

Enhanced-Spectrum Management and Telephone Return for the Cisco uBR7200 Series Cable Router

This product and document are in development. Some portions of this document are not complete. This document will be revised as soon as the content is available.

Feature Overview

This feature module provides software support for telephone return in a cable-routed system. Telephone return in a cable environment is that part of the cable network which connects the subscriber's cable modem with the headend cable router over standard phone lines (as opposed to an all-cable network connecting the headend router with cable modems).

This document also supports spectrum management enhancements including already published feature modules describing per-modem filters and per-modem traffic-shaping capabilities. For more information on these previously published cable-related feature modules, see:

- *Per-modem and Per-Host Access List Support Feature*
- *Upstream Traffic Shaping Feature*

Benefits

Spectrum management enhancements improve system-wide throughput and increase efficiency of bandwidth utilization. Telephone (or telco) return allows Multi-Service Operators (MSOs) to support their cable subscribers without replacing existing hardware.

Related Documents

For more information on cable routers, see:

- *Voice, Video, and Home Applications Configuration Guide*
- *Voice, Video, and Home Applications Command Reference*

Supported Platforms

Cisco uBR7200 Series

Supported MIBs and RFCs

MIBs

None

RFCs

- DOCSIS Telephony Return
- SP-CMTRI-I01-970804

Configuration Tasks

Perform the following tasks to configure the features discussed in this document:

- Configuring Enhanced Spectrum Management
- Configuring Telco Return

Configuring Enhanced Spectrum Management

To configure spectrum management, enter the following commands:

```
ubr7200#cable upstream <us> channel-width <channel-width1> <channel-width2>
ubr7200#cable upstream <us> modulation-profile <mod profile1> <mod profile2>
```

Configuring Telco Return

- Step 1** Boot the uBR7200 with the Telco-return bootflash image.
- Step 2** Verify uBR7200 output power level and downstream/upstream transmission.
- Step 3** Boot the Telco-return-return modems and verify modem registration.
- Step 4** Verify that the uBR7200 can ping the Telco-return modems.

Verifying Telco Return Configuration

To verify that the subscriber modem can log into the CMTS in telco-return mode:

- Step 1** Reboot the subscriber modem.
- Step 2** Allow the subscriber modem to complete telco registration (will take several minutes).
- Step 3** Enter the **show cable modem** command on the uBR cable router to verify that the subscriber modem is shown in the list. The letter “T” indicates that a modem is a telco-return modem.

```
ubr7246-1#show cable modem
Interface    Prim Online   Timing Rec    QoS CPE IP address    MAC address
           Sid  State      Offset Power
Cable4/0/U0  2    online    2848  -0.50  5   1   10.2.0.3     0010.7b6b.53d5
Cable4/0/T   3    offline    0      0.00  2   1   10.2.0.101   0020.4001.4af6
Cable4/0/U0  4    online    2852  -0.75  5   1   10.2.0.6     0010.7b6b.7255
Cable4/0/U0  5    online    2850   0.25  5   1   10.2.0.7     0010.7b6b.5669
Cable4/0/U0  6    online    2851   0.00  2   1   10.2.0.4     0010.7b6b.53c9
Cable4/0/T   7    offline    0      0.00  2   0   10.2.0.102   0020.4001.4b32
```

- Step 4** Ping the subscriber modem from the uBR cable router to ensure the uBR cable router receives the echo reply packets.

Configuration Examples

The following example shows how to configure the cable router interface to support telco return:

```
#cable telco-return enable
ubr7223#conf t
Enter configuration commands, one per line. End with CNTL/Z.
ubr7223(config)#int c2/0
ubr7223(config-if)#cable telco-return spd 1 factory-default
ubr7223(config-if)#cable telco-return spd 1 phonenum 8005551212
ubr7223(config-if)#cable telco-return spd 1 phonenum 4085551212
ubr7223(config-if)#cable telco-return spd 1 phonenum 6505551212
ubr7223(config-if)#cable telco-return spd 1 service-provider norcal
ubr7223(config-if)#cable telco-return spd 1 dhcp-server 172.172.172.172
ubr7223(config-if)#cable telco-return spd 1 username joe
ubr7223(config-if)#cable telco-return spd 1 password password
ubr7223(config-if)#cable telco-return spd 1 dhcp-authenticate
ubr7223(config-if)#cable telco-return spd 1 threshold 5
ubr7223(config-if)#cable telco-return spd 1 ppp-authenticate both
ubr7223(config-if)#cable telco-return spd 1 manual-dial
ubr7223(config-if)#cable telco-return spd 1 dial-timer 7200
```

Command Reference

This section documents new or modified commands. All other commands used with this feature are documented in the Cisco IOS Release 12.0 command references:

