

# Cisco uBR7246 Universal Broadband Router Feature Enhancements

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## Feature Summary

The enhancements to the Cisco uBR7246 cable router extend and improve the command line interface (CLI). It supports burst profile, quality of service (QoS), improved parameter configuration, and the MC11 modem card.

Downstream QoS handling is compliant with Multimedia Cable Network System (MCNS) requirements, and upstream QoS handling and Spectrum Management have been improved.

The Cisco uBR7246 now supports multicast authentication via RADIUS, and security has been enhanced for baseline privacy (including MCNS Data Over Cable System Interface Specification (DOCSIS) compliance). Also, this cable router now supports Dynamic Host Configuration Protocol (DHCP) Relay Subscriber ID Insertion.

## Benefits

These enhancements to the Cisco uBR7246 cable router bring value to the digital broadband network by:

- Supporting burst profile configuration.
- Allowing QoS configuration including downstream QoS handling that is compliant with MCNS requirements and improved upstream QoS handling.
- Enhancing security for baseline privacy.

## Platforms

This feature is supported on the Cisco uBR7246 router only.

## Prerequisites

Complete the basic configuration of the Cisco uBR7246 as described in the *Cisco uBR7246 Universal Broadband Router Installation and Configuration Guide* and the *Voice, Video, and Home Applications Configuration Guide*.

## Supported MIBs and RFCs

The Cisco uBR7246 features support the Radio Frequency (RF) Interface Management Information Base (MIB). For descriptions of supported MIBs and how to use MIBs, see Cisco's MIB website on Cisco Connection Online (CCO) at <http://www.cisco.com/public/sw-center/netmgmt/cmtk/mibs.shtml>. No RFCs are supported by this feature.

## Configuration Tasks

The configuration tasks required by this version of the Cisco uBR7246 cable router are the same as those described in the *Cisco uBR7246 Universal Broadband Router Installation and Configuration Guide* and the *Voice, Video, and Home Applications Configuration Guide*.

## Verify

The verification tasks required by this version of the Cisco uBR7246 cable router are the same as those described in the *Cisco uBR7246 Universal Broadband Router Installation and Configuration Guide* and the *Voice, Video, and Home Applications Configuration Guide*.

Note the following:

- The controller must report being up.
- The comparison of the number of errors versus the number of error-free packets is a measure of the link quality. The percentage of errors should be less than 1%.

## Configuration Examples

Refer to the *Cisco uBR7246 Universal Broadband Router Installation and Configuration Guide* and the *Voice, Video, and Home Applications Configuration Guide* for configuration examples.

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# Command Reference

This section documents new or modified commands. All other commands used with this feature are documented in the Cisco IOS Release 11.3 command references.

- **cable downstream modulation**
- **cable flap-list aging**
- **cable flap-list insertion-time**
- **cable flap-list power-adjust threshold**
- **cable flap-list size**
- **cable helper-address**
- **cable insertion-interval**
- **cable match address**
- **cable modulation-profile**
- **cable privacy**
- **cable qos permission**
- **cable qos profile**
- **cable relay-agent-option**
- **cable shared-secret**
- **cable spectrum-group**
- **cable spectrum-group band**
- **cable spectrum-group frequency**
- **cable spectrum-group hop period**
- **cable spectrum-group hop threshold**
- **cable upstream channel-width**
- **cable upstream data-backoff automatic**
- **cable upstream data-backoff**
- **cable upstream modulation-profile**
- **cable upstream range-backoff automatic**
- **cable upstream range-backoff**
- **clear cable flap-list**
- **clear cable modem counters**
- **clear cable modem reset**
- **ping cable-modem**
- **show cable flap-list**
- **show cable modem**
- **show cable modulation-profile**
- **show cable qos permission**

- **show cable qos profile**
- **show cable spectrum-group**
- **show controllers cable downstream**
- **show controllers cable upstream**
- **show interface cable**
- **show interface cable sid**
- **show interface cable signal-quality**

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## cable downstream modulation

To set the modulation rate for a downstream port on a cable modem card, use the **cable downstream modulation** cable interface configuration command:

```
cable downstream modulation { 64qam | 256qam }
```

### Syntax Description

**64qam** Modulation is 6 bits per symbol.

**256qam** Modulation is 8 bits per symbol.

### Default

64qam.

### Command Mode

Cable interface configuration

### Usage Guidelines

This command was added in Cisco IOS Release 11.3 XA.

Downstream modulation defines the modulation type used in for downstream traffic. Specifying the symbol rate indirectly influences the interface speed: at 64qam, the interface speed is 6xx bits/second. Specifying 256qam sets the interface speed to 8xx bits/second.

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**Note** The Cisco cable modem cards support a downstream modulation setting for 256-QAM (8 bits per downstream symbol rate) as of 11.3(6)NA.

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### Example

The following example sets the downstream modulation:

```
Router(config-if) cable downstream modulation 64
```

## cable flap-list aging

To specify the number of days to age the cable modem from the flap-list table, use the **cable flap-list aging** global configuration command. Use the **no** form of this command to disable this feature.

**cable flap-list aging** *number of days*  
**no cable flap-list aging**

### Syntax Description

<i>number of days</i>	Specifies how many days of cable modem performance is retained in the flap list. Valid values are from 1-60 days.
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### Default

None.

### Command Mode

Global configuration

### Usage Guidelines

This command first appeared in Cisco IOS Release 11.3 NA.

A flap list is a table maintained by the Cisco uBR7246 for every modem (active or not) that is having communication difficulties. (Flapping refers to the rapid disconnecting and reconnecting of a cable modem that is having problems holding a connection.) The flap list contains modem MAC addresses and logs the time of the most recent activity. You can configure the size and entry thresholds for the flap list.

### Example

The following example specifies that the flap-list table retain two days of performance for this cable modem:

```
Router(config)# cable flap-list aging 2
```

### Related Commands

**cable flap-list insertion time**  
**cable flap-list size**  
**cable flap-list power-adjust threshold**  
**cable flap-list miss-threshold**  
**clear cable flap-list**

## cable flap-list insertion-time

To set the insertion time interval, use the **cable flap-list insertion-time** global configuration command. Use the **no** form of this command to disable insertion time.

**cable flap-list insertion-time** *seconds*  
**no cable flap-list insertion-time**

### Syntax Description

*seconds* Insertion time interval in seconds. Valid values are from 60 to 86400 seconds.

### Default

None.

### Command Mode

Global configuration

### Usage Guidelines

This command first appeared in Cisco IOS Release 11.3 NA. This command controls the operation of a flapping modem detector. When the link establishment rate of a modem is shorter than the period defined by this command, the modem is placed in the flap list.

### Example

The following example sets the insertion time interval to 62 seconds:

```
Router(config)# cable flap-list insertion-time 62
```

### Related Commands

**cable flap-list size**  
**cable flap-list power-adjust threshold**  
**cable flap-list aging**  
**cable flap-list miss-threshold**  
**clear cable flap-list**

## cable flap-list power-adjust threshold

To specify the power-adjust threshold for recording a flap-list event, use the **cable flap-list power-adjust threshold** global configuration command. Use the **no** form of this command to disable power-adjust thresholds.

**cable flap-list power-adjust threshold** *dBmV*  
**no cable flap-list power-adjust threshold**

### Syntax Description

*dBmV* Valid values are from 1 to 10 dBmV.

### Default

None.

### Command Mode

Global configuration

### Usage Guidelines

This command first appeared in Cisco IOS Release 11.3 NA. This command controls the operation of a flapping modem detector. When the power adjustment of a modem exceeds the threshold, the modem is placed in the flap list.

### Example

The following example the following command sets the power-adjust threshold to 1:

```
Router(config)# cable flap-list power-adjust threshold 1
```

### Related Commands

**cable flap-list insertion time**  
**cable flap-list size**  
**cable flap-list aging**  
**cable flap-list miss-threshold**  
**clear cable flap-list**

## cable flap-list size

To specify the maximum number of modems reported in the flap-list table, use the **cable flap-list size** global configuration command. Use the **no** form of this command to specify the default flap-list table size.

**cable flap-list size** *number*  
**no cable flap-list size**

### Syntax Description

*number* Specifies the number of modems that report flap performance to the flap-list table. Valid values are from 1-8191.

### Default

8192.

### Command Mode

Global configuration

### Usage Guidelines

This command first appeared in Cisco IOS Release 11.3 NA.

### Example

The following example limits the flap-list table size to no more than 2 modems:

```
Router(config)# cable flap-list size 2
```

### Related Commands

**cable flap-list size**  
**cable flap-list power-adjust threshold**  
**cable flap-list aging**  
**cable flap-list miss-threshold**  
**clear cable flap-list**

## cable helper-address

To specify a destination address for User Datagram Protocol (UDP) broadcast (DHCP) packets, use the **cable helper-address** interface configuration command. Use the **no** form of this command to disable this feature.

```
cable helper-address IP-address { cable-modem | host }  
no cable helper-address IP-address { cable-modem | host }
```

### Syntax Description

<i>IP-address</i>	The IP address of a DHCP server.
<i>cable-modem</i>	Specifies that only cable modem UDP broadcasts are forwarded.
<i>host</i>	Specifies that only host UDP broadcasts are forwarded.

### Default

None.

