

# Cisco uMG9820 QAM Gateway

The Cisco® uMG9820 QAM Gateway is a high-density, Gigabit Ethernet-optimized video quadrature amplitude modulation (QAM) product that offers nonstop, high-performance operation for video-on-demand (VoD) services. The Cisco uMG9820 QAM Gateway performs as the IP-to-MPEG-2 gateway between the Gigabit Ethernet transport network and the hybrid fiber-coaxial (HFC) cable network. It is ideal for cable operators requiring cost-effective solutions for their digital video services.

## Optimized for Gigabit Ethernet Networking

The Cisco uMG9820 QAM Gateway is optimized for Gigabit Ethernet technology. It accepts full line-rate Gigabit Ethernet video transport feeds into a single chassis, providing optimum efficiency (refer to Figure 1). There is no longer a need to daisy-chain QAM devices, eliminating the single point of failure present in the first QAM device in the chain. The Cisco uMG9820 QAM Gateway also lowers distribution hub capital expenditures (CapEx) and increases resiliency by reducing the switching costs inherent in other systems with lower QAM densities. Such systems are directly connected to switching devices by means of underutilized Gigabit Ethernet links, wasting port resources.

Figure 1  
Cisco uMG9820 QAM Gateway



## "Pay as You Grow" Modularity

The modular design of the Cisco uMG9820 QAM Gateway enhances scalability by making it easy to add more QAM channels as VoD service grows. The density of the product can be increased in increments of four to a maximum of a 24 QAM channels. The building-block design of the Cisco uMG9820 QAM Gateway allows the customer to purchase spare components, rather than an entire fixed-configuration system. This lowers the total cost of ownership for in-service video QAM equipment.

High-availability features allow the hot-swappable installation or replacement of QAM modules on active systems in operation. This accommodates future growth and maintenance, while minimizing costly service outages and maximizing uptime. System reliability challenges are further eliminated by the availability of redundant Gigabit Ethernet interfaces, cooling fans, and dual AC power supplies.

## Industry-Leading Density

The Cisco uMG9820 QAM Gateway is the highest-density Gigabit Ethernet QAM product available for digital video networks. The chassis accepts a minimum of two QAM cards and a maximum of six, for a total of 24 QAM channels in one rack unit (1RU). Each QAM card contains two RF ports capable of generating two QAM channels per port. The QAM card employs a 2:1 block upconverter with two frequency-agile, dual-channel block outputs; its versatility allows the ports to be split across multiple service groups, providing even greater flexibility and easier spectrum management. Fully tested and interoperable with Cisco's industry-leading networking equipment, and complemented by the industry's highest-rated service and support, the Cisco uMG9820 QAM Gateway is a primary element in delivering the next-generation digital video network.

## Features

- Modular, single-rack-unit chassis design
- Scalable up to 24 QAM
- 12 RF ports (2:1 block upconverter)
- Four QAM channels per QAM card
- Hot-swappable QAM cards, power supplies, and fan assembly
- Redundant Gigabit Ethernet interfaces
- Dual power supplies
- Field-upgradable software
- Standards-based interoperability
- Reduced VoD service costs

## Chassis

The Cisco uMG9820 QAM Gateway provides the versatility to configure an efficient video QAM system according to the needs of the operator. The modular chassis provides housing for the following:

- One processor card
- Up to six QAM cards
- Two power supplies
- One fan assembly (contains two fans)

## Chassis Features

- Support for online insertion and removal (OIR) of Cisco uMG9820 QAM Gateway modules
- Chassis that stores Common Language Equipment Identifier (CLEI) code, system serial numbers, and MAC addresses
- Removable machined front panel

## Processor

The Cisco uMG9820 processor card accepts MPEG-2 single-program transport streams (SPTSs) encapsulated in UDP/IP datagrams over Gigabit Ethernet. The MPEG-2 SPTS packets are processed and remultiplexed into MPEG-2 multiprogram transport streams (MPTS). MPEG-2 MPTS are then routed to QAM/RF cards for distribution.