- **cable downstream rate-limit**
- **cable max-hosts**
- **cable modem change-frequency**
- **cable modem max-hosts**
- **cable telco-return enable**
- **cable telco-return interval**
- **cable telco-return spd service-provider**
- **cable telco-return spd radius-realm**
- **cable telco-return spd service-provider**
- **cable telco-return spd dhcp-authenticate**
- **cable telco-return spd dhcp-server**
- **cable telco-return spd dial-timer**
- **cable telco-return spd factory-default**
- **cable telco-return spd manual-dial**
- **cable telco-return spd ppp-authenticate**
- **cable telco-return spd service-provider**
- **cable telco-return spd username**
- **cable upstream channel-width**
- **cable upstream fec-strength**
- **cable upstream hop algorithm**
- **cable upstream modulation**
- **cable upstream rate-limit**
- **show cable hop**
- **show cable modem**
- **show cable noise**
- **test cable awacs**

In Cisco IOS Release 12.0(1)T or later releases, you can search and filter the output for **show** and **more** commands. This functionality is useful when you need to sort through large amounts of output, or if you want to exclude output that you do not need to see.

To use this functionality, enter a **show** or **more** command as follows:

```
command / {begin | include | exclude} regular-expression
```

See the following example of the **show atm vc** command where the command output begins with "PeakRate":

```
show atm vc / begin PeakRate
```

For more information on the search and filter functionality, see the Cisco IOS Release 12.0(1)T feature module *CLI String Search*.

cable downstream rate-limit

To enable downstream rate limiting, use the **cable downstream rate-limit** EXEC command. Use the **no** form of this command to disable downstream rate limiting:

```
cable downstream rate-limit [token-bucket shaping | weighted-discard [expwt n]]  
no cable downstream rate-limit
```

Syntax Description

shaping Enables shaping with default parameters. To change the defaults, you can specify *granularity* (which is the traffic shaping granularity in msec), or you can specify *max-delay* (which is the maximum traffic shaping buffering delay in msec).

Defaults

No default behavior or values.

Command Modes

EXEC

Command History

Release	Modification
11.3(5)NA	This command was introduced
12.0(4)XI	The shaping keyword was added.

Examples

```
ubr7223 (config-if) #cable downstream rate-limit token-bucket shaping
```

Related Commands

Command	Description
cable upstream rate-limit	Controls upstream rate limiting.

cable max-hosts

To set the maximum number of hosts supported for an interface, use the **cable max-hosts** interface configuration command. Use the **no** form of this command to set the number of hosts to 0:

```
cable max-hosts n
no cable max-hosts
```

Syntax Description

n Specifies the maximum number of hosts supported per cable modem. Valid range is from 0 to 255.

Defaults

No default behavior or values.

Command Modes

Interface Configuration

Command History

Release	Modification
2.0(4)XI	This command was introduced.

Examples

```
ubr7223 (config-if)#cable max-hosts 15
```

Related Commands

Command	Description
cable modem max-hosts	Specifies the maximum number of hosts supported per modem.

cable modem change-frequency

To override the frequency used by a cable modem, use the **cable modem change-frequency** EXEC command:

```
cable modem [mac-addr / ip-addr] change-frequency [ds-frequency-hz] [us-channel-id]
```

Syntax Description

<i>mac-addr/ip-addr</i>	Specifies either the MAC address or the IP address of the cable modem whose frequency is to be changed.
ds-frequency-hz	(Optional) Specifies the downstream frequency for the cable modem (in Hertz).
us-channel-id	(Optional) Specifies the upstream channel ID.

Defaults

No default behavior or values.

Command Modes

EXEC

Command History

Release	Modification
12.0(4)XI	This command was introduced.

Examples

```
ubr7223#cable modem 172.172.172.12 change-freq 57000000
```

Related Commands

Command	Description
cable modem max-hosts	Deletes entries from the host name and address cache.

cable modem max-hosts

To specify the maximum number of hosts per modem, use the **cable modem max-hosts** EXEC command. Use the **no** form of this command to set the number of hosts to 0:

```
cable modem [mac-addr | ip-addr] max-hosts [n | default]
no cable modem [mac-addr | ip-addr] max-hosts
```

Syntax Description

<i>mac-addr</i> , <i>ip-addr</i>	Specify either the MAC address or the IP address for the cable modem.
max-hosts <i>n</i> or <i>default</i>	Specifies either the maximum number of hosts (from 0 to 255), or uses the default.

Defaults

0

Command Modes

EXEC

Command History

Release	Modification
12.0(4)XI	This command was introduced.

Examples

```
ubr7223#cable modem 172.172.172.12 max-hosts 39
```

Related Commands

Command	Description
cable max-hosts	Sets the maximum number of hosts supported for an interface.
cable modem change-frequency	Overrides the frequency used by a cable modem.

cable telco-return enable

To enable telephone return support, use the **cable telco-return enable** interface configuration command. Use the **no** form of this command to disable this feature:

cable telco-return enable
no cable telco-return enable

Syntax Description

This command has no arguments or keywords.

Defaults

No default behavior or values.

Command Modes

Interface Configuration

Command History

Release	Modification
12.0(4)XI	This command was introduced.