### Command Mode

Interface configuration

### Usage Guidelines

This command first appeared in Cisco IOS Release 11.3 NA. If you specify a secondary interface address, the giaddr field in the DHCP requests will be sent to the primary address for DHCP requests received from cable modems, and to the secondary IP address for DHCP requests received from hosts.

### Examples

The following example forwards UDP broadcasts from cable modems to the DHCP server at 172.23.66.44:

```
Router(config-if)# cable helper-address 172.23.66.44 cable-modem
```

The following example forwards UDP broadcasts from hosts to the DHCP server at 172.23.66.44:

```
Router(config-if)# cable helper-address 172.23.66.44 host
```

## cable insertion-interval

To set the time between opportunities for cable modems to request a connection from the Cisco uBR7246, use the **cable insertion-interval** interface configuration command. Use the **no** form of this command to use the automatic setting and ignore any minimum or maximum time settings.

```
cable insertion-interval { automatic | [min] [max]}
no cable insertion-interval
```

### Syntax Description

<b>automatic</b>	Causes the Cisco uBR7246 MAC scheduler for each upstream modem to vary the frequency of initial ranging slots used by new modems joining the network.
<i>min</i>	Minimum time in milliseconds that the cable modem termination system (CMTS) is allowed to vary the initial ranging slot time. Valid values are from 25 to 200 milliseconds. Default is 50 milliseconds.
<i>max</i>	Maximum time in milliseconds that the CMTS is allowed to vary the initial ranging slot time. Valid values are from 500 to 2000 milliseconds. Default is 2000 milliseconds (that is, 2 seconds).

### Default

automatic (dynamically varying the frequency of initial ranging upstream slots between 50 milliseconds to 2 seconds).

### Command Mode

Interface configuration

### Usage Guidelines

This command first appeared in Cisco IOS Release 11.3 NA. Use this command to configure the frequency at which the initial maintenance interval is to appear in MAP messages. MAP messages define the precise time intervals during which modems can transmit.

Use the **automatic** keyword with this command when you have to bring a lot of modems on line quickly (for example, after a major power failure). Override the **automatic** keyword by specifying an insertion interval.

### Example

The following example shows the minimum time period between initial ranging slots of 25 milliseconds:

```
Router(config-if)# cable insertion-interval automatic 25
```

### Related Commands

**cable insertion-interval**

## cable match address

To specify that IP multicast streams be encrypted, use the **cable match address** interface configuration command. Use the **no** form of this command if you do not want to use encryption.

**cable match address** *access-list*  
**no cable match address**

### Syntax Description

*access-list*

Specifies that the IP multicast streams defined by the access list be encrypted. Access lists can be IP access list numbers or an IP access list name. Valid access list numbers are 100-199

### Default

None.

### Command Mode

Interface configuration

### Usage Guidelines

This command first appeared in Cisco IOS Release 11.3 NA. Configure the access list using the **ip access-list** command.

### Examples

The following example specifies that the multicast stream defined by the access list named **reno** be encrypted:

```
Router(config-if)# cable match address reno
```

The following example specifies that the multicast stream defined by the access list number **102** be encrypted:

```
Router(config-if)# cable match address 102
```

### Related Commands

**ip access-list**

## cable modulation-profile

To define the modulation profile, use the **cable modulation-profile** global configuration command. Use the **no** form of this command to remove the specified modulation profile, except for modulation profile 1. In the case of modulation profile 1, the **no** form of this command sets all of the parameters in a burst to default values.

```
cable modulation-profile profile iuc fec-bytes fec-len burst-len guard-t mod scrambler seed diff
pre-len last-cw uw-len
no cable modulation-profile profile iuc fec-bytes fec-len burst-len guard-t mod scrambler seed
diff pre-len last-cw uw-len
```

## Syntax Description

<i>profile</i>	The modulation profile number.
<i>iuc</i>	Interval usage code. Valid entries are: <b>initial</b> , <b>long</b> , <b>request</b> , <b>short</b> , or <b>station</b> .
<i>fec-bytes</i>	The number of bytes that can be corrected per FEC code word. Valid values are from 0 to 10, where 0 means no FEC.
<i>fec-len</i>	FEC code word length. Valid values are from 16-253 kbytes.
<i>burst-len</i>	Maximum burst length in minislots. Valid values are from 0 to 255, where 0 means no limit.
<i>guard-t</i>	Guard time in symbols. The time between successive bursts.
<i>mod</i>	Modulation. Valid values are <b>16qam</b> and <b>qpsk</b> .
<i>scrambler</i>	Enable or disable scrambler. Valid entries are <b>scrambler</b> and <b>no-scrambler</b> .
<i>seed</i>	Scrambler seed in hexadecimal format. Valid values are from 0x0000 to 0x7FFF.
<i>diff</i>	Enable or disable differential encoding. Valid entries are <b>diff</b> and <b>no-diff</b> .
<i>pre-len</i>	Preamble length in bits. Valid values are from 2 to 128.
<i>last-cw</i>	Handling of FEC for last code word. Valid entries are <b>fixed</b> for fixed code word length and <b>shortened</b> for shortened last code word.
<i>uw-len</i>	Upstream unique word length. Enter <b>uw8</b> for 8-bit unique words or <b>uw16</b> for 16-bit unique code words.

## Default

None.

## Command Mode

Global configuration

## Usage Guidelines

This command first appeared in Cisco IOS Release 11.3 NA.



**Caution** Changes to modulation profiles causes changes to the physical layer. Because changing physical layer characteristics affects router performance and function, this task should be reserved for expert users.

## Example

The following example defines the burst parameters for profile 2 as follows:

The request burst is defined to have 0 fec-tbytes, 16 kbytes fec-len, a burst-len of 1, a guard time of 8, a mod value of qpsk, scrambler enabled with a seed value of 152, differential encoding is disabled, a preamble length of 64 bits, a fixed code word length, and 8-bit unique words for upstream unique word length. The remaining initial, station, short, and long bursts are defined in similar fashion for profile 2.

```
Router(config)# cable modulation-profile 2 request 0 16 1 8 qpsk scrambler 152 no-diff
64 fixed uw8
Router(config)# cable modulation-profile 2 initial 5 34 0 48 qpsk scrambler 152 no-diff
128 fixed uw16
Router(config)# cable modulation-profile 2 station 5 34 0 48 qpsk scrambler 152 no-diff
128 fixed uw16
Router(config)# cable modulation-profile 2 short 6 75 6 8 16qam scrambler 152 no-diff
144 fixed uw8
Router(config)# cable modulation-profile 2 long 8 220 0 8 16qam scrambler 152 no-diff
160 fixed uw8
```

---

**Note** You have to create all of the bursts (request, initial, station, short and long) for this modulation profile in order to use the modulation profile command.

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See Table 3 for a description of the output display fields.

## Related Commands

**cable upstream modulation-profile**  
**show cable modulation-profile**

## cable privacy

To enable privacy in the system, use the **cable privacy** interface configuration command. Use the **no** form of this command to disable privacy.

```
cable privacy [mandatory | authenticate-modem | authorize-multicast]
no cable privacy
```

## Syntax Description

<b>mandatory</b>	(Optional) Enforce Baseline Privacy for all modems.
<b>authenticate-modem</b>	(Optional) Use AAA protocols to authenticate all modems during BPI initialization.
<b>authorize-multicast</b>	(Optional) Use AAA protocols to authorize all multicast stream (IGMP) join requests.

## Default

Mandatory.

## Command Mode

Interface configuration

## Usage Guidelines

This command first appeared in Cisco IOS Release 11.3 NA. While the default for this command is enable privacy, it is not mandatory.

## Examples

The following example displays the options available with this command:

```
Router(config-if)# cable privacy ?
  authenticate-modem  turn on BPI modem authentication
  authorize-multicast  turn on BPI multicast authorization
  kek                 KEK Key Parms
  mandatory           force privacy be mandatory
  tek                 TEK Key Parms
```

The following example turns on BPI modem authentication:

```
Router(config-if)# cable privacy authenticate-modem
```

The following example turns on BPI muticast authorization:

```
Router(config-if)# cable privacy authorize-multicast
```

The following example forces Baseline Privacy to be used for all modems:

```
Router(config-if)# cable privacy mandatory
```

## Related Commands

**ping cable-modem**

## cable qos permission

To specify permission for updating the QoS table, use the **cable qos permission** global configuration command. Use the **no** form of this command to remove a previously enabled permission.

```
cable qos permission {create-snmp / modems / update-snmp}  
no cable qos permission
```

### Syntax Description

<i>create-snmp</i>	Permits creation of QoS table entries by Simple Network Management Protocol (SNMP).
<i>modems</i>	Permits creation of QoS table entries by modem registration requests.
<i>update-snmp</i>	Permits dynamic update of QoS table entries by SNMP.

### Default

Enable by modem and SNMP.

### Command Mode

Global configuration

### Usage Guidelines

This command first appeared in Cisco IOS Release 11.3 NA.

