethernet ports

```
uMG9820# show ip interface brief
```

```
Interface IP-address OK Method Status Protocol
FastEthernet0/1 192.168.145.130 YES DHCP Up Up
FastEthernet0/2 64.13.20.160 YES DHCP Up Down
GigabitEthernet0/1 192.168.1.34 NO Manual Up Down
GigabitEthernet0/2 0.0.0.0 NO Manual Administratively Down Down
```



Note

To clear counters, use the **clear counters** command in enable mode, as follows:

```
uMG9820# clear counters
```

Using GE Session Commands

This section covers commands for the following operations:

- [Setting the UDP Port Assignment](#)
- [Setting Session Timeouts for All Sessions](#)
- [Setting Maximum Network Jitter](#)
- [Setting PID Remapping](#)
- [Setting Bitwise Emulation Mode](#)
- [Configuring Session Cloning and Multicast for Program Data Delivery](#)

- [Setting MPTS Pass-through](#)
- [Retrieving Input Session Data](#)
- [Retrieving Input Session PSI Data](#)

Setting the UDP Port Assignment

There are two ways to set the user datagram protocol (UDP) port assignment:

- [Default Method](#)
- [User-Defined Method](#)



Tip

See also the provisioning information provided in [Special Issues: UDP, page 4-16](#).

Default Method

The UDP port is a 16-bit number of the form QQQQQQQQ Pppppppp, with a valid range of 0x0100 through 0x18FF, where the bytes are defined as follows:

- Program 0 (0x00) is always reserved for the Network Information Table (NIT), when one is to be used. The NIT is optional.
- QQQQQQQQ = QAM channel (0x01 through 0x18).
- Pppppppp = Assigned program number (0x01 through FF).



Note

A maximum of 16 programs can be active on any single QAM channel at any time, provided the aggregate bit rate of all the programs does not exceed (1) 38.81070 Mbps for 256QAM, or (2) 26.97035 Mbps for 64QAM.

[Table 4-2 on page 4-14](#) shows the mappings between the QAM subinterfaces and channels and the UDP ports. All port ranges for each channel are from 1 through 255 (00000001–11111111). Program 0 is represented by numbers such as 256, 512, 768, ... 6144.

Table 4-2 Mapping QAM Subinterfaces and Channels to UDP Ports

QAM Subinterface (slot/port.qam)	QAM Channel	UDP Port Range
1/1.1	1	257–511
1/1.2	2	513–767
1/2.1	3	769–1023
1/2.2	4	1025–1279
2/1.1	5	1281–1535
2/1.2	6	1537–1791
2/2.1	7	1793–2047
2/2.2	8	2049–2303
3/1.1	9	2305–2559

Table 4-2 Mapping QAM Subinterfaces and Channels to UDP Ports (continued)

QAM Subinterface (slot/port.qam)	QAM Channel	UDP Port Range
3/1.2	10	2561–2815
3/2.1	11	2817–3071
3/2.2	12	3073–3327
4/1.1	13	3329–3583
4/1.2	14	3585–3839
4/2.1	15	3841–4095
4/2.2	16	4097–4351
5/1.1	17	4353–4607
5/1.2	18	4609–4863
5/2.1	19	4865–5119
5/2.2	20	5121–5375
6/1.1	21	5377–5631
6/1.2	22	5633–5887
6/2.1	23	5889–6143
6/2.2	24	6145–6399

User-Defined Method

You can override the default UDP port mapping for individual QAM channels by specifying the UDP port, the output program to which the sessions are mapped, and the number of sessions to be remapped.

```
uMG9820(config-subif)# [no] video udp UDP-port-number {program program-number
[count number of sessions]}
```

where

UDP-port-number = UDP port number of the desired incoming session to be mapped

If a range is being defined, this number acts as the initial value in the series. Subsequent values are incremented according to either an even or a sequential numbering scheme, as specified by the user.

program-number = Output program number to which the sessions are being mapped—the range is 1 to 255

number-of-sessions = Number of UDP ports to remap—the range is 1 to 16

Example—Map incoming session on UDP port 5201 to program 10 on slot 1, port 1, QAM channel 2

```
uMG9820# configure terminal
uMG9820(config)# interface qam 1/1.2
uMG9820(config-subif)# video udp 5201 program 10
```

Example—Remove mapping of UDP ports 8201 to program number 2 on slot 1, port 1, QAM channel 2

```
uMG9820# configure terminal
uMG9820(config)# interface qam 1/1.2
uMG9820(config-subif)# no video udp 8201 program 2
```

Example—Revert all mapping of UDP ports on slot 1, port 1, QAM channel 2 to default mapping behavior

```
uMG9820# configure terminal
uMG9820(config)# interface qam 1/1.2
uMG9820(config-subif)# no video udp
```

Special Issues: UDP

Note the following special issues related to UDP:

1. Each MPEG single program transport stream (SPTS) is encapsulated in UDP datagrams and is assigned a destination UDP port number by the VoD server.
2. Each UDP datagram can contain a maximum of seven 188-byte MPEG packets. Because only one destination UDP port can be defined for each UDP datagram, *all* of the MPEG packets contained in a UDP datagram *must* come from the same program.
3. A maximum of 256 SPTSs, programs, sessions, or UDP port sessions can be sent to the Cisco uMG9820 at a time. The 257th is dropped.
4. The terms “program” and “UDP port session” are used synonymously, because each program (movie) can be uniquely identified by its destination UDP port while it is active. The term “session” is also sometimes used. A UDP port can be mapped to only one QAM channel at any time. For example, if UDP port 5201 is currently mapped to QAM channel 1 and at some point the user maps UDP port 5201 to QAM channel 2, then the mapping between UDP port 5201 and QAM channel 1 is removed automatically.
5. Within the Cisco uMG9820, a user can map any number of UDP port numbers to a QAM channel. Each UDP port mapped to a QAM channel occupies a program space when active. A maximum of 16 programs (or program spaces) can be active on any single QAM channel at any time, provided the aggregate bit rate of all the programs does not exceed 38.81070 Mbps using 256QAM or 26.97035 Mbps using 64QAM (if available). These information rates are dictated by the ITU J.83 Annex B standard.

The implication of this is that QAM channel loading is *entirely* the responsibility of the end user to manage. Suppose the following:

- A user maps more than 16 UDP ports to a QAM channel.
- The SPTS for each UDP port is a 3.75-Mbps movie when active.
- 256QAM is being used.

If an 11th SPTS/UDP port session is requested on that QAM channel, and its addition exceeds the total bandwidth (38.81071 Mbps), then all programs in that channel are randomly corrupted (their packets dropped) until the bandwidth is reduced by (a) removing a session, or (b) reducing the bandwidth required by one or more sessions.

In summary, the user is responsible for bandwidth management. Although the user can request up to 16 sessions per QAM channel, the total bandwidth for the channel cannot be exceeded. Otherwise, MPEG packets are randomly dropped from all the sessions on that block. For example, a user can put 16 low-bandwidth (< 2.4 Mbps) sessions on one 256QAM channel, with no problem. However, if the user puts three HDTV (15 Mbps x 3 = 45 Mbps) sessions on that channel all three programs are randomly corrupted.

6. When default UDP port mapping is used, the range of valid program numbers is restricted to 1 to 255, because only the low-order byte is used to assign the program number. The implication of this is that the user will never see a program number outside the range of 1 to 255 when using default UDP port mapping.

Setting Session Timeouts for All Sessions

To set session timeouts for all sessions:

```
uMG9820(config)# [no] video timeout {signal-loss milliseconds | stop-psi milliseconds | session-close minutes}
```

where

signal-loss milliseconds = Configures the time after packet loss when a signal loss is assumed. If no packets come into a session after *milliseconds* milliseconds, the signal is assumed to be lost. Range is from 500 to 10000 milliseconds. Default is 5000 milliseconds.

stop-psi milliseconds = Removes system resources and outgoing program-specific information (PSI) program references for sessions that have gone to an inactive state after *milliseconds* milliseconds. Range is from 500 to 86400000 milliseconds. Default is 5000 milliseconds.

session-close minutes = Configures the time, in *minutes* minutes, after packet loss when the video session is closed. Range is from 1 to 1440 minutes. Default is 5 minutes.

Example—Set signal loss to 500 milliseconds

```
uMG9820# configure terminal
uMG9820(config)# video timeout signal-loss 500
```

Example—Set system resources and outgoing PSI resources to be removed

```
uMG9820# configure terminal
uMG9820(config)# video timeout stop-psi 10000
```

Example—Set session close timeout to 4 minutes

```
uMG9820# configure terminal
uMG9820(config)# video timeout session-close 4
```

Setting Maximum Network Jitter

To set the maximum allowable network jitter (packet latency) for the specified UDP port session:



Note

This setting is not supported in initial releases. It affects the session's overall latency within the unit.

```
uMG9820(config-if)# [no] video udp UDP-port-number jitter jitter-value
```

where

UDP-port-number = UDP port number of the desired incoming session for which the maximum network jitter is to be set.

jitter-value = Maximum network jitter value in milliseconds. The jitter value may be set in the range of 0 to 250 milliseconds.

The default *jitter-value* is 100 milliseconds.

Example—Set maximum network jitter value for UDP port 5201 to 250 milliseconds for GE port 1

```
uMG9820# configure terminal
uMG9820(config)# interface gigabitethernet 0/1
uMG9820(config-if)# video udp 5201 jitter 250
```

Example—Set maximum network jitter value for UDP port 5201 to default value for GE port 1

```
uMG9820# configure terminal
uMG9820(config)# interface gigabitethernet 0/1
uMG9820(config-if)# no video udp 5201 jitter
```

Setting PID Remapping

To remap or drop PIDs within an incoming UDP port session:

```
uMG9820(config-if)# [no] video UDP UDP-port-number in PID-number {out PID-number | drop}
```

where

UDP-port-number = UDP port number of the desired incoming session that contains the PID to be remapped

in PID-number = PID number to be remapped or dropped

out PID-number = New PID number (in decimal) in the outgoing program

Example—Remap incoming PID 1000 on UDP port 5201 to PID 1001 for GE port 1

```
uMG9820# configure terminal
uMG9820(config)# interface gigabitethernet 0/1
uMG9820(config-if)# video udp 5201 in 1000 out 1001
```

Example—Drop incoming PID 1000 on UDP port 5201 for GE port 1

```
uMG9820# configure terminal
uMG9820(config)# interface gigabitethernet 0/1
uMG9820(config-if)# video udp 5201 in 1000 drop
```

Example—Handle PIDs on UDP port 5201 in default manner for GE port 1

```
uMG9820# configure terminal
uMG9820(config)# interface gigabitethernet 0/1
uMG9820(config-if)# no video udp 5201
```

Setting Bitwise Emulation Mode

The Cisco uMG9820 is able to emulate the UDP port mapping of third-party QAM gateways that accommodate fixed QAM-channel groups of eight channels each. Up to three eight-channel gateways can be emulated. The user's mappings are converted to the scheme used by the Cisco uMG9820, and then are reconverted to the user's mapping scheme. IP addresses are assigned automatically, based upon the IP address established for the port.

Table 4-3 presents a sample bitwise mapping scheme for a third-party QAM gateway.

Table 4-3 Third-Party Mapping Scheme for UDP Port Numbers

QAM channel								Session number							
15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0

- For bits 15 to 8, one bit represents one QAM channel. QAM channels range from 1 to 8.
- Session (program) numbers range from 1 to 25.
- *Example:* UDP port number 0x1007 represents the following:
QAM channel 5, program number 7



Note If fewer than three IP addresses are chosen, the QAM channels that would be associated with those addresses are unused.

Table 4-4 shows the default mappings, standard-bitwise mappings, and paired-bitwise mappings between the QAM subinterfaces and channels and the UDP ports. Also, the IP address scheme is shown for bitwise mode. All port ranges for each channel are from 1 through 255 (00000001–11111111). Program 0 is represented by numbers such as 256, 512, 768, ... 6144.

