



Configuring the Cisco uMG9850 QAM Module

This document describes how to configure the Cisco uMG9850 QAM Module. This module, designed for the Cisco Catalyst 4500 series switches, provides Video-on-Demand (VoD) services for a hybrid fiber coax (HFC) cable network. It accepts Moving Pictures Expert Group-2 (MPEG-2) digital video from an IP network, and outputs the video as a quadrature amplitude modulated (QAM) RF stream that can be received by digital set-top boxes (STBs) over the cable network.

Feature History for the Cisco uMG9850 QAM Module

Release	Modification
Release 12.1(20)EU	This feature was introduced.

Finding Support Information for Platforms and Cisco IOS Software Images

Use Cisco Feature Navigator to find information about platform support and Cisco IOS software image support. Access Cisco Feature Navigator at <http://www.cisco.com/go/fn>. You must have an account on Cisco.com. If you do not have an account or have forgotten your username or password, click **Cancel** at the login dialog box and follow the instructions that appear.

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Restrictions for the Cisco uMG9850 QAM Module

Conditional access system (CAS) functionality is not supported in initial releases.

You must wait at least 15 seconds after removing a module before you reinsert it. If you are removing more than one module, you must wait at least 15 seconds before removing the next. If you are inserting more than one module, you must wait at least 15 seconds before inserting the next. Otherwise, an assertion error is raised and you must reboot the switch.

Information About the Cisco uMG9850 QAM Module

This section introduces the following concepts that are important in understanding how this product works:

- [Basic Concepts, page 2](#)
- [Video Configuration Modes, page 3](#)
- [UDP Port Mappings: Default and Manual, page 4](#)

Basic Concepts

To configure and use the Cisco uMG9850, note the following digital video concepts:

- **Stream**—A stream is the output from an MPEG audio or video encoder. The output of a single encoder is an elementary stream (ES). One video stream and one or more audio streams can be combined by means of a shared clock reference into a program, which is the basic unit of a digital video service.

For VoD service on a cable network, video and audio streams are transmitted in a transport stream, which uses fixed-size packets for digital transmission. One or more programs can be combined in a transport stream. A single program transport stream (SPTS) contains only one program, and is output by a VoD server for transmission to the Cisco uMG9850. A multiple program transport stream (MPTS) contains multiple programs, and is output by the Cisco uMG9850 for transmission to an STB. A program clock reference (PCR) is included for each program in the transport stream. Transport streams also contain information for the STB to locate a selected program.

- **Session**—A session is a stream of video programming being received over an IP network. A session is identified by its UDP port number.
- **Program**—A program is the audio and video content being delivered to customers.
- **Packet identifier**—Each elementary stream in a program is identified by a unique packet identifier (PID). In an MPTS, the PID of each elementary stream must be unique, in order for the STB to locate a selected program. The Cisco uMG9850 may change the PID of one or more elementary streams, to ensure the uniqueness of PIDs in an MPTS.



Note PIDs can range from 0 to 8191, but PIDs 0 and 1 are preassigned, and PIDs 2 through 15 are reserved for system use.

- **Program specific information**—Each transport stream includes a program association table (PAT) that lists every program in the stream. Each program's entry in the PAT points to a program map table (PMT), which lists the PID for each elementary stream that makes up each program in the stream.

- UDP port map—A UDP port map describes the relationship between (1) the UDP port number of a session, and (2) the QAM channel and program number to be assigned to that session. The Cisco uMG9850 uses the UDP port map to route each incoming program to the correct QAM channel. The Cisco uMG9850 also includes a default port map, which may be overwritten with a user-defined UDP port map. The VoD server and the Cisco uMG9850 must be configured with the same UDP port map.

Video Configuration Modes

It is helpful to understand the various command modes that are used to configure and monitor video services. There are four basic command modes:

- [Privileged EXEC Mode](#)
- [Global Configuration Mode](#)
- [Interface Configuration Mode](#)
- [Subinterface Configuration Mode](#)

Privileged EXEC Mode

Use this provisioning mode to execute **show** and **debug** commands that are specific to video, as well as to other functions on the switch. The following prompt illustrates privileged EXEC mode:

```
Switch#
```

Global Configuration Mode

Use this provisioning mode to enter interface and subinterface provisioning modes (through the **configure terminal** command), to execute commands that support video on the entire switch. The following prompt shows how to enter global provisioning mode:

```
Switch# config terminal  
Switch(config)#
```

Interface Configuration Mode

There are 12 RF ports or interfaces (F-connectors) on the Cisco uMG9850, in three RF modulator circuit packages with four F-connectors each. Each package performs QAM modulation and RF upconversion.

Pairs of ports are supported by a separate RF upconverter group (or circuit block). Each port is addressed as a QAM provisioning group, with two QAM channels (6 MHz apart) per carrier frequency. Consequently, there are four QAM channels per RF upconverter group, addressed in configuration as *slot/1.1*, *slot/1.2*, *slot/2.1*, and *slot/2.2*.

Video and asynchronous serial interface (ASI) interfaces are addressed as **interface qam interface** and **interface asi interface**, respectively, as follows:

interface—Slot and port number in *slot/port* format, where *slot* is the physical slot where the Cisco uMG9850 module resides in the switch, and *port* is the port on the module. The valid range for *slot* varies with the type of switch (see [Determining the Location of a Cisco uMG9850 in the Switch](#), page 8). The valid range for a video (QAM) port is 1 to 12, with no default.

Address a video interface as in the following example:

```
Switch(config)# interface qam 6/1
```

```
Switch(config-if)#
```

The ASI port is always port 15. Address an ASI interface as in the following example:

```
Switch(config)# interface asi 6/15
Switch(config-if)#
```

Subinterface Configuration Mode

QAM channels are addressed as *interface.qam*, where *interface* is *slot/port* (discussed above), and *qam* is the QAM channel of interest. The options for *qam* are 1 or 2, with no default.

Address a QAM channel as in the following examples:

```
Switch(config)# interface qam 6/1.1
Switch(config-subif)#
```

or

```
Switch(config)# interface qam 6/1.2
Switch(config-subif)#
```



Tip

For convenience in entering QAM channel provisioning mode, simply address *slot/port.1*

UDP Port Mappings: Default and Manual

This section discusses the binary mapping scheme for UDP port numbers (also referred to as session numbers) as used by the Cisco uMG9850 for default mappings, as well as issues related to remapping UDP ports manually when default configurations are not used.

Default Cisco uMG9850 Binary Mapping Scheme for UDP Port Numbers

[Table 1](#) illustrates the default binary mapping scheme used by the Cisco uMG9850 to map a user datagram protocol (UDP) port number to a slot, QAM channel, and program number (from most significant to least significant bit, respectively). These mappings are used for preconfigured UDP port mappings.



Note

Normally, UDP port mappings are preconfigured in a file that resides on the VoD server, and must conform to the mapping scheme in [Table 1](#) for nondefault operation. Otherwise, new UDP port mappings must be entered manually. See [Manual Mapping, page 6](#).

Table 1 Default Cisco uMG9850 Binary Mapping Scheme for UDP Port Numbers

Set to 1		Slot				QAM channel						Program number			
15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0

- There are 16 bits in the UDP port number, from bit 15 through bit 0.
- Bits 15 and 14 are set to 1, complying with requirements for private IP ports.



Note The lowest possible number, 49152 (0xc000, 11000000 00000000), is the lowest number that conforms with the Industry Standard Architecture (ISA) bus standard.

- Bits 13 through 11 define the slot number. The range is 3 to 9.
- Bits 10 through 5 define the QAM number. The range is 1 to 24.
- Bits 4 through 0 define the program (or session) number. The range is 1 to 25.

Example: UDP port number 55330 (0xd822) renders in binary as 11 011 000001 00010. Following the two fixed bits (11), this represents slot 3 (011), QAM 1 (000001), and program 2 (00010).



Note A Cisco uMG9850 can accept a maximum of 600 maps: 24 QAM channels times 25 programs.

Table 2 shows the default mapping of QAM subinterfaces and channels to UDP ports.

Table 2 Default Mapping of QAM Subinterfaces and Channels to UDP Ports

QAM Subinterface (slot/port.qam)	QAM Channel	UDP Port Range					
		Slot 2 ¹	Slot 3	Slot 4	Slot 5	Slot 6	Slot 7 ²
slot/1.1	1	53281–53305	55329–55353	57377–57401	59425–59449	61473–61497	63521–63545
slot/1.2	2	53313–53337	55361–55385	57409–57433	59457–59481	61505–61529	63553–63577
slot/2.1	3	53345–53369	55393–55417	57441–57465	59489–59513	61537–61561	63585–63609
slot/2.2	4	53377–53401	55425–55449	57473–57497	59521–59545	61569–61593	63617–63641
slot/1.1	5	53409–53433	55457–55481	57505–57529	59553–59577	61601–61625	63649–63673
slot/1.2	6	53441–53465	55489–55513	57537–57561	59585–59609	61633–61657	63681–63705
slot/2.1	7	53473–53497	55521–55545	57569–57593	59617–59641	61665–61689	63713–63737
slot/2.2	8	53505–53529	55553–55577	57601–57625	59649–59673	61697–61721	63745–63769
slot/1.1	9	53537–53561	55585–55609	57633–57657	59681–59705	61729–61753	63777–63801
slot/1.2	10	53569–53593	55617–55641	57665–57689	59713–59737	61761–61785	63809–63833
slot/2.1	11	53601–53625	55649–55673	57697–57721	59745–59769	61793–61817	63841–63865
slot/2.2	12	53633–53657	55681–55705	57729–57753	59777–59801	61825–61849	63873–63897
slot/1.1	13	53665–53689	55713–55737	57761–57785	59809–59833	61857–61881	63905–63929
slot/1.2	14	53697–53721	55745–55769	57793–57817	59841–59865	61889–61913	63937–63961
slot/2.1	15	53729–53753	55777–55801	57825–57849	59873–59897	61921–61945	63969–63993
slot/2.2	16	53761–53785	55809–55833	57857–57881	59905–59929	61953–61977	64001–64025
slot/1.1	17	53793–53817	55841–55865	57889–57913	59937–59961	61985–62009	64033–64057
slot/1.2	18	53825–53849	55873–55897	57921–57945	59969–59993	62017–62041	64065–64089
slot/2.1	19	53857–53881	55905–55929	57953–57977	60001–60025	62049–62073	64097–64121
slot/2.2	20	53889–53913	55937–55961	57985–58009	60033–60057	62081–62105	64129–64153
slot/1.1	21	53921–53945	55969–55993	58017–58041	60065–60089	62113–62137	64161–64185
slot/1.2	22	53953–53977	56001–56025	58049–58073	60097–60121	62145–62169	64193–64217

Table 2 *Default Mapping of QAM Subinterfaces and Channels to UDP Ports (continued)*

QAM Subinterface (slot/port.qam)	QAM Channel	UDP Port Range					
		Slot 2 ¹	Slot 3	Slot 4	Slot 5	Slot 6	Slot 7 ²
slot/2.1	23	53985–54009	56033–56057	58081–58105	60129–60153	62177–62201	64225–64249
slot/2.2	24	54017–54041	56065–56089	58113–58137	60161–60185	62209–62233	64257–64281

1. Cisco Catalyst 4506 only
2. Cisco Catalyst 4507 only

Manual Mapping

To create a nondefault mapping manually, use a number starting with decimal 49152 (or hexadecimal 0xc000) to configure a UDP port mapping for one session or a range of sessions at a time. (Numbers can be entered in either format. The system automatically identifies a hexadecimal input by its “0x” prefix). [Table 3](#) shows nondefault UDP port ranges in decimal and hexadecimal formats.

Table 3 *Nondefault UDP Port Ranges*

From		To	
Decimal	Hexadecimal	Decimal	Hexadecimal
49152	0xc000	65535	0xffff



Tip

To enter a UDP port mapping manually, any number in the above range is sufficient. The number 49152 is used in the examples in this document.

How to Configure the Cisco uMG9850 QAM Module

This section presents a variety of tasks for configuring the Cisco uMG9850. [Table 4](#) lists these tasks by category: switch-level, module-level, and monitoring and troubleshooting:

A variety of configurations are possible, depending upon the network design. Most likely, video input will be on one switch, and the Cisco uMG9850 modules, with unique IP addresses, reside on one or more switches in different subnets. A video stream may or may not use the same VLAN as the modules, and can enter the switch through any Gigabit Ethernet (GE) port that is available.

Table 4 *Module Configuration Tasks by Category*

Category	Task
Configuring Gigabit Ethernet Input and Output Ports into a VLAN	Determining the Location of a Cisco uMG9850 in the Switch, page 8
	Configuring Gigabit Ethernet Input Ports into a VLAN, page 10
Configuring Video Features on the Cisco uMG9850	Setting the Frequency and Output Power of the QAM Module Channels, page 13
	Setting Up, Editing, and Routing a Video Stream to a QAM Channel, page 15
	Setting Up the PSI Parameters, page 27
Monitoring and Troubleshooting	Configuring the ASI Port for QAM Channel Routing (Optional), page 32
	Setting the Video Statistics Interval for All Cisco uMG9850 Modules in the Switch, page 35
	Using show Commands for Troubleshooting, page 36

Determining the Location of a Cisco uMG9850 in the Switch

To provision one or more Cisco uMG9850 modules, you need to know where they reside in the Cisco Catalyst switch. Table 5 shows where the Supervisor e engines and Cisco uMG9850 modules reside in the Cisco Catalyst switch models that support the Cisco uMG9850.

Table 5 Slot Use in Cisco Catalyst Switch Models That Support the Cisco uMG9850

Slot	Cisco Catalyst Switch Model	
	4506	4507
	Function	
1	Supervisor engine	Supervisor engine
2	Cisco uMG9850	Supervisor engine
3	Cisco uMG9850	Cisco uMG9850
4	Cisco uMG9850	Cisco uMG9850
5	Cisco uMG9850	Cisco uMG9850
6	Cisco uMG9850	Cisco uMG9850
7	Not used	Cisco uMG9850

If you do not know where the Cisco uMG9850 modules reside, do the following to determine their locations in the switch.



Tip

You can do this in either user mode (illustrated below) or privileged EXEC mode.

Prerequisites

None

Restrictions

You cannot configure a Cisco uMG9850 unless it is physically installed.

You must wait at least 15 seconds after removing a module before you reinsert it. If you are removing more than one module, you must wait at least 15 seconds before removing the next. If you are inserting more than one module, you must wait at least 15 seconds before inserting the next. Otherwise, an assertion error is raised and you must reboot the switch.

SUMMARY STEPS

1. **show module**

DETAILED STEPS

Step 1 Switch> **show module**
 Chassis Type : WS-C4507R
 Power consumed by backplane : 40 Watts


```

Mod Ports Card Type                               Model                               Serial No.
-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+
 1      2 1000BaseX (GBIC) Supervisor(active)   WS-X4515                               JAB071306BH
 6     17 24QAM 1SFP 1RJ45(10/100/1000)       WS-X4712-QAM-24B                       CSJ0726210F

M MAC addresses                                Hw  Fw          Sw          Status
-----+-----+-----+-----+-----+-----+-----+-----+-----+
1 000c.8572.0000 to 000c.8572.0001 1.2 12.1(12r)EW 12.1(20031007:11 Ok
6 000c.0c07.abef to 000c.0c07.abff 2.3                                     Offline

```

Step 2 Note the location of the QAM modules, under the Model column.



Note Module names may vary, but the “Card Type” or “Model” is identified by “QAM.” This example shows a single Cisco uMG9850 module, in slot 6.

What to Do Next

Proceed to [Configuring Gigabit Ethernet Input Ports into a VLAN, page 10](#).

Configuring Gigabit Ethernet Input Ports into a VLAN

Video streams on inbound GE interfaces are included in single VLANs to use network addresses more efficiently. The IP addresses and subnet masks configured for each VLAN interface populate the IP switching table on the switch with the forwarding information needed to forward the video packets to their destination. The number and use of VLANs varies according to the programming and management needs of the system operator.

Do the following to create a VLAN interface, assign an IP address to the incoming (video source) interface, and assign input GE ports to the VLAN.



Note

It is the responsibility of the multiple systems operator (MSO) to plan subnets and VLANS and assign addresses carefully.

Prerequisites

For the last step of this procedure, at least one Cisco uMG9850 module must be in the appropriate slot in the switch. See [Table 5 on page 8](#).

Restrictions

None

SUMMARY STEPS

1. **enable**
2. **configure terminal**
3. **vlan** *vlan-id*
4. **state active**
5. **exit**
6. **interface vlan** *vlan-id*
7. **ip address** *ip-address mask*
8. **no shut**
9. **interface gigabitethernet** *interface*
10. **switchport**
11. **switchport access vlan** *vlan-id*
12. **no shut**
13. **exit**
14. **video slot route vlan** *vlan-number* **ip address** *ip-address*
15. Repeat Step 3 through Step 14 for additional VLAN and GE interfaces, as required.