### Example

The following example enables modems to request arbitrary QoS parameters:

```
Router(config)# cable qos permission modems
```

### Related Commands

```
cable qos profile  
show cable qos permission  
show cable qos profile
```

## cable qos profile

To configure a QoS profile, use the **cable qos profile** global configuration command. Use the **no** form of this command to either set default values for profile group numbers 1 or 2, or remove the QoS profile if no specific parameters remain.

```
cable qos profile { groupnum | guaranteed-upstream / max-burst / max-upstream /
max-downstream / priority / tos-overwrite / value }
no cable qos profile { groupnum | guaranteed-upstream / max-burst / max-downstream / priority
/ tos-overwrite / value }
```

## Syntax Description

<i>groupnum</i>	QoS profile group number. QoS profiles 1 and 2 are required by the system. QoS profile 1 is used during registration and QoS profile 2 is the default QoS profile. Both profiles are preconfigured and cannot be removed. However, you can modify these profiles.
<i>guaranteed-upstream</i>	Guaranteed minimum upstream rate in kilobytes per second. Valid values are from 0 to 100,000. Default value is 0 (no reserved rate).
<i>max-burst</i>	Maximum upstream transmit burst size in bytes that the modem can send for any single transmit burst. Valid values are from 0 to 255 minislots. Default value is 0 (no limit).
<i>max-upstream</i>	Maximum upstream data rate in kilobytes per second that a modem using this QoS profile will receive. Valid values are from 0 to 255 minislots. Default value is 0 (no upstream rate limit).
<i>max-downstream</i>	Maximum downstream data rate in kilobytes per second that a modem using this QoS profile will receive. Valid values are from 0 to 255 minislots. Default value is 0 (no downstream rate limit).
<i>priority</i>	Relative priority number assigned to upstream traffic by this QoS profile. Valid values are from 0 to 7, with 7 being the highest priority. Default value is 0.
<i>tos-overwrite</i>	Overwrite the Type of Service (TOS) field in the IP datagrams received on the upstream before forwarding them downstream (or IP backbone). This parameter sets the mask-hex (hexadecimal mask) bits to value hex (hexadecimal value). This helps the CMTS identify datagrams for QoS on the backbone.
<i>value</i>	The value substituted for the TOS value. See above.

## Default

None.

## Command Mode

Global configuration

## Usage Guidelines

This command first appeared in Cisco IOS Release 11.3 NA.

## Examples

The following examples configure QoS profile 4 with guaranteed upstream of 2 kbps, maximum transmission burst of 2, maximum downstream rate of 3 kbps, with a priority of 4, cable baseline privacy set, and a *tos-overwrite* mask and value byte (in hex) of 0x2:

```
Router(config)# cable qos profile 4 guaranteed-upstream 2
Router(config)# cable qos profile 4 max-burst 2
Router(config)# cable qos profile 4 max-downstream 3
Router(config)# cable qos profile 4 priority 4
Router(config)# cable qos profile 4 tos-overwrite 0x2
```

## Related Commands

**cable qos permission**  
**show cable qos profile**

## cable relay-agent-option

To enable the system to insert the cable modem MAC address into a DHCP packet received from a modem or host and forward the packet to a DHCP server, use the **cable relay-agent-option** interface configuration command. Use the **no** form of this command to disable insertion.

**cable relay-agent-option**  
**no cable relay-agent-option**

### Syntax Description

This command has no keywords or arguments.

### Default

**no cable relay-agent-option.**

### Command Mode

Interface configuration

### Usage Guidelines

This command first appeared in Cisco IOS Release 11.3 NA. This functionality enables a DHCP server to identify the user (cable modem) sending the request and initiate appropriate action based on this information.

### Example

The following example enables the insertion of DHCP relay agent information into DHCP packets:

```
Router(config-if)# cable relay-agent-option
```

## cable shared-secret

To configure authentication and data privacy parameters, use the **cable shared-secret** interface configuration command. Use the **no** form of this command to disable authentication during the modem's registration phase.

**cable shared-secret** [**0** | **7**] *authentication-key*  
**no cable shared-secret**

### Syntax Description

<b>0</b>	(Optional) Specifies that an unencrypted message will follow.
<b>7</b>	(Optional) Specifies that an encrypted message will follow.
<i>authentication-key</i>	Text string is a shared secret string. When you enable the service password-encryption option, the password is stored in encrypted form. The text string is a 64-character authentication key.

### Default

**no cable shared-secret.**

### Command Mode

Interface configuration

### Usage Guidelines

This command first appeared in Cisco IOS Release 11.3 XA.

### Example

The following example activates cable modem authentication, using “3344912349988...sf” as the shared secret key and indicating that an encrypted message follows:

```
router (if-config) # cable shared-secret 7 3344912349988cisco@xapowenaspasdpuy230jhm...sf
```



## cable spectrum-group band

To configure a continuous band setting for a spectrum group, use the **cable spectrum-group band** global configuration command. Use the **no** form of this command to delete the band settings for a spectrum group.

```
cable spectrum-group group-number [time day hh:mm:ss] [delete] band start-freq-hz
end-freq-hz [power-level-dbmV]
no cable spectrum-group group-number
```

### Syntax Description

<i>group-number</i>	Spectrum group number. Valid values are from 1 to 32.
<b>time day</b> <i>hh:mm:ss</i>	(Optional) For scheduled spectrum groups, makes the band setting available at the specified time.
<b>delete</b>	(Optional) When specified, removes the band setting from use at the specified time.
<b>band</b>	Specifies that a continuous band setting be used in this group.
<i>start-freq-hz</i>	Lower boundary of the frequency band.
<i>end-freq-hz</i>	Upper boundary of the frequency band.
<i>power-level-dbmV</i>	(Optional) Nominal input power level. Valid values are from -10 to +10 decibels per millivolt (dBmV). Some cable plants might want to change only the input power level and not frequency on a daily time schedule.

### Default

None.

### Command Mode

Global configuration

### Usage Guidelines

This command first appeared in Cisco IOS Release 11.3 XA1. This command specifies that a continuous band setting be used as a unit of allocated spectrum within this spectrum group. Cable plants can choose to set up a daily schedule that changes the input power level and not the frequency.

### Examples

The following example specifies that all the upstream ports for spectrum-group 4 share the same spectrum from 5000004 Hz to 40000000 Hz with a power level of 5 dBmV on Mondays at noon:

```
Router(config)# cable spectrum-group 4 time Monday 12:00:00 band 5000004 40000000 5
```

The following example deletes the frequency band created in the previous example:

```
Router(config)# cable spectrum-group 4 time Monday 12:00:00 delete band 5000004 40000000 5
```

## cable spectrum-group frequency

To configure a spectrum group to use a center frequency, use the **cable spectrum-group frequency** global configuration command. Use the **no** form of this command to delete the configured frequency setting for this spectrum group.

```
cable spectrum-group groupnum [time day hh:mm:ss] [delete] frequency freq-hz [dBmV]  
no cable spectrum-group groupnum [time day hh:mm:ss] [delete] frequency freq-hz [dBmV]
```

### Syntax Description

<i>groupnum</i>	Spectrum group number. Valid values are from 1 to 32.
<b>time day</b> <i>hh:mm:ss</i>	(Optional) When specified, makes the frequency setting available at the specified time.
<b>delete</b>	(Optional) When specified, removes the frequency setting from use at the specified time.
<b>frequency</b>	Specifies that a center frequency setting should be used in this group.
<b>freq-hz</b>	Upstream center frequency. Valid values are from 5,000,000 to 42,000,000 Hz. Half of the upstream carrier energy is distributed above and half below the specified frequency.
<b>dBmV</b>	(Optional) Nominal input power level. Valid values are from -10 to +10 dBmV.

### Default

None.

### Command Mode

Global configuration

### Usage Guidelines

This command first appeared in Cisco IOS Release 11.3 XA1. A spectrum group allows the upstream frequency and input power level to change whenever noise impairs upstream traffic.

Cable plants can choose to set up a daily schedule that changes the input power level and not the frequency.

### Example

The following example configures spectrum group 4 with an upstream frequency of 5000004 Hz and a power level of 5 dBmV:

```
Router(config)# cable spectrum-group 4 frequency 5000004 5
```

## cable spectrum-group hop period

To set the frequency-hop period, use the **cable spectrum-group hop period** global configuration command. Use the **no** form of this command to delete the frequency hop period for this spectrum group.

**cable spectrum-group** *groupnum* **hop period** *1-3600 seconds*  
**no cable spectrum-group** *groupnum* **hop period**

### Syntax Description

<i>groupnum</i>	Spectrum group number. Valid values are from 1 to 32.
<i>1-3600 seconds</i>	Specifies the frequency-hop time period. Valid values are from 1 to 3600 seconds.

### Default

300 seconds.

### Command Mode

Global configuration

### Usage Guidelines

This command first appeared in Cisco IOS Release 11.3 NA.

### Example

The following example sets the frequency hop period to 60 seconds:

```
Router(config)# cable frequency-hop period 60
```

### Related Commands

**cable spectrum-group hop threshold**

## cable spectrum-group hop threshold

To specify a hop threshold for a spectrum group, use the **cable spectrum-group hop threshold** global configuration command. Use the **no** form of this command to delete the hop threshold for this spectrum group.

**cable spectrum-group** *groupnum* **hop threshold** [*1-100 percent*]  
**no cable spectrum-group** *groupnum* **hop threshold**

### Syntax Description

<i>groupnum</i>	Spectrum group number. Valid values are from 1 to 32.
<i>1-100 percent</i>	(Optional) Specifies the hop threshold. Valid range of modems is 1 to 100%.

### Default

100 percent.

### Command Mode

Global configuration

### Usage Guidelines

This command first appeared in Cisco IOS Release 11.3 NA.