Table 4-4 Mapping QAM Subinterfaces and Channels to UDP Ports in Standard-Bitwise and Paired-Bitwise Modes

QAM Subinterface (slot/port.qam)	QAM Channel	UDP Port Range			Bitwise IP Addresses
		Default Mappings	Standard Bitwise	Paired Bitwise	
1/1.1	1	257–511	257–511	4097–4351	A.B.C.D
1/1.2	2	513–767	513–767	257–511	
1/2.1	3	769–1023	1025–1279	8193–16383	
1/2.2	4	1025–1279	2049–2303	513–767	
2/1.1	5	1281–1535	4097–4351	16385–16639	
2/1.2	6	1537–1791	8193–8447	1025–1279	
2/2.1	7	1793–2047	16385–16639	32769–33023	
2/2.2	8	2049–2303	32769–33023	2049–2303	
3/1.1	9	2305–2559	257–511	4097–4351	A.B.C.D+1
3/1.2	10	2561–2815	513–767	257–511	
3/2.1	11	2817–3071	1025–1279	8193–16383	
3/2.2	12	3073–3327	2049–2303	513–767	
4/1.1	13	3329–3583	4097–4351	16385–16639	
4/1.2	14	3585–3839	8193–8447	1025–1279	
4/2.1	15	3841–4095	16385–16639	32769–33023	
4/2.2	16	4097–4351	32769–33023	2049–2303	
5/1.1	17	4353–4607	257–511	4097–4351	A.B.C.D+2
5/1.2	18	4609–4863	513–767	257–511	
5/2.1	19	4865–5119	1025–1279	8193–16383	
5/2.2	20	5121–5375	2049–2303	513–767	
6/1.1	21	5377–5631	4097–4351	16385–16639	
6/1.2	22	5633–5887	8193–8447	1025–1279	
6/2.1	23	5889–6143	16385–16639	32769–33023	
6/2.2	24	6145–6399	32769–33023	2049–2303	

To change the Cisco uMG9820 port mappings to bitwise or paired-bitwise mode:

```
uMG9820(config-if)# [no] video emulation-mode {bitwise | paired-bitwise}
[number-ip-address {1 | 2 | 3}]
```

**Caution**

This command removes all custom port mappings.

Example—Setting standard bitwise emulation mode on GE port 1**Note**

This example sets three IP addresses automatically.

```
uMG9820# configure terminal
uMG9820(config)# interface gigabitethernet 0/1
uMG9820(config-if)# video emulation-mode bitwise
```

Example—Setting paired-bitwise emulation mode on GE port 1

```
uMG9820# configure terminal
uMG9820(config)# interface gigabitethernet 0/1
uMG9820(config-if)# video emulation-mode paired-bitwise
```

Example—Setting bitwise emulation mode on GE port 1, but using next two IP addresses instead of three**Note**

If fewer than three IP addresses are chosen, the QAM channels that would be associated with those addresses are unused.

```
uMG9820# configure terminal
uMG9820(config)# interface gigabitethernet 0/1
uMG9820(config-if)# video emulation-mode bitwise number-ip-address 2
```

Configuring Session Cloning and Multicast for Program Data Delivery

Program Data Delivery

The VoD Program Data Delivery (PDD) support provided by the Cisco uMG9820 makes possible the delivery of electronic program guide (EPG) data, other client data, and navigation data to a VoD client application running on the set-top box, enabling the VoD subscriber to browse and select content for viewing. Most cable systems deliver such data through one or more in-band carousels to which the VoD client tunes at startup, as well as during program navigation, as needed.

Program-related information is streamed from a server, and can be delivered to subscribers inband through the Cisco uMG9820. The data are encapsulated as SPTS MPEG-2 streams delivered by means of IP/UDP, as regular VoD sessions are. However, program data, unlike a normal VoD SPTS, can be delivered by means of multicast as well as unicast.

Because of limitations of program data servers, a single copy of a program data stream is sent to a Cisco uMG9820 QAM channel, where the stream can be cloned to one, several, or all QAM channels. Also, the program data stream may contain program clock references (PCRs), or may be a pure data stream without timing information. To support PDD and similar functionality, the Cisco uMG9820 remaps the PID, either by using the default map or a user-specified configuration.

PDD functionality on the Cisco uMG9820 supports the following:

- Multicast
- Cloning

- Programs having up to 16 elementary streams

The following restrictions apply to session cloning and multicast:

- A UDP port can be either clonable or not. A nonclonable UDP should be configured in QAM subinterface configuration mode. A clonable UDP should be configured in global configuration mode.
- Multicast sessions are by default clonable and can be configured only in global configuration mode.
- An input session can be mapped to a QAM channel at most once.

This section covers commands for the following operations:

- [Joining or Leaving an IGMP Multicast Group](#)
- [Mapping a Single Input UDP Session to a Single QAM](#)
- [Mapping a Single Input UDP Session to All 24 QAMs](#)
- [Mapping an Input Multicast Session to a Single QAM](#)
- [Mapping an Input Multicast Session to All 24 QAMs](#)

Joining or Leaving an IGMP Multicast Group

To join or leave an internet Internet Group Management Protocol (IGMP) multicast group:

```
uMG9820(config)# [no] ip igmp static-group group-IP-address [source source-IP-address]
```

Example—Join an IGMP multicast group with a single source

```
uMG9820# configure terminal
uMG9820(config)# interface gigabitethernet 0/1
uMG9820(config-if)# ip igmp static-group 224.2.129.116 source 192.168.3.10
```

Example—Leave an IGMP multicast group with a single source

```
uMG9820# configure terminal
uMG9820(config)# interface gigabitethernet 0/1
uMG9820(config-if)# no ip igmp static-group 224.2.129.116 source 192.168.3.10
```

Mapping a Single Input UDP Session to a Single QAM

To map an input UDP session to a particular QAM channel with a specified output program number:

```
uMG9820(config)# [no] video udp UDP-port-number qam slot/port.qam program program-number
```

Example—Map UDP session 512 to QAM channel 4/1/1, specifying program 4

```
uMG9820# configure terminal
uMG9820(config)# video udp 512 qam 4/1.1 program 4
```

Mapping a Single Input UDP Session to All 24 QAMs

To map an input UDP session to all the 24 QAM channels on the device (all output programs have the same specified output program number):

```
uMG9820(config)# [no] video udp UDP-port-number all program program-number
```

Example—MAP UDP session 512 to all 24 QAM channels, specifying program 11

```
uMG9820# configure terminal
uMG9820(config)# video udp 512 all program 11
```

Mapping an Input Multicast Session to a Single QAM

To map an input multicast session to a particular QAM with a specified output program number:

```
uMG9820# configure terminal
UMG9820(config)# [no] video multicast source-address source-IP-address dest-address
destination-IP-address qam slot/port.qam program program-number
```

Example—Map an input multicast session with source address 224.1.0.5 and destination address 224.1.0.7 to QAM channel 1/1.1, specifying program 2

```
uMG9820# configure terminal
UMG9820(config)# video multicast source-address 224.1.0.5 dest-address 224.1.0.7 qam 1/1.1
program 2
```

Mapping an Input Multicast Session to All 24 QAMs

To map an input multicast session to all the 24 QAMs on the device (all output programs have the same specified output program number):

```
uMG9820(config)# [no] video multicast source-address source-IP-address dest-address
destination-IP-address all program program-number
```

Example—Map an input multicast session with source address 224.1.0.1 and destination address 224.1.0.12 to all QAM channels, specifying program 14

```
uMG9820# configure terminal
UMG9820(config)# video multicast source-address 224.1.0.5 dest-address 224.1.0.12 all
program 14
```

Setting MPTS Pass-through

Digital broadcast programs are typically delivered in a multiprogram transport stream (MPTS) from a statistical multiplexer (or other video source) to the Cisco uMG9820. The Cisco uMG9820 can pass the MPTS through to the set-top boxes without remultiplexing the video streams, and may update the peak cell rate (PCR) or PSI information in the MPTS as necessary to output a valid transport stream. The Cisco uMG9820 outputs the MPTS on one or more QAM channels based on the UDP port map of the incoming stream.

To set the output QAM for pass-through:

```
uMG9820(config)# video udp UDP-port-number qam slot/port.qam pass-through
```

Example—Map incoming session on UDP port number 257 to slot 1, port 1, QAM channel 2

```
uMG9820# configure terminal
uMG9820(config)# video udp 257 qam 1/1.2 pass-through
```

Retrieving Input Session Data

To list all the session information, input errors, session state, and continuity count errors:

```
uMG9820# show interface gigabitethernet slot/port video [session UDP-port-number]
```

where

slot = 0

port = 1 or 2

UDP-port-number = Number of specific UDP port (optional)

If a specific session UDP port number is provided, then only information on that session is provided. The following information is provided in the response:

- User-defined session parameters
- Session status (inactive, active, invalid program-specific information)
- Jitter buffer status (underflow and overflow count) and average fullness
- Continuity count errors

Example—Display all active video sessions on GE port 1

```
uMG9820# show interface gigabitethernet 0/1 video
```

```
Emulation mode: None
Number of active sessions 240
Source continuity error counter 0
Overflow 1
Continuity 0
Alignment 0
Miss 0
```

Example—Display video session information for UDP port 514 on GE port 1

```
uMG9820# show interface gigabitethernet 0/1 video session 514
```

```
Emulation mode:      None
Current State:      Active
UDP port number:    514      Output QAM number:      2
Max Jitter Value:  0          Jitter Overflow:        0
Jitter Underflow:  0          Average Fullness:
```



Note

To clear counters, use the **clear counters** command in enable mode, as follows:

```
uMG9820# clear counters
```

Retrieving Input Session PSI Data

To list all the program-specific information (PSI), such as program number, elementary stream ID and PIDs, for a video session:

```
uMG9820# show interface gigabitethernet slot/port video psi [session UDP-port-number]
```

where

slot = 0

port = 1 or 2

UDP-port-number = Number of specific UDP port (optional)

If a specific session UDP port number is provided, then only information on that session is provided.

Example—Display PSI information for all active video sessions on GE port 1

```
uMG9820# show interface gigabitethernet 0/1 video psi
```

```
Emulation mode: None
Inactive PSI timeout is 0 milliseconds.
Active PSI timeout is 5 seconds.
Queued PSI timeout is 300 seconds.
```

Example—Display PSI information for UDP port 514 on GE port 1

```
uMG9820# show interface gigabitethernet 0/1 video psi session 514

Emulation mode: None
Number of PIDs:          3      Program Number: 0x0002
Input PMT PID:          0x01f4  Output PMT PID: 0x0030
Input PID (Type 0x0081): 0x01e2  Output PID:      0x0031
Input PID (Type 0x0081): 0x01e3  Output PID:      0x0032
Input PID (Type 0x0002): 0x01e1  Output PID:      0x0033
```

Retrieving Video PSI Data

To list PSI data for all UDP port sessions or for one specific session:

```
uMG9820>show video psi [session UDP-port-number]
```

where

UDP-port-number = Number of specific UDP port (optional)

If a specific session UDP port number is provided, then only information on that session is provided.

Example—Display video PSI information for all UDP port sessions

```
uMG9820> show video psi

UDP port#: 257
Session Status: ACTIVE
TSID: 1 PAT VERSION: 1 NIT PID: 0
Source Program #: 1
PMT PID: 32 PCR PID: 33 CA_SYS ID: 0 ECM PID 0
Elementary Streams:
  (1) PID: 33 Stream Type: 2

  (2) PID: 36 Stream Type: 129

  (3) PID: 35 Stream Type: 192

UDP port#: 258
Session Status: ACTIVE
TSID: 1 PAT VERSION: 1 NIT PID: 0
Source Program #: 2
PMT PID: 48 PCR PID: 49 CA_SYS ID: 0 ECM PID 0
Elementary Streams:
  (1) PID: 49 Stream Type: 2

  (2) PID: 52 Stream Type: 129

  (3) PID: 51 Stream Type: 192

UDP port#: 259
Session Status: ACTIVE
TSID: 1 PAT VERSION: 1 NIT PID: 0
Source Program #: 3
PMT PID: 48 PCR PID: 65 CA_SYS ID: 0 ECM PID 0
Elementary Streams:
  (1) PID: 65 Stream Type: 2

  (2) PID: 68 Stream Type: 129

  (3) PID: 67 Stream Type: 192
```

Example—Display video PSI information for a specific UDP port session

```
uMG9820> show video psi session 257

UDP port#: 257
Session Status: ACTIVE
TSID: 1 PAT VERSION: 1 NIT PID: 0
Source Program #: 1
PMT PID: 32 PCR PID: 33 CA_SYS ID: 0 ECM PID 0
Elementary Streams:
  (1) PID: 33 Stream Type: 2

  (2) PID: 36 Stream Type: 129

  (3) PID: 35 Stream Type: 192
```

Retrieving Video Session Information

To list video session information for only active sessions, for all sessions, or for a specific session:

```
uMG9820> show video session {active | all | UDP-port-number}
```

where

UDP-port-number = Number of specific UDP port (optional)

If a specific session UDP port number is provided, then only information on that session is provided.