DETAILED STEPS

	Command or Action	Purpose
Step 1	<code>enable</code> Example: Switch> enable	Enables privileged EXEC mode. • Enter your password when prompted.
Step 2	<code>configure terminal</code> Example: Switch# configure terminal	Enables global configuration mode.
Step 3	<code>vlan vlan-id</code> Example: Switch(config-vlan)# vlan 20	(Optional) Enters VLAN configuration mode and creates a Layer 3 switch virtual interface (SVI) for video service if one has not been created yet. Range is 1 to 4096. If a VLAN for video service has been created and made active, proceed to Step 6.
Step 4	<code>state active</code> Example: Switch(config-vlan)# state active	Makes the VLAN active. Tip To confirm which VLANs are active or suspended, use the show vlan command and note the Status column.
Step 5	<code>exit</code> Example: Switch(config-vlan)# exit	Exits VLAN configuration mode.
Step 6	<code>interface vlan vlan-id</code> Example: Switch(config)# interface vlan 20	Enters interface configuration mode for the VLAN created in Step 3.
Step 7	<code>ip address ip-address mask</code> Example: Switch(config-if)# ip address 192.168.20.4 255.255.255.0	Assigns an IP interface and subnet mask to the VLAN.
Step 8	<code>no shut</code> Example: Switch(config-if)# no shut	Enables the VLAN interface.
Step 9	<code>interface gigabitethernet slot/port</code> Example: Switch(config-if)# interface gigabitethernet 6/10	Assigns a GE interface to be included in the VLAN. (See Interface Configuration Mode, page 3 .) This is the interface of an incoming video stream. Tip If you are unsure of the location of modules you want to configure, see Determining the Location of a Cisco uMG9850 in the Switch, page 8 .

Command or Action	Purpose
<p>Step 10 <code>video slot route vlan vlan-number ip-address ip-address</code></p> <p>Example: Switch(config)# video 6 route vlan 20 ip-address 192.168.20.6</p>	<p>Switches video packets from the input GE port to the output GE port. A backplane port provides communication between the supervisor engine and the Cisco uMG9850. This command assigns an IP address to that port. This IP address should be in the same subnet as the IP address assigned in Step 6.</p> <p>Note For the syntax of this command, see video <slot> route vlan, page 83.</p> <p>The VoD server must be configured to deliver a video stream to the destination IP address configured here.</p> <p>Note At least one Cisco uMG9850 module must be present in the switch chassis. Table 5 on page 8 shows where the Cisco uMG9850 modules can reside in the supporting Cisco Catalyst switch models.</p>
<p>Step 11 Repeat Step 3 through Step 10 for additional VLAN and Gigabit Ethernet interfaces, as required.</p>	

What to Do Next

Proceed to [Setting the Frequency and Output Power of the QAM Module Channels, page 13](#).

Setting the Frequency and Output Power of the QAM Module Channels

Each F-connector (QAM port) provides two QAM channels, and the output power and frequency are configured for both channels simultaneously. Setting frequency and power for one QAM channel automatically sets the appropriate values for the other channel in the same interface.

Do the following to set the frequency and output power of the channels on a port in a QAM module.

**Note**

For background, see [Interface Configuration Mode, page 3](#).

QAM channels are provisioned in subinterface mode (see [Subinterface Configuration Mode, page 4](#)), which provides logical access to the subinterface command set for a given slot and port. Generally speaking, consider the provisioning of such basic functions as frequency and power, modulation format (see [Setting the Modulation Format, page 16](#)), and forward error correction (FEC) interleave level and mode (see [Configuring the FEC Interleave Level and Mode, page 17](#)) as taking place on both *slot/port* QAM channels simultaneously and automatically.

Setting the power for one channel automatically sets the same power level on both channels.

Configuring the frequency for one QAM channel automatically configures the correct frequency for the other QAM channel in its upconverter group. The frequency bandwidth of each QAM upconverter block is 6 MHz. Consequently, if *slot/port.1* is set to frequency *f1*, then *slot/port.2* is automatically set to frequency *f1 + 6 MHz*. Similarly, if *slot/port.2* is set to frequency *f2*, then *slot/port.1* is automatically set to frequency *f2 - 6 MHz*.

Prerequisites

None

Restrictions

None

SUMMARY STEPS

1. **enable**
2. **configure terminal**
3. **interface qam** *interface.qam*
4. **video frequency** *frequency*
5. **video power** *power*

DETAILED STEPS

	Command or Action	Purpose
Step 1	<code>enable</code> Example: Switch> enable	Enables privileged EXEC mode. • Enter your password if prompted.
Step 2	<code>configure terminal</code> Example: Switch# configure terminal	Enables global configuration mode.
Step 3	<code>interface qam interface.qam</code> Example: Switch(config)# interface qam 6/1.1 Switch(config-subif)#	Enables subinterface configuration mode. See Subinterface Configuration Mode, page 4 . Note For the syntax of this command, see interface qam, page 55 .
Step 4	<code>video frequency frequency</code> Example: Switch(config-subif)# video freq 800	The frequency range for QAM <i>slot/port.1</i> is 50 through 854 MHz, and for QAM <i>slot/port.2</i> is 56 to 860 MHz. Note For the syntax of this command, see video frequency, page 91 .
Step 5	<code>video power power</code> Example: Switch(config-subif)# video power 50	When both QAM channels in an RF port are enabled, the power range is from 43 through 58 dBmV. If only one QAM channel is enabled, the range is 42 to 53 dBmV. Note If both QAM channels are up, RF port power is configured to <i>power</i> + 3 dBmV. If only one channel is up, RF port power is configured to <i>power</i> . If no channel is up, RF port power is not configured. Frequency and power must be entered on separate command lines. Note For the syntax of this command, see video power, page 100 .
Step 6	Monitor video frequency and power.	We recommend that you use appropriate test equipment to monitor video frequency and power before proceeding.

What to Do Next

Proceed to [Setting Up, Editing, and Routing a Video Stream to a QAM Channel, page 15](#). Proceed through the topics in [Video Configuration Tasks by Category, page 15](#), as appropriate. Both basic and advanced tasks are presented.

Setting Up, Editing, and Routing a Video Stream to a QAM Channel

This section discusses how to set up, edit, and route a video stream (session, program, PID) to a desired output QAM channel.

[Table 6](#) lists video configuration tasks by category: basic and advanced.

Table 6 *Video Configuration Tasks by Category*

Category	Task
Basic	Setting the Modulation Format, page 16
	Configuring the FEC Interleave Level and Mode, page 17
	Statically Setting Session Timeouts, page 19
	Statically Routing a Range of Program Sessions to a QAM Channel, page 21
	Statically Routing a Single Program Session to a QAM Channel, page 22
	Setting PMT and PAT Intervals for the Switch, page 27
Advanced	Configuring Maximum Jitter for a Session, page 23
	Statically Filtering PIDs, page 25
	Remapping Input PIDs to Output PIDs, page 26
	Setting TSID and NIT-PID Values, page 30



Note

To monitor the output of a QAM channel, see [Configuring the ASI Port for QAM Channel Routing \(Optional\), page 32](#).

Setting the Modulation Format

Setting the modulation format on one QAM channel applies the same format to all four *slot/port* channels in a modulator group. (For background, see [Interface Configuration Mode, page 3](#).)

To set the modulation format for all four channels in a QAM modulation group, perform the following procedure:

SUMMARY STEPS

1. **enable**
2. **configure terminal**
3. **interface qam** *interface.qam*
4. **video format** *format*

DETAILED STEPS

	Command or Action	Purpose
Step 1	enable Example: Switch> enable	Enables privileged EXEC mode. • Enter your password if prompted.
Step 2	configure terminal Example: Switch# configure terminal	Enables global configuration mode.
Step 3	interface qam <i>interface.qam</i> Example: Switch(config)# interface qam 5/2.1 Switch(config-subif)#	Enables QAM configuration mode. See Subinterface Configuration Mode, page 4 . Note For the syntax of this command, see interface qam, page 55 .
Step 4	video format <i>format</i> Example: Switch(config-subif)# video format 64	Sets the modulation format for all four channels in a QAM modulator group—that is, QAM channels 5/1.1, 5/1.2, through 5/2.1, 5/2.2, where • <i>format</i> = QAM modulation format (256) The default format is 256. Tip If the FEC interleave level is set to 1, the option “256” (256QAM) is not available and does not appear. See Configuring the FEC Interleave Level and Mode, page 17 . Note For the syntax of this command, see video format, page 90 .

Configuring the FEC Interleave Level and Mode

Forward error correction (FEC) reduces bit error rate (BER) in data transmission by correcting recovered bit errors in the demodulator. Interleaving is a technique that reorders (in time) individual code-word bits with other code-word bits to spread error bursts over many different code words. The technique used is compliant with ITU J.83, Annex B.

Setting the interleave level and mode on any of the 12 QAM interfaces (ports) sets the QAM symbol rate on that port only. (For background, see [Interface Configuration Mode, page 3](#).) If the interleave level and mode is set on one QAM channel, the same value is applied to all four *slot/port* channels in a modulator group.

To set the FEC interleave level and mode for all four channels in a QAM modulator group, perform the following procedure:



Caution

The default settings should be satisfactory. Realize that varying the settings can result in an increase in packet latency. Always monitor new settings to ensure that resulting BERs are acceptable.

SUMMARY STEPS

1. **enable**
2. **configure terminal**
3. **interface qam** *interface.qam*
4. **video interleave level** *level*
5. **video interleave mode** *mode*

DETAILED STEPS

	Command or Action	Purpose
Step 1	enable Example: Switch> enable	Enables privileged EXEC mode. • Enter your password if prompted.
Step 2	configure terminal Example: Switch# configure terminal	Enables global configuration mode.
Step 3	interface qam <i>interface.qam</i> Example: Switch(config)# interface qam 6/2.1	Enables QAM configuration mode. See Subinterface Configuration Mode, page 4 . Note For the syntax of this command, see interface qam, page 55 .

Command or Action	Purpose
<p>Step 4 <code>video interleave level <i>level</i></code></p> <p>Example: Switch(config-subif)# <code>video interleave level 2</code></p>	<p>Sets the FEC interleave level, which can be 1 or 2. The default is 2.</p> <p>Tip If the FEC interleave level is set to 1, the option “256” (256QAM) is not available and will not appear. See Setting the Modulation Format, page 16.</p> <p>Note For the syntax of this command, see video interleave, page 92.</p>
<p>Step 5 <code>video interleave mode <i>mode</i></code></p> <p>Example: Switch(config-subif)# <code>video interleave mode 2</code></p>	<p>Sets the FEC interleave mode, which can be any value from 1 to 14, except 11 and 13. The default is 6.</p> <p>Note The mode option can be used only when the interleave level is 2 (default).</p> <p>Each mode determines a set of I and J values as defined in ITU J.83, Annex B. (Level and mode must be set on separate command lines.)</p> <p>Note For the syntax of this command, see video interleave, page 92.</p>

Statically Setting Session Timeouts

You can statically set a session timeout for the entire Cisco uMG9850 module, or for the entire switch, to determine when the session is closed once packets no longer come into the session. You can also set the time, following the absence of packets, at which a loss of signal is reported. Use **video slot timeout** to address an entire module in a given slot, and **video timeout** to address the entire switch. The options and parameters are the same in both cases.



Note

When a session is closed, this means that the Cisco uMG9850 has not received any video packets for the given session's UDP port for the period determined by **video slot timeout session-close** or **video timeout session-close**. The session no longer exists, and is not listed following a **show** command. The range is from 1 to 1440 minutes. The default is 10 minutes.

When a session is inactive, this means that the Cisco uMG9850 has not received any video packets for the given session's UDP port for the period determined by **video slot timeout signal-loss** or **video timeout signal-loss**. The session still exists, and is listed following a **show** command. If packets start arriving before the timer set by **video slot timeout session-close** or **video timeout session-close** counts down, the session becomes active. The range is from 200 to 10000 milliseconds. The default is 5000 milliseconds.

The value for **video slot timeout signal-loss** or **video timeout signal-loss** should always be larger than the value configured for jitter.

SUMMARY STEPS

1. **enable**
2. **configure terminal**
3. **video slot timeout session-close** *timeout-in-minutes*
4. **video slot timeout signal-loss** *timeout-in-milliseconds*
5. **video timeout session-close** *timeout-in-minutes*
6. **video timeout signal-loss** *timeout-in-milliseconds*

DETAILED STEPS

	Command or Action	Purpose
Step 1	enable Example: Switch> enable	Enables privileged EXEC mode. • Enter your password if prompted.
Step 2	configure terminal Example: Switch# configure terminal	Enables global configuration mode.

	Command or Action	Purpose
Step 3	<pre>video slot timeout session-close timeout-in-minutes</pre> <p>Example: Switch(config)# video 6 timeout session-close 25</p>	<p>Configures session-close timeout for an entire module, and sets the number of minutes, following the absence of packets, at which the session closes. (See Note at beginning of this section.) The slot is where the Cisco uMG9850 resides. (Table 5 on page 8 shows where the Cisco uMG9850 modules can reside in the supporting Cisco Catalyst switch models.)</p> <p>Note For the syntax of this command, see video <slot> timeout, page 85.</p>
Step 4	<pre>video slot timeout signal-loss timeout-in-milliseconds</pre> <p>Example: Switch(config)# video 6 timeout signal-loss 500</p>	<p>Configures signal-loss timeout for an entire module, and sets the number of milliseconds, following the loss of signal, at which the session becomes inactive. (See Note at beginning of this section.) The slot is where the Cisco uMG9850 resides. (Table 5 on page 8 shows where the Cisco uMG9850 modules can reside in the supporting Cisco Catalyst switch models.)</p> <p>Note For the syntax of this command, see video <slot> timeout, page 85.</p> <p>Tip To see inactive sessions, use the command show video <slot> session, page 71.</p>
Step 5	<pre>video timeout session-close timeout-in-minutes</pre> <p>Example: Switch(config)# video timeout session-close 25</p>	<p>Enables configuration mode for the entire switch, and sets the number of minutes, following the absence of packets, at which the session closes. (See Note at beginning of this section.)</p> <p>Note For the syntax of this command, see video timeout, page 105.</p>
Step 6	<pre>video timeout signal-loss timeout-in-milliseconds</pre> <p>Example: Switch(config)# video timeout signal-loss 500</p>	<p>Enables configuration mode for the entire switch, and sets the number of milliseconds, following the loss of signal, at which the sessions become inactive. (See Note at beginning of this section.)</p> <p>Note For the syntax of this command, see video timeout, page 105.</p>

Statically Routing a Range of Program Sessions to a QAM Channel

The UDP port number of each program session allows each session to be routed to a designated QAM channel by default. You can overwrite the default routing (which is signaled by the port number) and route a range of program sessions to a QAM channel



Note

You can also use this command to route a range of program sessions to the ASI port (port 15) for monitoring. See [Configuring the ASI Port for QAM Channel Routing \(Optional\)](#), page 32.

SUMMARY STEPS

1. **enable**
2. **configure terminal**
3. **interface qam** *interface.qam*
4. **video sessions** *number-of-sessions* **udp** *first-UDP-port-num* **program** *first-program-number*

DETAILED STEPS

	Command or Action	Purpose
Step 1	enable Example: Switch> enable	Enables privileged EXEC mode. • Enter your password if prompted.
Step 2	configure terminal Example: Switch# configure terminal	Enables global configuration mode.
Step 3	interface qam <i>interface.qam</i> Example: Switch(config)# interface qam 5/2.1 Switch(config-subif)#	Enables QAM configuration mode. See Subinterface Configuration Mode , page 4. Note For the syntax of this command, see interface qam , page 55.
Step 4	video sessions <i>number-of-sessions</i> udp <i>first-UDP-port-num</i> program <i>first-program-number</i> Example: Switch(config-subif)# video sessions 8 udp 49153 prog 28	Enables video configuration mode and routes a range of program sessions to the previously selected QAM channel. Tip To verify that UDP portmaps are configured properly, use show interface qam <interface.qam> video portmap , page 64. To verify that a session is active, use show interface qam <interface> video , page 60 Note For the syntax of this command, see video sessions , page 103.

Statically Routing a Single Program Session to a QAM Channel

The UDP port number of each program session allows each session to be routed to a designated QAM channel by default. If necessary, you can overwrite the default routing (which is signaled by the port number) and route a single program session to a QAM channel.

SUMMARY STEPS

1. **enable**
2. **configure terminal**
3. **interface qam** *interface.qam*
4. **video udp** *UDP-port-number* **program** *out-program-number*

DETAILED STEPS

	Command or Action	Purpose
Step 1	enable Example: Switch> enable	Enables privileged EXEC mode. • Enter your password if prompted.
Step 2	configure terminal Example: Switch# configure terminal	Enables global configuration mode.
Step 3	interface qam <i>interface.qam</i> Example: Switch(config)# interface qam 5/2.1 Switch(config-subif)#	Enables QAM configuration mode. See Subinterface Configuration Mode, page 4 . Note For the syntax of this command, see interface qam, page 55 .
Step 4	video udp <i>UDP-port-number</i> program <i>out-program-number</i> Example: Switch(config-subif)# video udp 49152 program 10	Remaps a UDP port to an output program number on a QAM channel, where <i>UDP-port-number</i> is a UDP port number (see UDP Port Mappings: Default and Manual, page 4), and <i>out-program-number</i> ranges from 1 to 255. Note For the syntax of this command, see video udp, page 108 .

Configuring Maximum Jitter for a Session

You can set the maximum allowable network jitter (packet latency variation) for a specified UDP port session. This global video setting affects the overall packet latency (at the buffer level) within an entire Cisco uMG9850.



Note

The **jitter** option sets the size of a dejittering buffer that absorbs the input jitter. This buffer introduces system delay (the time for a packet to enter and leave the Cisco uMG9850). The greater the value of **jitter**, the greater the delay introduced to the output stream. You can change the size of the dejitter buffer at either the slot or the session level. (The default level is the default level for the switch, 300 milliseconds.) Changing it at the slot level changes the default value for jitter. Consequently, for all sessions having the default value for jitter, the jitter value is changed to the new value. For sessions that have nondefault jitter values (as configured by the command **video udp**), their current jitter value is maintained.



Tip

When setting the jitter value (the size of the dejitter buffer), take into consideration the network jitter (the inherent jitter introduced at the input of the Cisco uMG9850), and allow for clock tracking. Leave approximately 50 milliseconds for clock tracking. For example, if peak-to-peak network jitter is 100 milliseconds, set the jitter value to 150 milliseconds.