### Example

The following example limits the maximum number of modems to 2000:

```
Router(config)# cable spectrum-group hop threshold 2000
```

### Related Commands

**cable spectrum-group hop period**

## cable upstream channel-width

To specify an upstream channel width, use the **cable upstream channel-width** interface configuration command. Use the **no** form of this command to set the channel width to 1600000 for a port number.

**cable upstream** *portnum* **channel-width** *width*  
**no cable upstream** *portnum* **channel-width**

### Syntax Description

<i>portnum</i>	Port number.
<i>width</i>	Specifies upstream channel width in Hz. Valid values are 200000 (160000 symbols/sec), 400000 (320000 symbols/sec), 800000 (640000 symbols/sec), 1600000 (1280000 symbols/sec), and 3200000 (2560000 symbols/sec)

### Default

1600000 Hz.

### Command Mode

Interface configuration

### Usage Guidelines

This command first appeared in Cisco IOS Release 11.3 NA.

### Example

The following example configures port 2 with a channel width of 200 kHz (which is equivalent to a symbol rate of 160 ksym/s):

```
Router(config-if)# cable upstream 2 channel-width 200000
```

## cable upstream data-backoff automatic

To specify start and stop values for data backoff, use the **cable upstream data-backoff automatic** interface configuration command. Use the **no** form of this command to use the default data backoff values.

**cable upstream *portnum* data-backoff automatic**  
**no cable upstream *portnum* data-backoff automatic**

### Syntax Description

<i>portnum</i>	Port number.
<b>automatic</b>	Specifies automatic data backoff or fixed start and end values.

### Default

0 (start), 4 (end).

### Command Mode

Interface configuration

### Usage Guidelines

This command first appeared in Cisco IOS Release 11.3 NA. Cisco recommends that you use this automatic setting.

### Example

The following example sets the automatic values for port 2:

```
Router(config-if)# cable upstream 2 data-backoff automatic
```

### Related Commands

**cable upstream data-backoff start end**

## **cable upstream data-backoff** *start end*

To specify fixed starting and ending values for initial ranging backoff, use the **cable upstream data-backoff** *start end* interface configuration command. Use the **no** form of this command to apply default values.

**cable upstream** *portnum* **data-backoff** *start end*  
**no cable upstream** *portnum* **data-backoff**

### Syntax Description

<i>portnum</i>	Port number.
<i>start</i>	Specifies the start value. Valid values are from 0 to 15.
<i>end</i>	Specifies the end value. Valid values are from 0 to 15.

### Default

0 (start), 4 (end).

### Command Mode

Interface configuration

### Usage Guidelines

This command first appeared in Cisco IOS Release 11.3 NA. The start and end values are binary exponential algorithm parameters. Cisco recommends that you use the automatic setting.

### Example

The following example configures upstream port 2 to use a data backoff start value of 2 and an end value of 4:

```
Router(config-if)# cable upstream 2 data-backoff 2 4
```

### Related Commands

**cable upstream data-backoff automatic**

## cable upstream modulation-profile

To assign a modulation profile to an interface, use the **cable upstream modulation-profile** interface configuration command. Use the **no** form of this command to assign modulation profile 1 to the interface.

```
cable upstream portnum modulation-profile profile  
no cable upstream portnum modulation-profile
```

### Syntax Description

<i>portnum</i>	Port number.
<i>profile</i>	Assigns the modulation profile to the specified interface.

### Default

Modulation profile 1.

### Command Mode

Interface configuration

### Usage Guidelines

This command first appeared in Cisco IOS Release 11.3 NA.

### Example

The following example assigns modulation profile 8 to interface 2:

```
Router(config-if)# cable upstream 2 modulation-profile 8
```

### Related Commands

**cable modulation profile**

## cable upstream range-backoff automatic

To specify automatic initial ranging backoff calculation, use the **cable upstream range-backoff automatic** interface configuration command. Use the **no** form of this command to set default values.

**cable upstream** *portnum* **range-backoff automatic**  
**no cable upstream** *portnum* **range-backoff**

### Syntax Description

<i>portnum</i>	Port number.
<b>automatic</b>	Specifies the fixed data backoff start and end values.

### Default

0 (start), 4 (end).

### Command Mode

Interface configuration

### Usage Guidelines

This command first appeared in Cisco IOS Release 11.3 NA.

### Example

The following example sets the range backoff to automatic for port 2:

```
Router(config-if)# cable upstream 2 range-backoff automatic
```

### Related Commands

**cable upstream range-backoff** *start end*

## cable upstream range-backoff *start end*

To configure the range for initial ranging backoff calculation, use the **cable upstream range-backoff *start end*** interface configuration command. Use the **no** form of this command to set default values.

```
cable upstream portnum range-backoff start end
no cable upstream portnum range-backoff
```

### Syntax Description

<i>portnum</i>	Port number.
<i>start</i>	Binary exponential algorithm. Sets the start value for data backoff. Valid values are from 0 to 15.
<i>end</i>	Binary exponential algorithm. Sets the end value for data backoff. Valid values are from 0 to 15.

### Default

Start value is 0, end value is 4.

### Command Mode

Interface configuration

### Usage Guidelines

This command first appeared in Cisco IOS Release 11.3 NA. Cisco recommends that you use the automatic values.

### Example

The following example sets the data backoff range to start at 2 and end at 4:

```
Router(config-if)# cable upstream 2 range-backoff 2 4
```

### Related Commands

**cable upstream range-backoff automatic**

## clear cable flap-list

To reset the flap-list table, use the **clear cable flap-list** privileged EXEC configuration command.

**clear cable flap-list** [*mac-addr* | *all*]

### Syntax Description

<i>mac-addr</i>	(Optional) MAC address. Specify the 48-bit hardware address of an individual cable modem.
<i>all</i>	(Optional) Remove all modems from the flap-list table.

### Default

None.

### Command Mode

Privileged EXEC

### Usage Guidelines

This command first appeared in Cisco IOS Release 11.3 NA.

### Example

The following example removes all the modems from the flap-list table:

```
Router# clear cable flap-list all
```

### Related Commands

- clear cable flap-list aging**
- clear cable flap-list insertion time**
- clear cable flap-list size**
- clear cable flap-list power-adjust threshold**
- clear cable flap-list miss-threshold**

## clear cable modem counters

To reset a cable modem's flapping counters to zero, use the **clear cable modem counters** privileged EXEC configuration command.

```
clear cable modem {mac-addr | ip-addr | all} counters
```

### Syntax Description

<i>mac-addr</i>	MAC address. Specify the 48-bit hardware address of an individual cable modem.
<i>ip-addr</i>	IP address. Specify the IP address of an individual cable modem.
<i>all</i>	Resets the flapping data for all modems.

### Default

None.

### Command Mode

Privileged EXEC

### Usage Guidelines

This command first appeared in Cisco IOS Release 11.3 NA.

### Example

The following example clears the counters for the modem at IP address 172.00.00.00:

```
Router# clear cable modem 172.00.00.00 counters
```

### Related Commands

**clear cable modem reset**

## clear cable modem reset

To remove a modem from the Station Maintenance List and reset the modem, use the **clear cable modem reset** privileged EXEC configuration command.

**clear cable modem** {*mac-addr* | *ip-addr* | *all*} **reset**

### Syntax Description

<i>mac-addr</i>	MAC address. Specify the 48-bit hardware address of an individual cable modem.
<i>ip-addr</i>	IP address. Specify the IP address of an individual cable modem.
<i>all</i>	Removes all the cable modems from the Station Maintenance List.

### Default

None.

### Command Mode

Privileged EXEC

### Usage Guidelines

This command first appeared in Cisco IOS Release 11.3 NA. This command causes the link to the modem to drop. The modem responds by resetting itself. It may take up to 30 seconds for the modem to start the reset sequence.

### Example

The following example removes the cable modem at 172.00.00.00 from the Station Maintenance List:

```
Router# clear cable modem 172.00.00.00 reset
```

### Related Commands

**clear cable modem counters**

## ping cable-modem

To determine if a specific cable modem is on line, use the **ping cable-modem** privileged EXEC configuration command.

**ping cable-modem** *mac-addr*

### Syntax Description

*mac-addr* Cable modem IP address.

### Default

None.

### Command Mode

Privileged EXEC

### Usage Guidelines

This command first appeared in Cisco IOS Release 11.3 NA.

### Example

The following example indicates that the cable modem at 172.00.00.00 is connected to the network and is operational:

```
Router# ping cable-modem 172.00.00.00
172.00.00.00 is alive
```

## show cable flap-list

To display the cable flap-list, use the **show cable flap-list** privileged EXEC configuration command.

**show cable flap-list [sort-flap | sort-time]**

### Syntax Description

- sort-flap** (Optional) Sorted by number of times the cable modem has flapped.
- sort-time** (Optional) Sorted most recent time the cable modem is detected to have flapped.

### Default

None.

### Command Mode

Privileged EXEC

### Usage Guidelines

This command first appeared in Cisco IOS Release 11.3 NA.