### Processor Card Features

- Redundant 1+1 Gigabit Ethernet port configuration (one active plus one backup)
- 10BASE-T/100BASE-TX Ethernet port for out-of-band management network management system (NMS)
- 10BASE-T/100BASE-TX Ethernet port for conditional access system (CAS) traffic
- EIA/TIA-232 console port for direct serial communications with the processor card
- Configurable user transport stream ID

## QAM

The QAM card accepts up to four MPEG-2 MPTS and outputs up to four QAM/RF modulated and upconverted signals.

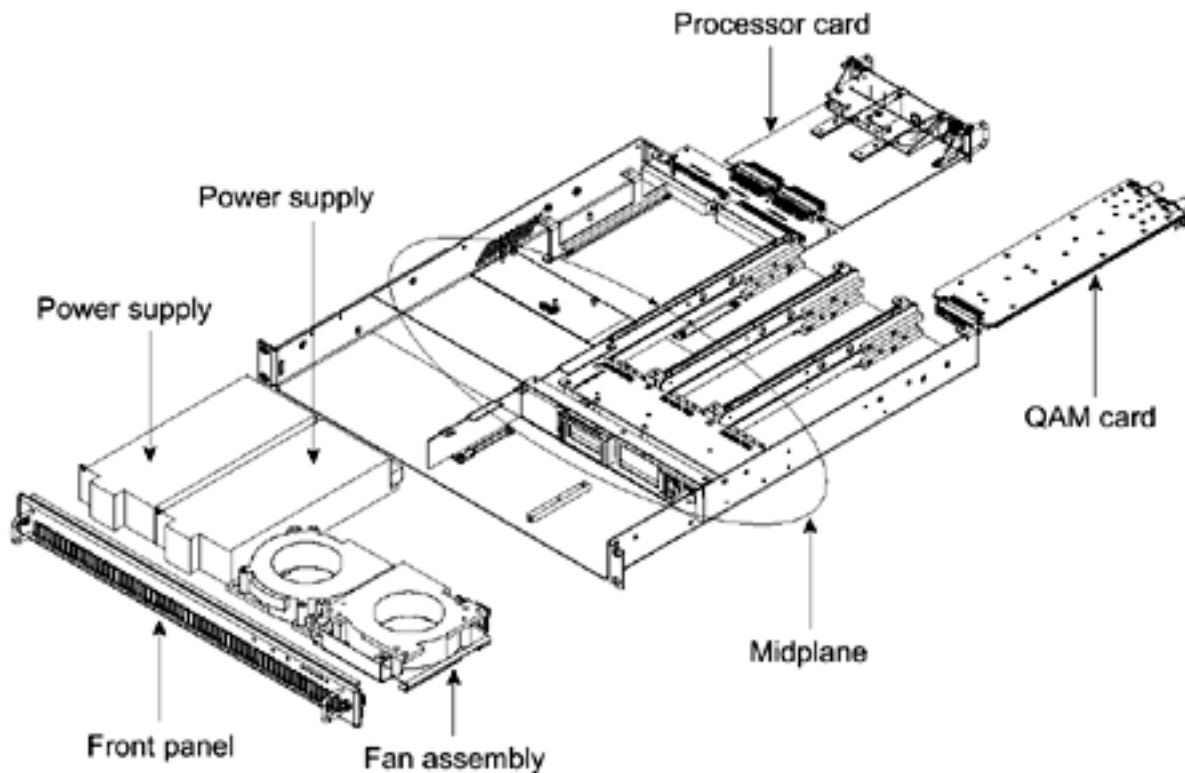
### QAM Card Features

- 256 QAM
- Two RF ports with two QAM channels per port
- Hot-swappable—OIR of the QAM card will not cause a service outage

Figure 2 illustrates the modularity of the Cisco uMG9820 QAM Gateway.

Figure 2

Cisco uMG9820 QAM Gateway Components



## Specifications

Tables 1 through 5 give specifications for the Cisco uMG9820 QAM Gateway.