The value for **video slot timeout signal-loss** or **video timeout signal-loss** should always be larger than the value configured for jitter.

SUMMARY STEPS

1. **enable**
2. **configure terminal**
3. **video slot udp *UDP-port-number* jitter level**

DETAILED STEPS

	Command or Action	Purpose
Step 1	<pre>enable</pre> <p>Example: Switch> enable</p>	<p>Enables privileged EXEC mode.</p> <ul style="list-style-type: none"> Enter your password if prompted.
Step 2	<pre>configure terminal</pre> <p>Example: Switch# configure terminal</p>	<p>Enables global configuration mode.</p>
Step 3	<pre>video slot udp UDP-port-number jitter level</pre> <p>Example: Switch(config)# video 6 udp 49152 jitter 250</p>	<p>Sets the UDP port and maximum network jitter level, in milliseconds. See UDP Port Mappings: Default and Manual, page 4. The default for jitter is 300 milliseconds, and the range is 0 to 300 milliseconds.</p> <p>Note For the syntax of this command, see video <slot> udp <UDP-port-number> jitter, page 88. Jitter can also be configured at the slot level (see video <slot> jitter, page 81).</p>

Statically Filtering PIDs

If necessary, you can set up a filter that causes a packet with a given packet identifier (PID) to be dropped for a given UDP session on a selected Cisco uMG9850. If the session does not contain packets with that PID, the filter is ignored.

SUMMARY STEPS

1. **enable**
2. **configure terminal**
3. **video slot udp *UDP-port-number* filter-pid in-pid**

DETAILED STEPS

	Command or Action	Purpose
Step 1	enable Example: Switch> enable	Enables privileged EXEC mode. <ul style="list-style-type: none"> • Enter your password if prompted.
Step 2	configure terminal Example: Switch# configure terminal	Enables global configuration mode.
Step 3	video slot udp <i>UDP-port-number</i> filter-pid in-pid Example: Switch(config)# video6 udp 49152 filter-pid 30	Sets a PID filter for all packets on a Cisco uMG9850 in the selected slot, where <i>UDP-port-number</i> is a UDP port number (see UDP Port Mappings: Default and Manual, page 4), and <i>in-pid</i> is an input PID from 0 through 8191. Note For the syntax of this command, see video <slot> udp <UDP-port-number> filter-pid, page 87 .

Remapping Input PIDs to Output PIDs

You can remap input PIDs to output PIDs on a QAM channel.

SUMMARY STEPS

1. **enable**
2. **configure terminal**
3. **interface qam** *interface.qam*
4. **video udp** *UDP-port-number in in-pid out out-pid*

DETAILED STEPS

	Command or Action	Purpose
Step 1	enable Example: Switch> enable	Enables privileged EXEC mode. <ul style="list-style-type: none">• Enter your password if prompted.
Step 2	configure terminal Example: Switch# configure terminal	Enables global configuration mode.
Step 3	interface qam <i>interface.qam</i> Example: Switch(config)# interface qam 5/2.1 Switch(config-subif)#	Enables subinterface configuration mode. See Subinterface Configuration Mode, page 4 .
Step 4	video udp <i>UDP-port-number in in-pid out out-pid</i> Example: Switch(config-subif)# video udp 49152 in 16 out 8000	Remaps an input PID to an output PID on a QAM channel, where <i>UDP-port-number</i> is a UDP port number (see UDP Port Mappings: Default and Manual, page 4), and <i>in-pid</i> and <i>out-pid</i> range from 16 to 8191. Note For the syntax of this command, see video udp, page 108 .

Setting Up the PSI Parameters

You can set up various program-specific information (PSI) parameters, either globally (for the entire switch) or on an individual QAM channel.



Note

If any sessions are active in the switch, global program association table (PAT) and program map table (PMT) commands are rejected. If no sessions are active, the PAT and PMT rates on each QAM port are checked.

The range is from 50 to 450 milliseconds. The default rate is the default rate for the switch, 100 milliseconds. If the QAM rates are different from the original switch rate, they are left unchanged. If they are the same as the original switch rate, the rate is changed on both the QAM port and the switch.

Changing the default rates in global configuration mode changes the rates for the entire switch. Changing the default rates in subinterface configuration mode changes the rates for the selected QAM channel only.

This section presents the following procedures:

- [Setting PMT and PAT Intervals for the Switch, page 27](#)
- [Setting PMT and PAT Intervals on a QAM Channel, page 29](#)
- [Setting TSID and NIT-PID Values, page 30](#)



Setting PMT and PAT Intervals for the Switch

SUMMARY STEPS

1. **enable**
2. **configure terminal**
3. **video interval pat** *milliseconds*
4. **video interval pmt** *milliseconds*

DETAILED STEPS

	Command or Action	Purpose
Step 1	enable Example: Switch> enable	Enables privileged EXEC mode. • Enter your password if prompted.
Step 2	configure terminal Example: Switch# configure terminal	Enables global configuration mode.

Command or Action	Purpose
<p>Step 3 <code>video interval pat milliseconds</code></p> <p>Example: Switch(config)# video interval pat 100</p>	<p>Sets the interval at which the PAT (program association table) is distributed for all Cisco uMG9850 modules in the switch. Changing the default rate in this configuration mode overwrites the rate for the switch. (See Note at beginning of this section, Setting Up the PSI Parameters, page 27.)</p> <p> Caution The syntax for a switch is different from the syntax for a QAM channel.</p> <p>Note For the syntax of this command, see video interval pat, page 94.</p>
<p>Step 4 <code>video interval pmt milliseconds</code></p> <p>Example: Switch(config)# video interval pmt 100</p>	<p>Sets the interval at which the PMT (program map table) is distributed for all Cisco uMG9850 modules in the switch. Changing the default rate in this configuration mode overwrites the rate for the switch. (See Note at beginning of this section, Setting Up the PSI Parameters, page 27.)</p> <p> Caution The syntax for a switch is different from the syntax for a QAM channel.</p> <p>Note For the syntax of this command, see video interval pmt, page 96.</p>

Setting PMT and PAT Intervals on a QAM Channel

To set PMT and PAT intervals for a QAM channel:

SUMMARY STEPS

1. **enable**
2. **configure terminal**
3. **interface qam** *interface.qam*
4. **video interval pat** *milliseconds*
5. **video interval pmt** *milliseconds*

DETAILED STEPS

	Command or Action	Purpose
Step 1	enable Example: Switch> enable	Enables privileged EXEC mode. • Enter your password if prompted.
Step 2	configure terminal Example: Switch# configure terminal	Enables global configuration mode.
Step 3	interface qam <i>interface.qam</i> Example: Switch(config)# interface qam 5/2.1 Switch(config-subif)#	Enables subinterface configuration mode. See Subinterface Configuration Mode, page 4 .
Step 4	video interval pat <i>milliseconds</i> Example: Switch(config-subif)# video pat interval 100	Sets PAT intervals for the QAM channel. Changing the default rate in this configuration mode overwrites the rate for the QAM channel only. (See Note at beginning of this section, Setting Up the PSI Parameters, page 27 .) Note For the syntax of this command, see video interval pat, page 94 .
Step 5	video interval pmt <i>milliseconds</i> Example: Switch(config-subif)# video pmt interval 100	Sets PMT intervals for the QAM channel. Changing the default rate in this configuration mode overwrites the rate for the QAM channel only. (See Note at beginning of this section, Setting Up the PSI Parameters, page 27 .) Note For the syntax of this command, see video interval pmt, page 96 .

Setting TSID and NIT-PID Values

At each hub, each QAM channel must have a unique transport stream ID (TSID). The software checks for and guarantees the uniqueness of a TSID within a chassis only.



Caution

It is the responsibility of the operator to avoid TSID conflicts among switches. To see all the TSIDs within a switch, use the command [show video <slot>](#), [page 66](#), and address each Cisco uMG9850 in the switch.

The PID for the network information table, or NIT-PID, can be configured from the QAM interface. If the NIT-PID is already used as a video, audio, or data PID, the configuration is rejected.

For the transport stream that is to be transmitted over a QAM channel, you must configure the TSID and NIT-PID (network information table packet ID) values for that channel.

To set TSID and NIT-PID values:

SUMMARY STEPS

1. **enable**
2. **configure terminal**
3. **interface qam** *interface.qam*
4. **video tsid**
5. **video nitpid**

DETAILED STEPS

	Command or Action	Purpose
Step 1	enable Example: Switch> enable	Enables privileged EXEC mode. • Enter your password if prompted.
Step 2	configure terminal Example: Switch# configure terminal	Enables global configuration mode. See Global Configuration Mode, page 3 .
Step 3	interface qam <i>interface.qam</i> Example: Switch(config)# interface qam 5/2.1 Switch(config-subif)#	Enables QAM configuration mode. See Subinterface Configuration Mode, page 4 . Note For the syntax of this command, see interface qam, page 55 .

	Command or Action	Purpose
Step 4	<code>video tsid <i>tsid</i></code> Example: Switch(config)# video tsid 444	Sets the value of the transport stream ID (TSID) for the QAM channel. The range is from 1 to 65535. Note For the syntax of this command, see video tsid, page 107 .
Step 5	<code>video nitpid <i>nitpid</i></code> Example: Switch(config)# video nitpid 555	Sets the value of the network information table packet ID (NIT-PID) for the QAM channel. The range is from 16 to 8191. Note For the syntax of this command, see video nitpid, page 99 .

Configuring the ASI Port for QAM Channel Routing (Optional)

You can route the input of a single QAM channel to the asynchronous serial interface (ASI) port to monitor the channel. This section discusses how to configure the ASI port, and route the input of a QAM channel to the ASI port.



Note

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

This section presents the following procedures:

- [Setting the Byte-Gap Value \(S-rate\) of the ASI Port, page 32](#)
- [Routing the Output of a QAM Channel to the ASI port, page 34](#)

Setting the Byte-Gap Value (S-rate) of the ASI Port

You can change the gap spacing of the data bytes in the output of the ASI port. The S-rate is the spacing of data bytes (the number of ASI transport null bytes between the data bytes) within the output transport stream. If there is not a sufficient number of data bytes in the stream, padding the stream with null bytes maintains the signal voltage and integrity.

SUMMARY STEPS

1. **enable**
2. **configure terminal**
3. **interface asi slot/15**
4. **video byte-gap value**

DETAILED STEPS

	Command or Action	Purpose
Step 1	enable Example: Switch> enable	Enables privileged EXEC mode. <ul style="list-style-type: none"> • Enter your password if prompted.
Step 2	configure terminal Example: Switch# configure terminal	Enables global configuration mode.

	Command or Action	Purpose
Step 3	<pre>interface asi slot/15</pre> Example: <pre>Switch(config)# interface asi 5/15 Switch(config-if)#</pre>	Enables ASI configuration mode. See Interface Configuration Mode, page 3 . Note For the syntax of this command, see interface asi, page 53 .
Step 4	<pre>video byte-gap value</pre> Example: <pre>Switch(config-if)# video byte-gap 4</pre>	Changes the byte gap from the default. Note For the syntax of this command, see video byte-gap, page 89 .

Routing the Output of a QAM Channel to the ASI port

You can route the output of a QAM channel (a single program) to the asynchronous serial interface (ASI) port (in ASI signaling format), to monitor the output of the channel. Use a video decoder to view the selected program. The ASI port is always addressed as *slot/15*. See [Interface Configuration Mode, page 3](#).



Note

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

SUMMARY STEPS

1. **enable**
2. **configure terminal**
3. **interface asi *slot/15***
4. **video interface**

DETAILED STEPS

	Command or Action	Purpose
Step 1	enable Example: Switch> enable	Enables privileged EXEC mode. • Enter your password if prompted.
Step 2	configure terminal Example: Switch# configure terminal	Enables global configuration mode.
Step 3	interface asi <i>slot/15</i> Example: Switch(config)# interface asi 5/15	Enables ASI interface configuration mode. See Interface Configuration Mode, page 3 . Note For the syntax of this command, see interface asi, page 53 .
Step 4	video route qam <i>interface.qam</i> Example: Switch(config-subif)# video route qam 5/2.1	Routes the output of the selected QAM port to the ASI interface previously assigned. See Subinterface Configuration Mode, page 4 . Note For the syntax of this command, see video route, page 102 .

Monitoring and Troubleshooting

The following **show** and **debug video** commands can be of help in monitoring and troubleshooting video delivery. A variety of standard **show** commands that are part of the Cisco Catalyst switch environment are also useful in video environments.

This section presents the following procedures:

- [Setting the Video Statistics Interval for All Cisco uMG9850 Modules in the Switch, page 35](#)
- [Using show Commands for Troubleshooting, page 36](#)

Setting the Video Statistics Interval for All Cisco uMG9850 Modules in the Switch

You can globally set the interval at which video statistics are retrieved from all Cisco uMG9850 modules in the switch. These statistics are useful in monitoring and troubleshooting.

SUMMARY STEPS

1. **enable**
2. **configure terminal**
3. **video interval stats** *interval*

DETAILED STEPS

	Command or Action	Purpose
Step 1	enable Example: Switch> enable	Enables privileged EXEC mode. • Enter your password if prompted.
Step 2	configure terminal Example: Switch# configure terminal	Enables global configuration mode.
Step 3	video interval stats Example: Switch(config)# video interval stats 30	Sets the interval at which video statistics are reported for all Cisco uMG9850 modules in the switch. Note For the syntax of this command, see video interval stats, page 98 .

Using show Commands for Troubleshooting

This section presents a variety of **show** commands that are useful in troubleshooting the Cisco uMG9850. [Table 7](#) lists these commands by category. These commands are executed at the following prompt (see [Privileged EXEC Mode, page 3](#)):

Switch#

Table 7 Categories of Information Viewable Through show Commands

Category	Reference
Gigabit Ethernet	Gigabit Ethernet Interface: Status, page 37
Cisco uMG9850 module	Cisco uMG9850 Module: Showing Diagnostics, page 37
	Cisco uMG9850 Module: Showing IDPROM, page 38
Video	show interface qam <interface> video, page 60
	show interface qam <interface.qam> video portmap, page 64
	show interface qam <interface.qam> video portmap, page 64
	show video <slot>, page 66
	show video <slot> psi session, page 68
	show video <slot> route, page 70
	show video <slot> session, page 71
	show video <slot> ts_table, page 73
	show video <slot> version, page 74
QAM/ASI	show interface asi <interface> video, page 58

Gigabit Ethernet Interface: Status

You can view standard information related to the status of a Gigabit Ethernet interface on the switch. Use the command **show gigabitethernet interface** (see [Interface Configuration Mode, page 3](#)).



Note

This **show** command is a Cisco Catalyst switch command.

Examples

```
Switch# show interface gig 4/14
```

```
GigabitEthernet1/1 is down, line protocol is down (notconnect)
  Hardware is Gigabit Ethernet Port, address is 000b.fd42.eac0 (bia 000b.fd42.eac0)
  MTU 1500 bytes, BW 1000000 Kbit, DLY 10 usec,
    reliability 255/255, txload 1/255, rxload 1/255
  Encapsulation ARPA, loopback not set
  Keepalive set (10 sec)
  Auto-duplex, Auto-speed
  input flow-control is off, output flow-control is off
  ARP type: ARPA, ARP Timeout 04:00:00
  Last input never, output never, output hang never
  Last clearing of "show interface" counters never
  Input queue: 0/2000/0/0 (size/max/drops/flushes); Total output drops: 0
  Queueing strategy: fifo
  Output queue: 0/40 (size/max)
  5 minute input rate 0 bits/sec, 0 packets/sec
  5 minute output rate 0 bits/sec, 0 packets/sec
    0 packets input, 0 bytes, 0 no buffer
  Received 0 broadcasts (0 multicast)
    0 runts, 0 giants, 0 throttles
    0 input errors, 0 CRC, 0 frame, 0 overrun, 0 ignored
    0 input packets with dribble condition detected
    0 packets output, 0 bytes, 0 underruns
    0 output errors, 0 collisions, 0 interface resets
    0 babbles, 0 late collision, 0 deferred
    0 lost carrier, 0 no carrier
    0 output buffer failures, 0 output buffers swapped out
```

Cisco uMG9850 Module: Showing Diagnostics

You can view information related to the installed hardware EEPROM, as well as standard diagnostic information related to the switch. Use the command **show diag online module slot**, where *slot* is the number of the slot in which the Cisco uMG9850 resides.



Note

This **show** command is a Cisco Catalyst switch command.

Examples

```
Switch# show diag online module 3
```

Slot	Ports	Card Type	Diag Status	Diag Details
2	14	video card (more info)	Passed	None

```
Detailed Status
-----
```

```

. = Pass                U = Unknown
L = Loopback failure   S = Stub failure
I = ILC failure        P = Port failure
E = SEEPROM failure   G = GBIC integrity check failure

```

```

Ports 1  2  3  4  5  6  7  8  9  10 11 12 13 14
      .  .  .  .  .  .  .  .  .  .  .  .  .  .

```

Cisco uMG9850 Module: Showing IDPROM

The command **show idprom module** is useful to see whether the Cisco uMG9850 module has been programmed correctly. If not, the result of issuing the command will be garbled text. If the module has been programmed correctly, you can see information related to the installed IDPROM, as well as standard diagnostic information related to the switch. Use the command **show idprom module slot**, where *slot* is the number of the slot in which the Cisco uMG9850 resides.



Note

This **show** command is a Cisco Catalyst switch command.