### Sample Display

The following displays show the return for flap-list tables sorted by MAC address and by time:

```

router# show cable flap-list sort-flap
Mac Addr      CableIF      Ins   Hit   Miss   CRC   P-Adj   Flap   Time
.1eab.2c0b    C6/0 U0     108  318   27     0     0       108   Sep 10 15:26:56
.1eb2.bb07    C6/0 U0      0    293   31     1     1        1   Sep 10 15:15:49
.7b6b.71cd    C6/0 U0      1    288   32     0     0        1   Sep 10 15:12:13
.1eb2.bb8f    C6/0 U0      1    295   30     0     0        1   Sep 10 15:11:44
router#
Router# show cable flap-list sort-time
Mac Addr      CableIF      Ins   Hit   Miss   CRC   P-Adj   Flap   Time
00e0.2222.2202 C4/0 U0     464  2069  242     0    421     885   Oct 16 22:47:23
0010.7b6b.57e1 C4/0 U0      0    2475   43     0   1041    1041   Oct 16 22:47:04
    
```

**Table 1 Show Cable flap-list Field Descriptions**

Field	Description
Mac Addr	The customer account or street address.
CableIF	The physical port, including the upstream port.
Ins	The number of times the modem comes up and inserts itself into the network. It can indicate intermittent downstream sync loss or DHCP or modem registration problems.

---

<b>Field</b>	<b>Description</b>
Hit	The number of times the modem responds to MAC layer keep alive messages. (The minimum hit rate is once per 30 seconds. It can indicate intermittent upstream, laser clipping, or common-path distortion.
Miss	The number of times the modem misses the MAC layer keep alive message. An 8% miss rate is normal for the MC11 card. It can indicate intermittent upstream, laser clipping, or common-path distortion.
CRC	The number of Cyclic Redundancy Check errors from this modem. It can indicate intermittent upstream, laser clipping, or common-path distortion.
P-Adj	The number of times the headend instructed the modem to adjust TX power more than 3 dB. It can indicate amplifier degradation, poor connections, or thermal sensitivity.
Flap	The sum of P-Adj and Ins values. Modems with high flap counts will have high SIDs and may not register.
Time	The most recent time that the modem dropped the connection.

## Related Commands

**ping docsis**

## show cable modem

To view configuration settings on the Cisco uBR7246, use the **show cable** EXEC command.

**show cable modem** [*ip-address* / *mac-address*]

### Syntax Description

- ip-address* (Optional) Specify the IP address of the modem.
- mac-address* (Optional) Specify the MAC address of the modem.

### Command Mode

Privileged EXEC

### Usage Guidelines

This command first appeared in Cisco IOS Release 11.3 XA.

This command displays information on all cable modems or a particular cable modem on the network.

### Sample Display

The following are sample outputs from the **show cable modem** command:

```
router# show cable modem
Interface      SID  Online  Timing  Receive  QoS  IP address  MAC address
              State  Offset  Power
Cable6/0/U0   1    online  3046   -2.00    4    10.30.128.35  0010.7b6b.7213
Cable6/0/U0   2    online  3047    0.00    4    10.30.128.34  0010.7bb3.fbdd
Cable6/0/U0   3    offline 3033    6.75    2     0.0.0.0      0020.4001.3e66
```

Table 2 describes the fields shown in the **show cable modem** display.

**Table 2 Show Cable Modem Field Descriptions**

Field	Description
Interface	The interface on which the cable modem has an active connection and the upstream port on the interface that is being used by the cable modem.
SID	The service identifier assigned to the modem.
Online State	The status of the cable modem.
Timing offset	The cable modem's current timing adjustment in units of the 10.24 MHz time base tick.
Receiver Power	The receive power level of the modem.
QoS	The service class assigned to the modem.
IP address	IP address of the modem.
MAC address	Media access layer address.

## Related Commands

You can use the master indexes or search online to find documentation of related commands.

- show cable burst-profile**
- show cable modulation-profile**
- show cable privacy**
- show cable qos**
- show cable spectrum-group**

## show cable modulation-profile

To display modulation profile group information, use the **show cable modulation-profile** Privileged EXEC command.

**show cable modulation-profile** [*profile*] [*iuc-code*]

### Syntax Description

<i>profile</i>	(Optional) Profile number. Valid values are from 1 to 8.
<i>iuc-code</i>	(Optional) Internal usage code. Values are:
initial	Initial Ranging Burst
long	Long Grant Burst
request	Request Burst
short	Short Grant Burst
station	Station Ranging Burst

### Command Mode

Privileged EXEC

### Usage Guidelines

This command first appeared in Cisco IOS Release 11.3 XA.

This command displays modulation profile group information. A modulation profile is a collection of six burst profiles that are sent out in a UCD message to configure a modem’s transmit parameters for the following upstream message types: request, initial maintenance, station maintenance, short grant, and long grant.

### Sample Display

The following is sample output from the **show cable modulation-profile** command:

```
router# show cable modulation-profile 1
Mo IUC      Type  Preamb Diff FEC      FEC      Scrambl Max  Guard Last Scrambl Preamb
      length enco T        CW      seed    B    time CW    size  offset
                        bytes  size
1 request qpsk  64    no  0x0    0x10   0x152  1    8    no  yes  56
1 initial qpsk 128    no  0x5    0x22   0x152  0    48   no  yes  0
1 station qpsk 128    no  0x5    0x22   0x152  0    48   no  yes  0
1 short  qpsk  72    no  0x5    0x4B   0x152  0    8    no  yes  48
```

Table 3 describes the fields shown in the **show cable modulation-profile** display.

**Table 3 Show Cable Modulation-Profile Field Descriptions**

Field	Description
Mo	Modulation profile group number. A modulation profile group is the set of burst profiles that define upstream transmit characteristics for the various types of upstream transmission classes.

**Table 3 Show Cable Modulation-Profile Field Descriptions**

Field	Description
IUC	Interval usage code. Each upstream transmit burst belongs to a class which is given a number called the IUC. Bandwidth maps messages (MAP) by IUC codes used to allocate upstream time slots. The following types are currently defined: <ol style="list-style-type: none"> <li>1. Request: bandwidth request slot</li> <li>2. Initial Maintenance: initial link registration contention slot</li> <li>3. Station Maintenance: link keep-alive slot</li> <li>4. Short Data Grant: short data burst slot</li> <li>5. Long Data Grant: long data burst slot</li> </ol>
Type	Modulation type. Possible values are 16qam or qpsk.
Preamb length	Preamble length. Possible values are 2 to 128 bits.
Diff enco	Differential encoding enabled (yes) or not enabled (no).
FEC T bytes	Number of bytes that can be corrected for each FEC code word.
FEC CW size	Size, in bytes, of the FEC codeword. Possible values are 16 to 253 bytes.
Scrambl seed	Scrambler seed value in hex format.
Max B size	Maximum burst size.
Guard time size	Time between successive bursts measured in symbols.
Last CW short	Handling of FEC for shortened last code word.
Scrambl	Scrambler enabled (yes) or not enabled (no).
Preamb offset	The bits to be used for the preamble value.

## Related Commands

You can use the master indexes or search online to find documentation of related commands.

**show cable burst-profile**  
**show cable modem**  
**show cable privacy**  
**show cable qos**  
**show cable spectrum-group**

## show cable qos permission

To display the status of permissions for changing QoS tables, use the **show cable qos permission** privileged EXEC configuration command.

**cable qos permission**

### Syntax Description

This command has no keywords or arguments.

### Command Mode

Privileged EXEC

### Usage Guidelines

This command first appeared in Cisco IOS Release 11.3 NA.

### Sample Displays

The following example displays the output of the **show cable qos permission** command:

```
Router# show cable qos permission

Create by SNMP   Update by SNMP   Create by modems
yes              yes              yes
```

Table 4 describes the fields shown in the **show cable qos permission** displays.

**Table 4** Show Cable Qos Permission Command Field Descriptions

Field	Description
Create by SNMP	Indicates permission setting for creation of QoS table entries by Simple Network Management Protocol (SNMP).
Update by SNMP	Indicates permission setting for creation of QoS table entries by modem registration requests.
Create by modems	Indicates permission setting for dynamic updating of QoS table entries by Simple Network Management Protocol (SNMP).

### Related Commands

**cable qos permission**  
**cable qos profile**  
**show qos profile**

## show cable qos profile

To display QoS profiles, use the **show cable qos profile** privileged EXEC configuration command.

**show cable qos profile** *service class*

## Syntax Description

*service class* Displays cable quality of service table.

## Command Mode

Privileged EXEC

## Usage Guidelines

This command first appeared in Cisco IOS Release 11.3 NA.

## Sample Displays

The following example displays the QoS tables for profiles 1, 2, 3, and 4:

```
Router# show cable qos profile
Service Prio Max      Guarantee Max      Max tx TOS  TOS  Create  B
class      upstream upstream  downstream burst  mask  value by  priv
           bandwidth bandwidth bandwidth          mask  value  by  enab
1          0          0          0          0          0x0  0x0  cmts  no
2          0      64000          0      1000000    0          0x0  0x0  cmts  no
3          0      1000          0      1000       0          0x0  0x0  cmts  no
4          7     2000000    100000    4000000    0          0x0  0x0  cm    yes
```

Table 5 describes the fields shown in the **show cable qos profile** displays.