Example—Display video session information for all active UDP port sessions

```
uMG9820> show video session active

State: ACTIVE      Source IP 192.168.50.112      DEST UDP 257 (SPTS 240) to qam 1/1.1
Continuity error counter      1893464
Overflow error counter        0
Underflow error counter      1327759

State: ACTIVE      Source IP 192.168.50.112      DEST UDP 258 (SPTS 81) to qam 1/1.1
Continuity error counter      1902549
Overflow error counter        0
Underflow error counter      1364450

State: ACTIVE      Source IP 192.168.50.112      DEST UDP 259 (SPTS 97) to qam 1/1.1
Continuity error counter      1893779
Overflow error counter        0
Underflow error counter      1303794

State: ACTIVE      Source IP 192.168.50.112      DEST UDP 769 (SPTS 0) to qam 1/2.1
Continuity error counter      1896098
Overflow error counter        0
Underflow error counter      1330853
```

Example—Display video session information for all UDP port sessions

```
uMG9820> show video session all
```

```
State: ACTIVE      Source IP 192.168.50.112    DEST UDP 257 to qam 1/1.1
State: ACTIVE      Source IP 192.168.50.112    DEST UDP 258 to qam 1/1.1
State: ACTIVE      Source IP 192.168.50.112    DEST UDP 259 to qam 1/1.1
State: ACTIVE      Source IP 192.168.50.112    DEST UDP 769 to qam 1/2.1
State: ACTIVE      Source IP 192.168.50.112    DEST UDP 770 to qam 1/2.1
State: ACTIVE      Source IP 192.168.50.112    DEST UDP 771 to qam 1/2.1
State: ACTIVE      Source IP 192.168.50.112    DEST UDP 1281 to qam 2/1.1
State: ACTIVE      Source IP 192.168.50.112    DEST UDP 1282 to qam 2/1.1
State: ACTIVE      Source IP 192.168.50.112    DEST UDP 1283 to qam 2/1.1
State: ACTIVE      Source IP 192.168.50.112    DEST UDP 1793 to qam 1/2.1
```

Example—Display video session information for a specific UDP port session

```
uMG9820> show video session 258
```

```
SPTS number 81
State: ACTIVE
Source IP 192.168.50.112
Destination IP 192.168.136.6
Maps to QAM 1/1.1, program 2
Start time 30357:41:34
Continuity error counter      1902549
Overflow error counter        0
Alignment error counter       0
Underflow error counter       1366915
Jitter buffer size 0 ms
Jitter buffer average fullness 0.8%
```

Retrieving Interface Statistics

To display all video statistics, specific video statistics, all video program-specific information (PSI) statistics, or specific session video PSI statistics for a GE interface:

**Note**

For additional information, see [Configuring the Transport Stream, page 4-31](#).

```
uMG9820> show interface slot/port [video | video session UDP-port-number | video psi |
video psi session UDP-port-number]
```

where

slot = 0

port = 1 or 2

UDP-port-number = Number of specific UDP port

Example—Display hardware data for GE interface 1

```
uMG9820> show interface gigabitethernet 0/1
```

```
GigabitEthernet 0/1 is up, line state is no module installed.
Hardware is Gigabit Ethernet Port, address is 0005.9a3d.d649
MTU 1518 bytes, BW 1000000 Kbit
Encapsulation ARPA, loopback not set
Full-duplex, 1000Mb/s
input flow-control is off, output flow-control is off
ARP type: ARPA
Input rate  0 Mbits/sec,    0 packets/sec
Output rate  0 Mbits/sec,    0 packets/sec
  0 packets input, 0 bytes
  Received 0 broadcasts (0 multicast)
  0 runts, 0 giants
  0 input errors, 0 CRC, 0 overrun
  0 lost carrier, 0 no carrier
```

Example—Display GE video interface statistics for port 1

```
uMG9820-3> show interface gigabitethernet 0/1 video
```

```
Emulation mode : None
Number of active sessions 0
Source continuity error counter 0
Overflow 2
Alignment 0
Miss 360
```

Example—Display GE video session interface statistics for port 1, UDP port 50000

```
uMG9820-3> show interface gigabitethernet 0/1 video session 50000
```

```
Emulation mode : None
Current State      : Active
UDP port number    :          50000 Output QAM number      :          1
Max Jitter Value   :              0 Jitter Overflow       :          0
Jitter Underflow   :              0 Average Fullness     :          0
Continuity Errors  :              0
```

Example—Display GE video PSI session interface statistics for port 1

```
uMG9820-3> show interface gigabitethernet 0/1 video psi
```

```
Emulation mode : None
Signal-loss timeout is 500 milliseconds.
Stop-psi timeout is 500 milliseconds.
Session-close timeout is 1 minutes.
```

Example—Display GE PSI session interface statistics for port 1, UDP port 50000

```
uMG9820-3> show interface gigabitethernet 0/1 video psi session 50000
```

```
Emulation mode : None
Number of PIDs      :          4   Program Number : 0x0002
Input PMT PID       : 0x0020   Output PMT PID : 0x0040
Input PID (Type 0x02) : 0x0021   Output PID    : 0x0041
Input PID (Type 0x04) : 0x0024   Output PID    : 0x0042
Input PID (Type 0x81) : 0x002c   Output PID    : 0x0043
Input PID (Type 0x81) : 0x002e   Output PID    : 0x0044
```

Configuring FE Management Ports

The management and CAS ports are addressed using the command-line interface (CLI) as Fast Ethernet (FE) ports 1 and 2, respectively. This section covers commands for the following operations:

- [Enabling and Disabling an FE Port](#)
- [Setting an FE Port IP Address](#)
- [Setting an FE Port MAC Address](#)
- [Setting an FE Port in DHCP Mode](#)
- [Setting the Default Gateway](#)
- [Retrieving FE Port Statistics](#)
- [Retrieving FE Port Status](#)
- [Setting Boot Mode](#)

Enabling and Disabling an FE Port

To enable and disable an FE port:

```
uMG9820(config-if)# [no] shut
```

Changes to an FE port's state take effect immediately.



Note

In the initial release of this product, only FE port 1 is implemented.

Example—Enable FE port 1

```
uMG9820# configure terminal
uMG9820(config)# interface fastethernet 0/1
uMG9820(config-fastethernet[0/1])# no shut
```

Example—Disable FE port 1

```
uMG9820# configure terminal
uMG9820(config)# interface fastethernet 0/1
uMG9820(config-if)# shut
```

Setting an FE Port IP Address

To set the IP address and subnet mask of an FE port:

```
uMG9820(config-if)# ip address IP-address subnet-mask
```

where

IP-address = Text string for standard IP address

subnet-mask = Text string for standard subnet mask

Changes to an FE port's IP address take effect immediately.

Example—Set the IP address to 192.168.0.10 and subnet mask to 255.255.255.0 for FE port 1

```
uMG9820# configure terminal
uMG9820(config)# interface fastethernet 0/1
uMG9820(config-if)# ip address 192.168.0.10 255.255.255.0
```

Setting an FE Port MAC Address

To set the MAC address for an FE port:

```
uMG9820(config-if)# mac-address MAC-address
```

where

MAC-address = Text string for a standard MAC address in *H.H.H* form

Changes to an FE port's MAC address take effect following a reload only if the change is first written to the startup configuration. See [Managing Configurations, page 4-40](#).

Example—Set the MAC address to 0000.0123.5678 for FE port 1

```
uMG9820# configure terminal  
uMG9820(config)# interface fastethernet 0/1  
uMG9820(config-if)# mac-address 0000.0123.5678
```

Setting an FE Port in DHCP Mode

To instruct the FE port to obtain its IP address information from a Dynamic Host Configuration Protocol (DHCP) server:

```
uMG9820(config-if)# [no] dhcp
```

Changes to DHCP mode are immediate. When DHCP is disabled, the IP address reverts to the manually specified value.

Example—Enable DHCP mode for FE port 1

```
uMG9820# configure terminal  
uMG9820(config)# interface fastethernet 0/1  
uMG9820(config-if)# dhcp
```

Example—Disable DHCP mode for FE port 1

```
uMG9820# configure terminal  
uMG9820(config)# interface fastethernet 0/1  
uMG9820(config-if)# no dhcp
```

Setting the Default Gateway

To set the IP address of the default gateway for FE ports:

```
uMG9820(config-fastethernet (slot/port))# ip default-gateway IP-address
```

where

IP-address = Text string for a standard IP address

Example—Set the default gateway address to 192.168.0.1 for FE port 1

```
uMG9820# configure terminal  
uMG9820(config)# interface fastethernet 0/1  
uMG9820(config-if)# ip default-gateway 192.168.0.1
```

Retrieving FE Port Statistics

To retrieve packet and buffer statistics for an FE port:

```
uMG9820# show interface fastethernet slot/port
```

where

slot = 0

port = 1 or 2

Example—Show packet and buffer statistics for FE port 1

```
uMG9820# show interface fastethernet 0/1
```

```
FastEthernet0/1 Link Encapsulation:Ethernet HW Address 0050.c206.c299
IP Address:192.168.145.130 Broadcast:192.168.145.255 Netmask:255.255.255.0
RX Packets:88 Errors:0 Dropped:0 Overruns:0 Frame:0
TX Packets:6 Errors:0 Dropped:0 Overruns:0 Carrier:0
Collisions:0 TX Queue Length:100
RX bytes:11406 (11.1 kb) TX bytes:913 (913.0 b)
Interrupt:14
Gateway:192.168.145.1 DHCP:Enabled BootP:Disabled
```

Retrieving FE Port Status

To retrieve the status of an FE port:

```
uMG9820# show ip interface [brief] fastethernet slot/port
```

where

brief = Optional keyword to display link status only

slot = 0

port = 1 or 2

You can retrieve the following IP statistics for the specified FE port:

- Link status (up or down)
- Packet and buffer counters

Example—Show the status of FE port 1

```
uMG9820# show ip interface fastethernet 0/1
```

```
FastEthernet 0/1 is Up
Internet address is 192.168.145.130, subnet mask is 255.255.255.0
Broadcast address of 192.168.145.255 is valid
MTU is 1500 bytes, Metric is 1
```

Example—Show only the link status of FE port 1

```
uMG9820# show ip interface brief fastethernet 0/1
```

```
Interface IP-address OK Method Status Protocol
FastEthernet0/1 192.168.145.130 YES DHCP Up Up
```



Tip

You can also use **show ip interface** and **show ip interface brief** to see the status of all Ethernet ports, as in [Retrieving IP Status, page 4-12](#).

**Note**

To clear counters, use the **clear counters** command in enable mode as follows:

```
uMG9820# clear counters
```

Setting Boot Mode

By default, the system boots from internally stored images. However, it is possible to specify the location of the system and kernel images on a remote file system and enable/disable BootP (bootstrap protocol) mode. These files are obtained over an FE management port.

To enable BootP mode, images, and paths:

```
uMG9820(config-fastethernet[0/1])# [no] boot {system path | kernel path}
```

where

system path = Remote-system file path for the system image

kernel path = Remote-system file path for the kernel image

Example—Enable BootP mode

```
uMG9820# configure terminal
uMG9820(config)# interface fastethernet 0/1
uMG9820(config-if)# boot
```

Example—Set BootP system path to “ramdisk_img.gz”

```
uMG9820# configure terminal
uMG9820(config)# interface fastethernet 0/1
uMG9820(config-if)# boot system ramdisk_img.gz
```

Example—Set BootP kernel path to “zImage”

```
uMG9820# configure terminal
uMG9820(config)# interface fastethernet 0/1
uMG9820(config-if)# boot kernel zImage
```

Example—Disable BootP mode

```
uMG9820# configure terminal
uMG9820(config)# interface fastethernet 0/1
uMG9820(config-if)# no boot
```

Configuring the Transport Stream

MPEG-2 program-specific information (PSI) uses a variety of messages to inform the MPEG receiver about the content of the program stream, and about the streams that are available within the network.