Example

```

Switch# show idprom module 2

Module 2 Idprom :
Common Block Signature = 0xABAB
Common Block Version = 1
Common Block Length = 144
Common Block Checksum = 4464
Idprom Size = 256
Block Count = 2
FRU Major Type = 0x4201
FRU Minor Type = 321
OEM String = Cisco Systems, Inc.
Product Number = WS-X4412-2GB-T
Serial Number = JAE064002EP
Part Number = 73-4838-02
Part Revision = A0
Manufacturing Deviation String =
Hardware Revision = 1.1
Manufacturing Bits = 0x0000
Engineering Bits = 0x0000
Snmp OID = 0.0.0.0.0.0.0
Power Consumption = 0
RMA Failure Code = 0 0 0 0
Linecard Block Signature = 0x4201
Linecard Block Version = 1
Linecard Block Length = 24
Linecard Block Checksum = 850
Feature Bits = 0x0000000000000000
Card Feature Index = 82
MAC Base = 0008.e3cf.dc00
MAC Count = 14

```

Configuration Examples for the Cisco uMG9850 QAM Module

This section presents basic configurations on both the headend switch, which accepts video streams from a VoD server, and on the distribution hub (Dhub) switch, which delivers selected streams to set-top boxes on customer premises:

- [Headend Switch Configuration: Example, page 40](#)
- [Dhub Switch Configuration: Example, page 42](#)

Figure 1 illustrates Cisco uMG9850 modules in a basic video distribution architecture, with a headend and a Dhub switch connected through a single EtherChannel.

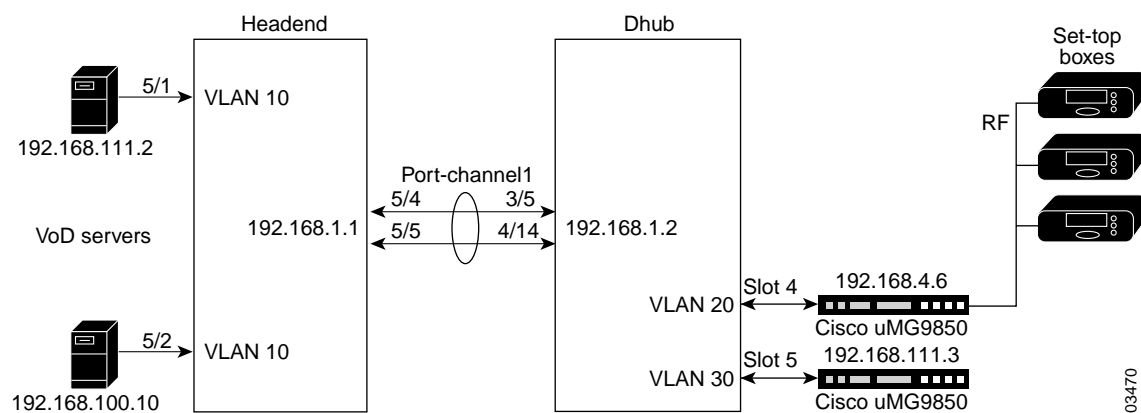


Note

For a thorough discussion of video distribution architectures and related issues, refer to *Cisco Gigabit-Ethernet Optimized VoD Solution Design and Implementation Guide*, at the following URL:

<http://www.cisco.com/univercd/cc/td/doc/solution/vodsols/geopt1/voddig/index.htm>

Figure 1 Cisco uMG9850 Modules in a Basic Video Distribution Architecture



- Two types of VoD server provide the video streams to the headend switch, a Cisco Catalyst 4507.
- The headend switch, in turn, delivers video traffic through a single EtherChannel to another Cisco Catalyst 4507, in the Dhub.
- The three VLANs are as follows:
 - VLAN 10: 192.168.5.254, ingress VoD traffic
 - VLAN 20: 192.168.4.254, Cisco uMG9850 in slot 4 of Dhub switch
 - VLAN 30: 192.168.111.100, Cisco uMG9850 in slot 5 of Dhub switch
- Video traffic is delivered over two Gigabit Ethernet (GE) interfaces that share VLAN 10.
- The Cisco uMG9850 in slot 4 in the Dhub switch forwards selected video streams (ranging from QAM 4/1.1 through 4/12.2) to set-top boxes.
- The ASI port of the Cisco uMG9850 in slot 4 of the Dhub switch is configured to route the output of QAM channel 4/1.1 to an MPEG analyzer.

Headend Switch Configuration: Example

```

Headend# show running-config

Building configuration...

Current configuration : 5270 bytes
!
version 12.1
service nagle
no service pad
service timestamps debug uptime
service timestamps log uptime
service password-encryption
service compress-config
!
hostname Headend
!
boot system bootflash:cat4000-i5s-mz.121-19.EW.bin
enable secret 5 $1$1/0H$jqrWfrXCpX7yYfh9ArFYj1
!
clock timezone est -5
ip subnet-zero
no ip domain-lookup
ip host hub 192.168.1.2
!
!
spanning-tree extend system-id
no spanning-tree vlan 2,10,20
port-channel load-balance src-dst-port
!
redundancy
mode rpr
main-cpu
auto-sync standard
!
!
interface Port-channel1
ip address 192.168.1.1 255.255.255.0
!
interface GigabitEthernet1/1
!
interface GigabitEthernet1/2
!
interface GigabitEthernet2/1
!
interface GigabitEthernet2/2
!
interface FastEthernet3/1
switchport access vlan 2
switchport mode access
!
interface FastEthernet3/2
!
<---omitted interfaces FastEthernet3/3 through 3/46--->
!
interface FastEthernet3/47
!
interface FastEthernet3/48
!
interface GigabitEthernet5/1
switchport access vlan 10
switchport mode access

```



```
    load-interval 30
    speed nonegotiate
!
interface GigabitEthernet5/2
    switchport access vlan 10
    switchport mode access
    load-interval 30
    speed nonegotiate
!
interface GigabitEthernet5/3
    switchport access vlan 10
    switchport mode access
    load-interval 30
    speed nonegotiate
!
interface GigabitEthernet5/4
    no switchport
    no ip address
    load-interval 30
    speed nonegotiate
    channel-group 1 mode on
!
interface GigabitEthernet5/5
    no switchport
    no ip address
    load-interval 30
    speed nonegotiate
    channel-group 1 mode on
!
interface GigabitEthernet5/6
    no switchport
    no ip address
    load-interval 30
    speed nonegotiate
    channel-group 1 mode on
!
interface GigabitEthernet6/1
!
interface GigabitEthernet6/2
!
<---omitted interfaces GigabitEthernet6/3 through 6/22--->
!
interface GigabitEthernet6/23
!
interface GigabitEthernet6/24
!
interface GigabitEthernet7/1
!
interface GigabitEthernet7/2
!
<---omitted interfaces GigabitEthernet7/3 through 7/22--->
!
interface GigabitEthernet7/23
!
interface GigabitEthernet7/24
!
interface Vlan1
    no ip address
!
interface Vlan2
    ip address 192.100.100.251 255.255.255.0
    ip access-group deny_from_servers out
!
interface Vlan10
```

```

ip address 192.168.5.254 255.255.255.0
no ip redirects
no ip unreachable
load-interval 30
standby 1 ip 192.168.5.253
standby 1 mac-address 0000.0000.0001
!
ip default-gateway 192.100.100.254
ip classless
ip route 0.0.0.0 0.0.0.0 192.100.100.254
ip route 192.168.4.0 255.255.255.0 Port-channel1
ip route 192.168.111.0 255.255.255.0 Port-channel1
no ip http server
!
!
ip access-list extended deny_from_servers
deny ip 192.168.5.0 0.0.0.255 any
permit ip any any
!
access-list 101 permit ip any host 192.168.4.254
access-list 102 permit ip any host 192.168.4.2
!
!
line con 0
password 7 1511021F0725
logging synchronous
stopbits 1
line vty 0 3
password 7 1511021F0725
logging synchronous
login
line vty 4
login
!
end

```

Dhub Switch Configuration: Example

```

Dhub# show running-config

Building configuration...

Current configuration : 5772 bytes
!
version 12.1
no service pad
service timestamps debug uptime
service timestamps log uptime
service password-encryption
service compress-config
!
hostname Dhub
!
boot system bootflash:cat4000-i5s-mz.208
enable password 7 14141B180F0B
!
ip subnet-zero
!
video 4 session-close-timeout 1
video 4 route Vlan20 ip-address 192.168.4.6
video 4 start_udp 257
video 5 session-close-timeout 1

```

```
video 5 route Vlan30 ip-address 192.168.111.3
video 5 start_udp 257
spanning-tree extend system-id
port-channel load-balance src-dst-port
!
redundancy
mode rpr
main-cpu
  auto-sync standard
!
!
interface Port-channel1
 ip address 192.168.1.2 255.255.255.0
 load-interval 30
!
interface GigabitEthernet1/1
!
interface GigabitEthernet1/2
!
interface GigabitEthernet3/1
 switchport access vlan 30
 switchport mode access
 load-interval 30
 speed nonegotiate
!
interface GigabitEthernet3/2
 switchport access vlan 20
 switchport mode access
 load-interval 30
 speed nonegotiate
!
interface GigabitEthernet3/3
 switchport access vlan 20
 switchport mode access
 load-interval 30
 speed nonegotiate
!
interface GigabitEthernet3/4
 no switchport
 no ip address
 speed nonegotiate
 channel-group 1 mode on
!
interface GigabitEthernet3/5
 no switchport
 no ip address
 load-interval 30
 speed nonegotiate
 channel-group 1 mode on
!
interface GigabitEthernet3/6
 no switchport
 no ip address
 load-interval 30
 speed nonegotiate
 channel-group 1 mode on
!
interface QAM4/1
!
interface QAM4/1.1
 video freq 471000000
 video sessions 12 udp 258 prog 2
!
interface QAM4/1.2
```

```
video freq 477000000
video sessions 10 udp 514 prog 2
!
interface QAM4/2
!
interface QAM4/2.1
video freq 471000000
video sessions 10 udp 770 prog 2
!
interface QAM4/2.2
video freq 477000000
video sessions 10 udp 1026 prog 2
!
interface QAM4/3
!
interface QAM4/3.1
video freq 471000000
video sessions 10 udp 1282 prog 2
!
interface QAM4/3.2
video freq 477000000
video sessions 10 udp 1538 prog 2
!
interface QAM4/4
!
interface QAM4/4.1
video freq 471000000
video sessions 10 udp 1794 prog 2
!
interface QAM4/4.2
video freq 477000000
video sessions 10 udp 2050 prog 2
!
interface QAM4/5
!
interface QAM4/5.1
video freq 471000000
video sessions 10 udp 2306 prog 2
!
interface QAM4/5.2
video freq 477000000
video sessions 10 udp 2562 prog 2
!
interface QAM4/6
!
interface QAM4/6.1
video freq 471000000
video sessions 10 udp 2818 prog 2
!
interface QAM4/6.2
video freq 477000000
video sessions 10 udp 3074 prog 2
!
interface QAM4/7
!
interface QAM4/7.1
video freq 471000000
video sessions 10 udp 3330 prog 2
!
interface QAM4/7.2
video freq 477000000
video sessions 10 udp 3586 prog 2
!
interface QAM4/8
```

```
!  
interface QAM4/8.1  
  video freq 471000000  
  video sessions 10 udp 3842 prog 2  
!  
interface QAM4/8.2  
  video freq 477000000  
  video sessions 10 udp 4098 prog 2  
!  
interface QAM4/9  
!  
interface QAM4/9.1  
  video freq 471000000  
  video sessions 10 udp 4354 prog 2  
!  
interface QAM4/9.2  
  video freq 477000000  
  video sessions 10 udp 4610 prog 2  
!  
interface QAM4/10  
!  
interface QAM4/10.1  
  video freq 471000000  
  video sessions 10 udp 4866 prog 2  
!  
interface QAM4/10.2  
  video freq 477000000  
  video sessions 10 udp 5122 prog 2  
!  
interface QAM4/11  
!  
interface QAM4/11.1  
  video freq 471000000  
  video sessions 10 udp 5378 prog 2  
!  
interface QAM4/11.2  
  video freq 477000000  
  video sessions 10 udp 5634 prog 2  
!  
interface QAM4/12  
!  
interface QAM4/12.1  
  video freq 471000000  
  video sessions 10 udp 5890 prog 2  
!  
interface QAM4/12.2  
  video freq 477000000  
  video sessions 10 udp 6146 prog 2  
!  
interface GigabitEthernet4/13  
  no switchport  
  ip address 192.100.100.250 255.255.255.0  
!  
interface GigabitEthernet4/14  
  no switchport  
  no ip address  
  channel-group 1 mode on  
!  
interface ASI4/15  
  video route qam 4/1.1  
!  
interface GigabitEthernet4/16  
!  
interface QAM5/1
```

```
!  
interface QAM5/1.1  
  video power 55  
  video freq 519000000  
  video sessions 10 udp 8213 prog 21  
!  
interface QAM5/1.2  
  video power 55  
  video freq 525000000  
  video sessions 10 udp 543 prog 31  
!  
interface QAM5/2  
!  
interface QAM5/2.1  
  shutdown  
  video power 55  
  video freq 531000000  
!  
interface QAM5/2.2  
  video power 55  
  video freq 537000000  
  video sessions 10 udp 267 prog 11  
!  
interface QAM5/3  
!  
interface QAM5/3.1  
  video format 64  
  video power 55  
  video freq 531000000  
  video sessions 8 udp 4097 prog 1  
!  
interface QAM5/3.2  
  shutdown  
  video format 64  
  video power 55  
  video freq 537000000  
!  
interface QAM5/4  
!  
interface QAM5/4.1  
  shutdown  
  video format 64  
!  
interface QAM5/4.2  
  shutdown  
  video format 64  
!  
interface QAM5/5  
!  
interface QAM5/5.1  
  shutdown  
!  
interface QAM5/5.2  
  shutdown  
!  
interface QAM5/6  
!  
interface QAM5/6.1  
  shutdown  
!  
interface QAM5/6.2  
  shutdown  
!  
interface QAM5/7
```

```
!  
interface QAM5/7.1  
  shutdown  
!  
interface QAM5/7.2  
  shutdown  
!  
interface QAM5/8  
!  
interface QAM5/8.1  
  shutdown  
!  
interface QAM5/8.2  
  shutdown  
!  
interface QAM5/9  
!  
interface QAM5/9.1  
  shutdown  
!  
interface QAM5/9.2  
  shutdown  
!  
interface QAM5/10  
!  
interface QAM5/10.1  
  shutdown  
!  
interface QAM5/10.2  
  shutdown  
!  
interface QAM5/11  
!  
interface QAM5/11.1  
  shutdown  
!  
interface QAM5/11.2  
  shutdown  
!  
interface QAM5/12  
!  
interface QAM5/12.1  
  shutdown  
!  
interface QAM5/12.2  
  shutdown  
!  
interface GigabitEthernet5/13  
!  
interface GigabitEthernet5/14  
!  
interface ASI5/15  
  no ip address  
  shutdown  
!  
interface GigabitEthernet5/16  
!  
interface Vlan1  
  no ip address  
!  
interface Vlan20  
  description Cisco_uMG9850  
  ip address 192.168.4.254 255.255.255.0  
  no ip redirects
```

```

!
interface Vlan30
  description Cisco_uMG9850
  ip address 192.168.111.100 255.255.255.0
  no ip redirects
  load-interval 30
!
ip classless
ip route 192.168.0.0 255.255.255.0 192.100.100.254
no ip http server
!
!
line con 0
  password 7 00071A150754
  stopbits 1
line vty 0 3
  password 7 00071A150754
  login
line vty 4
  login
!
end

```

Additional References

The following sections provide references related to the Cisco uMG9850 module the Cisco Catalyst 4500 series switches, as well as an overview of the architecture of the Cisco Video on Demand Solution.

Related Documents

Related Topic	Document Title and URL
Cisco Catalyst 4500 series IOS command reference, software configuration guide, system message guide, and release notes Note Refer to the above documents only for basic switch configuration. These documents do not discuss the use of the Cisco uMG9850 module, or related issues.	<i>Switch Documentation, Cisco IOS Software Release 12.1(20)EW</i> http://www.cisco.com/univercd/cc/td/doc/product/lan/cat4000/12_1_20/index.htm
Cisco Gigabit-Ethernet Optimized Video on Demand Solution	<i>Cisco Gigabit-Ethernet Optimized VoD Solution, Release 1.0</i> http://www.cisco.com/univercd/cc/td/doc/solution/vodsols/geopt1/index.htm The <i>Cisco Gigabit-Ethernet Optimized VoD Solution Design and Implementation Guide</i> presents the architecture for delivering a video stream to a set-top box.

Standards

Standards	Title
<ul style="list-style-type: none"> EN300 468 	<i>Digital Video Broadcasting (DVB); Specification for Service Information (SI) in DVB systems</i>
<ul style="list-style-type: none"> ETSI TR 101 891 	<i>Digital Video Broadcasting (DVB); Professional Interfaces: Guidelines for the implementation and usage of the DVB Asynchronous Serial Interface (ASI)</i>
<ul style="list-style-type: none"> ISO/IEC 13818-1 (MPEG-2) ISO/IEC 13818-2 (video coding) ISO/IEC 13818-3 (audio coding) 	<i>Information Technology – Generic coding of moving pictures and associated audio information (MPEG-2)</i>
<ul style="list-style-type: none"> ITU-T J.83, Annex B 	<i>Digital multi-programme systems for television, sound and data services for cable distribution</i>

MIBs

MIBs	MIBs Link
<p>The following new MIBs are supported:</p> <ul style="list-style-type: none"> CISCO-VIDEO-NETWORK-MIB 	<p>To locate and download MIBs for selected platforms, Cisco IOS releases, and feature sets, use Cisco MIB Locator found at the following URL:</p> <p>http://www.cisco.com/go/mibs</p>

RFCs

RFCs	Title
<ul style="list-style-type: none"> RFC 1889 	RTP: A Transport Protocol for Real-Time Applications
<ul style="list-style-type: none"> RFC 2250 	RTP Payload Format for MPEG1/MPEG2 Video
<ul style="list-style-type: none"> RFC 2326 	Real-Time Streaming Protocol (RTSP)
<ul style="list-style-type: none"> RFC 2327 	SDP: Session Description Protocol

Technical Assistance

Description	Link
<p>Technical Assistance Center (TAC) home page, containing 30,000 pages of searchable technical content, including links to products, technologies, solutions, technical tips, and tools. Registered Cisco.com users can log in from this page to access even more content.</p>	<p>http://www.cisco.com/public/support/tac/home.shtml</p>

Command Reference

This section documents new and modified commands for the Cisco uMG9850.