**Table 5 Show Cable Qos Profile Command Field Descriptions**

Field	Description
Service Class	Profile number.
Prio	Priority level.
Max upstream bandwidth	Maximum upstream bandwidth.
Guarantee upstream bandwidth	Guaranteed minimum upstream bandwidth.
Max downstream bandwidth	Maximum downstream bandwidth.
Max tx burst	Maximum transmit burst size in minislots.
Tos mask	Hex value of the mask bits.
Tos value	Value mask byte set to.
Create by	Identity of the profile creator.
B priv enab	Reports yes if Baseline Privacy is enabled for this QoS profile. Reports no if Baseline Privacy is not enabled for this Qos profile.

## Related Commands

**cable qos permission**  
 **cable qos profile**  
 **show cable qos permission**

## show cable spectrum-group

To display information about spectrum groups, use the **show cable spectrum-group** privileged EXEC configuration command.

```
show cable spectrum-group [groupnum]
```

### Syntax Description

*groupnum*

(Optional) Display information about the specified group number. If no group number is specified, information for all spectrum groups is displayed.

### Command Mode

Privileged EXEC

### Usage Guidelines

This command first appeared in Cisco IOS Release 11.3 XA.

### Sample Displays

The following are sample outputs from the **show cable spectrum-group** command for the upstream spectrum group named **sales**:

```
Router# show cable spectrum-group sales
Spectrum  Frequency Band  Upstream  Time      Time      Input      Shared
Group     (MHz)           Port      Available Delete     PowerLevel Topology
  4        5.000-40.000
  4         5.000
  4        5.000-40.000      Mon 12:00:00  Mon 12:00:00  5         N
  4         5.000              Mon 12:00:00  5         N
```

Table 6 describes the fields shown in the **show cable spectrum-group** displays.

**Table 6** Show Cable Spectrum-Group Command Field Descriptions

Field	Description
Spectrum-Group	Identifies the spectrum group.
Frequency Band (MHz)	Identifies the upper and lower ranges of the frequency for this spectrum group.
Upstream Port	Identifies the upstream port number.
Time Available	Identifies the day and time of day when this group is available.
Time Delete	Identifies the day and time of day when this group will be deleted.
Input PowerLevel	Identifies the assigned decibels per millivolt (dBmV) input level.

**Table 6            Show Cable Spectrum-Group Command Field Descriptions (Continued)**

<b>Field</b>	<b>Description</b>
Shared Topology	Indicates if upstreams are physically combined (share the same combiner group). Y, or yes, values indicate that upstreams which are members of the spectrum group are combined and cannot be assigned overlapping frequency bands.  N, or no, values indicate that upstreams which are members of the of the spectrum group are not combined and can be assigned overlapping frequency bands.

## Related Commands

- cable spectrum-group**
- show cable burst-profile**
- show cable modem**
- show cable modulation-profile**
- show cable privacy**
- show cable qos**

## show controllers cable upstream

To display information about a specific cable modem card slot's interface controllers, use the **show controllers cable** privileged EXEC command.

```
show controllers cable slot/port [upstream] [port]
```

### Syntax Description

<i>slot/port</i>	Slot number/port number indicating the location of the Cisco MC11 cable modem card.
<b>upstream</b>	(Optional) Displays upstream interface status.
<i>port</i>	(Optional) Selects specific upstream port.

### Command Mode

Privileged EXEC

### Usage Guidelines

This command first appeared in Cisco IOS Release in release 11.3 XA and changed in this release.

### Sample Display

The following is sample output from the show controllers cable upstream command for the modem located in slot 4, port 0:

```
Router# show controllers cable 4/0 upstream 2
Cable4/0 Upstream 2 is administratively down
  Frequency 5.008 MHz, Channel Width 0.200 MHz, QPSK Symbol Rate 0.160 Msps
  Spectrum Group 4
  Nominal Input Power Level 5 dBmV, Tx Timing Offset 0
  Ranging Backoff Start 16, Ranging Backoff End 16, Tx Backoff Start 16
  Tx Backoff End 16, Modulation Profile Group 1
  part_id=0x3137, rev_id=0x01, rev2_id=0xFF
  nb_agc_thr=0x0000, nb_agc_nom=0x0000
  Range Load Reg Size=0x58
  Request Load Reg Size=0x0E
  Minislot Size in number of Timebase Ticks is = 8
  Minislot Size in Symbols =8
  Bandwidth Requests = 0x0
  Piggyback Requests = 0x0
  Invalid BW Requests= 0x0
  Minislots Requested= 0x0
  Minislots Granted = 0x0
  Minislot Size in Bytes = 2
  UCD Count = 0
  DES Ctrl Reg#0 = C00C0C43, Reg#1 = 0
```

Table 7 describes the fields shown in the **show controllers cable upstream** display.

**Table 7 Show Controllers Cable Upstream Command Field Descriptions**

Field	Description
Cable	Slot number/port number indicating the location of the Cisco MC11 cable modem card

**Table 7 Show Controllers Cable Upstream Command Field Descriptions (Continued)**

<b>Field</b>	<b>Description</b>
Upstream is administratively down	Indicates the RF upstream interface is disabled.
Frequency	Transmission frequency of the RF upstream channel.
Channel Width	Indicates the width of the RF upstream channel.
QPSK Symbol Rate	Indicates the modulation technique for upstream transmission.
Spectrum Group 4	Indicates the spectrum group associated with this slot and port.
Nominal Input Power level	Indicates the desired power level coming into the receiver.
Tx Timing Offset	Indicates the current ranging offset on the channel.
Ranging Backoff Start	Indicates how many ranging slots to backoff before resending the ranging bursts after an upstream collision. Expressed as exponents of 2. See below.
Ranging Backoff End	Indicates how many ranging slots to backoff before resending the ranging bursts after an upstream collision. Expressed as exponents of 2. See above.
Tx Backoff Start	Indicates the starting exponential backoff value for data collisions.
Tx Backoff End	Indicates the ending exponential backoff value for data collisions.
Modulation Profile Group	A set of burst profiles defining an upstream range.
part_id=	Identification number for burst demodulation hardware.
rev_id=	Identification number for burst demodulation hardware.
rev2_id=	Identification number for burst demodulation hardware.
nb_agc_thr=	Threshold used to control gain into hardware.
nb_agc_nom=	Used to accelerate convergence of input power level.
Range Load Reg Size=	Size, indicated by number of symbols, for range request bursts.
Request Load Reg Size=	Size, indicated by number of symbols, for request bursts.
Minislot Size in number of Timebase Ticks is	Size in tick units of upstream minislot. A tick is 6.25 microseconds.
Minislot Size in Symbols	Size in symbols of the upstream minislot.
Bandwidth Requests	Number of successful bandwidth requests received in the contention minislots.
Piggyback Requests	Number of successful bandwidth requests piggybacked with regular data transmissions.
Invalid BW Requests	Number of invalid bandwidth (BW) requests. (An example of an invalid bandwidth request is a modem using a non-existent SID to request bandwidth.
Minislots Requested	Total number of minislots requested.
Minislots Granted	Total number of minislots granted.
Minislot Size in Bytes	Size in bytes of the minislot.
UCD Count	Number of UCDs sent for this upstream.
DES Ctrl Reg # =	Interval DES controller register dump.

## Related Commands

**show controllers cable downstream**

## show interface cable

To display cable interface information, use the **show interface cable** privileged EXEC command:

```
show interface cable slot/port [downstream | upstream] ranging]
```

### Syntax Description

<i>port/slot</i>	Identifies the uBR7200 chassis slot number and downstream port number. Valid range is 3 to 6.
<b>downstream</b>	(Optional) Displays cable downstream port information for a cable modem.
<b>upstream</b>	(Optional) Displays cable upstream port information for a cable modem.
<b>ranging</b>	(Optional) Displays ranging-specific data.

### Command Mode

Privileged EXEC

### Usage Guidelines

This command first appeared in Cisco IOS Release 11.3 XA.

### Sample Display

The following is sample output for the cable modem located in slot 6/port 0 from the **show interface cable** command:

```
router# show interface cable 6/0
Cable6/0 is up, line protocol is up
  Hardware is BCM3210 FPGA, address is 00e0.1e5f.7a60 (bia 00e0.1e5f.7a60)
  Internet address is 1.1.1.3/24
  MTU 1500 bytes, BW 27000 Kbit, DLY 1000 usec, rely 255/255, load 1/255
  Encapsulation, loopback not set, keepalive not set
  ARP type: ARPA, ARP Timeout 04:00:00
  Last input 4d07h, output 00:00:00, output hang never
  Last clearing of "show interface" counters never
  Queueing strategy: fifo
  Output queue 0/40, 0 drops; input queue 0/75, 0 drops
  5 minute input rate 0 bits/sec, 0 packets/sec
  5 minute output rate 0 bits/sec, 0 packets/sec
    10908 packets input, 855000 bytes, 0 no buffer
    Received 3699 broadcasts, 0 runts, 0 giants, 0 throttles
    3 input errors, 3 CRC, 0 frame, 0 overrun, 0 ignored, 0 abort
    5412 packets output, 646488 bytes, 0 underruns
    0 output errors, 0 collisions, 13082 interface resets
    0 output buffer failures, 0 output buffers swapped out
```

Table 8 describes the fields shown in the **show interface cable** display.