Examples

```
ubr7233 (config-if)#cable telco-return enable
```

Related Commands

Command	Description
cable telco-return interval	Defines the interval for sending Telephony Channel Descriptor (TCD) and Termination System Information (TSI) messages.

cable telco-return interval

To specify the intervals for sending TCD enrollment messages and TSI messages, use the **cable telco-return interval** interface configuration command. Use the **no** form of this command to set the time interval to the default:

```
cable telco-return interval seconds
no cable telco-return interval
```

Syntax Description

seconds Specifies the number of seconds for TCD or TSI messages. Valid range is from 2 to 60 seconds.

Defaults

2 seconds

Command Modes

Interface Configuration

Command History

Release	Modification
12.0(4)XI	This command was introduced.

Examples

```
ubr7223(config-if)#cable telco-return interval 40
```

Related Commands

Command	Description
cable telco-return enable	Enables or disables the telco return feature.

cable telco-return spd dhcp-authenticate

To set the DHCP Authenticate parameter in TCD messages as TRUE (1), which specifies the DHCP server that must be used, use the **cable telco-return spd dhcp-authenticate** interface configuration command. Use the **no** form of this command to set the DHCP Authenticate parameter to the default value and remove the parameter from subsequent TCD messages:

```
cable telco-return spd number dhcp-authenticate
no cable telco-return spd dhcp-authenticate
```

Syntax Description

spd *number* Specifies the SPD number.

Defaults

FALSE (0)

Command Modes

Interface Configuration

Command History

Release	Modification
12.0(4)XI	This command was introduced.

Usage Guidelines

The DHCP Authenticate parameter, which is an optional parameter, is expressed as a boolean value.

Examples

```
ubr7223 (config-if) #cable telco-return spd 2 dhcp-authenticate
```

Related Commands

Command	Description
cable telco-return spd dhcp-server	Specifies the IP address of the DHCP server parameter in TCD messages.
cable telco-return spd dial-timer	Specifies the Demand Dial Timer TCD parameter for TCD messages.
cable telco-return spd factory-default	Indicates the factory default service provider descriptor (SPD) used by cable modems.
cable telco-return spd ppp-authenticate	Specifies the PPP Authentication parameter in TCD messages.
cable telco-return spd phonenum	Specifies the Telephone Numbers parameter in TCD messages.

cable telco-return spd threshold	Specifies the Connection Attempt Threshold parameter for TCD messages.
---	--

cable telco-return spd dhcp-server

To specify the IP address of the DHCP server parameter in TCD messages, use the **cable telco-return spd dhcp-server** interface configuration command. Use the **no** form of this command to set the default value and remove the parameter from subsequent TCD messages:

```
cable telco-return spd number dhcp-server ip address
no cable telco-return spd dhcp-server
```

Syntax Description

spd <i>number</i>	Specifies the SPD number.
<i>ip address</i>	Specifies the IP address of the DHCP server.

Defaults

0

Command Modes

Interface Configuration

Command History

Release	Modification
12.0(4)XI	This command was introduced.

Examples

```
ubr7223 (config-if) #cable telco-return spd 2 dhcp-server 206.44.207.255
```

Related Commands

Command	Description
cable telco-return spd dhcp-authenticate	Specifies the DHCP Authenticate parameter in TCD messages as TRUE.
cable telco-return spd dial-timer	Specifies the Demand Dial Timer TCD parameter for TCD messages.
cable telco-return spd factory-default	Indicates the factory default service provider descriptor (SPD) used by cable modems.
cable telco-return spd ppp-authenticate	Specifies the PPP Authentication parameter in TCD messages.
cable telco-return spd phonenum	Specifies the Telephone Numbers parameter in TCD messages.
cable telco-return spd threshold	Specifies the Connection Attempt Threshold parameter for TCD messages.

cable telco-return spd dial-timer

To specify the Demand Dial Timer TCD parameter for TCD messages, use the **cable telco-return spd dial-timer EXEC** command. Use the **no** form of this command to set the default value and remove the dial-timer parameter from subsequent TCD messages:

```
cable telco-return spd number dial-timer seconds
no cable telco-return spd dial-timer
```

Syntax Description

spd <i>number</i>	Specifies the SPD number.
dial-timer <i>seconds</i>	Specifies the number of seconds of the Demand Dial Timer parameter for TCD messages. Valid range is from 0 to 4294967295.

Defaults

0

Command Modes

Interface Configuration

Command History

Release	Modification
12.0(4)XI	This command was introduced.

Examples

```
ubr7223 (config-if) #cable telco-return spd 2 dial-timer 7200
```

Related Commands

Command	Description
cable telco-return spd dhcp-authenticate	Specifies the DHCP Authenticate parameter in TCD messages as TRUE.
cable telco-return spd dhcp-server	Specifies the IP address of the DHCP server parameter in TCD messages.
cable telco-return spd factory-default	Indicates the factory default service provider descriptor (SPD) used by cable modems.
cable telco-return spd ppp-authenticate	Specifies the PPP Authentication parameter in TCD messages.
cable telco-return spd phonenum	Specifies the Telephone Numbers parameter in TCD messages.
cable telco-return spd threshold	Specifies the Connection Attempt Threshold parameter for TCD messages.

cable telco-return spd factory-default

To indicate the service provider descriptor (SPD) used by cable modems during the factory default procedure, use the **cable telco-return spd factory-default** interface configuration command. Use the **no** form of this command to disable this feature:

```
cable telco-return spd number factory-default
no cable telco-return spd
```

Syntax Description

spd *number* Specifies the SPD number.