Note

All other commands used with this feature are documented in the *Catalyst 4500 Series Switch Cisco IOS Software Configuration Guide, 12.1(20)EW*, at the following URL:

http://www.cisco.com/univercd/cc/td/doc/product/lan/cat4000/12_1_20/config/index.htm

- [clear video <slot> statistics](#), page 52
- [interface asi](#), page 53
- [interface qam](#), page 55
- [show](#), page 57 (This page introduces all **show** commands.)
- [show interface qam <interface> video](#), page 60
- [show interface qam <interface.qam> video portmap](#), page 64
- [show interface asi <interface> video](#), page 58
- [show video <slot>](#), page 66
- [show video <slot> psi session](#), page 68
- [show video <slot> route](#), page 70
- [show video <slot> session](#), page 71
- [show video <slot> ts_table](#), page 73
- [show video <slot> version](#), page 74
- [video](#), page 76 (This page introduces all **video** commands.)
- [video <slot> frequency allow-any](#), page 79
- [video <slot> jitter](#), page 81
- [video <slot> route vlan](#), page 83
- [video <slot> timeout](#), page 85
- [video <slot> udp <UDP-port-number> filter-pid](#), page 87
- [video byte-gap](#), page 89
- [video format](#), page 90
- [video frequency](#), page 91
- [video interleave](#), page 92
- [video interval pat](#), page 94
- [video interval pmt](#), page 96
- [video interval stats](#), page 98
- [video nitpid](#), page 99
- [video power](#), page 100
- [video route](#), page 102
- [video sessions](#), page 103

- [video timeout](#), page 105
- [video tsid](#), page 107
- [video udp](#), page 108
- [video utilization-threshold](#), page 110

clear video <slot> statistics

To clear the video statistics of all sessions or a single session on a Cisco uMG9850 in a selected slot, use this command in privileged EXEC mode.

clear video *slot* **statistics** [**session** *session-number*]

Syntax Description	slot	Specifies the physical slot number for the Cisco uMG9850 QAM Module. For valid slot ranges, see Table 5 on page 8 .
	session	Selects a specific video session (UDP port).
	<i>session-number</i>	Session number. See UDP Port Mappings: Default and Manual, page 4 .

Defaults No default behaviors or values

Command Modes Privileged EXEC

Command History	Release	Modification
	12.1(20)EU	This command was introduced.

Usage Guidelines None

Examples The following example shows how to clear video statistics on a Cisco uMG9850 in slot 6:

```
Switch# clear video 6 statistics
Switch#
```

Related Commands	Command	Description
	Various	See show, page 57 .

interface asi

You can route one of the 24 transport streams (QAM channels) to the ASI output port. This allows you to route a stream to a decoder, monitor, or MPEG analyzer for troubleshooting. This command is used to enter ASI interface configuration mode, in order to use [video route](#) and [video byte-gap](#).

To enter interface configuration mode for an asynchronous serial interface (ASI) output port on the Cisco uMG9850, use this command in global configuration mode.

```
interface asi slot/15
```

Syntax Description	interface	Enables interface configuration mode.
	asi	Selects the ASI output port.
	<i>slot</i>	Specifies the physical slot number for the Cisco uMG9850 QAM Module. For valid slot ranges, see Table 5 on page 8 .
	15	Specifies the required physical port. The number of the ASI port on the Cisco uMG9850 is always 15.

Defaults

The number of the ASI port on the Cisco uMG9850 is always 15.

Command Modes

ASI interface configuration. See [Interface Configuration Mode, page 3](#).

Command History

Release	Modification
12.1(20)EU	This command was introduced.

Usage Guidelines

The ASI port is always port 15 on each module. The slot varies. Use **no shut** to enable the port.



Note

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

Examples

The following example shows how to enter interface configuration mode for the ASI port on the Cisco uMG9850 in slot 4, assign QAM channel 3/7.2 to the ASI interface, and set a byte gap of 1:

```
Switch# configure terminal
Switch(config)# interface asi 6/15
Switch(config-if)# video route interface qam 6/7.2
Switch(config-if)# video byte-gap 1
Switch(config-if)# no shut
```

Related Commands	Command	Description
	video route	Allows a QAM channel to be routed to a selected ASI port. See video route, page 102 . Do not confuse this command with video <slot> route vlan, page 83
	video byte-gap	Sets the number of null ASI transport bytes to be inserted between data bytes in the output streams. See video byte-gap, page 89 . Range is 1 to 4.
	interface qam	Enables interface configuration mode for a QAM output port or channel on the Cisco uMG9850.

interface qam

To enter subinterface interface configuration mode for an output QAM port or channel on the Cisco uMG9850, use this command in global configuration mode.

```
interface qam interface.qam
```

Syntax	Description
interface	Enables interface configuration mode.
qam	Enables QAM interface configuration, for either a single channel, both channels, or all four channels in a QAM modulator group. For background, see Interface Configuration Mode, page 3 .
<i>interface</i>	Slot and port number in <i>slot/port</i> format. See Interface Configuration Mode, page 3 . For valid slot ranges, see Table 5 on page 8 . The valid range for port is 1 to 12, with no default.
<i>qam</i>	The QAM channel of interest. The valid range for <i>qam</i> is 1 to 2, with no default.

Defaults None

Command Modes Subinterface configuration. See [Subinterface Configuration Mode, page 4](#).



Note

This mode is not used frequently in video contexts. The command options that can be used at the interface configuration level (slot and port only) are **description**, **exit**, and **shutdown**.

Command History	Release	Modification
	12.1(20)EU	This command was introduced.

Usage Guidelines To address power, frequency, modulation format, and interleave mode, you need to address only a single channel. (See [Subinterface Configuration Mode, page 4](#).) The other channel is configured automatically.

Examples To enter interface configuration mode for the second QAM port on the Cisco uMG9850 in slot 5:

```
Switch# configure terminal
Switch(config)# interface qam 5/2
Switch(config-if)#
```

To enter subinterface configuration mode for the first QAM channel on the first QAM port on the Cisco uMG9850 in slot 5:

```
Switch# configure terminal
Switch(config)# interface qam 5/1.1
Switch(config-subif)#
```

■ interface qam

Related Commands	Command	Description
	interface asi	Enables interface configuration mode for the asynchronous serial interface on the Cisco uMG9850.

show

Table 8 shows the hierarchy of the video-related **show** commands . These commands are executed at the following prompt (see [Privileged EXEC Mode, page 3](#)):

Switch#



Note

The command **show video**, without the parameter *slot*, is not available in user mode.

Table 8 *show Commands*

Command Hierarchy			Reference	
show	interface	asi <interface>	show interface asi <interface> video, page 58	
		qam <interface>	show interface qam <interface> video, page 60	
		qam <interface.qam>	show interface qam <interface.qam> video, page 62 show interface qam <interface.qam> video portmap, page 64	
	video	<slot>		show video <slot>, page 66
				show video <slot> psi session, page 68
				show video <slot> route, page 70
				show video <slot> session, page 71
				show video <slot> ts_table, page 73
			show video <slot> version, page 74	

```
show interface asi <interface> video
```

show interface asi <interface> video

To view information about a single QAM channel routed to the output ASI interface, use this command in privileged EXEC mode.

show interface asi *interface* video

Syntax Description	Parameter	Description
	interface	Enables interface configuration mode.
	asi	Enables reporting on the ASI interface.
	<i>interface</i>	Specifies the physical slot number and port for the Cisco uMG9850, in <i>slot/15</i> format. The number of the ASI port on the Cisco uMG9850 is always 15. For valid slot ranges, see Table 5 on page 8 . See also Interface Configuration Mode, page 3 .
	video	Enables reporting on video information. (This is required.)

Defaults The ASI port is always 15.

Command Modes Privileged EXEC

Command History	Release	Modification
	12.1(20)EU	This command was introduced.

Usage Guidelines The following information is retrieved:

- Port status (active/inactive)
- QAM channel routed to the ASI interface
- Program details (if available)

Examples To view information about what channel is routed to the ASI port of a Cisco uMG9850 in slot 3:

```
Switch# show interface asi 5/15 video

Port Status :      Inactive
Byte Gap :         1
QAM interface: qam 3/1.1
Total # of active programs :7
Program 1          State: active   PMT PID: 32,    PCR pid: 33
Session UDP 49152
(1) PID: 33        Stream type 2
(2) PID: 36        Stream type 129
(3) PID: 42        Stream type 192
Program 2          State: active   PMT PID: 48,    PCR pid: 49
Session UDP 49153
(1) PID: 49        Stream type 2
(2) PID: 52        Stream type 129
```

```
(3) PID: 58      Stream type 192
Program 3       State: active  PMT PID: 64,   PCR pid: 65
Session UDP 49154
(1) PID: 65      Stream type 2
(2) PID: 68      Stream type 129
(3) PID: 74      Stream type 192
```

Related Commands

Command	Description
Various	See show , page 57.

■ `show interface qam <interface> video`

show interface qam <interface> video

To view video information about both channels on an output QAM interface, use this command in privileged EXEC mode.

show interface qam *interface* video

Syntax Description	Parameter	Description
	interface	Enables interface configuration mode.
	qam	Enables reporting for both channels on a QAM interface.
	<i>interface</i>	Slot and port number in <i>slot/port</i> format. For valid slot ranges, see Table 5 on page 8 . See Interface Configuration Mode, page 3 .
	video	Enables reporting on video parameters.

Defaults No default behaviors or values

Command Modes Privileged EXEC

Command History	Release	Modification
	12.1(20)EU	This command was introduced.

Usage Guidelines Information such as the following is retrieved:

- Number of active QAMs and QAM status (shut/no shut)
- QAM modulator group number
- TSID, NIT PID, and PSI interface values
- Upconverter frequency and power, and QAM modulation type
- Port error status

Examples To view information about both QAM channels on QAM interface 5/1:

```
Switch# show interface qam 5/1 video
```

```
Modulator Group 1
QAM 1
    TSID: 10, Nit Pid: 16, PAT Int: 100
    Status: enabled
    Frequency: 100000000 Hz
    Power: 50 dBmV
    Modulation: 256 QAM
    # of active sessions: 7
    Average Output Packet Count: 15482 pps
    Average Output bit rate: 23.284928 Mbps
    Utilization : 60 percentage
    High Utilization threshold: 75 percentage
```

```
QAM 2      Low Utilization threshold: 10 percentage
           TSID: 2, Nit Pid: 16, PAT Int: 100
           Status: disabled
           Frequency: 106000000 Hz
           Power: 50 dBmV
           Modulation: 256 QAM
           # of active sessions: 6
           Average Output Packet Count: 13160 pps
           Average Output bit rate: 19.792640 Mbps
           Utilization : 51 percentage
           High Utilization threshold: 75 percentage
           Low Utilization threshold: 10 percentage
```

Related Commands

Command	Description
Various	See show, page 57 .

```
show interface qam <interface.qam> video
```

show interface qam <interface.qam> video

To view video information about a single QAM channel, use this command in privileged EXEC mode.

```
show interface interface.qam video
```

Syntax Description	Parameter	Description
	interface	Enables interface configuration mode.
	qam	Enables reporting for both channels on a QAM interface.
	<i>interface.qam</i>	Slot and port number in <i>slot/port.qam</i> format. For valid slot ranges, see Table 5 on page 8 . See Subinterface Configuration Mode, page 4 .
	video	Enables reporting on video parameters.

Defaults No default behaviors or values

Command Modes Privileged EXEC

Command History	Release	Modification
	12.1(20)EU	This command was introduced.

Usage Guidelines Information such as the following is retrieved:

- Number of programs and active sessions
- TSID and NIT-PID information
- Packets per second and bit rate through the channel
- Active trick modes
- Video and audio format for each session
- QAM error status (such as oversubscribed, underflow)

Examples To view video information about QAM channel 3/2.1:

```
Switch# show interface qam 3/2.1 video

TSID: 37, Nit Pid: 8191, PAT Interval: 100 ms
Total bitrate: 0.0 Mbps

Total # of programs :10
Program 1,      Status: active,      PMT PID: 16,      PCR pid: 17
ECM PIDS:24,
Session UDP 49152
(1) PID: 17      Stream type 128
(2) PID: 20      Stream type 129
(3) PID: 21      Stream type 129
Program 2,      Status: active,      PMT PID: 32,      PCR pid: 33
```

```
ECM PIDS:40,  
Session UDP 49153  
(1) PID: 33      Stream type 128  
(2) PID: 36      Stream type 129  
(3) PID: 37      Stream type 129  
Program 3,      Status: Inactive  
Program 4,      Status: Inactive  
Program 5,      Status: Inactive  
Program 6,      Status: Inactive  
Program 7,      Status: Inactive  
Program 8,      Status: Inactive  
Program 9,      Status: Inactive  
Program 10,     Status: Inactive
```

Related Commands

Command	Description
Various	See show, page 57 .

```
show interface qam <interface.qam> video portmap
```

show interface qam <interface.qam> video portmap

To view information about the UDP portmaps on an output QAM interface, use this command in privileged EXEC mode.

show interface *interface.qam* **video portmap**

Syntax Description	Parameter	Description
	interface	Enables interface configuration mode.
	qam	Enables reporting for both channels on a QAM interface.
	<i>interface.qam</i>	QAM slot and port number in <i>slot/port.qam</i> format. For valid slot ranges, see Table 5 on page 8 . See Subinterface Configuration Mode, page 4 .
	video	Enables reporting on video parameters.
	portmap	Selects UDP portmap data.

Defaults No default behaviors or values

Command Modes Privileged EXEC

Command History	Release	Modification
	12.1(20)EU	This command was introduced.

Usage Guidelines Information such as the following is retrieved:

- UDP port number, in decimal and hexadecimal
- Output program number



Tip

Occasionally, if user-defined port mapping is removed, as in the following example:

```
Switch(config-subif)# no video udp 49152 program 1
```

the default port mapping will not appear following the execution of this **show** command. To generate the default port mapping, execute **no video sessions**. See Related Commands, below.

Examples

To view UDP portmap information on QAM channel 6/1.1:

```
ODI-SW# show interface qam 6/1.1 video portmap
```

```
Did not get a reply from the module for this query.
The statistics shown may not be up-to-date.port map for qam 1:
  udp 61473 (0xF021)  out_prog_num 1
  udp 61474 (0xF022)  out_prog_num 2
  udp 61475 (0xF023)  out_prog_num 3
  udp 61476 (0xF024)  out_prog_num 4
```



```

udp 61477 (0xF025) out_prog_num 5
udp 61478 (0xF026) out_prog_num 6
udp 61479 (0xF027) out_prog_num 7
udp 61480 (0xF028) out_prog_num 8
udp 61481 (0xF029) out_prog_num 9
udp 61482 (0xF02A) out_prog_num 10
udp 61483 (0xF02B) out_prog_num 11
udp 61484 (0xF02C) out_prog_num 12
udp 61485 (0xF02D) out_prog_num 13
udp 61486 (0xF02E) out_prog_num 14
udp 61487 (0xF02F) out_prog_num 15
udp 61488 (0xF030) out_prog_num 16
udp 61489 (0xF031) out_prog_num 17
udp 61490 (0xF032) out_prog_num 18
udp 61491 (0xF033) out_prog_num 19
udp 61492 (0xF034) out_prog_num 20
udp 61493 (0xF035) out_prog_num 21
udp 61494 (0xF036) out_prog_num 22
udp 61495 (0xF037) out_prog_num 23
udp 61496 (0xF038) out_prog_num 24
udp 61497 (0xF039) out_prog_num 25

```

Related Commands

Command	Description
no video udp	See video udp , page 108.
Various	See show , page 57.

■ show video <slot>

show video <slot>

To view information related to the modulator groups, including frequency and power, use this command in privileged EXEC mode.

show video slot

Syntax Description	video	Enables reporting on video information.
	slot	The slot in which the Cisco uMG9850 resides in the switch. For valid slot ranges, see Table 5 on page 8 .

Defaults No default behaviors or values

Command Modes Privileged EXEC

Command History	Release	Modification
	12.1(20)EU	This command was introduced.

Usage Guidelines You must enter a slot number to see all the available options. The following information is retrieved with the *slot* option only:

- Active modulator groups
- Upconverter frequency and power for each channel



Tip

To clear statistics, use the command [clear video <slot> statistics, page 52](#).