**Table 8 Show Interface Cable Field Descriptions**

Field	Description
Cable slot/port is up/ ...administratively down	Indicates whether the interface hardware is currently active or taken down by the administrator.
line protocol is up/ ...administratively down	Indicates whether the software processes that handle the line protocol believe the interface is usable or if it has been taken down by the administrator.
hardware	Hardware type and address.
Internet address	Internet address followed by subnet mask.
MTU	Maximum Transmission Unit (MTU) of the interface.
BW	Bandwidth of the interface in kilobits per second.
DLY	Delay of the interface in microseconds.
rely	Reliability of the interface as a fraction of 255, calculated as an exponential average over 5 minutes. (For example, 255/255 is 100% reliability.)
load	Load on the interface as a fraction of 255, calculated as an exponential average over 5 minutes. (For example, 255/255 is complete saturation.)
Encapsulation	Encapsulation method assigned to this interface.
ARP type	Type of Address Resolution Protocol (ARP) and timeout value assigned.
Last input	Number of hours, minutes, and seconds since the last packet was successfully received by an interface.
output	Number of hours, minutes, and seconds since the last packet was successfully transmitted by an interface.
Last clearing of "show interface" counters	Time at which the counters that measure cumulative statistics (such as number of bytes transmitted and received) were last reset to zero.
Queueing strategy	Displays the type of queueing configured for this interface. In The following example output, the type of queueing configured is First In First Out (FIFO).
Output queue	Number of packets in the output queue. The format of this number is A/B, where A indicates the number of packets in the queue and B indicates the maximum number of packets allowed in the queue.
drops	Indicates the number of packets dropped due to a full queue.
input queue/drops	Number of packets in the input queue. The format of this number is A/B, where A indicates the number of packets in the queue and B indicates the maximum number of packets allowed in the queue.
drops	Indicates the number of packets dropped due to a full queue.
Five minute input rate Five minute output rate	Average number of bits and packets transmitted per second in the last five minutes.
packets input	Total number of error-free packets received by the system.
bytes input	Total number of bytes, including data and MAC encapsulation, in the error-free packets received by the system.
no buffer	Number of received packets discarded because there was no buffer space in the main system.
Received broadcast	Total number of broadcast or multicast packets received by the interface.

**Table 8 Show Interface Cable Field Descriptions (Continued)**

Field	Description
runt	Number of packets that are discarded because they are smaller than the medium's minimum packet size.
giants	Number of packets that are discarded because they exceed the medium's maximum packet size.
input errors	Includes runts, giants, no buffers, CRC, frame, overrun, and ignored counts.
CRC	Cyclic redundancy checksum generated by the originating LAN station or far-end device does not match the checksum calculated from the data received.
frame	Number of packets received incorrectly having a CRC error and a non-integer number of octets.
overrun	Number of times the receiver hardware was unable to hand received data to a hardware buffer because the input rate exceeded the receiver's ability to handle the data.
ignored	Number of received packets ignored by the interface because the interface hardware ran low on internal buffers.
packets output	Total number of messages transmitted by the system.
bytes	Total number of bytes, including data and MAC encapsulation, transmitted by the system.
underruns	Number of times the transmitter has been running faster than the receiving device can handle.
output errors	Sum of all errors that prevented the final transmission of packets out of the interface being examined.
collisions	Not applicable for the Cisco uBR7246.
interface resets	Number of times an interface has been completely reset.
output buffer failures	Number of times the output buffer has failed.
output buffer swapped out	Number of times the output buffer has been swapped out.

The following is sample output for the downstream cable interface of slot 6 on port 0 from the **show interface cable downstream** command:

```
router# show interface cable 6/0 downstream
Cable6/0: Downstream is up
      111947771 packets output, 1579682655 bytes, 0 discarded
      0 output errors
```

Table 9 describes the fields shown in the **show interface cable downstream** display.

**Table 9 Show Interface Cable Downstream Field Descriptions**

Field	Description
Cable	Indicates the location of the downstream interface.
Downstream is up/...administratively down	Indicates the administrative state of the interface.
packets output	Total number of packets transmitted out of this interface.

**Table 9 Show Interface Cable Downstream Field Descriptions (Continued)**

Field	Description
bytes	Total number of bytes transmitted out of this interface.
discarded	Total number of packets discarded.
output errors	Sum of all errors that prevented downstream transmission of packets out of this interface.

The following is sample output for the upstream cable interface located in slot 6/port 0 from the **show interface cable upstream** command:

```

router# show interface cable 6/0 upstream
Cable6/0: Upstream 0 is up
  Received 3699 broadcasts, 0 multicasts, 28586 unicasts
  0 discards, 0 errors, 0 unknown protocol
  21817 packets error-free, 2371 corrected, 8097 uncorrectable
  0 noise, 0 microreflections
  CBR_queue_depth: [not implemented], ABR_queue_depth: [not implemented],
  UBR[1]_queue_depth: 0, UBR[2]_queue_depth: 0,
  UBR[3]_queue_depth: 0, POLLS_queue_depth: [not implemented]
  ADMIN_queue_depth: [not implemented]

  Last Minislot Stamp (current_time_base):190026   FLAG:1
  Last Minislot Stamp (scheduler_time_base):200706   FLAG:1
    
```

Table 10 describes the fields shown in the **show interface cable upstream** display.

**Table 10 Show Interface Cable Upstream Field Descriptions**

Field	Description
Cable	Identifying the cable interface.
Upstream is up/...administratively down	Indicates the administrative state of the upstream interface.
Received broadcasts	Number of broadcast packets received through this upstream interface.
multicasts	Number of multicast packets received through this upstream interface.
unicasts	Number of unicast packets received through this interface.
discards	Number of packets discarded by this interface.
errors	Sum of all errors that prevented upstream transmission of packets through this interface
unknown protocols	Number of packets received that were generated using a protocol unknown to the Cisco uBR7246.
packets error-free	Number of packets received through this upstream interface that were free from errors.
corrected	Number of error packets received through this upstream interface that were corrected.
uncorrectable	Number of error packets received through this upstream interface that could not be corrected.
noise	Number of upstream packets corrupted by line noise.
microreflections	Number of upstream packets corrupted by microreflections.

**Table 10 Show Interface Cable Upstream Field Descriptions (Continued)**

Field	Description
CBR_queue_depth	Number of packets in the Constant Bit Rate queue; used to keep track of traffic allocated to the CBR service class.
UBR[1]_queue_depth	Number of packets per cable modem card in slot 1.
UBR[2]_queue_depth	Number of packets per cable modem card in slot 2.
UBR[3]_queue_depth	Number of packets per cable modem card in slot 3.
POLLS_queue_depth	Number of requests from other cable modems on the network requesting information or requesting permission to connect.

The following is sample output for the upstream cable interface located in slot 6/port 0 from the **show interface cable ranging** command:

```
router# show interface cable 6/0 ranging
CMTS using fixed init ranging period : 500 msecs
Periodic ranging period/modem          : 10000 (msec)
Periodic ranging-request timeout       : 30 (msec)
Periodic ranging sids in station maintenance list : 11
Periodic ranging sids in rng request pending list : 0
```

Table 11 describes the fields shown in the **show interface cable upstream** display.

**Table 11 Show Interface Cable Ranging Field Descriptions**

Field	Description
CMTS...ranging period	Shows the initial fixed ranging period.
Periodic ranging period/modem	Shows the periodic ranging period.
Periodic ranging-request timeout	Displays the ranging request timeout value.
Periodic ranging sids ...	Displays the number of periodic ranging sids found in the Station Maintenance List.
Periodic ranging sids in rng ...	Displays the number of periodic ranging sids found in the ranging request pending list.

## Related Commands

You can use the master indexes or search online to find documentation of related commands.

- show interface cable sid**
- show interface cable signal-quality**

## show interface cable sid

To display information by service identifier (SID) of each cable modem on the network, use the **show interface sid** privileged EXEC command:

```
show interfaces cable slot/port sid [sid-number]
```

### Syntax Description

*slot/port* Identifies the uBR7200 chassis slot number and downstream port number. Valid values are from 3 to 6.

*sid-number* (Optional) Identifies the service identification number.

### Command Mode

Privileged EXEC

### Usage Guidelines

This command first appeared in Cisco IOS Release 11.3 XA. Data transport over the RF link uses the registered SID address rather than the Ethernet address. This allows multiple hosts to access the network via a single cable modem.

### Sample Display

The following are sample outputs from two uses of the **show interface cable sid** command:

```
router# show interface cable 6/0 sid
SID Status QoS Creattime Inoctets Inpackets IP address MAC address
1 enable 2 57 80139964 101336 1.1.1.5 00e0.1eab.2c0b
2 enable 2 57 49132 649 1.1.1.7 00e0.1eb2.bb07
3 enable 2 58 80042891 100555 1.1.1.2 00e0.1eab.2c29
```

```
router# show interface cable 6/0 sid 1
SID Status QoS Creattime Inoctets Inpackets IP address MAC address
1 enable 2 57 80140204 101340 1.1.1.5 00e0.1eab.2c0b
```

If the value for the QoS group in the display appears as 0, it indicates that a temporary SID has been assigned to a cable modem that is in the process of connecting to the network:

```
router# show interface cable 6/0 sid
SID Status QoS Creattime Inoctets Inpackets IP address MAC address
1 enable 0 57 80140204 101340 1.1.1.5 00e0.1eab.2c0b
```

If there are no cable modems connected to the cable interface you have selected, the display will appear as follows:

```
router# show interface cable 6/0 sid
SID Status QoS Creattime Inoctets Inpackets IP address MAC address
1 Not in use
```

---

**Note** Use the **show cable qos** command to examine the actual quality of service parameters assigned to the QoS group numbers.