Defaults

No default behavior or values.

Command Modes

Interface Configuration

Command History

Release	Modification
12.0(4)XI	This command was introduced.

Usage Guidelines

The SPD specified is the factory default SPD.

Examples

```
ubr7223(config-if)#cable telco-return spd 2 factory-default
```

Related Commands

Command	Description
cable telco-return spd dhcp-authenticate	Specifies the DHCP Authenticate parameter in TCD messages as TRUE.
cable telco-return spd dhcp-server	Specifies the IP address of the DHCP server parameter in TCD messages.
cable telco-return spd dial-timer	Specifies the Demand Dial Timer TCD parameter for TCD messages.
cable telco-return spd factory-default	Indicates the factory default service provider descriptor (SPD) used by cable modems.
cable telco-return spd ppp-authenticate	Specifies the PPP Authentication parameter in TCD messages.
cable telco-return spd phonenum	Specifies the Telephone Numbers parameter in TCD messages.

cable telco-return spd threshold	Specifies the Connection Attempt Threshold parameter for TCD messages.
---	--

cable telco-return spd manual-dial

To specify the manual dial parameter in TCD messages, use the **cable telco-return spd manual-dial** interface configuration command. Use the **no** form of this command to remove the parameter from subsequent TCD messages:

cable telco-return spd *number* **manual-dial**
no cable telco-return spd *number* **manual-dial**

Syntax Description

spd *number* Specifies the SPD number.

Defaults

No default behavior or values.

Command Modes

Interface Configuration

Command History

Release	Modification
12.0(4)XI	This command was introduced.

Examples

```
ubr7223 (config-if) #cable telco-return spd 1 manual-dial
```

Related Commands

Command	Description
cable telco-return spd username	Specifies the Login Username parameter in TCD messages.
cable telco-return password	Specifies the Login Password parameter in TCD messages.
cable telco-return spd radius-realm	Specifies the RADIUS Realm parameter in TCD messages.

cable telco-return spd password

To specify the Login Password parameter in TCD messages, use the **cable telco-return spd password** interface configuration command. Use the **no** form of this command to remove the parameter from subsequent TCD messages:

```
cable telco-return spd number password string
no cable telco-return spd password
```

Syntax Description

spd <i>number</i>	Specifies the SPD number.
<i>string</i>	Specifies the login password.

Defaults

No default behavior or values.

Command Modes

Interface Configuration

Command History

Release	Modification
12.0(4)XI	This command was introduced.

Examples

```
ubr7223 (config-if) #cable telco-return spd 2 password 9JwoKd7
```

Related Commands

Command	Description
cable telco-return service- provider	Specifies the Service Provider Name parameter in TCD messages.
cable telco-return spd username	Specifies the Login Username parameter in TCD messages.
cable telco-return spd radius-realm	Specifies the RADIUS Realm parameter in TCD messages.

cable telco-return spd phonenum

To specify the Telephone Numbers parameter in TCD messages, use the **cable telco-return spd phonenum** interface configuration command. Use the **no** form of this command to delete any or all previously entered telephone numbers.

cable telco-return spd *number* **phonenum** *string*
no cable telco-return spd *number* **phonenum**

Syntax Description

spd <i>number</i>	Specifies the SPD number.
<i>string</i>	Specifies the telephone number to be used by the Telephone Numbers parameter in TCD messages.

Defaults

No default behavior or values.

Command Modes

Interface Configuration

Command History

Release	Modification
12.0(4)XI	This command was introduced.

Usage Guidelines

You can repeat this command to enter up to three telephone numbers that are mapped to the Telephone Numbers parameters (in TCD messages). The phone numbers appear as Phone Number 1, Phone Number 2, and Phone Number 3 in the order in which you enter them.

Examples

```
ubr7223 (config-if) #cable telco-return spd 2 phonenum 9255551212
```

Related Commands

Command	Description
cable telco-return spd dhcp-authenticate	Specifies the DHCP Authenticate parameter in TCD messages as TRUE.
cable telco-return spd dhcp-server	Specifies the IP address of the DHCP server parameter in TCD messages.
cable telco-return spd dial-timer	Specifies the Demand Dial Timer TCD parameter for TCD messages.
cable telco-return spd factory-default	Indicates the factory default service provider descriptor (SPD) used by cable modems.

cable telco-return spd ppp-authenticate	Specifies the PPP Authentication parameter in TCD messages.
cable telco-return spd threshold	Specifies the Connection Attempt Threshold parameter for TCD messages.

cable telco-return spd ppp-authenticate

To specify the PPP Authentication parameter in TCD messages, use the **cable telco-return spd ppp-authenticate EXEC** command. Use the **no** form of this command to remove the parameter from subsequent TCD messages:

```
cable telco-return spd number ppp-authenticate [both | chap | pap]
no cable telco-return spd ppp-authenticate
```

Syntax Description

spd <i>number</i>	Specifies the SPD number.
<i>both</i>	Specifies PAP and CHAP authentication.
<i>chap</i>	Specifies CHAP authentication.
<i>pap</i>	Specifies PAP authentication.