Examples To view video details for a Cisco uMG9850 in slot 6:

```
Switch# show video 6

Number of QAMs per port 2

Modulators:
  Group 1: Port 1, Port 2
  Group 2: Port 3, Port 4
  Group 3: Port 5, Port 6
  Group 4: Port 7, Port 8
  Group 5: Port 9, Port 10
  Group 6: Port 11, Port 12

Upconverter settings:
  QAM      Frequency(Hz)   Power(dBmV)
  6/1.1    100000000       50
  6/1.2    106000000       50
```

6/2.1	112000000	50
6/2.2	118000000	50
6/3.1	124000000	50
6/3.2	130000000	50
6/4.1	136000000	50
6/4.2	142000000	50
6/5.1	148000000	50
6/5.2	154000000	50
6/6.1	160000000	50
6/6.2	166000000	50
6/7.1	172000000	50
6/7.2	178000000	50
6/8.1	184000000	50
6/8.2	190000000	50
6/9.1	196000000	50
6/9.2	202000000	50
6/10.1	208000000	50
6/10.2	214000000	50
6/11.1	220000000	50
6/11.2	226000000	50
6/12.1	232000000	50
6/12.2	238000000	50

Related Commands

Command	Description
Various	See show , page 57.
clear video <slot> statistics	See clear video <slot> statistics , page 52.

show video <slot> psi session

To view program-specific information (PSI) related to the input, use this command in privileged EXEC mode.

show video *slot* **psi session** *session-number*

Syntax Description	video	Enables reporting on video information.
	<i>slot</i>	The slot in which the Cisco uMG9850 resides in the switch. For valid slot ranges, see Table 5 on page 8 .
	psi	Selects PSI-specific information.
	session	Reports PSI information for a specific session (UDP port).
	<i>session-number</i>	Session number. See UDP Port Mappings: Default and Manual, page 4 .

Defaults No default behaviors or values

Command Modes Privileged EXEC

Command History	Release	Modification
	12.1(20)EU	This command was introduced.

Usage Guidelines Information such as the following is retrieved:

- UDP port number and session status
- PSI parameters
- Source program
- Streams and stream types

Examples To view PSI details for a Cisco uMG9850 in slot 3 for a specific session:

```
Switch# show video 3 psi session 0xc000

UDP port#:49152
Session Status: active
TSID: 25891, PAT VERSION: 2, NIT PID : 0
Source Program #: 1
PMT PID 89, PCR PID 64 CA_SYS ID:18249, ECM PID 89

Elementary Streams:
(1) Pid: 64 Stream type:128
(2) Pid: 65 Stream type:129
(3) Pid: 66 Stream type:129
```

Related Commands

Command	Description
Various	See show , page 57.

show video <slot> route

To view video route information related to the input, use this command in privileged EXEC mode.

show video slot route

Syntax Description	video	Enables reporting on video information.
	slot	The slot in which the Cisco uMG9850 resides in the switch. For valid slot ranges, see Table 5 on page 8 .
	route	Enables reporting on video route details.

Defaults No default behaviors or values

Command Modes Privileged EXEC

Command History	Release	Modification
	12.1(20)EU	This command was introduced.

Usage Guidelines None

Examples To view input video route details for a Cisco uMG9850 in slot 3:

```
Switch# show video 3 route
video route 3 interface Vlan20 ip-address 192.168.20.6
```

Related Commands	Command	Description
	Various	See show , page 57.

show video <slot> session

To view a variety of video details related to sessions , use this command in privileged EXEC mode.

show video slot session [*UDP-port-number* | **active** | **all**]

Syntax Description	video	Enables reporting on video information.
	<i>slot</i>	The slot in which the Cisco uMG9850 resides in the switch. For valid slot ranges, see Table 5 on page 8 .
	session	Invokes a report on a specific session (UDP port).
	<i>UDP-port-number</i>	Input UDP port number associated with the session. See UDP Port Mappings: Default and Manual, page 4 .
	active	Shows data for all active sessions.
	all	Shows data for all sessions, including idle sessions.

Defaults No default behaviors or values

Command Modes Privileged EXEC

Command History	Release	Modification
	12.1(20)EU	This command was introduced.

Usage Guidelines You must enter a slot number to see all the available options.

The following information is retrieved, for all sessions:

- All session information
- Input errors
- CC errors
- Sync loss
- Sender information (source IP address and UDP for each session)

The following information is retrieved for a specified session:

- Session start time
- Source IP address
- Input CC errors
- Jitter (peak, average)
- Encryption (on/off)
- Source data rate

**Tip**

To clear statistics, use the command [clear video <slot> statistics, page 52](#).

Examples

To view video details for a Cisco uMG9850 in slot 3 for a specific session:

```
Switch# show video 3 session 49152

UDP: 49152
State: active
IP address: Source 192.168.51.101, Destination 192.168.20.6
Output: Qam 3/1.1, Program 1
Start time: 06:06:05 UTC Sun Dec 22 2002
Encryption: No
Signalled bit rate (Mbps): avg 3.732, min 3.722, max 11.167
Measured bit rate (Mbps): avg 3.734, min 1.710, max 3.743
Jitter (ms): avg 8.249, max 9.102
PCR interval (ms): avg 13.440, max 23.838
PCR frequency adjustment: 729 Hz, 27.00 ppm
MPEG packets: PCR 76812, non-PCR 2439699, unref 305988, total 2822499
Source errors: signal drop 0, PCR jump 0, sync loss 0, cc error 0
Buffer errors: underflow 0, overflow 0
```

To view session information for a Cisco uMG9850 in slot 6 for all active sessions:

```
Switch# show video 6 session active

Number of active sessions: 0
Total number of sessions: 580
Source continuity count errors: 0
Source peak network jitter (ms): 0
Source average network jitter (ms): 0
Link Utilization (5 minutes): 0 %
```

```
Number of failed sessions: 0
```

To view session information for a Cisco uMG9850 in slot 6 for all sessions:

```
Switch# show video 6 session all

State: idle Source IP 0.0.0.0 Dest UDP 49152 to qam 6/1.1
State: idle Source IP 0.0.0.0 Dest UDP 49153 to qam 6/1.1
State: idle Source IP 0.0.0.0 Dest UDP 49154 to qam 6/1.1
State: idle Source IP 0.0.0.0 Dest UDP 49155 to qam 6/1.1
State: idle Source IP 0.0.0.0 Dest UDP 49156 to qam 6/1.1
State: idle Source IP 0.0.0.0 Dest UDP 61505 to qam 6/1.2
State: idle Source IP 0.0.0.0 Dest UDP 61506 to qam 6/1.2
<---snip--->
```

Related Commands

Command	Description
Various	See show, page 57 .
clear video <slot> statistics	See clear video <slot> statistics, page 52 .

show video <slot> ts_table

To view the transport stream ID (TSID) table for each QAM channel in a Cisco uMG9850, use this in privileged EXEC mode.

show video slot ts_table

Syntax Description	video	Enables reporting on video information.
	slot	The slot in which the Cisco uMG9850 resides in the switch. For valid slot ranges, see Table 5 on page 8 .
	ts_table	Returns the TSID table for all QAM channels in a module.

Defaults No default behaviors or values

Command Modes Privileged EXEC

Command History	Release	Modification
	12.1(20)EU	This command was introduced.

Usage Guidelines The following information is retrieved:

- The TSID for each QAM channel

Examples To view the TSID table for a Cisco uMG9850 in slot 3:

```
Switch# show video 3 ts_table
```

```
qam 6/1.1 tsid 600
qam 6/1.2 tsid 601
qam 6/2.1 tsid 603
qam 6/2.2 tsid 604
qam 6/3.1 tsid 606
qam 6/3.2 tsid 607
qam 6/4.1 tsid 609
qam 6/4.2 tsid 610
<---snip--->
qam 6/8.1 tsid 621
qam 6/8.2 tsid 622
qam 6/9.1 tsid 624
qam 6/9.2 tsid 625
qam 6/10.1 tsid 627
qam 6/10.2 tsid 628
qam 6/11.1 tsid 630
qam 6/11.2 tsid 631
qam 6/12.1 tsid 633
qam 6/12.2 tsid 634
```

show video <slot> version

To view software version information for a Cisco uMG9850, use this command in privileged EXEC mode:

show video slot version

Syntax Description	video	Enables reporting on video information.
	slot	The slot in which the Cisco uMG9850 resides in the switch. For valid slot ranges, see Table 5 on page 8 .
	version	Shows software version information for a module.

Defaults No default behaviors or values

Command Modes Privileged EXEC

Command History	Release	Modification
	12.1(20)EU	This command was introduced.

Usage Guidelines Information such as the following is retrieved:

- Hardware details
- Software details

Examples To view software version information for a Cisco uMG9850 in slot 3:

```
Switch# show video 3 version

Board Type:                                0
CPLD Revision:                            0.0
Sailfish FPGA Hardware Revision:          0x0
Blackfin FPGA Hardware Revision:          0x0
Last Reset Cause Register:                0
Marvell Version:                          0
CPU Version:                              0.0
CPU Speed:                                0 KHz
Main Memory:                              0 Bytes
Video Software Build Revision:            0
Video Software Release:                   0
Rom Monitor Build Revision:               0
Rom Monitor Release:                     0
Sailfish FPGA Build Revision:             0
Sailfish FPGA Release:                   0
Blackfin FPGA Build Revision:             0
Blackfin FPGA Release:                   0
```

Versions of software bundled in IOS are:

```
Embedded Video Software Build:      111
Embedded Video Software Release:    12.1E(24VQ)EWV
Embedded Rom Monitor Build:         109
Embedded Rom Monitor Release:       12.1E(14VR)EW
Embedded Sailfish Build:            109
Embedded Sailfish Release:          12.1E(24SF)EWV
Embedded Blackfin Build:            107
Embedded Blackfin Release:          12.1E(24BF)EWV
```

video

The video commands can be categorized as either *global* (see [Global Configuration Mode, page 3](#)) or *interface* (see [Interface Configuration Mode, page 3](#)) commands.

[Table 9](#) shows the hierarchy of the global **video** commands. These commands are executed at the following prompt:

```
Switch(config)#
```



Note

Program-specific information (PSI) commands are so indicated in the Notes column, below.

Table 9 Global video Command Hierarchy

Commands Hierarchy		Reference	Notes	
video	<3-7>	frequency	video <slot> frequency allow-any, page 79	You must first select an individual slot in which a Cisco uMG9850 resides.
		jitter	video <slot> jitter, page 81	
		route	video <slot> route vlan, page 83	
		timeout	video <slot> timeout, page 85	
		udp <UDP-port-number> filter-pid	video <slot> udp <UDP-port-number> filter-pid, page 87	
		udp <UDP-port-number> jitter	video <slot> udp <UDP-port-number> jitter, page 88	
	interval	pat	video interval pat, page 94	These PSI commands apply to all Cisco uMG9850 modules in a switch.
		pmt	video interval pmt, page 96	
		stats	video interval stats, page 98	
	timeout	session-close	video timeout, page 105	Syntax is similar to that for video <slot> timeout, page 85 . This addresses all Cisco uMG9850 modules in a switch.
signal-loss				

[Table 10 on page 77](#) shows the hierarchy of the interface and subinterface **video** commands (see [Interface Configuration Mode, page 3](#), and [Subinterface Configuration Mode, page 4](#)).



Tip

To enter subinterface **video** command mode, configuring one QAM channel configures the other automatically. For consistency in entering subinterface configuration mode, do the following:

For a QAM interface:

```
Switch(config)# interface qam slot/1.1
```

For an ASI interface:

```
Switch(config)# interface asi slot/15
```

Table 10 Interface and Subinterface video Command Hierarchy

Command Hierarchy		Reference	Notes	
video	byte-gap	video byte-gap, page 89	This is an ASI interface command. See Interface Configuration Mode, page 3 .	
	format	video format, page 90		
	frequency	video frequency, page 91		
	interleave	video interleave, page 92	Includes both interleave level and interleave mode.	
	interval	pat	video interval pat, page 94	PSI command
		pmt	video interval pmt, page 96	
		stats	video interval stats, page 98	
	nitpid	video nitpid, page 99		
	power	video power, page 100		
	route	video route, page 102	This is an ASI interface command. See Interface Configuration Mode, page 3 .	
	sessions	video sessions, page 103	PSI command	
	tsid	video tsid, page 107		
	udp	video udp, page 108		
utilization-threshold	video utilization-threshold, page 110			

Defaults Various. See individual command descriptions.

Command Modes Interface and subinterface configuration. See [Interface Configuration Mode, page 3](#), and [Subinterface Configuration Mode, page 4](#),

Command History	Release	Modification
	12.1(20)EU	These commands were introduced.

Usage Guidelines Various. See individual command descriptions.

■ video

Examples Various. See individual command descriptions.

Related Commands

Command	Description
Various	See individual command descriptions.

video <slot> frequency allow-any

Frequency conflicts can result in undesirable results, depending on how QAM channels are cabled. This command allows you to configure the software either to allow frequency conflicts or to check for them and block conflicting assignments.

To configure the entire Cisco uMG9850 to ignore conflicting frequencies from being configured, use this command in global configuration mode. To configure the entire Cisco uMG9850 to check for conflicting frequencies, use the **no** form of this command.

video slot frequency allow-any

no video slot frequency allow-any

Syntax Description

no	Instructs the software to check for frequencies that conflict with frequencies that have already been set.
<i>slot</i>	The slot in which the Cisco uMG9850 resides in the switch. For valid slot ranges, see Table 5 on page 8 .
frequency	Instructs the software to check for conflicting frequencies. Used with allow-any (see below).
allow-any	Parameter required to complete the command, both with and without the no form.

Defaults

Frequency conflicts are allowed. Note the following Caution:



Because the default allows frequency conflicts, it is the responsibility of the MSO to avoid such conflicts. To instruct the Cisco uMG9850 to check for frequency conflicts, use **no video slot frequency allow-any**.

Command Modes

Global configuration

Command History

Release	Modification
12.1(20)EU	This command was introduced.

Usage Guidelines

If instructed to check for conflicts, the software checks whether any QAM channel has already been set to a frequency within the range -6 to $+6$ MHz of the frequency about to be configured. If the new frequency is within this range, the user is prevented from configuring the conflicting frequency.

The option **allow-any** is required to complete this command. There are no other options. Use the command **interface qam interface.qam frequency** to set the frequency on QAM channels.

■ video <slot> frequency allow-any

Examples

The following example shows how to allow any frequency to be set on a Cisco uMG9850 in slot 6:

```
Switch(config)# video 6 frequency allow-any
```

The following example shows how to check for conflicting frequencies on a Cisco uMG9850 in slot 6, and prevent conflicting assignments:

```
Switch(config)# no video 6 frequency allow-any
```

Related Commands

Command	Description
interface qam	Sets frequency on QAM channels.

video <slot> jitter

To configure jitter levels for a Cisco uMG9850 in a given slot, use this command in global configuration mode. To return to default values, use the **no** form of this command.

video slot jitter level

no video slot jitter

Syntax Description	slot	The slot in which the Cisco uMG9850 resides in the switch. For valid slot ranges, see Table 5 on page 8 .
	jitter	Configures the size of the dejitter buffer for the entire Cisco uMG9850.
	level	Size of dejitter buffer in milliseconds. The range is from 0 to 300.

Defaults See Usage Guidelines, below.

Command Modes Global configuration

Command History	Release	Modification
	12.1(20)EU	This command was introduced.

Usage Guidelines Note the following:



Note

The **jitter** option sets the size of a dejittering buffer that absorbs the input jitter. This buffer introduces system delay (the time for a packet to enter and leave the Cisco uMG9850). The greater the value of **jitter**, the greater the delay introduced to the output stream. You can change the size of the dejitter buffer at either the slot or the session level. (The default level is the default level for the switch, 300 milliseconds.) Changing it at the slot level changes the default value for jitter. Consequently, for all sessions having the default value for jitter, the jitter value is changed to the new value. For sessions that have nondefault jitter values (as configured by the command [video udp, page 108](#)), their current jitter value is maintained.



Tip

When setting the jitter value (the size of the dejitter buffer), take into consideration the network jitter (the inherent jitter introduced at the input of the Cisco uMG9850), and allow for clock tracking. Leave approximately 50 milliseconds for clock tracking. For example, if peak-to-peak network jitter is 100 milliseconds, set the jitter value to 150 milliseconds.

The value for **video slot timeout signal-loss** or **video timeout signal-loss** should always be larger than the value configured for jitter.

Examples

The following example shows how to set the jitter level on a Cisco uMG9850 in slot 6 to 150 milliseconds:

```
Switch(config)# video 6 jitter 150
```

The following example shows how to return the jitter level for a Cisco uMG9850 in slot 6 to default values:

```
Switch(config)# no video 6 jitter
```

Related Commands

Command	Description
Various	See video , page 76.
video udp	Jitter option adjusts jitter at the session level. See video udp , page 108.

video <slot> route vlan

To configure the delivery of a video stream from a VoD server to a Cisco uMG9850, use this command in global configuration mode. To remove the video stream from the VLAN, use the **no** form of this command.

video slot route vlan *vlan-number ip-address ip-address*

no video slot route vlan *vlan-number ip-address ip-address*

Syntax Description	slot	The slot in which the Cisco uMG9850 resides in the switch. For valid slot ranges, see Table 5 on page 8 .
	route	Configures switching of video packets from the input GE port to the output GE port. The argument vlan is required, to select a Cisco Catalyst VLAN in which to route the packets.
	vlan	Configures the VLAN in which video packets are routed.
	<i>vlan-number</i>	Range is 1 to 4094.
	ip-address	Assigns an IP address to a backplane port supporting communications between the supervisor engine and the Cisco uMG9850.

Defaults No default behaviors or values

Command Modes Global configuration

Command History	Release	Modification
	12.1(20)EU	This command was introduced.

Usage Guidelines This command switches video packets from the input GE port to the output GE port. A backplane port provides communication between the supervisor engine and the Cisco uMG9850. This command assigns an IP address to that port.

The VoD server must be configured to deliver a video stream to the destination IP address configured here.