---

Table 12 describes the fields shown in the output for the **show interface cable sid** displays.

**Table 12 Show Interface cable SID Field Descriptions**

<b>Field</b>	<b>Description</b>
SID	Service identification number.
Status	“Disable” means that the SID has been administratively disabled. “Enable” is the normal state.
QoS	Quality of service.
Creattime	When the SID was created, number of seconds since system booted.
Inoctets	Number of octets received using this SID.
Inpackets	Number of packets received using this SID.
IP address	IP address of the modem owning this SID.
MAC address	MAC address of the modem owning this SID.

## Related Commands

You can use the master indexes or search online to find documentation of related commands.

**show interface cable signal-quality**

## show interface cable signal-quality

To display information about the signal quality, use the **show interface cable signal-quality** privileged EXEC command:

```
show interface cable slot/port signal-quality
```

### Syntax Description

*slot/port* Identifies the uBR7200 chassis slot number and downstream port number. Valid values are from 3 to 6.

### Command Mode

Privileged EXEC

### Usage Guidelines

This command first appeared in Cisco IOS Release 11.3 XA.

### Sample Display

The following is sample output from the **show interface signal quality** command:

```
router# show interface cable 6/0 signal-quality  
Cable6/0: Upstream 0 is up includes contention intervals: TRUE
```

Table 13 describes the fields shown in the **show controllers cable upstream** display.

**Table 13 Show Interface Cable Signal Quality Field Descriptions**

Field	Description
Cable	Interface name.
Upstream is up includes contention intervals	States whether this statement is true.

### Related Commands

You can use the master indexes or search online to find documentation of related commands.

```
show interface  
show interface cable downstream  
show interface cable sid
```

## Debug Commands

The following **debug cable** commands have been added to or modified in this release of the Cisco uBR7246 and are available to help you troubleshoot the cable interfaces:

- **debug cable envm**
- **debug cable error**
- **debug cable mac**
- **debug cable map**
- debug cable Rx

The **debug cable envm** command is the same as the **debug cable env** command in previously documented in the *Voice, Video, and Home Applications Configuration Guide*. The **debug cable error** command is the same as the **debug cable err** command in *Voice, Video, and Home Applications Configuration Guide*.

For information on other **debug cable** commands, refer to *Voice, Video, and Home Applications Configuration Guide*.

## debug cable mac

Use the **debug cable mac** EXEC command to display MAC-layer information for the specified cable modem. The **no** form of this command disables debugging output.

**debug cable mac**

### Syntax Description

This command takes no keywords or arguments.

### Default

None.

### Command Mode

Privileged EXEC

### Usage Guidelines

This command first appeared in Cisco IOS Release in release 11.3 NA.

---

**Note** Do not use this command if you have a large number of modems on your net. The Cisco uBR7246 will become flooded with console printouts.

---

### Example

The following example shows the return for the MAC layer:

```
router# debug cable mac

19:46:27: Ranging Modem with Sid 1 on i/f : Cable6/0/U0

19:46:27: Got a ranging request
19:46:27: SID value is 1 on Interface Cable6/0/U0
19:46:27: CM mac address 00:E0:1E:B2:BB:07
19:46:27: Timing offset is 0
19:46:27: Power value is FE0, or 0 dB
19:46:27: Freq Error = 0, Freq offset is 0
19:46:27: Ranging has been successful for SID 1 on Interface Cable6/0/U0

19:46:29: Ranging Modem with Sid 2 on i/f : Cable6/0/U0
19:46:29: Got a ranging request
19:46:29: SID value is 2 on Interface Cable6/0/U0
19:46:29: CM mac address 00:E0:1E:B2:BB:8F
19:46:29: Timing offset is 1
19:46:29: Power value is 1350, or 0 dB
19:46:29: Freq Error = 0, Freq offset is 0
19:46:29: Ranging has been successful for SID 2 on Interface Cable6/0/U0
```

```

19:46:32: Ranging Modem with Sid 3 on i/f : Cable6/0/U0

19:46:32: Got a ranging request
19:46:32: SID value is 3 on Interface Cable6/0/U0
19:46:32: CM mac address 00:E0:1E:B2:BB:B1
19:46:32: Timing offset is FFFFFFFF
19:46:32: Power value is 1890, or -1 dB
19:46:32: Freq Error = 0, Freq offset is 0
19:46:32: Ranging has been successful for SID 3 on Interface Cable6/0/U0

19:46:34: Ranging Modem with Sid 5 on i/f : Cable6/0/U0
    
```

**Table 14** Sample Output for the debug cable mac Command

Field	Description
SID value is....	Reports the service ID of the modem. range is from 1 through 891. The information on this line should agree with the first line of the return (that is, Ranging Modem with Sid...).
CM mac address....	The MAC address of the specified cable modem.
Timing offset is....	The time by which to offset the frame transmission upstream so the frame arrives at the expected minislot time at the CMTS.
Power value is FE0, or 0 dB	The raw value derived from the 3137 Broadcom chip. Alternately, the dB value specifies the relative change in the transmission power level that the cable modem needs to make so transmissions arrive at the CMTS at the desired power level. This desired power level is usually 0, but you can use the CLI to change it via the <b>cable power-level</b> command.
Freq Error = ....	The raw value derived from the 3137 Broadcom chip.
Freq offset is ....	Specifies the relative change in the transmission frequency that the cable modem will make to match the CMTS.

## Related Commands

**show controllers cable downstream**

## debug cable map

Use the **debug cable map** EXEC command to display map debugging messages. The **no** form of this command disables debugging output.

**debug cable map**

### Syntax Description

This command takes no keywords or arguments.

### Command Mode

Privileged EXEC

### Usage Guidelines

This command first appeared in Cisco IOS Release in release 11.3 NA.

### Example

The following example displays all the MAP messages with and without data grants:

```
router# debug cable map

19:41:53: On interface Cable6/0, sent 5000 MAPs, 1321 MAPs had grant(s)Long Grants
13256993, Total Short Grants 223
A sample Map without any data grant
----- MAP MSG -----
us_ch_id: 1   ucd_count: 5   num_elems: 9   reserved: 0
Alloc Start Time: 33792           Ack Time: 33618
Rng_bkoff_start: 0   Rng_bkoff_end: 2
Data_bkoff_start: 1   Data_bkoff_end: 3:
sid:16383   iuc:1   mslot_offset:0
sid:0   iuc:7   mslot_offset:40
A sample Map with data grant(s)
----- MAP MSG -----
us_ch_id: 1   ucd_count: 5   num_elems: 7   reserved: 0
Alloc Start Time: 33712           Ack Time: 33578
Rng_bkoff_start: 0   Rng_bkoff_end: 2
Data_bkoff_start: 1   Data_bkoff_end: 3
sid:2   iuc:6   mslot_offset:0
sid:16383   iuc:1   mslot_offset:16
sid:0   iuc:7   mslot_offset:40
```

**Table 15** Debug Cable MAP Field Descriptions

Field	Description
sent 5000 MAPs	Total number of maps transmitted.
MAPs had grant(s) Long Grants	Total number of grants considered long sized by CMTS.
Total Short Grants	Total number of grants considered short sized by CMTS.
us_ch_id	Identifies the upstream channel ID for this message.
ucd_count	Number of upstream channel descriptors (UCDs).

---

Field	Description
num_elems	Number of information elements in the map.
reserved	Reserved for alignment.
Alloc Start Time	Start time from CMTS initialization (in minislots) for assignments in this map.
Ack Time	Latest time from CMTS initialization (in minislots) processed in upstream. The cable modems use this time for collision detection.
Rng_bkoff_start	Initial backoff window for initial ranging contention, expressed as a power of 2. Valid values are from 0-15.
Rng_bkoff_end	Final backoff window for initial ranging contention, expressed as a power of 2. Valid values are from 0-15.
Data_bkoff_start	Initial backoff window for contention data and requests, expressed as a power of 2. Valid values are from 0-15.
Data_bkoff_end	Final backoff window for contention data and requests, expressed as a power of 2. Valid values are from 0-15.
sid	Service ID.
iuc	Interval usage code (IUC) value.
mslot_offset	Minislot offset.

## Related Commands

**show controllers cable downstream**

## debug cable Rx

Use the **debug cable Rx** EXEC command to display incoming transmissions. The **no** form of this command disables debugging output.

**debug cable Rx**

## Syntax Description

This command takes no arguments.

## Command Mode

Privileged EXEC.

## Usage Guidelines

This command first appeared in Cisco IOS Release in release 11.3 NA.

## Related Commands

**show controllers cable downstream**

## What to Do Next

For more information on the Cisco uBR7246, refer to the *Voice, Video, and Home Applications Configuration Guide*.

For instructions on the advanced configuration of the port adapters installed in your Cisco uBR7246, refer to the respective installation documents that shipped with each port adapter. This documentation is also available on the Cisco Documentation CD-ROM and on CCO.

For instructions on the advanced configuration of the cable modem cards, refer to the document *Cisco uBR7246 Universal Broadband Router Cable Modem Card Installation and Configuration*. This document accompanies every Cisco cable modem card that is shipped from the factory as an installed item in a Cisco uBR7246 or as a FRU. The document is also available on the Cisco Documentation CD-ROM and on CCO.