These commands are applied in subinterface mode to an individual QAM channel addressed as *slot/port.qam*, where

slot = 0, 1, 2, 3, 4, 5, or 6

port = 1 or 2

qam = 1 or 2

[Table 4-5](#) lists the MPEG messages and message components that are addressed by the CLI.

Table 4-5 MPEG Messages and Message Components Addressed by the CLI

Message	Description
Program Association Table (PAT)	The first message the receiver attempts to acquire from an MPEG stream. The PAT contains a list of the programs in the stream, as well as a pointer to the PMT for each (see below). It also includes the transport stream ID, or TSID. (See Table 4-6 on page 4-32.)
Program Map Table (PMT)	A message that describes the elements of a program. Each program has its own PMT. Once a receiver has acquired a PMT message, it has the information needed to find different elements (for example, video and audio) for that program within the stream.
Network Information Table (NIT)	A list of all of the transport streams within the network, along with their associated RF frequencies. The NIT is identified by means of a network-shared NIT ID (NIT PID). This allows the receiver to know what streams are available. (NIT messages are not always present.)

[Table 4-6](#) shows the default TSID assignment for each QAM channel (subinterface).

Table 4-6 Default TSID Assignment for each QAM Subinterfaces

QAM Subinterface (<i>slot/port.qam</i>)	Default TSID (Decimal)	Default TSID (Hexadecimal)
1/1.1	111	0x006F
1/1.2	112	0x0070
1/2.1	121	0x0079
1/2.2	122	0x007A
2/1.1	211	0x00D3
2/1.2	212	0x00D4
2/2.1	221	0x00DD
2/2.2	222	0x00DE
3/1.1	311	0x0137
3/1.2	312	0x0138
3/2.1	321	0x0141
3/2.2	322	0x0142
4/1.1	411	0x019B
4/1.2	412	0x019C
4/2.1	421	0x01A5
4/2.2	422	0x01A6
5/1.1	511	0x01FF
5/1.2	512	0x0200
5/2.1	521	0x0209

Table 4-6 Default TSID Assignment for each QAM Subinterfaces (continued)

QAM Subinterface (slot/port.qam)	Default TSID (Decimal)	Default TSID (Hexadecimal)
5/2.2	522	0x020A
6/1.1	611	0x0263
6/1.2	612	0x0264
6/2.1	621	0x026D
6/2.2	622	0x026E

This section covers commands for the following operations:

- [Setting PAT Message Parameters](#)
- [Setting PMT Message Interval](#)

Setting PAT Message Parameters

To set the message field parameters for the outgoing PAT message:

```
uMG9820(config-subif)# [no] video pat {interval time | tsid tsid | nit-pid pid}
```

where

time = Maximum interval, in milliseconds, between PAT messages

The default value for *time* is 100 milliseconds.

tsid = Transport stream ID for the output going PAT message. The default value must be unique for each transport stream.

pid = Reference to the NIT PID value in program zero of the PAT message.

The default is to have no reference program zero (program0, which is the NIT PID) in the PAT message.

Example—Set maximum PAT interval to 500 milliseconds on slot 1, port 1, QAM channel 2

```
uMG9820# configure terminal
uMG9820(config)# interface qam 1/1.2
uMG9820(config-subif)# video pat interval 500
```

Example—Set the TSID field of the PAT message to 2250 on slot 1, port 1, QAM channel 2

```
uMG9820# configure terminal
uMG9820(config)# interface qam 1/1.2
uMG9820(config-subif)# video pat tsid 2250
```

Example—Include program 0 with a reference to PID 4090 in the PAT on slot 1, port 1, QAM channel 2

```
uMG9820# configure terminal
uMG9820(config)# interface qam 1/1.2
uMG9820(config-subif)# video pat nit-pid 4090
```

Example—Remove program 0 from the PAT message on slot 1, port 1, QAM channel 2

```
uMG9820# configure terminal
uMG9820(config)# interface qam 1/1.2
uMG9820(config-subif)# no video pat nit-pid
```

Setting PMT Message Interval

To set the maximum PMT message interval:

```
uMG9820(config-subif)# [no] video pmt interval time
```

where

time = Maximum interval, in milliseconds, between PMT messages

The default value for *time* is 100 milliseconds.

Example—Set maximum PMT interval to 500 milliseconds on slot 1, port 1, QAM channel 2

```
uMG9820# configure terminal
uMG9820(config)# interface qam 1/1.2
uMG9820(config-subif)# video pmt interval 500
```

Configuring and Monitoring QAM Service

This section covers commands for the following operations:

- [Enabling and Disabling a QAM Channel](#)
- [Setting QAM Modulation](#)
- [Setting QAM Frequency](#)
- [Setting QAM Output Power](#)
- [Enabling ALC](#)
- [Enabling RF Output](#)
- [Retrieving QAM Statistics](#)
- [Retrieving QAM Output Video Data](#)

These commands are applied in subinterface mode to an individual QAM channel,

where

slot = 1, 2, 3, 4, 5, or 6

port = 1 or 2

qam = 1 or 2

Enabling and Disabling a QAM Channel

To enable or disable a QAM channel:

```
uMG9820(config-subif)# [no] shut
```



Note

The default state for all QAM channels is **shut**. This prevents interference with existing cable-channel configurations. To mute the RF output of a channel, see the **video mute** command in [Enabling RF Output](#), page 4-38.

Example—Enable QAM output on slot 1, port 1, QAM channel 2

```
uMG9820# configure terminal
uMG9820(config)# interface qam 1/1.2
uMG9820(config-subif)# no shut
```

Example—Disable QAM output on slot 1, port 1, QAM channel 2

```
uMG9820# configure terminal
uMG9820(config)# interface qam 1/1.2
uMG9820(config-subif)# shut
```

Setting QAM Modulation

To set the modulation rate for all QAM outputs on the selected QAM card:

```
uMG9820(config-subif)# [no] video format type
```

where

type = Modulation scheme. Values are either 64QAM or 256QAM.

The default value for *type* is 256QAM.



Note The modulation for both channels for a port is set when either channel 1 or channel 2 is addressed.

Example—Set the modulation rate for all QAM outputs on slot 1, port 1, QAM channel 2 to 64QAM

```
uMG9820# configure terminal
uMG9820(config)# interface qam 1/1.2
uMG9820(config-subif)# video format 64QAM
```

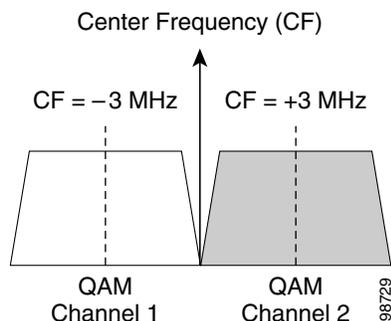
Example—Set the modulation rate for all QAM outputs on slot 1, port 1, QAM channel 2 to the default (256QAM)

```
uMG9820# configure terminal
uMG9820(config)# interface qam 1/1.2
uMG9820(config-subif)# no video format
```

Setting QAM Frequency

Figure 4-1 illustrates the QAM channel 1 and channel 2 frequencies in relation to the center frequency.

Figure 4-1 QAM Channel Frequencies



- The default frequency is 500 MHz (center of band).

- The range is 225 to 900 MHz (center of band).

To set the center frequency of the selected QAM channel:

```
uMG9820(config-subif)# [no] video frequency frequency
```

where

frequency = QAM channel center frequency in Hz, from 225000000 to 900000000.



Note The frequency for both channels for a port is set when either channel 1 or channel 2 is addressed, and is determined by the center frequency.



Caution

Do not set the two 6-MHz QAM channels within a 12-MHz-wide RF channel to the same center frequency. See [Special Issues: Selecting QAM Frequencies to Avoid Overlap](#), page 4-36.

Example—Set the center frequency of slot 1, port 1, QAM channel 1 to 850 MHz

```
uMG9820# configure terminal
uMG9820(config)# interface qam 1/1.1
uMG9820(config-subif)# video frequency 850000000
```



Note

In this example, the center frequency of QAM channel 1/1.2 is automatically adjusted to 856000000 Hz.

Example—Set the center frequency of slot 1, port 1, QAM channel 1 to 500 MHz

```
uMG9820# configure terminal
uMG9820(config)# interface qam 1/1.1
uMG9820(config-subif)# no video frequency
```

Special Issues: Selecting QAM Frequencies to Avoid Overlap

The frequencies on an RF chain (or block: the circuitry providing the maximum bandwidth of a QAM port—from 3 MHz below the bottom center frequency to 3 MHz above the top center frequency) must not overlap those of the other port on the same QAM card. (For this discussion, the two ports on the same card are referred to as *adjacent ports*.) The settings of the QAM frequencies (center frequencies) on each channel determine the upper and lower bounds of the RF chain.



Note

To maximize reliability and isolation, each RF chain on a given QAM card is a separate circuit, with its own local oscillator (LO). However, if frequencies on both RF chains on a card are set too closely to each other, they can be amplified by the LOs on the adjacent chain—resulting in spurious products. The rules presented in this section ensure the necessary signal isolation.

Note the following rules for selecting QAM frequencies (center frequencies):

1. The two 6-MHz QAM channels within a 12-MHz-wide RF chain cannot be set to the same center frequency. The center frequency of the QAM channel on *slot/port.1* is always 6 MHz lower than the center frequency of the QAM channel on *slot/port.2*.
2. The two 12-MHz-wide RF chains on any QAM card (one chain from port 1 and the other from port 2) must not overlap. The center frequencies for the 6-MHz QAM channels on *slot/1.1* and *slot/1.2* must be different from the center frequencies for the 6-MHz QAM channels on *slot/2.1* and *slot/2.2*.



Caution The center frequencies of each of the two 12-MHz RF chains must be at least 12 MHz apart.

- As long as rule 2 is strictly adhered to on each QAM card, it is valid to set up more than one QAM card in a Cisco uMG9820 chassis with the same frequency assignments.

Table 4-7 lists both invalid (examples 1 and 2) and valid (examples 3 and 4) QAM center frequency schemes. For an explanation of each example, see the [Notes](#) following the table.



Note These frequency assignments are for illustration only.

- Where the assignments are invalid, it is because the RF chains on the ports on the same card overlap completely or partially.
- Where the assignments are valid, the same frequencies can be assigned to more than one QAM card in a chassis—as long as the above rules are not violated on those cards.

Table 4-7 Sample Invalid and Valid QAM Center Frequency Schemes

Invalid					Valid					
Example	Port	Chain Range, MHz	Channel	Center Frequency	Example	Port	Chain Range, MHz	Channel	Center Frequency	
1	1	347–359	slot/1.1	350	4	1	347–359	slot/1.1	350	
			slot/1.2	356				slot/1.2	356	
	2		slot/2.1	350				359–371	slot/2.1	362
			slot/2.2	356					slot/2.2	368
2	1	347–359	slot/1.1	350	5	2	347–359	slot/1.1	350	
			slot/1.2	356				slot/1.2	356	
	2		slot/2.1	356				459–471	slot/2.1	462
			slot/2.2	362					slot/2.2	468
3	1	839–851	slot/1.1	842	6	1	839–851	slot/1.1	842	
			slot/1.2	848				slot/1.2	848	
	2		slot/2.1	854				853–865	slot/2.1	856
			slot/2.2	860					slot/2.2	862

Notes

- Example 1 (Invalid): RF chains on adjacent ports overlap completely.
- Example 2 (Invalid): RF chains on adjacent ports overlap partially.
- Example 3 (Invalid): RF chains on adjacent ports overlap (the top frequency of one chain is the same as that on the bottom of the chain on the adjacent port).
- Example 4 (Valid): RF chains overlap, but are on the same port.
- Example 5 (Valid): RF chains do not overlap, and are on the same port.
- Example 6 (Valid): RF chains do not overlap, and are on different adjacent ports.

Setting QAM Output Power

To set the combined output power level for a QAM port:

```
uMG9820(config-subif)# [no] video power power
```

where

power = QAM power assignment in dBmV.

- The default power level is 50 dBmV.
- The range is 44.0 to 60.0 dBmV, in increments of 0.1 dB.

Example—Set the output power level of slot 1, port 1, QAM channel 1 to 60.3 dBmV

```
uMG9820# configure terminal
uMG9820(config)# interface qam 1/1.1
uMG9820(config-subif)# video power 60.3
```



Note The output power for both channels for a port is set when either channel 1 or channel 2 is addressed.