Defaults

No default behavior or values.

Command Modes

Interface Configuration

Command History

Release	Modification
12.0(4)XI	This command was introduced.

Examples

```
ubr7223 (config-if) #cable telco-return spd 2 ppp-authenticate chap
```

Related Commands

Command	Description
cable telco-return spd dhcp-authenticate	Specifies the DHCP Authenticate parameter in TCD messages as TRUE.
cable telco-return spd dhcp-server	Specifies the IP address of the DHCP server parameter in TCD messages.
cable telco-return spd dial-timer	Specifies the Demand Dial Timer TCD parameter for TCD messages.
cable telco-return spd factory-default	Indicates the factory default service provider descriptor (SPD) used by cable modems.
cable telco-return spd phonenum	Specifies the Telephone Numbers parameter in TCD messages.

cable telco-return spd threshold	Specifies the Connection Attempt Threshold parameter for TCD messages.
---	--

cable telco-return spd radius-realm

To specify the RADIUS Realm service provider descriptor (SPD) parameter in TCD messages, use the **cable telco-return spd radius-realm** interface configuration command. Use the **no** form of this command to remove the parameter from subsequent TCD messages:

cable telco-return spd *number* **radius-realm** *string*
no cable telco-return spd *number* **radius-realm**

Syntax Description

spd *number* Specifies the SPD number.
string Specifies the RADIUS Realm name.

Defaults

No default behavior or values.

Command Modes

Interface Configuration

Command History

Release	Modification
12.0(4)XI	This command was introduced.

Examples

```
ubr7223 (config-if) #cable telco-return spd radius-realm sunol
```

Related Commands

Command	Description
cable telco-return service- provider	Specifies the Service Provider Name parameter in TCD messages.
cable telco-return spd username	Specifies the Login Username parameter in TCD messages.
cable telco-return password	Specifies the Login Password parameter in TCD messages.

cable telco-return spd service-provider

To specify the Service Provider Name parameter in TCD messages, use the **cable telco-return service-provider** interface configuration command. Use the **no** form of this command to remove the parameter from subsequent TCD messages:

```
cable telco-return spd number service-provider string
no cable telco-return spd number service-provider
```

Syntax Description

spd <i>number</i>	Specifies the SPD number.
<i>string</i>	Specifies the service provider name.

Defaults

No default behavior or values.

Command Modes

Interface Configuration

Command History

Release	Modification
12.0(4)XI	This command was introduced.

Examples

```
ubr7223 (config-if) #cable telco-return spd 2 service-provider san_jose
```

Related Commands

Command	Description
cable telco-return spd username	Specifies the Login Username parameter in TCD messages.
cable telco-return password	Specifies the Login Password parameter in TCD messages.
cable telco-return spd radius-realm	Specifies the RADIUS Realm parameter in TCD messages.

cable telco-return spd threshold

To specify the Connection Attempt Threshold parameter for TCD messages, use the **cable telco-return spd threshold** interface configuration command. Use the **no** form of this command to set the default threshold:

```
cable telco-return spd number threshold number
no cable telco-return spd threshold
```

Syntax Description

spd <i>number</i>	Specifies the SPD number.
threshold <i>number</i>	Specifies the connection attempt threshold. Valid range is from 1 to 255.

Defaults

1

Command Modes

Interface Configuration

Command History

Release	Modification
12.0(4)XI	This command was introduced.

Examples

```
ubr7223 (config-if) #cable telco-return spd 2 threshold 200
```

Related Commands

Command	Description
cable telco-return spd dhcp-authenticate	Specifies the DHCP Authenticate parameter in TCD messages as TRUE.
cable telco-return spd dhcp-server	Specifies the IP address of the DHCP server parameter in TCD messages.
cable telco-return spd dial-timer	Specifies the Demand Dial Timer TCD parameter for TCD messages.
cable telco-return spd factory-default	Indicates the factory default service provider descriptor (SPD) used by cable modems.
cable telco-return spd ppp-authenticate	Specifies the PPP Authentication parameter in TCD messages.
cable telco-return spd phonenum	Specifies the Telephone Numbers parameter in TCD messages.

cable telco-return spd username

To specify the Login Username parameter in TCD messages, use the **cable telco-return spd username** interface configuration command. Use the **no** form of this command to remove the parameter from subsequent TCD messages:

```
cable telco-return spd number username string
no cable telco-return spd number username
```

Syntax Description

spd <i>number</i>	Specifies the SPD number.
<i>string</i>	Specifies the login username.