Note At least one Cisco uMG9850 module must be present in the switch chassis. See [Table 5 on page 8](#).



Caution

Do not confuse this command with the command [video route, page 102](#), which is a QAM interface command.

Examples

The following example shows how to assign video traffic on a Cisco uMG9850 in slot 6 to VLAN 20, with the following IP address:

```
Switch(config)# video 6 route vlan 20 ip-address 192.168.20.6
```

The following example shows how to remove the assignment of video traffic on a Cisco uMG9850 in slot 6 to VLAN 20, with the following IP address:

```
Switch(config)# no video 6 route vlan 20 ip-address 192.168.20.6
```

Related Commands

Command	Description
Various	See video , page 76.
video timeout	Global switch command. See video timeout , page 105.

video <slot> timeout

You can configure when a video session times out when packets are not received after a certain interval. This command applies to an entire Cisco uMG9850 module.

To configure timeout parameters, use this command in global configuration mode. To return to default values, use the **no** form of this command.

video slot timeout {**session-close** *minutes* | **signal-loss** *milliseconds*}

no video slot timeout session-close

no video slot timeout signal-loss

Syntax Description		
<i>slot</i>	The slot in which the Cisco uMG9850 resides in the switch. For valid slot ranges, see Table 5 on page 8 .	
timeout	Configures the timeout options.	
session-close	Configures the time after packet loss when the video session is closed	
<i>minutes</i>	Number of minutes, from 1 to 1440.	
signal-loss	Configures the time after packet loss when a signal loss is assumed. The session becomes inactive.	
<i>milliseconds</i>	Number of milliseconds, from 200 to 10000.	

Defaults See Usage Guidelines, below.

Command Modes Global configuration

Command History	Release	Modification
	12.1(20)EU	This command was introduced.

Usage Guidelines The syntax of this command is similar to that for the command [video timeout, page 105](#), except that this command addresses a single Cisco uMG9850 module. You must configure each parameter on a separate command line.



Note

When a session is closed, this means that the Cisco uMG9850 has not received any video packets for the given session's UDP port for the period determined by the commands **video slot timeout session-close** or **video timeout session-close**. The session no longer exists, and is not listed following a **show** command. The range is from 1 to 1440 minutes. The default is 10 minutes.

When a session is inactive, this means that the Cisco uMG9850 has not received any video packets for the given session's UDP port for the period determined by the commands **video slot timeout signal-loss** or **video timeout signal-loss**. The session still exists, and is listed following a **show** command. If packets start arriving before the timer set by the commands **video slot timeout session-close** or **video timeout**

session-close counts down, the session becomes active. The range is from 200 to 10000 milliseconds. The default is 5000 milliseconds.

The value for the commands **video slot timeout signal-loss** or **video timeout signal-loss** should always be larger than the value configured for jitter.

Examples

The following example shows how to set **session-close** to 25 and **signal-loss** to 500 on a Cisco uMG9850 in slot 6:

```
Switch(config)# video 3 timeout session-close 25
```

```
Switch(config)# video 3 timeout signal-loss 500
```

Related Commands

Command	Description
Various	See video , page 76.
show video <slot>	Shows which sessions are inactive. See show video <slot> , page 66.
video <slot> jitter	See video <slot> jitter , page 81.
video timeout	See video timeout , page 105.

video <slot> udp <UDP-port-number> filter-pid

You can filter out an input elementary video stream based on its input packet ID (PID). This affects the PIDs in the transport stream that is delivered to the specified UDP port.

To filter out an input elementary video stream based on its input PID, use this command in global configuration mode.

video slot udp UDP-port-number filter-pid PID-number

Syntax Description	slot	The slot in which the Cisco uMG9850 resides in the switch. For valid slot ranges, see Table 5 on page 8 .
	udp	Configures PID filter and jitter parameters for the entire Cisco uMG9850.
	<i>UDP-port-number</i>	UDP port. See UDP Port Mappings: Default and Manual, page 4 .
	filter-pid	Filters out an input elementary video stream based on its input PID.
	<i>PID-number</i>	Range is 0 to 8191

Defaults See Usage Guidelines, below.

Command Modes Global configuration

Command History	Release	Modification
	12.1(20)EU	This command was introduced.

Usage Guidelines See the Usage Guidelines for [video <slot> jitter, page 81](#).



Caution

Do not confuse this command with the subinterface command [video udp, page 108](#).

Examples The following example shows how to set a PID filter on PID 0 for UDP session 49152, for the entire Cisco uMG9850:

```
Switch(config)# video 6 udp 49152 filter-pid 0
```

Related Commands	Command	Description
	Various	See video, page 76 .
	video udp	See video udp, page 108 , for a discussion of the subinterface (QAM channel) version of this command.

video <slot> udp <UDP-port-number> jitter

You can set the maximum allowable network jitter (packet latency variation) for a specified UDP port session. This global video setting affects the overall packet latency within the Cisco uMG9850.



Note For more information about jitter, see the Usage Guidelines for [video <slot> jitter, page 81](#).

To configure maximum jitter for a session, use this command in global configuration mode.

video slot udp UDP-port-number jitter level

Syntax Description		
<i>slot</i>	The slot in which the Cisco uMG9850 resides in the switch. For valid slot ranges, see Table 5 on page 8 .	
udp	Configures PID filter and jitter parameters for the entire Cisco uMG9850.	
<i>UDP-port-number</i>	UDP port. See UDP Port Mappings: Default and Manual, page 4 .	
jitter	Sets the maximum allowable network jitter for the entire Cisco uMG9850.	
<i>level</i>	Number of milliseconds, from 0 to 200.	

Defaults See Usage Guidelines, below.

Command Modes Global configuration

Command History	Release	Modification
	12.1(20)EU	This command was introduced.

Usage Guidelines See the Usage Guidelines for [video <slot> jitter, page 81](#).



Caution

Do not confuse this command with the subinterface command [video udp, page 108](#).

Examples The following example shows how to set maximum allowable network jitter for UDP session 49152 to 150 milliseconds, for the entire Cisco uMG9850 in slot 6:

```
Switch(config)# video 6 udp 49152 jitter 150
```

Related Commands	Command	Description
	Various	See video, page 76 .
	video <slot> jitter	Configures jitter for all sessions in a selected Cisco uMG9850. See video <slot> jitter, page 81 .

video byte-gap

You can change the spacing between the data bytes within the output video transport stream.

To configure the size of the byte-gap (S-rate) value for an asynchronous serial interface (ASI) port, use the command **video byte-gap** in interface configuration mode. To reset the ASI port to the default gap size, use the **no** form of this command.

video byte-gap *bytes*

no video byte-gap

Syntax Description	byte-gap	Sets the number of null ASI transport bytes to be inserted between data bytes in the output streams.
	<i>bytes</i>	Range is 1 to 4, with a default of 2.
Defaults	2 bytes	
Command Modes	Interface configuration (ASI interface only). See Interface Configuration Mode, page 3 .	
Command History	Release	Modification
	12.1(20)EU	This command was introduced.
Usage Guidelines	None	
Examples	<p>The following example shows an ASI port being configured for a byte-gap value of 3 bytes.</p> <pre>Switch# configure terminal Switch(config)# interface asi 5/15 Switch(config-if)# video byte-gap 3</pre>	
Related Commands	Command	Description
	interface asi	Configures an ASI port. Required for the command video byte-gap . See interface asi, page 53 .

video format

To configure the downstream modulation format for a QAM port, use the **video format** command in subinterface configuration mode. To reset the port to its default modulation rate (256QAM), use the **no** form of this command.

video format { 64 | 256 }

no video format

Syntax Description	64	Configures the port for the 64QAM modulation rate.
	256	Configures the port for the 256QAM modulation rate (default).

Defaults	256QAM
----------	--------

Command Modes	Subinterface configuration (QAM interface only). See Subinterface Configuration Mode, page 4 .
---------------	--

Command History	Release	Modification
	12.1(20)EU	This command was introduced.

Usage Guidelines	Configuring the video modulation rate for one QAM channel automatically configures the same rate for all four QAM channels in its modulator group. Each Cisco uMG9850 has six modulator groups, yielding a total of 24 channels per module. See Video Configuration Modes, page 3 .
------------------	---

Examples	The following example sets a QAM channel for the 64-QAM modulation rate. This configures all four QAM channels (5/1.1 through 5/2.2) in its modulator group for the same modulation rate.
----------	---

```
Switch# configure terminal
Switch(config)# interface qam 5/2.1
Switch(config-subif)# video format 64
```

Related Commands	Command	Description
	video frequency	Sets the frequency on a QAM interface. See video frequency, page 91 .
	video interleave	Sets the FEC interleave on a QAM interface. See video interleave, page 92 .
	video power	Sets the power on a QAM interface. See video power, page 100 .

video frequency

To configure the frequency for the upconverter connected to a QAM port, use this command in subinterface configuration mode.

video frequency *frequency*

Syntax Description	frequency	Sets the port frequency on both channels on a QAM port.
	<i>frequency</i>	Port frequency, in megahertz (MHz). The frequency range for QAM <i>slot/port.1</i> is 50 to 854 MHz, and for QAM <i>slot/port.2</i> is 56 to 860 MHz. For valid slot ranges, see Table 5 on page 8 .

Defaults	The default center frequency, in MHz, for each port is determined by the following formula: $100 + (port_ID * 12)$ where <i>port_ID</i> is an integer from 0 to 11.
----------	--

Command Modes	Subinterface configuration (QAM interface only). See Subinterface Configuration Mode, page 4 .
---------------	--

Command History	Release	Modification
	12.1(20)EU	This command was introduced.

Usage Guidelines	Configuring the frequency for one QAM channel automatically configures the correct frequency for the other QAM channel in its upconverter group. The frequency bandwidth of each QAM upconverter block is 6 MHz. Consequently, if <i>slot/port.1</i> is set to frequency f1, then <i>slot/port.2</i> is set to frequency f1 + 6 MHz. Similarly, if <i>slot/port.2</i> is set to frequency f2, then <i>slot/port.1</i> is set to frequency f2 – 6 MHz.
------------------	---

Examples	The following example sets both QAM channels on port 1 of a Cisco uMG9850 in slot 4 to an upconverter frequency of 850 MHz. This configures the frequency for both QAM channels using this upconverter (4/1.1 and 4/1.2).
----------	---

```
Switch# configure terminal
Switch(config)# interface qam 4/1.1
Switch(config-subif)# video freq 850
```

Related Commands	Command	Description
	video format	Sets the modulation format on a QAM interface. See video format, page 90 .
	video interleave	Sets the FEC interleave on a QAM interface. See video interleave, page 92 .
	video power	Sets the power on a QAM interface. See video power, page 100 .

video interleave

You can change the Reed-Solomon forward error correction (FEC) interleave level and mode on a QAM port.

To configure the FEC interleave parameters for a QAM port, use this command in subinterface configuration mode. To reset the interleave values to their defaults, use the **no** form of this command.

video interleave {**level** *level* | **mode** *mode*}

no video interleave

Syntax Description

interleave	Enables configuration of FEC interleave level and mode.
level	Configures the FEC interleave level for the port.
<i>level</i>	The valid values for <i>level</i> are as follows: <ul style="list-style-type: none"> • 1 = FEC interleave level 1 • 2 = FEC interleave level 2 (default)
mode	Configures the interleave mode for the port.
<i>mode</i>	The mode option can be used only when the interleave level is 2 (default). The valid range for <i>mode</i> is any value from 1 to 14, with the exception of 11 and 13. The default is 6. Each mode configures the port for the “I” and “J” interleave values as shown in Table 11 on page 93 .

Defaults

The default interleave level is 2. The default mode is 6.



Note

The defaults may not work with some MPEG analyzers.

Command Modes

Subinterface configuration (QAM interface only). See [Subinterface Configuration Mode, page 4](#).

Command History

Release	Modification
12.1(20)EU	This command was introduced.

Usage Guidelines

The **video interleave** command configures the operation of the FEC interleave on the QAM channels. If the interleave level and mode is set on one QAM channel, the same value is applied to all four *slot/port* channels in a modulator group. See [Video Configuration Modes, page 3](#).

When operating with level 2 interleave, you can choose the specific interleave parameters by selecting one of the modes shown in [Table 11 on page 93](#):

Table 11 FEC Interleave Mode Values

Mode	I (bytes)	J (depth)
1	128	1
2	128	2
3	64	2
4	128	3
5	32	4
6	128	4
7	16	8
8	128	5
9	8	16
10	128	6
12	128	7
14	128	8

**Note**

You must set mode and level on separate command lines.

Examples

The following example shows how to set a video interleave level of 1 and a mode of 1 on both channels of interface 2 in a Cisco uMG9850 in slot 5:

```
Switch# configure terminal
Switch(config)# interface qam 5/2.1
Switch(config-subif)# video interleave level 1
Switch(config-subif)# video interleave mode 1
```

Related Commands

Command	Description
video format	Sets the modulation format on a QAM interface. See video format, page 90 .
video frequency	Sets the frequency on a QAM interface. See video frequency, page 91 .
video power	Sets the power on a QAM interface. See video power, page 100 .

video interval pat

You can set the interval at which all the Cisco uMG9850 modules in a switch, or a single QAM channel, distribute the program access table (PAT).

To set the PAT interval, use the following command in global or subinterface configuration mode. To reset the PAT interval to the default, use the **no** form of this command.

video interval pat *milliseconds*

no video interval pat

Syntax Description

interval	Configures the interval for transmission of the PAT.
pat	Selects the interval PAT distribution.
<i>milliseconds</i>	Range is 50 to 450 milliseconds.

Defaults

The default rate is 100 milliseconds, the same as for the switch. See Usage Guidelines, below.

Command Modes

Global and subinterface (QAM interface only) configuration. See [Subinterface Configuration Mode, page 4](#).

Command History

Release	Modification
12.1(20)EU	This command was introduced.

Usage Guidelines

This is a PSI command.

Changing the default in global configuration overwrites the rate for the switch. Changing the default in subinterface configuration mode overwrites the rate for the selected QAM channel only.

If any sessions are active in the switch, global PAT and PMT commands are rejected. If no sessions are active, the PAT and PMT rates on each QAM channel are checked. If they are different from the original switch rate, they are left unchanged. If they are the same as the original switch rate, the rate is changed on both the QAM channels and the switch.

Examples

The following example shows how to set a PAT interval of 100 milliseconds for all Cisco uMG9850 modules in a switch:

```
Switch# configure terminal
Switch(config)# video interval pat 200
```

The following example shows how to set a PAT interval of 200 milliseconds for the first QAM channel of port 1 in a Cisco uMG9850 module in slot 5:

```
Switch# configure terminal
Switch(config)# interface qam 5/1.1
Switch(config-subif)# video interval pat 200
```

Related Commands	Command	Description
	video interval pmt	Sets the interval at which all the Cisco uMG9850 modules in a switch distribute the PMT. See video interval pmt, page 96 .
	video interval stats	Sets the interval at which all the Cisco uMG9850 modules in a switch report video statistics. See video interval stats, page 98 .
	Various	See commands indicated as “PSI commands” in Notes column of Table 9 on page 76 .

video interval pmt

You can set the interval at which all the Cisco uMG9850 modules in a switch, or a single QAM channel, distribute the program map table (PMT).

To set the PMT interval, use this command in global or subinterface configuration mode . To reset the PMT interval to the default, use the **no** form of this command.

video interval pmt *milliseconds*

no video interval pmt

Syntax Description

interval	Configures the interval for transmission of the PMT.
pmt	Selects the interval for PMT distribution.
<i>milliseconds</i>	Range is 50 to 450 milliseconds.

Defaults

The default rate is 100 milliseconds, the same as for the switch. See Usage Guidelines, below.

Command Modes

Global and subinterface (QAM interface only) configuration. See [Subinterface Configuration Mode, page 4](#).

Command History

Release	Modification
12.1(20)EU	This command was introduced.

Usage Guidelines

This is a PSI command.

Changing the default in global configuration overwrites the rate for the switch. Changing the default in subinterface configuration mode overwrites the rate for the selected QAM channel only.



Note If any sessions are active in the switch, global PAT and PMT commands are rejected. If no sessions are active, the PAT and PMT rates on each QAM channel are checked. If they are different from the original switch rate, they are left unchanged. If they are the same as the original switch rate, the rate is changed on both the QAM channels and the switch.

Examples

The following example shows how to set a PMT interval of 200 milliseconds for all Cisco uMG9850 modules in a switch:

```
Switch# configure terminal
Switch(config)# video interval pmt 200
```

The following example sets a PMT interval of 200 milliseconds for the first QAM channel of port 1 in a Cisco uMG9850 module in slot 5:

```
Switch# configure terminal
```



```
Switch(config)# interface qam 5/1.1  
Switch(config-subif)# video interval pmt 200
```

Related Commands

Command	Description
video interval pat	Sets the interval at which all the Cisco uMG9850 modules in a switch distribute the PAT . See video interval pat, page 94
video interval stats	Sets the interval at which all the Cisco uMG9850 modules in a switch report video statistics. See video interval stats, page 98 .

video interval stats

You can set the interval at which all the Cisco uMG9850 modules in a switch report video statistics.