Example—Set the output power level of slot 1, port 1, QAM channel 1 to the default (50 dBmV)

```
uMG9820# configure terminal
uMG9820(config)# interface qam 1/1.1
uMG9820(config-subif)# no video power
```

Enabling ALC

This command enables or disables the automatic level control (ALC) of a specified QAM port. When enabled, the ALC keeps the output level to within +/- 0.2 dB of the power setting, to account for level variations due to changes in levels of, for example, temperature and frequency.



Note This command automatically enables ALC on both QAM channels of the port.

To enable or disable automatic level control (ALC) of a specified QAM port:

```
uMG9820(config-subif)# [no] alc
```

Example—Disable ALC on slot 1, port 2

```
uMG9820# configure terminal
uMG9820(config)# interface qam 1/2.1
uMG9820(config-subif)# no alc
```

Enabling RF Output

This command enables or disables (mutes) RF output on both QAM channels of a specified QAM port.



Note Unlike the **shut** command, the **mute** command disables both QAM channels on a port.

To enable or disable RF output on a QAM port:

```
uMG9820(config-subif)# [no] video mute
```

Example—Disable RF output on slot 1, port 2

```
uMG9820# configure terminal
uMG9820(config)# interface qam 1/2.1
uMG9820(config-subif)# video mute
```

Example—Enable RF output on slot 1, port 2

```
uMG9820# configure terminal
uMG9820(config)# interface qam 1/2.1
uMG9820(config-subif)# no video mute
```

Retrieving QAM Statistics

To display QAM statistics for a specified QAM channel:

```
uMG9820# show interface qam slot/port.qam
```

Example—Show QAM statistics for slot 1, port 1, QAM channel 1

```
uMG9820# show interface qam 1/1.1
```

```
Output Frequency : 249000000 Hz
Output RF Power Level : 46.0 dBmV Output RF Attenuation : 19.6 dB
Port Enable : Enabled Channel Enable : Enabled
QAM Mode : 256 Encode State : Annex B
Interleaver Depth : 128,1 Bytes per packet : 188
Gain Compensation : Active RF block ALC setting : Enabled
RF block ALC power : 46.0 dBmV Temperature : 46.0C +/- 3C
Alarm Codes :
```

Retrieving QAM Output Video Data

To display video program data for a specified QAM channel:

```
uMG9820# show interface qam slot/port.qam video
```

The following information is retrieved:

- Transport stream ID (TSID) and NIT PID
- PAT and PMT interval
- Bitrate through this QAM
- PSI data for each program

Example—Show video program data for slot 1, port 1, QAM channel 1

```
uMG9820# show interface qam 1/1.1 video
```

```
TSID: 111 NIT-PID: 0 PAT Interval: 100 PMT Interval: 100
Average Bitrate: 0 bps
Program (INACTIVE): 0
```

```

Program (INACTIVE): 0

```

Upgrading Software

This section covers commands for the following operation:

- [Initiating a Software Upgrade from a File Server](#)

Initiating a Software Upgrade from a File Server

To configure and perform an upgrade from a remote server:

```

uMG9820# upgrade {server IP-address | filename remote-filename | now [force] |
[gigabitethernet [force]]}

```

where

server *IP-address* = IP address of the server where the upgrade files are stored

remote-filename = Name of the upgrade file stored on the remote system

now = Perform the software upgrade or processor card upgrade if the specified file has a higher version number than that of software currently installed

gigabitethernet = Perform only an automated processor card update

force = Perform the software upgrade to the specified file, regardless of software version, or force an automated processor card update

Example—Specify 192.168.3.7 as the IP address of the server where the upgrade software resides:

```

uMG9820# upgrade server 192.168.3.7

```

Example—Specify “newsoftware.tar” as the upgrade filename:

```

uMG9820# upgrade filename newsoftware.tar

```

Example—Upgrade to the new software immediately:

```

uMG9820# upgrade now

```

Example—Upgrade to the new software immediately, even if it is older than the currently installed version:

```

uMG9820# upgrade now force

```

Managing Configurations

This section covers commands for the following operations:

- [Saving a Running Configuration to the Startup Configuration](#)
- [Restoring the Startup Configuration to the Running Configuration](#)
- [Saving a Configuration to a TFTP Server](#)

- [Retrieving a Configuration from a TFTP Server](#)
- [Displaying Configuration Files](#)

Saving a Running Configuration to the Startup Configuration

To save the current running-configuration settings to a storage location for the startup-configuration settings (except for the case where a BootP configuration is used):

```
uMG9820# copy running-config startup-config
```

where

running-config = Current running configuration settings (in RAM)

startup-config = Stored configuration settings that are loaded at startup

Example—Copy the running configuration settings to the startup configuration file

```
uMG9820# copy running-config startup-config
```

Restoring the Startup Configuration to the Running Configuration

To load the stored startup-configuration settings to the running configuration settings (overwriting current running-configuration settings, and appending changes to the file):

```
uMG9820# copy startup-config running-config
```

where

running-config = current running-configuration settings

startup-config = stored configuration settings that are loaded at startup

Example—Copy the stored startup configuration settings to the running configuration

```
uMG9820# copy startup-config running-config
```

Saving a Configuration to a TFTP Server

To save either the current running-configuration settings or the startup-configuration settings to a user-specified TFTP location—either to a specific IP address or a TFTP server name:

```
uMG9820# copy { running-config | startup-config | tftp URL
```

where

running-config = Current running-configuration settings

startup-config = Stored configuration settings that are loaded at startup

URL = Location of a specific filename on a TFTP server: (**tftp://ip-address/filename** or **tftp://tftp-server-name/filename**)



Note Use TFTP, not FTP, to send and retrieve files between the Cisco uMG9820 and a server.

Example—Save the current running configuration settings to a file called “runcfgdate” on a TFTP server with IP address 192.168.2.45:

```
uMG9820# copy running-config tftp://192.168.2.45/runcfgdate
```

Retrieving a Configuration from a TFTP Server

To restore either the current running-configuration settings or the startup-configuration settings from a user-specified TFTP server:

```
uMG9820# copy tftp URL { running-config | startup-config }
```

where

running-config = Current running-configuration settings

startup-config = Stored configuration settings that are loaded at startup

URL = Location of a specific filename on a TFTP server: (**tftp://ip-address/filename** or **tftp://tftp-server-name/filename**)

Example—Restore the current running-configuration settings from a file called “runcfgdate” on a TFTP server with IP address 192.168.2.45

```
uMG9820# copy tftp://192.168.2.45/runcfgdate running-config
```

Displaying Configuration Files

To display either the current running-configuration settings or the startup-configuration settings:

```
uMG9820# show { running-config | startup-config }
```

where

running-config = Current running-configuration settings

startup-config = Stored configuration settings that are loaded at startup

Example—Show the current running-configuration settings

```
uMG9820# show running-config
```



Note

For an example of output, see [Sample Configuration, page 4-43](#).

Example—Show the startup-configuration settings

```
uMG9820# show startup-config
```

Using the Terminal (Console) Port

The terminal or console port allows the CLI to be accessed through the RS-232 interface.



Note

The RS-232 port parameters are fixed and cannot be edited. The parameters are as follows:

9600 bits per second, 8 data bits, no parity, 1 stop bit

Sample Configuration

The following example illustrates the results of the **show running-config** command on a Cisco uMG9820.

```
uMG9820# show run

upgrade server 192.168.145.10
upgrade filename umg9820-1_3_0-1.tar.gz
hostname uMG9820
configure terminal
no logging server
snmp-server community private RW
snmp-server host 192.168.142.73 traps version 1 private
snmp-server host 192.168.142.73 private
snmp-server community public RO
snmp-server host 0.0.0.0 traps version 1 public
snmp-server host 0.0.0.0 public
interface fastethernet 0/1
no shut
no boot debug
no boot
ip address 192.168.2.108 255.255.255.0
ip default-gateway 192.168.145.1
mac-address 0050.c206.c31d
dhcp
interface fastethernet 0/2
shut
mac-address 0050.c206.c2a2
dhcp
interface gigabitethernet 0/1
ip address 192.168.1.34 255.255.255.0
mac-address 0050.c206.c0aa
no shut
no negotiation auto
no video timeout inactive
no video timeout release
no video timeout queue
interface gigabitethernet 0/2
shut
configure terminal
no logging console
no logging level
terminal speed 9600
terminal parity none
terminal databits 8
terminal stopbits 1
interface qam 6/1.1
video udp 5377 program 11
interface qam 1/1.1
no video pat tsid
no video pat nit-pid
video pmt interval 100
video pat interval 100
video format 256QAM
video interleaver 128,4
video frequency 531000000
video power 60.4
no video mute
no video alc
no shut
interface qam 1/1.2
no video pat tsid
```

```
no video pat nit-pid
no shut
interface qam 1/2.1
no video pat tsid
no video pat nit-pid
video frequency 255000000
video power 59.4
no video mute
no video alc
no shut
interface qam 1/2.2
no video pat tsid
no video pat nit-pid
no shut
interface qam 2/1.1
no video pat tsid
no video pat nit-pid
video format 256QAM
video interleaver 128,4
video frequency 531000000
video power 61.7
no video mute
no video alc
no shut
interface qam 2/1.2
no video pat tsid
no video pat nit-pid
no shut
interface qam 2/2.1
no video pat tsid
no video pat nit-pid
video frequency 255000000
video power 61.2
no video mute
no video alc
no shut
interface qam 2/2.2
no video pat tsid
no video pat nit-pid
no shut
interface qam 3/1.1
no video pat tsid
no video pat nit-pid
video format 256QAM
video interleaver 128,4
video frequency 531000000
video power 58.0
no video mute
video alc
no shut
interface qam 3/1.2
no video pat tsid
no video pat nit-pid
no shut
interface qam 3/2.1
no video pat tsid
no video pat nit-pid
video frequency 255000000
video power 57.0
no video mute
video alc
no shut
interface qam 3/2.2
no video pat tsid
```

```
no video pat nit-pid
no shut
interface qam 4/1.1
no video pat tsid
no video pat nit-pid
video format 256QAM
video interleaver 128,4
video frequency 531000000
video power 63.2
no video mute
no video alc
no shut
interface qam 4/1.2
no video pat tsid
no video pat nit-pid
no shut
interface qam 4/2.1
no video pat tsid
no video pat nit-pid
video frequency 255000000
video power 61.9
no video mute
no video alc
no shut
interface qam 4/2.2
no video pat tsid
no video pat nit-pid
no shut
interface qam 5/1.1
no video pat tsid
no video pat nit-pid
video format 256QAM
video interleaver 128,4
video frequency 531000000
video power 61.1
no video mute
no video alc
no shut
interface qam 5/1.2
no video pat tsid
no video pat nit-pid
no shut
interface qam 5/2.1
no video pat tsid
no video pat nit-pid
video frequency 255000000
video power 61.1
no video mute
no video alc
no shut
interface qam 5/2.2
no video pat tsid
no video pat nit-pid
no shut
interface qam 6/1.1
no video pat tsid
no video pat nit-pid
video format 256QAM
video interleaver 128,4
video frequency 531000000
video power 62.4
no video mute
no video alc
no shut
```

```
interface qam 6/1.2
  no video pat tsid
  no video pat nit-pid
  no shut
interface qam 6/2.1
  no video pat tsid
  no video pat nit-pid
  video frequency 255000000
  video power 62.0
  no video mute
  no video alc
  no shut
interface qam 6/2.2
  no video pat tsid
  no video pat nit-pid
  no shut
uMG9820#
```



Troubleshooting

Your Cisco uMG9820 went through extensive testing before leaving the factory. However, if you encounter problems starting the Cisco uMG9820, use the information in this chapter to help isolate the cause of the problems. The procedures in this chapter cover troubleshooting the initial system startup. In addition, references to CLI commands are provided to troubleshoot GE and FE ports, as well as QAM channels.