Defaults

No default behavior or values.

Command Modes

Interface Configuration

Command History

Release	Modification
12.0(4)XI	This command was introduced.

Examples

```
ubr7223 (config-if) #cable telco-return spd 3 username sandy
```

Related Commands

Command	Description
cable telco-return service- provider	Specifies the Service Provider Name parameter in TCD messages.
cable telco-return password	Specifies the Login Password parameter in TCD messages.
cable telco-return spd radius-realm	Specifies the RADIUS Realm parameter in TCD messages.

cable upstream channel-width

To configure channel-width preferences, use the **cable upstream channel-width** interface configuration command. Use the **no** form of this command to use the default:

cable upstream *usport* **channel-width** *first-choice-width* [*last-choice-width*]
no cable upstream *usport* **channel-width**

Syntax Description

<i>usport</i>	Specifies the upstream port number. Valid range is from 0 to 5.
<i>first-choice-width</i>	Specifies the upstream channel width in Hertz. Valid values are 200000, 400000, 800000, 1600000, and 3200000 Hz. The corresponding symbol rates are 200, 400, 800, 1600, and 3200, ksym/s.
<i>last-choice-width</i>	(Optional) The upstream channel width in hertz. The valid values are the same as those for the <i>first-choice-width</i> parameter. Use this parameter to enable symbol rate management algorithms. The symbol rate automatically steps up from the <i>first-choice-width</i> value to the highest value until a stable channel is established.

Defaults

1600000 hz

Command Modes

Interface Configuration

Command History

Release	Modification
11.3(5)NA	This command was introduced.
12.0(4)XI	The <i>last-choice-width</i> option was added.

Usage Guidelines

Whenever possible, the system attempts to increase the channel width by one step. This command requires the MC16S card.

Examples

```
Router(config-if)#cable upstream 3 channel-width 160000 3200000
```

Related Commands

Command	Description
cable upstream fec-strength	Overrides the forward error correction (FEC) setting specified in the modulation profile for an upstream channel.

cable upstream hop algorithm	Configures the hop algorithm for the upstream port.
cable upstream modulation	Overrides modulation types specified in the modulation profile for an upstream channel.

cable upstream fec-strength

To override the forward error correction (FEC) setting specified in the modulation profile for this upstream channel, use the **cable upstream fec-strength** interface configuration command. Use the **no** form of this command to disable this feature:

```
cable upstream usport fec-strength t-bytes
no cable upstream usport fec-strength
```

Syntax Description

<i>usport</i>	Specifies the upstream port number. Valid range is from 0 to 5.
<i>t-bytes</i>	Overrides the FEC strength specified in the modulation profile for this upstream channel. Valid values are: 0 which disables FEC 1 which is the lowest FEC strength 10 which is the highest FEC strength.

Defaults

No default behavior or values.

Command Modes

Interface Configuration

Command History

Release	Modification
12.0(4)XI	This command was introduced.

Examples

```
ubr7200(config-if)#cable upstream 2 fec-strength 3
```

Related Commands

Command	Description
cable upstream fec	Enables forward error correction.
cable upstream channel-width	Configures channel-width preferences.
cable upstream hop algorithm	Configures the hop algorithm for the upstream port.
cable upstream modulation	Overrides modulation types specified in the modulation profile for an upstream channel.

cable upstream hop algorithm

To configure the hop algorithm for the upstream port, use the **cable upstream hop algorithm** interface configuration command. Use the **no** form of this command to configure the optimum algorithm:

```
cable upstream usport hop algorithm {blind | optimum}
no cable upstream usport hop algorithm
```

Syntax Description

<i>usport</i>	Specifies the upstream port number. Valid range is from 0 to 5.
blind	Selects the blind frequency hop algorithm.
optimum	Selects the optimum hop algorithm.

Defaults

Optimum.

Command Modes

Interface Configuration

Command History

Release	Modification
12.0(4)XI	This command was introduced.

Usage Guidelines

Install the MC16S card to use this feature.

Examples

```
ubr7200(config-if)#cable upstream 3 hop algorithm optimum
```

Related Commands

Command	Description
cable upstream channel-width	Configures channel-width preferences.
cable upstream fec-strength	Overrides the forward error correction (FEC) setting specified in the modulation profile for an upstream channel.
cable upstream modulation	Overrides modulation types specified in the modulation profile for an upstream channel.

cable upstream modulation

To override modulation types specified in the modulation profile for the specified upstream channel, use the **cable upstream modulation** interface configuration command. Use the **no** form of this command to disable overriding modulation profiles:

```
cable upstream usport modulation first-choice-width [last-choice-width]  
no cable upstream usport modulation
```

Syntax Description

<i>usport</i>	Specifies the upstream port number. Valid range is from 0 to 5.
<i>first-choice-mod</i>	Overrides the modulation type specified in the modulation profile for this channel. Valid values are qpsk or qam16.
<i>last-choice-mod</i>	(Optional) Valid values are qpsk or qam16. Make sure this parameter is different from the <i>first-choice-mod</i> setting or it will be ignored. When used, this parameter enables modulation management algorithms.