To set the statistics interval for all Cisco uMG9850 modules in a switch, use this command in global configuration mode. To reset the statistics interval to the default, use the **no** form of this command.

video interval stats *seconds*

no video interval stats

Syntax Description	interval	Configures the interval for transmission of the PAT and PMT .
	stats	Selects the interval for the statistics.
	<i>seconds</i>	Range is from 0 to 3600 milliseconds.
Defaults	30 seconds	
Command Modes	Global configuration	
Command History	Release	Modification
	12.1(20)EU	This command was introduced.
Usage Guidelines	This is a PSI command. It is not available in subinterface (QAM) configuration mode.	
Examples	The following example shows how to set a video statistics interval of 120 seconds for all Cisco uMG9850 modules in a switch:	
	<pre>Switch# configure terminal Switch(config)# video interval stats 120</pre>	
Related Commands	Command	Description
	clear video <slot> statistics	Clears video statistics on a selected Cisco uMG9850. See clear video <slot> statistics, page 52 .
	video interval pat	Sets the interval at which all the Cisco uMG9850 modules in a switch distribute the PAT. See video interval pat, page 94
	video interval pmt	Sets the interval at which all the Cisco uMG9850 modules in a switch distribute the PMT. See video interval pmt, page 96
	Various	See commands indicated as “PSI commands” in Notes column of Table 9 on page 76 .

video nitpid

The PID for the network information table, or NIT-PID, can be configured from the QAM interface. If the NIT-PID is already used as a video, audio, or data PID, the configuration is rejected.

To specify the program ID (PID) to be used to identify network information table (NIT) packets that are sent on a QAM port, use this command in subinterface (QAM) configuration mode. To reset the port to the default NIT-PID, use the **no** form of this command.

video nitpid *nitpid*

no video nitpid

Syntax Description	nitpid	Configures the PID used to identify the network information table packets.
	<i>nitpid</i>	The NIT-PID number. Range is 16 to 8191.
Defaults	16	
Command Modes	Subinterface configuration (QAM interface only). See Subinterface Configuration Mode, page 4 .	
Command History	Release	Modification
	12.1(20)EU	This command was introduced.
Usage Guidelines	This is a PSI command.	
Examples	<p>The following example shows how to set a NIT-PID of 1003 on the first QAM channel of port 2 of a Cisco uMG9850 module in slot 5:</p> <pre>Switch# configure terminal Switch(config)# interface qam 5/2.1 Switch(config-subif)# video nitpid 1003</pre>	
Related Commands	Command	Description
	video tsid	See video tsid, page 107 .
	Various	See commands indicated as “PSI commands” in Notes column of Table 9 on page 76 .

video power

To configure the power level for the upconverter connected to a QAM channel, use this command in subinterface (QAM) configuration mode. To reset the port to its default power level, use the **no** form of this command.

video power *dBmV*

no video power

Syntax Description

power	Configures the power on both channels of a QAM interface (port).
<i>dBmV</i>	Port power level, in dBmV. Range is 42 to 58 dBmV. See Defaults, below.

Defaults

The default power is 50 dBmV. If a single QAM channel is enabled, the output power can range from 45 to 58 dBmV. If both QAM channels are enabled, the output power can range from 42 to 53 dBmV.

Command Modes

Subinterface configuration (QAM interface only). See [Subinterface Configuration Mode, page 4](#).

Command History

Release	Modification
12.1(20)EU	This command was introduced.

Usage Guidelines

Configuring the output power for one QAM channel automatically configures the same power level for the other QAM channel in its upconverter group.

If both QAM channels are up, RF port power is configured to *dBmV* + 3 dBmV. If only one channel is up, RF port power is configured to *dBmV*. If no channel is up, RF port power is not configured.



Caution

Output powers in software are approximate. Where precise values are required, check the output with an appropriate power meter according to local practice.

Examples

The following example shows how to configure a QAM channel in port 1 of a Cisco uMG9850 in slot 5 for an output power level of 45 dBmV. This configures the output power level for both QAM channels using this upconverter (5/1.1 and 5/1.2).

```
Switch# configure terminal
Switch(config)# interface qam 5/1.1
Switch(config-subif)# video power 45
```

Related Commands

Command	Description
video format	Sets the modulation format on a QAM interface. See video format, page 90 .
video frequency	Sets the frequency on a QAM interface. See video frequency, page 91 .
video interleave	Sets the FEC interleave on a QAM interface. See video interleave, page 92 .

video route

To map the output of a QAM channel to the asynchronous serial interface (ASI) output port monitoring and troubleshooting, use this command in ASI configuration mode. To remove the mapping, use the **no** form of this command.

video route *interface.qam*

no video route *interface.qam*

Syntax Description

route	Maps the output of a QAM channel to the ASI output port.
<i>interface.qam</i>	Specifies the QAM channel on the Cisco uMG9850.

Defaults

No default behaviors or values. See Usage Guidelines, below.

Command Modes

Interface configuration (ASI interface only). See [Subinterface Configuration Mode, page 4](#).

Command History

Release	Modification
12.1(20)EU	This command was introduced.

Usage Guidelines

The ASI port is port 15 on each module. The slot varies. (See [Table 5 on page 8](#).) Use **no shut** to enable the port.

Examples

The following example shows how to map the second QAM channel in port 2 on a Cisco uMG9850 in slot 5 to the ASI output port.

```
Switch# configure terminal
Switch(config)# interface asi 5/15
Switch(config-if)# video route qam 5/2.2
```

Related Commands

Command	Description
interface asi	See interface asi, page 53 .

video sessions

You can override the default session routing on a video line card, and instead map the UDP port of a particular program to a specific QAM channel. Instead of using the command [video udp, page 108](#), to configure individual port maps, you can use this command to generate 25 portmap entries for a selected QAM channel.



Caution

You cannot use both commands on the same QAM channel. See Usage Guidelines, below.

To configure the UDP port mapping for the video sessions on a QAM port, use this command in subinterface configuration mode. To replace nondefault UDP port mapping with default mapping, use the **no** form of this command.

```
video sessions number-of-sessions udp first-UDP-port-number program first-program-number
[even_only]
```

```
no video sessions
```

Syntax Description

sessions	Configures port mapping for a selected number of video sessions.
<i>number-of-sessions</i>	Configures the maximum number of sessions for this UDP port mapping. Range is 2 to 25, with a default of 2.
udp	Selects an incoming UDP port number to be mapped.
<i>first-UDP-port-number</i>	See UDP Port Mappings: Default and Manual, page 4 .
program	Selects the first outgoing program number to be mapped.
<i>first-program-number</i>	The first output program to be configured. Range is 1 to 255, with no default.
even_only	Optional. Uses even UDP port numbers only, reserving odd numbers for Real Time Control Protocol (RTCP) or other purposes.

Defaults

No default behaviors or values

Command Modes

Subinterface configuration (QAM interface only). See [Subinterface Configuration Mode, page 4](#).

Command History

Release	Modification
12.1(20)EU	This command was introduced.

Usage Guidelines

Using **no video sessions** when programs are running on the QAM channel results in the command being rejected. Also, it does not remove the nondefault map, but simply replaces it with the default map.



Tip

Occasionally, if user-defined port mapping is removed, as in the following example:

```
Switch(config-subif)# no video udp 49152 program 1
```

the default port mapping will not appear following the execution of the command `show interface qam <interface.qam> video portmap`. To generate the default port mapping, execute `no video sessions`. See Related Commands, below.

Examples

The following example shows how to map program 28 on UDP port 49874 to QAM channel 5/2.1:

```
Switch# configure terminal
Switch(config)# interface qam 5/2.1
Switch(config-subif)# video sessions 8 udp 49874 program 28
```

The following example shows how to do the same as the above, except that it shows how to select even UDP port numbers only:

```
Switch# configure terminal
Switch(config)# interface qam 5/2.1
Switch(config-subif)# video sessions 8 udp 49874 program 28 even_only
```

The following example shows how to replace nondefault UDP port mapping with default mapping:

```
Switch# configure terminal
Switch(config)# interface qam 5/2.1
Switch(config-subif)# no video sessions
```

Related Commands

Command	Description
<code>show interface qam <interface.qam> video portmap</code>	See show interface qam <interface.qam> video portmap , page 64.
<code>video udp</code>	See video udp , page 108. This command configures UDP portmaps one at a time.
Various	See video , page 76.

video timeout

You can configure when a video session times out when packets are not received after a certain interval. This command applies to all the Cisco uMG9850 modules in a switch. To address a single module, use [video <slot> timeout, page 85](#).

To configure timeout parameters on all Cisco uMG9850 modules in a switch, use this command in global configuration mode. To revert to default values, use the **no** form of this command.

video timeout {**session-close** *minutes* | **signal-loss** *milliseconds*}

no video timeout session-close

no video timeout signal-loss

Syntax Description

timeout	Configures the timeout options.
session-close	Configures the time after packet loss when the video session is closed
<i>minutes</i>	Number of minutes, from 1 to 1440. If no packets come into a session for <i>minutes</i> minutes, the session is closed.
signal-loss	Configures the time after packet loss when a signal loss is assumed. If no packets come into a session after <i>milliseconds</i> milliseconds, the signal is assumed lost.
<i>milliseconds</i>	Number of milliseconds, from 200 to 10000.

Defaults

See Usage Guidelines, below.

Command Modes

Global configuration

Command History

Release	Modification
12.1(20)EU	This command was introduced.

Usage Guidelines

The syntax of this command is similar to that for [video <slot> timeout, page 85](#), except that this command addresses all the Cisco uMG9850 modules in a switch. You must configure each parameter on a separate command line.



Note

When a session is closed, this means that the Cisco uMG9850 has not received any video packets for the given session's UDP port for the period determined by **video slot timeout session-close** or **video timeout session-close**. The session no longer exists, and is not listed following a **show** command. The range is 1 to 1440 minutes. The default is 10 minutes.

When a session is inactive, this means that the Cisco uMG9850 has not received any video packets for the given session's UDP port for the period determined by **video slot timeout signal-loss** or **video timeout signal-loss**. The session still exists, and is listed following a **show** command. If packets start

arriving before the timer set by **video slot timeout session-close** or **video timeout session-close** counts down, the session becomes active. The range is 200 to 10000 milliseconds. The default is 5000 milliseconds.

The value for **video slot timeout signal-loss** or **video timeout signal-loss** should always be larger than the value configured for jitter.

Examples

The following example shows how to set **session-close** to 25 and **signal-loss** to 500 on all the Cisco uMG9850 modules in a switch:

```
Switch(config)# video timeout session-close 25
Switch(config)# video timeout signal-loss 500
```

Related Commands

Command	Description
Various	See video , page 76.
show video <slot>	Shows which sessions are inactive. See show video <slot> , page 66.
video <slot> jitter	See video <slot> jitter , page 81.
video <slot> timeout	See video <slot> timeout , page 85.

video tsid

At each hub, each QAM channel must have a unique transport stream ID (TSID). The software checks for and guarantees the uniqueness of a TSID within a chassis only.

To specify the transport stream ID (TSID) to be used to identify transport stream packets that are sent on a QAM channel, use this command in subinterface configuration mode:

```
video tsid tsid
```

Syntax Description	tsid	Configures the transport stream ID.
	<i>tsid</i>	Specifies the unique identifier for the transport stream on the output port. Range is 1 to 65535, with no default.

Defaults By default, nonconflicting TSIDs are assigned to all Cisco uMG9850 modules in a switch. See Usage Guidelines, below.

Command Modes Subinterface configuration (QAM interface only). See [Subinterface Configuration Mode, page 4](#).

Command History	Release	Modification
	12.1(20)EU	This command was introduced.

Usage Guidelines Note the following Caution:



Caution

Although by default nonconflicting TSIDs are assigned to all Cisco uMG9850 modules in a switch, the user can assign conflicting TSIDs within an individual module, resulting in conflicts with other TSIDs in the switch. It is the responsibility of the MSO to avoid TSID conflicts. To see all the TSIDs within a switch, use the command [show video <slot>](#), [page 66](#), and address each Cisco uMG9850 in the switch.

Examples The following example shows how to specify a transport stream ID of 1001 for all packets sent out QAM channel 2 in port 2 of a Cisco uMG9850 in slot 5:

```
Switch# configure terminal
Switch(config)# interface qam 5/2.1
Switch(config-subif)# video tsid 1001
```

Related Commands	Command	Description
	video nitpid	See video nitpid, page 99 .
	Various	See commands indicated as “PSI commands” in Notes column of Table 9 on page 76 .

video udp

Each QAM channel has a default UDP port mapping. For example, a video stream with a destination UDP of 0xd821 will be sent to slot 3, QAM port 1 as output program 1. However, for a given User Datagram Protocol (UDP) session, you can remap (1) input packet IDs (PIDs) and (2) output program numbers to output PIDs on a QAM channel.

To remap either of the above, use this command in subinterface (QAM channel) configuration mode. To remove the user defined portmapping for a specific port number and program, use the **no** form of this command.

```
video udp UDP-port-number {[in in-pid out out-pid] | program prog-number}
```

```
no video udp UDP-port-number program prog-number
```

Syntax Description

udp	Configures UDP parameters
<i>UDP-port-number</i>	UDP port number for the desired incoming session. Range is 49152 to 65535, with no default. See UDP Port Mappings: Default and Manual, page 4 .
in	Configures the input PID to be filtered out from this session.
<i>in-pid</i>	Range is 16 to 8191, with no default.
out	Statically maps the input PID to the specified output PID, overriding the default output PID that is generated by the video subsystem.
<i>out-pid</i>	Range is 16 to 8191, with no default.
program	Creates a static route that maps an output program number on a UDP port to a QAM channel.
<i>prog-number</i>	The program to be routed. Range is from 1 to 255, with no default.

Defaults

No default behaviors or values

Command Modes

Subinterface (QAM channel) configuration. See [Subinterface Configuration Mode, page 4](#).

Command History

Release	Modification
12.1(20)EU	This command was introduced.

Usage Guidelines

An *in-pid* can be filtered whether or not an *out-pid* is specified.



Timesaver

To generate a range of 25 UDP portmaps automatically, use the command [video sessions, page 103](#).

Examples

The following example shows how to map input PID 16 on UDP session 49152 on interface 5/2.1 to output PID 17:

```
Switch# configure terminal
Switch(config)# interface qam 5/2.1
Switch(config-subif)# video udp 49152 in 16 out 17
Switch(config-subif)#
```

The following example shows how to route the input stream delivered to UDP port 49152 to QAM channel 5/2.1 as program 1:

```
Switch# configure terminal
Switch(config)# interface qam 5/2.1
Switch(config-subif)# video udp 49152 program 1
```

The following example shows how to remove the user-defined portmapping UDP port 49152 to QAM channel 5/2.1 as program 1:

```
Switch# configure terminal
Switch(config)# interface qam 5/2.1
Switch(config-subif)# no video udp 49152 program 1
```

**Tip**

Occasionally, if user-defined port mapping is removed, the default port mapping does not appear following the execution of the command [show interface qam <interface.qam> video portmap](#). To generate the default port mapping, execute **no video sessions**. See Related Commands, below.

Related Commands

Command	Description
show interface qam <interface.qam> video portmap	See show interface qam <interface.qam> video portmap , page 64.
video <slot> udp <UDP-port-number> filter-pid	See video <slot> udp <UDP-port-number> filter-pid , page 87, for a discussion of the global version of this command.
video sessions	Use this command to generate 25 UDP portmap entries automatically. See video sessions , page 103.

video utilization-threshold

It is possible that a given QAM channel can be either overwhelmed or underutilized. To monitor and correct for this, you can set either or both minimum and maximum bandwidth-utilization thresholds for video streams over a QAM channel.

To specify the high and low utilization thresholds for video streams, use this command in subinterface (QAM channel) configuration mode. To reset the values to their defaults, use the **no** form of this command.

video utilization-threshold {[**low** *low-utilization threshold*] / [**high** *high-utilization-threshold*]}

no video utilization-threshold

Syntax Description	utilization-threshold	Enables the setting of low and high utilization thresholds for video traffic on a QAM channel.
	low	Sets the low threshold.
	<i>low-utilization-threshold</i>	Utilization in percent, ranging from 0 through 95. See Defaults, below.
	high	Sets the high threshold.
	<i>high-utilization-threshold</i>	Utilization in percent, ranging from 5 through 95. See Defaults, below.

Defaults The default low utilization threshold is 0 percent. The default high utilization threshold is 75 percent.

Command Modes Subinterface configuration (QAM interface only). See [Subinterface Configuration Mode, page 4](#).

Command History	Release	Modification
	12.1(20)EU	This command was introduced.

Usage Guidelines If the percentage of QAM bandwidth being used is below the value for **low**, then the QAM channel is being underutilized. If the percentage of QAM bandwidth being used is above the value for **high**, then the QAM channel is being overutilized.

The high utilization threshold must be greater than the low utilization threshold. You can set either or both thresholds.

Examples The following example shows how to set a low utilization threshold of 10 percent on interface 5/2.1:

```
Switch# configure terminal
Switch(config)# interface qam 5/2.1
Switch(config-subif)# video utilization-threshold low 10
```

The following example shows how to set a high utilization threshold of 80 percent on interface 5/2.1:

```
Switch# configure terminal  
Switch(config)# interface qam 5/2.1  
Switch(config-subif)# video utilization-threshold high 80
```

Related Commands

Command	Description
Various	See video , page 76.

Glossary

ASI—asynchronous serial interface
 CLI—command-line interface
 Dhub—distribution hub
 DVB—digital video broadcasting
 ES—elementary stream
 GE—Gigabit Ethernet
 ISA—Industry Standard Architecture
 MIB—Management Information Base
 MPTS—multiple program transport stream
 MPEG—Moving Picture Experts Group
 MSO—multiple systems operator
 NIT—network information table
 PAT—program association table
 PID—packet ID
 PMT—program map table
 PSI—program-specific information
 RTCP—Real Time Control Protocol
 Session—a presentation program in Video on Demand (VoD)
 SPTS—single program transport stream
 STB—set-top box
 UDP—user datagram protocol
 uMG—universal media gateway
 VoD—Video on Demand


Note

Refer to [Internetworking Terms and Acronyms](#) for terms not included in this glossary.

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