This chapter presents the following major topics:

- [Overview, page 5-1](#)
- [Before You Call for Technical Assistance, page 5-2](#)
- [Solving Startup Problems by Using a Subsystems Approach, page 5-3](#)
- [Using CLI show Commands to Troubleshoot, page 5-7](#)



Caution

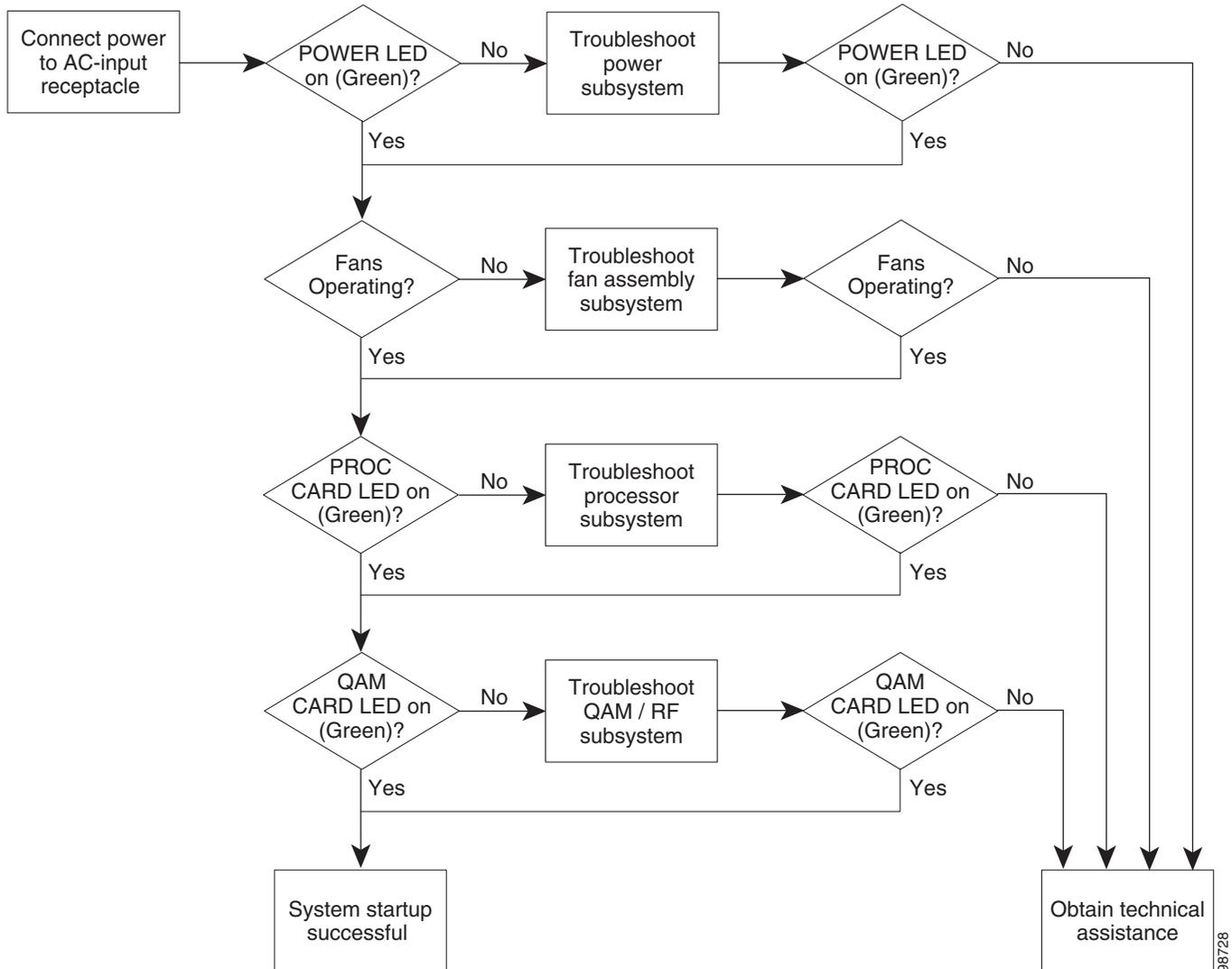
Make sure to review the safety warnings listed in the publication that accompanied your Cisco uMG9820 before using the troubleshooting procedures in this chapter. It is assumed that your Cisco uMG9820 is in the original factory configuration. If you have removed or replaced components or changed any default settings, the recommendations in this chapter might not apply.

Overview

This section describes the troubleshooting methods used in this chapter and describes how the Cisco uMG9820 is divided into subsystems for more efficient problem solving.

[Figure 5-1 on page 5-2](#) shows the general troubleshooting strategy described in this chapter. Refer to this chart, as necessary, to follow the steps to isolate problems to a specific subsystem.

Figure 5-1 General Troubleshooting Strategy for Startup Problems



Before You Call for Technical Assistance

If you are unable to solve the problem easily, contact a Cisco customer service representative for assistance and further instructions. (See [Obtaining Technical Assistance](#), page xvi.)

Provide the representative with the following information:

- Date you received the router
- Chassis serial number
- Type of software and release number
- Brief description of the problem you are having
- Brief explanation of the steps you have taken to isolate and resolve the problem

- Maintenance agreement or warranty information
- Information dump results (Optional. See [Creating an Information Dump](#).)

Creating an Information Dump

It can be helpful to Technical Assistance if you prepare an information dump before contacting them. To create this information dump, do the following:

-
- Step 1** Ensure that you are connected to a TFTP server.
 - Step 2** Enter the debug shell by typing `!` in enable mode.
 - Step 3** Enter the following command:
`uMG9820 (debug) #infodump tftp://server-ip-address/filename`
 - Step 4** The information dump is created and saved to the specified TFTP server.
 - Step 5** Type `exit` to return to enable mode.
-

Solving Startup Problems by Using a Subsystems Approach

The key to solving problems with the system is isolating the problem to a specific subsystem. The first step in solving startup problems is to compare what the system is doing to what it should be doing.

Because a startup problem is usually caused by a single component, it is more efficient to isolate the problem to a subsystem rather than to troubleshoot each component in the system. For these troubleshooting procedures, consider the following subsystems:

- Power subsystem—Includes the power supplies and the external power cable
- Processor subsystem—Includes the processor card
- QAM/RF subsystem—Includes the QAM cards
- Fan assembly subsystem—Includes the fan assembly and the power supplies

Startup problems are commonly due to the source power or to a port adapter that is dislodged from the Cisco uMG9820. Although an overtemperature condition is unlikely at initial startup, the environmental monitoring functions are included in this chapter, because they also monitor internal voltages. (See [More show Commands](#), page 5-8.)

Normal Startup Sequence

LEDs indicate all system states in the startup sequence. (See [Front Panel LEDs](#), page 1-4, and [Rear Panel Connectors and LEDs](#), page 1-5.) By checking the state of the LEDs, you can determine when and where the system failed in the startup sequence. Use the following descriptions to isolate the problem to a subsystem, and then proceed to the appropriate sections to try to resolve the problem.

When you start up the system, the following should occur:

1. You immediately hear the fans operating.

2. The LEDs on the Cisco uMG9820 come on and transition as follows:
 - a. The power LED (POWER) comes on immediately and is green, to indicate that the unit is receiving power. This LED comes on during a successful boot and remains on during normal operation of the Cisco uMG9820.

If this LED remains off when you start the Cisco uMG9820, then either there is a problem with the power supply (it is damaged or not connected correctly), or the processor card is not connected properly. Proceed to the discussion of the power subsystem in [Subsystem Troubleshooting Tips, page 5-4](#).

- b. The power supply and fan LED (PS/FAN) comes on and transitions from yellow to green, to indicate that no error condition has been detected on the power supplies or the fan assembly. This LED comes on during a successful boot and remains on during normal operation of the Cisco uMG9820. These LEDs flash if a redundant power supply is not installed.

If this LED remains off when you start the Cisco uMG9820, or if this LED fails to turn green, proceed to the discussion of the fan assembly subsystem in [Subsystem Troubleshooting Tips, page 5-4](#).


Caution

At any indication of a fan failure, even at ambient temperatures, replace the fan assembly. This is to protect the QAM modules from being damaged.

- c. The processor card LED (PROC) comes on initially at power up and is yellow during bootup. The LED turns green after a successful boot.
 - d. If this LED fails to come on or turn green, proceed to the discussion of the processor subsystem in [Subsystem Troubleshooting Tips, page 5-4](#).
 - e. Each QAM card LED (QAM) corresponding to a slot for which there is a QAM card installed comes on and then transitions from yellow to green, to indicate that no error condition has been detected on the corresponding QAM card. Each LED corresponding to a slot for which there is no QAM card installed does not come on.

If a QAM card LED for a slot in which there is a QAM card installed fails come on or to turn green, proceed to the discussion of the QAM/RF subsystem in [Subsystem Troubleshooting Tips, page 5-4](#).

Subsystem Troubleshooting Tips

Troubleshooting Major Subsystems

[Table 5-1](#) presents tips for troubleshooting the power, processor, QAM/RF module, and fan assembly subsystems.

Table 5-1 Subsystem Troubleshooting Tips

Subsystem	Symptom	Action	Comments
Power	Power LED (POWER) is on.	No action is required.	Power source is good, power supplies are functional.
	POWER LED is off.	1. Make sure that the power cable is connected at both ends.	If cable is properly connected, suspect power source or cable. Proceed as follows.
		2. Connect to another power source, if one is available.	If new power source is used and POWER LED comes on, first source is faulty. If POWER LED still fails to come on, proceed to Step 3 for this subsystem.
		3. Replace the power cord.	If the POWER LED comes on, the first cable is faulty. Return the faulty power cord to Cisco for replacement. If the POWER LED still fails to come on, proceed to Step 4 for this subsystem.
		4. Check the fuse and replace it as needed.	The fuse has blown, is defective, or is not seated properly.
	5. Disconnect power to the unit, and contact a Cisco service representative for further instructions.	One or both power supply modules may be faulty.	
Processor	Processor LED (PROC CARD) is on and green.	No action is required.	Cisco uMG9820 has initialized successfully; system is operational.
	PROC CARD LED is on and steady yellow.	1. Confirm the internal status of the processor card by using a variety of CLI commands.	Steady yellow indicates a hardware failure. Proceed to Step 2 for this subsystem. See More show Commands, page 5-8 .
	PROC CARD LED is on and flashing yellow.	2. Reinsert the processor card and restart the system.	Flashing yellow indicates that the fan assembly microcontroller has not detected the heartbeat from the processor in the last 5 seconds. If this fails to clear the problem, proceed to Step 3 for this subsystem.
		3. Disconnect power to the unit, and contact a Cisco service representative for further instructions.	

Table 5-1 Subsystem Troubleshooting Tips (continued)

Subsystem	Symptom	Action	Comments
QAM/RF	QAM LED (QAM) is on and green.	No action is required.	Cisco uMG9820 has initialized successfully; system is operational.
	QAM LED is off.	1. Refer to procedures for power and fan assembly subsystems in this table.	If the power supply and fans appear operational and the QAM LED is off, the QAM card may be connected improperly. Proceed to Step 2 for this subsystem.
		2. Reinsert the QAM card and restart the system.	If this fails, proceed to Step 5 for this subsystem.
	QAM LED is on and yellow.	3. Confirm that there are at least two QAM cards in the system.	A minimum of two QAM cards is required. If there are at least two cards, proceed to Step 4 and Step 5 for this subsystem.
		4. Confirm each QAM card's internal status by using a variety of CLI commands.	See More show Commands, page 5-8 .
	5. Disconnect power to the unit, and contact a Cisco service representative for further instructions.	If a QAM LED is either off or remains on and yellow, the system has detected a hardware failure in that specific card.	
Fan assembly	Airflow is noticeable; fans are moving. Power supply/fan assembly LED (PS/FAN) is on and green.	No action is required.	Fans are operating correctly, and the system has detected no faults. Tip Feel for airflow with your hand. If necessary, remove the bezel to observe fans.
	Fans are not moving.	1. Refer to procedures for the power subsystem in this table.	There is a problem with the fan or power.
	Power supply/fan assembly LED (PS/FAN) is on and yellow.	2. Reseat <i>both</i> power supplies and the fan assembly.	The system has detected a fault with one or both of the power supplies or the fan assembly. If this fails, proceed to Step 4 for this subsystem.
	Power supply/fan assembly LED (PS/FAN) is on and flashing.	3. Install a redundant power supply.	If only one power supply is installed, green and yellow LEDs flash.
		4. Disconnect power to the unit, and contact a Cisco service representative for further instructions.	 Caution At any indication of a fan failure, even at ambient temperatures, replace the fan assembly. This is to protect the QAM modules from being damaged.

Troubleshooting GE Ports

The following may be useful in helping to identify sources of error related to GE transport.