Table 1 Operational / Environmental / Safety / Regulatory

Features	Specifications
Operating temperature	50 to 104°F (0 to 40°C)
Nonoperating temperature	-40 to 158°F (-40 to 70°C)
Operational altitude	Sea level to 6562 ft (2000m)
Nonoperational altitude	Sea level to 15,748 ft (4800m)
Operating humidity	20 to 90 percent relative humidity, noncondensing
Nonoperating humidity	5 to 90 percent relative humidity, noncondensing
Input voltage	100 to 240 VAC
Input frequency	50 to 60 Hz
Input current	3A maximum @ 100 VAC input
Power consumption	278W (typical)
Mounting standard	19-inch rack-mount per EIA 310D Section 1, 1 RU
Dimensions (H x W x D)	1.72 x 18.98 x 21.41 in. (44 x 482 x 544 mm)
Weight	6.7 lb (3.0 kg) typical (empty chassis with midplane); 17.9 lb (8.1 kg) typical (fully loaded chassis)
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 UL 60950

Table 2 Inputs

Features	Specifications
Input interface	Redundant 1+1 port configuration Small Form-Factor Pluggable (SFP) module connectors
LAN protocol	IEEE 802.3z
Data rate per port	1000 Mbps
Data format	<ul style="list-style-type: none"> <li>• UDP datagram encapsulation of MPEG-2 SPTSs</li> <li>• Maximum of 256 MPEG-2 SPTSs encapsulated in UDP/IP</li> <li>• Up to six PIDs per program (including ECM PID)</li> <li>• Up to seven 188-byte MPEG-2 packets per UDP datagram</li> <li>• 3 to 4 Mbps per SPTS (nominal)</li> </ul>

Table 3 Processing Features

Features	Specifications
Function capability	<ul style="list-style-type: none"> <li>• PID remapping</li> <li>• PID filtering</li> <li>• MPEG-2 remultiplexing</li> <li>• PCR restamping</li> <li>• MPEG-2 PSI extraction, generation, and insertion</li> <li>• Input network jitter buffer (user-settable latency; maximum 70 ms)</li> </ul>

Table 4 Network Management

Features	Specifications
Management connectors	<ul style="list-style-type: none"> <li>• Two RJ-45 connectors:                             <ul style="list-style-type: none"> <li>– 10BASE-T/100BASE-TX Ethernet for network management</li> <li>– 10BASE-T/100BASE-TX Ethernet for CAS</li> </ul> </li> <li>• RS232</li> </ul>
Management protocols	<ul style="list-style-type: none"> <li>• BOOTP/Dynamic Host Control Protocol (DHCP)</li> <li>• Simple Network Management Protocol (SNMP) v1, v2C</li> <li>• FTP, Trivial FTP (TFTP)</li> <li>• Telnet</li> <li>• Command-line interface</li> </ul>

Table 5 Radio Frequency Output Specifications

Features	Specifications
Modulation format	256 QAM
Framing structure, channel encoding, modulation	Compliance with ITU-T Recommendation J.83 Annex B
MER (before equalizer)	> 34 dB
MER (after equalizer)	> 42 dB
BER	1e-10 (pre-FEC)
Output interface	F Connector, nominal impedance 75 ohms
Output frequency range	225 to 900 MHz
Frequency step size	12.5 kHz
Output level	47 dBmV to 57 dBmV per QAM channel
Output level step size	0.1 dB
Return loss	> 14 dB, in channel

## Ordering Information

Table 6 gives ordering information for the Cisco uMG9820 QAM Gateway.

Table 6

Part Number	Description
uMG9820-SYS-AC	Cisco uMG9820 QAM Gateway Basic Minimum Configuration <ul style="list-style-type: none"> <li>• 2 QAM cards</li> <li>• 1 processor card</li> <li>• 2 power supplies</li> <li>• 1 fan assembly</li> <li>• 1 chassis</li> </ul>
uMG9820-QC42B	Cisco uMG9820 QAM Gateway QAM Card
uMG9820-QC42B=	Cisco uMG9820 QAM Gateway QAM Card (spare)
uMG9820-PROC=	Cisco uMG9820 QAM Gateway Processor Card (spare)
PWR-uMG9820-AC=	Cisco uMG9820 QAM Gateway Power Supply (spare)
uMG9820-FAN=	Cisco uMG9820 QAM Gateway Fan Assembly (spare)



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