Defaults

No default behavior or values.

Command Modes

Interface Configuration

Command History

Release	Modification
12.0(4)XI	This command was introduced.

Usage Guidelines

The cable router first attempts to apply the modulation type specified in the first choice parameter. Then the cable router attempts to apply the modulation type specified in the second choice parameter. Whenever possible, the cable router tries to raise the modulation type to qam16.

Install the MC16S card to use this feature.

Examples

```
ubr7200 (config-if) #cable upstream 3 modulation qpsk qam16
```

Related Commands

Command	Description
cable upstream modulation-profile	Assigns a modulation profile to an interface.
cable upstream channel-width	Configures channel-width preferences.

cable upstream fec-strength	Overrides the forward error correction (FEC) setting specified in the modulation profile for an upstream channel.
cable upstream hop algorithm	Configures the hop algorithm for the upstream port.

cable upstream rate-limit

To enable upstream rate limiting, use the **cable upstream rate-limit** interface configuration command:

```
cable upstream port# rate-limit [token bucket [shaping]]
```

Syntax Description

shaping (Optional) Uses the default mode of token bucket policing with grant shaping.

Defaults

No default behavior or values.

Command Modes

Interface Configuration

Command History

Release	Modification
11.3(6)NA	This command was introduced.
11.3(9)NA	The shaping keyword was added.

Usage Guidelines

The host name entries will not be removed from nonvolatile random-access memory (NVRAM), but will be cleared in running memory.

Examples

```
ubr7200(config-if)#cable upstream 1 rate-limit token-bucket shaping
```

Related Commands

Command	Description
cable downstream rate-limit	Controls downstream rate limiting.

show cable hop

To display cable-hop statistics, use the **show cable hop** EXEC command:

```
show cable hop cable-if [upstream portnum]
```

Syntax Description

cable-if Specifies the cable interface.

upstream portnum (Optional) Specifies the upstream port for which to display the frequency hop status.

Defaults

No default behavior or values.

Command Modes

EXEC

Command History

Release	Modification
12.0(4)XI	This command was introduced.

Examples

```
ubr7200>show cable hop
Upstream  Port  Poll Missed Min   Missed Hop  Hop    Corr  Uncorr
Port      Status Rate Poll   Poll   Poll  Thres Period FEC    FEC
          (ms) Count Sample Pcnt Pcnt  (sec) Errors Errors
Cable4/0/U0 down  1000 * * * frequency not set * * * 0  0
Cable4/0/U1 down  1000 * * * frequency not set * * * 0  0
Cable4/0/U2 down  1000 * * * frequency not set * * * 0  0
Cable4/0/U3 down  1000 * * * frequency not set * * * 0  0
Cable4/0/U4 down  1000 * * * frequency not set * * * 0  0
Cable4/0/U5 down  1000 * * * frequency not set * * * 0  0
Cable5/0/U0 down  1000 * * * interface is down * * * 0  0
Cable5/0/U1 down  1000 * * * frequency not set * * * 0  0
Cable5/0/U2 down  1000 * * * interface is down * * * 0  0
Cable5/0/U3 down  1000 * * * interface is down * * * 0  0
Cable5/0/U4 down  1000 * * * interface is down * * * 0  0
Cable5/0/U5 down  1000 * * * interface is down * * * 0  0
Cable6/0/U0 down  1000 * * * interface is down * * * 0  0

CMTS-ubr7223#show cable hop c2/0 upstream 2
Upstream  Port  Poll Missed Min   Missed Hop  Hop    Corr  Uncorr
Port      Status Rate Poll   Poll   Poll  Thres Period FEC    FEC
          (ms) Count Sample Pcnt Pcnt  (sec) Errors Errors
Cable2/0/U2 admin down 1000 * * * frequency not set * * * 0  0
```

Table 1 show cable hop Command Field Descriptions

Field	Description
Upstream Port	The upstream port for this information line.
Port Status	Lists the status of the port. Valid states are “down” if frequency is unassigned or “admindown” if the port is shut down. If the port is up, this column shows the center frequency of the channel.
Poll Rate	The rate that station maintenance polls are generated (in msec).
Missed Poll Count	The number of missing polls.
Min Poll Sample	The number of polls in the sample.
Missed PollPct	The ratio of missing polls to the number of polls, expressed as a percentage.
Hop Thres Pcnt	The level that the missed poll percentage must exceed to trigger a frequency hop, expressed as a percentage.
Hop Period	The maximum rate that frequency hopping will occur (in seconds).
Corr FEC Errors	The number of correctable FEC errors on this upstream port. Forward error corrections (FECs) measure noise.
Uncorr FEC Errors	The number of uncorrectable FEC errors on this upstream port.