Polling Resources in Support of Failover

The microcontroller on the processor card detects whether an small form-factor pluggable (SFP) module is present in the GE ports. If an SFP module is present in a port, the processor card can then poll the SFP module to detect whether a fiber-optic cable has also been connected to that SFP module.

If the active GE port goes down, then the processor card checks the inactive port to see whether it has an SFP module and fiber-optic cable is attached. If so, the processor card activates that port and deactivates the port that went down.

As expected, if the inactive port is identified as not being ready to carry traffic (that is, both an SFP module and fiber-optic cable are not detected), then no failover switching takes place.

GE Port ALM LED Functionality

The MAC chip on the processor card detects PHY, CD, TX packet, and RX packet errors, as defined in the IEEE 802.3z standard. (The user cannot set the definitions and thresholds for these errors, as they are dictated by the standard.)

The MAC chip maintains a counter for the occurrence of each error type, and the microcontroller polls the MAC chip once per second. If any one of the counters is incremented, the ALM LED comes on.

If there is no change to any of the counters from the last time the counters were polled, then the ALM LED goes off. If any of the counters is incremented since the last time the counters were polled, the ALM LED remains on.

GE Port ERR LED Functionality

The microcontroller on the processor card maintains a bistate error flag for the TX and RX buffers. The occurrence of a TX buffer underrun or RX buffer overflow changes the state of the respective error flag to the “error” state. If the TX buffer or RS buffer returns to the expected operation, then the state of the respective flag is switched back to the no error state.

The microcontroller polls the TX buffer underrun and RX buffer overflow flags once per second (the same interval at which it polls the MAC chips). If the state of one or both error flags is in the error state, the ERR LED comes on.

If both error flags return to the no error state, the next time the flags are polled the ERR LED goes off. If either error flag is still in the error state the next time the flags are polled, then the ERR LED remains on.

Using CLI show Commands to Troubleshoot

This section presents resources for the following tasks:

- [Troubleshooting Ethernet Port and QAM Channels](#)
- [More show Commands](#)

The additional **show** commands are useful for environmental troubleshooting, as well as for retrieving software version and logging information,

Troubleshooting Ethernet Port and QAM Channels

In addition, [Chapter 1, “Product Overview,”](#) presents a variety of CLI **show** commands that are useful in troubleshooting GE and FE ports, as well as QAM channels.

Table 5-2 CLI Troubleshooting Commands

Category	Reference	Comments
GE Port and Video Session Commands	Retrieving Packet and Buffer Statistics, page 4-12	Displays packet and buffer statistics for the specified GE port.
	Retrieving IP Status, page 4-12	Displays the IP status of the specified GE port.
	Retrieving Input Session Data, page 4-22	Displays video session information, input errors, session state, jitter buffer status, and continuity count errors.
	Retrieving Input Session PSI Data, page 4-23	Displays video session program number, elementary stream ID, and PID.
FE Port Commands	Retrieving FE Port Statistics, page 4-30	Displays link status (up/down) and packet and buffer counters.
QAM Commands	Retrieving QAM Statistics, page 4-39	Displays QAM statistics for a specified QAM channel.
	Retrieving QAM Output Video Data, page 4-39	Displays video program data for a specified QAM channel.
	Retrieving Video Session Information, page 4-25	Displays video session information for all active sessions, for all sessions (active and inactive), or a specified UDP session.

More show Commands

A variety of additional **show** commands support the following tasks useful in troubleshooting:

- [Retrieving Environmental Status](#)
- [Retrieving QAM Card and Cisco uMG9820 Software Versions](#)
- [Retrieving ARP Table Information](#)
- [Retrieving Entries in the Local Log File](#)

Retrieving Environmental Status

Use the following environmental commands to see power, temperature, voltages, and fan (RPM) data, either singly or collectively:

- `show env alarms`
- `show env all`
- `show env fan`
- `show env power`
- `show env temperature`

show env alarms

```
uMG9820# show env alarms
```

Under normal conditions, this command shows nothing. If there is one or more alarm state, this command shows one or more of the following:

**Note**

The following is only a complete list of all possible alarms, not an indication of what is seen for a given alarm state.

```
uMG9820-Proc > RTC Battery Voltage out of range
uMG9820-Proc > GbE Mac Temperature out of range
uMG9820-Proc > IXP CPU Voltage out of range
uMG9820-Proc > FPGA Core Voltage out of range
uMG9820-Proc > 12V Power Supply Voltage out of range
uMG9820-Proc > 5V Power Supply Voltage out of range
uMG9820-Proc > 3.3V Power Supply Voltage out of range
uMG9820-Sys-AC > Midplane Temperature out of range
uMG9820-Proc > IXP CPU Temperature out of range
uMG9820-Proc > PCB Board Temperature out of range
uMG9820-Proc > PCR FPGA Temperature out of range
uMG9820-Proc > CAS FPGA Temperature out of range
uMG9820-Fan > Fan #1 RPM out of range
uMG9820-Fan > Fan #2 RPM out of range
uMG9820-Proc > Fan #1 RPM out of range
uMG9820-Proc > Fan #2 RPM out of range
uMG9820-Sys-AC > Main Power Supply failure
uMG9820-Sys-AC > Redundant Power Supply failure
```

show env all

```
uMG9820# show env all

uMG9820-Fan > Fan #1 RPM : 2565
uMG9820-Fan > Fan #2 RPM : 2610
uMG9820-Proc > Fan #1 RPM : 5684
uMG9820-Proc > Fan #2 RPM : 5595
uMG9820-Proc > PCB Temperature : 50 C
uMG9820-Proc > CPU Temperature : 51 C
uMG9820-Proc > GbE Temperature : 47 C
uMG9820-Sys-AC > Midplane Temperature : 24 C
uMG9820-Proc > PCR FPGA Temperature : 43 C
uMG9820-Proc > CAS FPGA Temperature : 46 C
```

```

uMG9820-Proc > Main Voltage #1 : 12.06 V
uMG9820-Proc > Main Voltage #2 : 5.13 V
uMG9820-Proc > Main Voltage #3 : 3.19 V
uMG9820-Proc > CPU Voltage : 1.94 V
uMG9820-Proc > FGPA Voltage : 1.49 V
uMG9820-Proc > Battery Voltage : 3.02 V

```

```
Alarms : No Alarms
```

show env fan

```

uMG9820# show env fan

uMG9820-Fan > Fan #1 RPM : 2520
uMG9820-Fan > Fan #2 RPM : 2565
uMG9820-Proc > Fan #1 RPM : 5768
uMG9820-Proc > Fan #2 RPM : 5591

```

show env power

```

uMG9820# show env power

uMG9820-Proc > 12V Main Voltage : 11.96 V
uMG9820-Proc > 5V Main Voltage : 5.13 V
uMG9820-Proc > 3.3V Main Voltage : 3.19 V
uMG9820-Proc > CPU Voltage : 1.94 V
uMG9820-Proc > FGPA Voltage : 1.48 V
uMG9820-Proc > Battery Voltage : 3.02 V

```

show env temperature

```

uMG9820# show env temperature

uMG9820-Proc > PCB Temperature : 50 C
uMG9820-Proc > CPU Temperature : 51 C
uMG9820-Proc > GbE Temperature : 47 C
uMG9820-Sys-AC > Midplane Temperature : 25 C
uMG9820-Proc > PCR FPGA Temperature : 43 C
uMG9820-Proc > CAS FPGA Temperature : 46 C

```

Retrieving QAM Card and Cisco uMG9820 Software Versions

The following commands retrieve the software versions, respectively, of the QAM card and of the Cisco uMG9820 unit itself:

- [show version](#)
- [show umg9820](#)



Note

Error messages reflect the absence of specific resources, which vary from configuration to configuration.

show version

```

uMG9820# show version

Shell v1.3.0
Compiled 01-Apr-04 14:08 by root on beren 2.4.18-3 unknown

                uMG9820 SOFTWARE COMPONENT VERSION NUMBERS
=====
uMG9820-PROC BOOTLOADER IMAGE FILE           : 0.0.12
uMG9820-PROC KERNEL IMAGE FILE               : 0.2.10
uMG9820-PROC RAMDISK IMAGE FILE              : 1.3.0
uMG9820-PROC MICROCODE                       : 0441
uMG9820-PROC FPGA 1 (PCR) FIRMWARE           : 144
uMG9820-PROC FPGA 2 (CAS) FIRMWARE          : 002
uMG9820-PROC PLD FIRMWARE                    : 07
uMG9820-FAN COOLING MODULE MICROCODE        : 0103
uMG9820-QC42B 1 MICROCODE                    : 0.75Z
uMG9820-QC42B 1 FPGA 256 QAM ANNEX B        : 044
uMG9820-QC42B 1 FPGA 64 QAM ANNEX B         : 044
uMG9820-QC42B 1 FPGA 256/64 QAM ANNEX A/C   : RESERVED FOR FUTURE USE
uMG9820-QC42B 1 FPGA Annex A/C COEFFICIENTS : RESERVED FOR FUTURE USE
uMG9820-QC42B 2 MICROCODE                    : 0.75Z
uMG9820-QC42B 2 FPGA 256 QAM ANNEX B        : 044
uMG9820-QC42B 2 FPGA 64 QAM ANNEX B         : 044
uMG9820-QC42B 2 FPGA 256/64 QAM ANNEX A/C   : RESERVED FOR FUTURE USE
uMG9820-QC42B 2 FPGA Annex A/C COEFFICIENTS : RESERVED FOR FUTURE USE
uMG9820-QC42B 3 MICROCODE                    : 0.75Z
uMG9820-QC42B 3 FPGA 256 QAM ANNEX B        : 044
uMG9820-QC42B 3 FPGA 64 QAM ANNEX B         : 044
uMG9820-QC42B 3 FPGA 256/64 QAM ANNEX A/C   : RESERVED FOR FUTURE USE
uMG9820-QC42B 3 FPGA Annex A/C COEFFICIENTS : RESERVED FOR FUTURE USE
uMG9820-QC42B 4 MICROCODE                    : 0.75Z
uMG9820-QC42B 4 FPGA 256 QAM ANNEX B        : 044
uMG9820-QC42B 4 FPGA 64 QAM ANNEX B         : 044
uMG9820-QC42B 4 FPGA 256/64 QAM ANNEX A/C   : RESERVED FOR FUTURE USE
uMG9820-QC42B 4 FPGA Annex A/C COEFFICIENTS : RESERVED FOR FUTURE USE
uMG9820-QC42B 5 MICROCODE                    : 0.75Z
uMG9820-QC42B 5 FPGA 256 QAM ANNEX B        : 044
uMG9820-QC42B 5 FPGA 64 QAM ANNEX B         : 044
uMG9820-QC42B 5 FPGA 256/64 QAM ANNEX A/C   : RESERVED FOR FUTURE USE
uMG9820-QC42B 5 FPGA Annex A/C COEFFICIENTS : RESERVED FOR FUTURE USE
uMG9820-QC42B 6 MICROCODE                    : 0.75Z
uMG9820-QC42B 6 FPGA 256 QAM ANNEX B        : 044
uMG9820-QC42B 6 FPGA 64 QAM ANNEX B         : 044
uMG9820-QC42B 6 FPGA 256/64 QAM ANNEX A/C   : RESERVED FOR FUTURE USE
uMG9820-QC42B 6 FPGA Annex A/C COEFFICIENTS : RESERVED FOR FUTURE USE
uMG9820#

```

show umg9820

```

uMG9820# show umg9820

uMG9820-Sys-AC
  Midplane HW Revision      : 6
  Chassis HW Revision       : 2
  System Revision           : 2
  System Cisco Serial Number : WAV12345678
  System Cisco Model Number  : UMG9820-SYS-AC
  System Cisco Part Number   : 74-3343-01
  GigabitEthernet MAC Address : 0050c206c0aa
  FastEthernet 0/1 MAC Address : 0050c206c31d
  FastEthernet 0/2 MAC Address : 0050c206c2a2

```

```

uMG9820-QC42B #1
Cisco Model Number : WQ20324
Cisco CLEI Number  : TBD
Cisco Serial Number : N/A
Cisco Part Number  : N/A
Hardware Revision   : 9
MCU Revision        : 0.75Z
FPGA Revisions      : 044:044:N/A:N/A
NVRAM Revision      : 3
uMG9820-QC42B #2
Cisco Model Number : WQ20324
Cisco CLEI Number  : TBD
Cisco Serial Number : N/A
Cisco Part Number  : N/A
Hardware Revision   : 9
MCU Revision        : 0.75Z
FPGA Revisions      : 044:044:N/A:N/A
NVRAM Revision      : 3
uMG9820-QC42B #3
Cisco Model Number : WQ20324
Cisco CLEI Number  : TBD
Cisco Serial Number : N/A
Cisco Part Number  : N/A
Hardware Revision   : 9
MCU Revision        : 0.75Z
FPGA Revisions      : 044:044:N/A:N/A
NVRAM Revision      : 3
uMG9820-QC42B #4
Cisco Model Number : WQ20324
Cisco CLEI Number  : TBD
Cisco Serial Number : N/A
Cisco Part Number  : N/A
Hardware Revision   : 9
MCU Revision        : 0.75Z
FPGA Revisions      : 044:044:N/A:N/A
NVRAM Revision      : 3
uMG9820-QC42B #5
Cisco Model Number : WQ20324
Cisco CLEI Number  : TBD
Cisco Serial Number : N/A
Cisco Part Number  : N/A
Hardware Revision   : 9
MCU Revision        : 0.75Z
FPGA Revisions      : 044:044:N/A:N/A
NVRAM Revision      : 3
uMG9820-QC42B #6
Cisco Model Number : WQ20324
Cisco CLEI Number  : TBD
Cisco Serial Number : N/A
Cisco Part Number  : N/A
Hardware Revision   : 9
MCU Revision        : 0.75Z
FPGA Revisions      : 044:044:N/A:N/A
NVRAM Revision      : 3
uMG9820-FAN
Cisco Serial Number : WAV07340097
Cisco Model Number  : UMG9820-FAN=
Cisco CLEI Number   : LFPQAFYHAA
Cisco Part Number   : 74-3344-01
Hardware Revision    : 3
uMG9820-PROC
Cisco Serial Number : WAV073901JA
Cisco Model Number  : UMG9820-PROC=
Cisco Part Number   : 74-3345-01

```

```

Cisco CLEI Number   : LFCC380DAA
Hardware Revision   : 6.04
PCB Board Revision  : 5a
GbE Module #1
  Identifier        : SFP
  Connector         : RJ45
  Transceiver       : 1000BASE-T DistanceMB/s
  Encoding          : 8B10B
  Nominal Bit Rate  : 0 Mbps
  Upper Bit Rate Margin : 0%
  Lower Bit Rate Margin : 0%
  Length (50mm)    : 0 m
  Length (62.5mm) : 0 m
  Length (copper)  : 100 m
  Vendor Name       : Molex Inc.
  Vendor OUI        : 00093a
  Vendor PN         : 74741-0001
  Vendor Rev        : D
  Vendor SN         : 33371308
GbE Module #2
  Identifier        : SFP
  Connector         : LC
  Transceiver       : 1000BASE-SX, Intermediate Distance, Shortwave Laser w/o OFC, Multi-mode, 50/62.5mm, 100-200MB/s
  Encoding          : 8B10B
  Nominal Bit Rate  : 2100 Mbps
  Upper Bit Rate Margin : 4%
  Lower Bit Rate Margin : 52%
  Length (50mm)    : 300 m
  Length (62.5mm) : 150 m
  Length (copper)  : 0 m
  Vendor Name       : PICOLIGHT
  Vendor OUI        : 000485
  Vendor PN         : PL-XPL-00-S23-28
  Vendor Rev        :
  Vendor SN         : 313CD02X
uMG9820#

```

Retrieving ARP Table Information

The following command displays the complete Address Resolution Protocol (ARP) table with IP address, MAC address, resolution type, and interface information.

show arp

```

uMG9820-2> show arp

Protocol Address      Age (min) Hardware Addr   Type   Interface
-----
Internet 171.71.225.96    -           0000.0c07.ac01  ARPA   FastEthernet0/1
Internet 10.77.241.59       -           0000.0c07.ac01  ARPA   FastEthernet0/1
Internet 172.22.95.76       -           0800.208a.95f7  ARPA   FastEthernet0/1
uMG9820-2>

```

Retrieving Entries in the Local Log File

The following command displays the entries in the current log file. The *number-of-lines* parameter determines the number of most recent log entries to be displayed.

show logging *number-of-lines*

```
uMG9820-2> show logging 25

Aug 20 12:17:55 uMG9820-2 daemon.crit uMG9820-Proc[318]: Fan #2 RPM out of range
Aug 20 12:22:53 uMG9820-2 daemon.crit uMG9820-Proc[318]: PCR FPGA temperature out of range
Aug 20 12:24:10 uMG9820-2 daemon.crit uMG9820-Proc[318]: PCR FPGA temperature out of range
Aug 20 12:27:49 uMG9820-2 daemon.crit uMG9820-Fan[318]: Fan #1 RPM out of range
Aug 20 12:27:49 uMG9820-2 daemon.crit uMG9820-Fan[318]: Fan #2 RPM out of range
Aug 20 12:29:47 uMG9820-2 daemon.crit uMG9820-Fan[318]: Fan #1 RPM out of range
Aug 20 12:29:47 uMG9820-2 daemon.crit uMG9820-Fan[318]: Fan #2 RPM out of range
Aug 20 12:29:47 uMG9820-2 daemon.crit uMG9820-Proc[318]: Fan #1 RPM out of range
Aug 20 12:29:47 uMG9820-2 daemon.crit uMG9820-Proc[318]: Fan #2 RPM out of range
Aug 20 12:35:41 uMG9820-2 daemon.crit uMG9820-Fan[318]: Fan #1 RPM out of range
Aug 20 12:35:41 uMG9820-2 daemon.crit uMG9820-Fan[318]: Fan #2 RPM out of range
Aug 20 12:37:39 uMG9820-2 daemon.crit uMG9820-Fan[318]: Fan #1 RPM out of range
Aug 20 12:37:39 uMG9820-2 daemon.crit uMG9820-Fan[318]: Fan #2 RPM out of range
Aug 20 12:37:39 uMG9820-2 daemon.crit uMG9820-Proc[318]: Fan #1 RPM out of range
Aug 20 12:37:39 uMG9820-2 daemon.crit uMG9820-Proc[318]: Fan #2 RPM out of range
Aug 20 12:39:42 uMG9820-2 daemon.crit uMG9820-Fan[318]: Fan #1 RPM out of range
Aug 20 12:39:42 uMG9820-2 daemon.crit uMG9820-Fan[318]: Fan #2 RPM out of range
Aug 20 12:41:42 uMG9820-2 daemon.crit uMG9820-Fan[318]: Fan #1 RPM out of range
Aug 20 12:41:42 uMG9820-2 daemon.crit uMG9820-Fan[318]: Fan #2 RPM out of range
Aug 20 12:41:42 uMG9820-2 daemon.crit uMG9820-Proc[318]: Fan #1 RPM out of range
Aug 20 12:41:42 uMG9820-2 daemon.crit uMG9820-Proc[318]: Fan #2 RPM out of range
Aug 20 12:44:18 uMG9820-2 daemon.crit uMG9820-Proc[318]: PCR FPGA temperature out of range
Aug 20 12:48:54 uMG9820-2 daemon.err uMG9820-Proc[318]: Gigabitethernet device 1 link down
Aug 20 12:48:59 uMG9820-2 daemon.notice uMG9820-Proc[318]: Gigabitethernet device 1 link
up
Aug 20 12:50:42 uMG9820-2 user.info commandline[8627]: show logging
uMG9820-2>
```



Cisco uMG9820 Technical Specifications

Table A-1 lists the technical specifications for the Cisco uMG9820.

Table A-1 Technical Specifications for the Cisco uMG9820

Characteristic	Value
Physical	
Dimensions	1.72 in. high x 18.98 in. wide x 21.41 in. deep (43.7 x 444.5 x 342.9 mm)
Mounting standard	1 RU, 19 in.
Weight	17.9 lbs (8.1 kg) typical (fully loaded)
Electrical	
Input voltage	100–240 VAC
Input frequency	50–60 Hz
Input current	3 A max. at 100 VAC input
AC power connector	IEC 320 standard 6.3-A power entry module, RFI filtered, with metric fuse holder
Standards	
EMI standards	CFR47: 2000, FCC Part 15, Subpart B for Class A
	Industry Canada ICES-003 for Class A
Safety standards	CAN/CSA-C22.2 No. 60950-00, UL 60950
Agency approvals	Refer to <i>Cisco uMG9820 QAM Gateway Regulatory Compliance and Safety Information</i>
Environmental	
Temperature	Operating: 40–104°F (10–40°C)
	Nonoperating: –40–158°F (–40–70°C)
Humidity (relative, noncondensing)	Operating: 20 to 90%
	Nonoperating: 5 to 95%
Altitude	Operating: sea level to 6562 ft (2000 M)
	Nonoperating: sea level to 15,748 ft (4800 M)

Table A-1 Technical Specifications for the Cisco uMG9820 (continued)

Characteristic	Value
Inputs	
Input interface	Redundant 1+1 port configuration
	SFP module connectors
LAN protocol	IEEE 802.3z
Data rate per port	1000 Mbps
Data format	UDP datagram encapsulation of MPEG-2 SPTS
	Maximum of 256 MPEG-2 SPTS encapsulated in UDP/IP
	Up to six PIDs per program (including ECM PID)
	Up to seven 188-byte MPEG-2 packets per UDP datagram
Processing features	
Function capability	PID remapping
	PID filtering
	MPEG-remultiplexing
	PCR restamping
	MPEG-2 PSI extraction, generation, and insertion
	Input network jitter buffer (user-settable latency; max. 70 milliseconds)
Network management	
Management connectors	RJ-45: 10BASE-T/100BASE-TX Ethernet for network management system (NMS)
	RJ-45: 10BASE-T/100BASE-TX Ethernet for conditional access system (CAS)
	EIA-232
Management protocols	BootP, DHCP
	SNMP v1, v2c
	TFTP
	Telnet
	Command-line interface (CLI)
RF output specifications	
Modulation format	256QAM and 64QAM
Framing structure, channel coding, modulation	Per ITU-T Recommendation J.83 Annex B
Output interface	F-connector (75-ohm impedance, nominal)
Monitor interface	MCX connector (50-ohm impedance, nominal)
Center frequency	225–900 MHz
Frequency step size	12.5 kHz

Table A-1 Technical Specifications for the Cisco uMG9820 (continued)

Characteristic	Value
Frequency response	256QAM: 12% square-root raised-cosine shaping
	64QAM: 18% square-root raised-cosine shaping
	Any 5-MHz band: +/- 0.25 dB
	Any 7-MHz band: +/- 0.4 dB
Frequency accuracy over time/temperature	+/- 20 kHz
Channel-to-channel level accuracy	+/- 0.7 dB
Group delay	Any 5-MHz band: 8 nsec p-p max.
Output levels	Total average block ¹ power: 60 dBmV
	Step size: 0.1 dB (typical)
	Max. attenuated ² block power: 50 dBmV
	Per-channel power: 57 dBmV
Gain control range	50–60 dBmV block power
Return loss	Inband: > 14 dB; 13 dB above 750 MHz
Spurious emissions and noise	In-channel, at max. power, center frequency +/- 3 MHz: < -48 dBc
	Broadband (50–860 MHz): < -60 dBc (with respect to total block power, including harmonics)
Isolation	RF chain to RF chain: < 50 dBc
Noise (phase) (standard 6-MHz CATV channels, double sideband)	1–10 kHz: < -40 dBc (< -50 dBc typical)
	10–50 kHz: < -40 dBc (< -50 dBc typical)
	50 kHz–3 MHz: < -51 dBc (< -55 dBc typical)
Noise (broadband)	< -9 dBmV (block power at 60 dBmV, plus average noise from all channels outside +/- 24 MHz from the band edges)
Noise (modulated adjacent) (2x dual-block channel-output version)	+/- 3–3.75 MHz: < -58 dBc (-61 dBc typical)
	+/- 3–3.75 MHz: < -59 dBc (-61 dBc typical)
	+/- 9–15 MHz: < -60.5 dBc (-63 dBc typical)

1. A “block” represents the entire RF signal (12 MHz) from each QAM port. The signal consists of two adjacent 6-MHz-wide QAM channels.

2. An attenuator on the RF output provides up to 10 dB of attenuation (see “Gain Control Range,” above).