Related Commands

Command	Description
show cable modem	Displays the cable modem statistics.
show cable host	Display the statistics for the host behind the cable modem.

show cable modem

To display cable-modem statistics, use the **show cable modem** EXEC command:

show cable modem *ip-address*

Syntax Description

ip-address (Optional) Specifies the IP address of the cable modem for which you want to gather statistics.

Defaults

No default behavior or values.

Command Modes

EXEC

show cable modem

Command History

Release	Modification
11.3 XA	This command was introduced.
12.0(4)XI	The output for this command was modified.

Examples

The following example clears all entries from the host name and address cache:

```
ubr7200#show cable modem
Interface  Prim Online  Timing Rec   QoS CPE IP address  MAC address
          Sid  State   Offset Power
Cable2/0/U0 1  online  2288   0.50  4   0  172.16.30.66  0010.7bb3.fb45
Cable2/0/U0 2  online  2288   0.50  4   0  172.16.30.68  0010.7bb3.fb7b
Cable2/0/U0 3  init(i) 2280   0.00  2   0  172.16.30.69  0010.9500.05e
```

Table 2 Show Cable Modem Field Descriptions

Field	Description
Interface	The interface on which the cable modem has an active connection.
Prim Sid	The primary service identifier assigned to the modem.
Online State	The status of the modem.
Timing Offset	The cable modem's current timing adjustment.
Rec Power	The nominal receive power in decibels for this SID.
QoS	The service class assigned to the modem.
CPE	The number of customer premises equipment devices (PCs, Macintoshes, Unix workstations, etc.) behind this cable modem.
IP address	The IP address of the modem.
MAC address	The media access layer address of the modem.

show cable noise

To display cable-noise statistics, use the **show cable noise** EXEC command:

```
show cable slot/port noise
```

Syntax Description

slot/port Specifies the slot and port number for which information is to be collected.

Defaults

No default behavior or values.

Command Modes

EXEC

Command History

Release	Modification
12.0(4)XI	This command was introduced.

Examples

```
ubr7223#show cable 6/0 noise
```

Related Commands

Command	Description
show cable modem	Displays the statistics for the specified cable modem.

test cable awacs

To test the cable linecard using onboard spectrum management hardware, use the **test cable awacs** EXEC command:

test cable *slot/port* awacs

Syntax Description

slot/port Specifies the slot and port number for which information is to be collected.

Defaults

No default behavior or values.

Command Modes

EXEC

Command History

Release	Modification
12.0(4)XI	This command was introduced.

Usage Guidelines

This command requires MC16S card.

Examples

```
ubr7200#test cable 6/3 awacs
```

Debug Commands

This section documents new or modified commands. All other commands used with this feature are documented in the Cisco IOS Release 12.0 command references.

- **debug cable freqhop**
- **debug cable hw-spectrum**
- **debug cable telco-return**
- **debug cable telco-return msg**

debug cable freqhop

To display debug messages for frequency hopping, use the **debug cable freqhop** EXEC command. Use the **no** form of this command to disable debugging output.

[no] debug cable freqhop

Syntax Description

This command has no arguments or keywords.

Defaults

Debugging for frequency hopping is not enabled.

Command History

Release	Modification
12.0(4)XI	This command was introduced.

Examples

```
ubr7223#debug cable freqhop  
CMTS freqhop debugging is on
```

debug cable hw-spectrum

To display debug messages for spectrum management (frequency agility), use the **debug cable hw-spectrum** EXEC command. Use the **no** form of this command to disable debugging output.

[no] debug cable hw-spectrum

Syntax Description

This command has no arguments or keywords.

Defaults

Debugging for spectrum management is not enabled.

Command History

Release	Modification
12.0	This command was introduced as debug cable specmgmt .
12.0(4)XI	Command renamed to debug cable hw-spectrum .

Examples

```
ubr7223#debug cable hw-spectrum
CMTS specmgmt debugging is on
```

debug cable telco-return

To display debug messages for telco-return events, use the **debug cable telco-return EXEC** command. Use the **no** form of this command to disable debugging output.

[no] debug cable telco return

Syntax Description

This command has no arguments or keywords.

Defaults

Debugging for telco-return events is not enabled.

Command History

Release	Modification
12.0(4)XI	This command was introduced.

Examples

```
CMTS-ubr7223#debug cable telco-return  
CMTS telco-return debugging is on
```

Related Commands

Command	Description
debug telco-return msg	Displays debug messages for telco-return events.

debug telco-return msg

To display debug messages for telco-return events, use the **debug cable telco-return msg EXEC** command. Use the **no** form of this command to disable debugging output.

[no] debug cable telco-return msg

Syntax Description

This command has no arguments or keywords.

Defaults

Debugging for telco-return messages is not enabled.

Command History

Release	Modification
12.0(4)XI	This command was introduced.

Examples

```
ubr7223#debug cable telco-return msg  
CMTS telco-return msg debugging is on
```

Related Commands

Command	Description
debug cable telco-return	Displays debug messages for telco-return events.

