



Configuring the Cisco uBR-MC88V Cable Interface Line Card

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The Cisco uBR-MC88V cable interface line card is a DOCSIS 3.0 line card designed specifically for Cisco uBR7246VXR and Cisco uBR7225VXR universal broadband routers. This line card transmits and receives radio frequency (RF) signals between the subscriber and the headend over a hybrid fiber-coaxial (HFC) system.

Finding Feature Information

Your software release may not support all the features documented in this module. For the latest feature information and caveats, see the release notes for your platform and software release. To find information about the features documented in this module, and to see a list of the releases in which each feature is supported, see the [“Feature Information for Configuring the Cisco uBR-MC88V Cable Interface Line Card” section on page 28](#).

Use Cisco Feature Navigator to find information about platform support and Cisco IOS, Catalyst OS, and Cisco IOS XE software image support. To access Cisco Feature Navigator, go to <http://www.cisco.com/go/cfn>. An account on Cisco.com is not required.



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Prerequisites for Configuring the Cisco uBR-MC88V Cable Interface Line Card

Table 1 lists the general compatibility prerequisites for the Cisco uBR-MC88V cable interface line card.

Table 1 *Software and Hardware Compatibility Matrix for the Cisco uBR-MC88V Line Card*

CMTS Platform	Processor Engine	Cisco IOS Release
<ul style="list-style-type: none"> • Cisco uBR7246VXR router • Cisco uBR7225VXR router 	<ul style="list-style-type: none"> • Network Processing Engine G2 (NPE-G2) 	12.2(33)SCD and later



Note

The Cisco uBR-MC88V cable interface line card requires the new uBR7246VXR fan tray as part of its hardware. The part number for the new fan tray is *MAS-U7246VXR-FAN2*.

Restrictions for Configuring the Cisco uBR-MC88V Cable Interface Line Card

- Online insertion and removal (OIR) or hot swapping between two Cisco uBR-MC88V line cards is supported in Cisco IOS Release 12.2(33)SCD. However, OIR between line cards of different types is not supported. That is, if you replace an existing Cisco uBR-MC28U line card with the Cisco uBR-MC88V line card, you must reconfigure the line card.



Note

We recommend that you reload the Cisco uBR7246VXR or Cisco uBR7225VXR router when replacing a cable interface line card with a card of a different type.

- You cannot install any of the existing line cards along with the Cisco uBR-MC88V line card in Cisco IOS Release 12.2(33)SCD.

- You cannot configure a bonded channel using the channels of multiple cable interface line cards. A bonded channel must be configured using the channels of the same line card.

**Note**

Note: We cannot bond across cards and cannot make a cable interface (Mac domain) across cards. Channel bonding can be done only on the same card.

- The Cisco uBR-MC88V cable interface line card supports the Advanced Encryption Standard (AES) only when the Baseline Privacy Interface Plus (BPI+) is enabled.

Information About the Cisco uBR-MC88V Cable Interface Line Card

The Cisco uBR-MC88V cable interface line card serves as the RF interface between the cable headend and the DOCSIS-compliant cable modems, EuroDOCSIS-compliant cable modems, or set-top boxes (STBs). The Cisco uBR-MC88V cable interface line card has eight RF upstream (US) and two downstream (DS) physical connectors. Each downstream physical connector includes four downstream channels. The Cisco uBR-MC88V line card supports two cable interfaces (MAC domains), and the downstream and upstream channels are dynamically associated with any of these MAC domains.

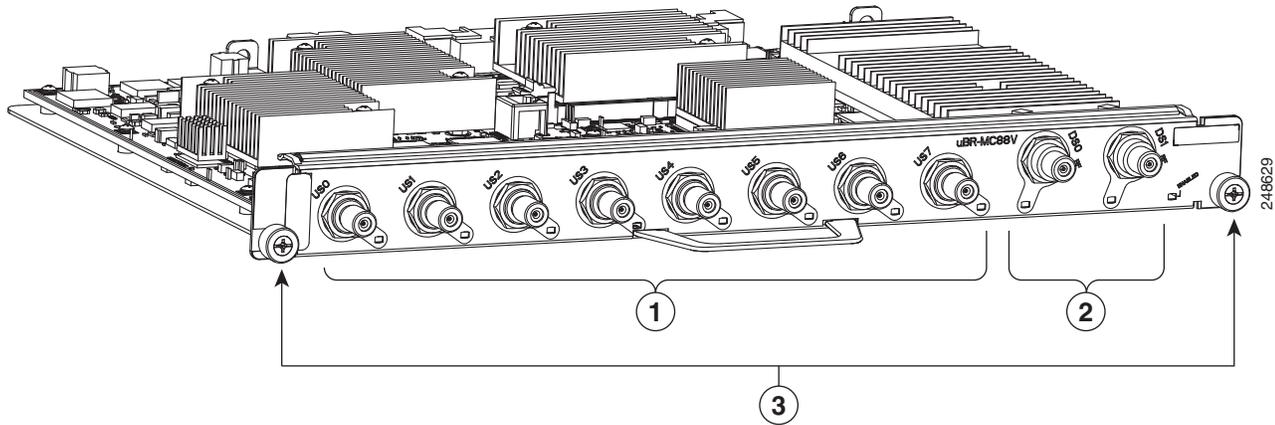
Upstream data, from the subscriber, comes through the upstream ports (US0–US7) on the Cisco uBR-MC88V cable interface line card. The line card then processes and configures the data and sends it across the backplane to the WAN or backhaul card (or both), and out to the Internet.

Downstream data, to the subscriber, comes from the Internet through the WAN or backhaul card (or both), and across the backplane to the Cisco uBR-MC88V cable interface line card. The Cisco uBR-MC88V line card processes and configures the data and sends it out through the appropriate radio frequency channel on a downstream port (DS0–DS1) to be combined with the rest of the downstream signals in the headend.

The Cisco uBR-MC88V cable interface line card supports both DOCSIS and EuroDOCSIS cable modem networks. The card supports downstream channels in the 69 to 999 MHz range, and upstream channels in the 5 to 55 MHz range. The Cisco uBR-MC88V cable interface line card supports Annex B and Annex A data rates, channel widths, and modulation schemes, and has DOCSIS MAC management and spectrum management capabilities. This card also supports DOCSIS 3.0, A-TDMA, S-CDMA, downstream bonding, and upstream bonding rates.

Figure 1 shows the Cisco uBR-MC88V cable interface line card faceplate.

Figure 1 Cisco uBR-MC88V Cable Interface Line Card Faceplate



1	Upstream F-connectors	3	Captive installation screws
2	Downstream F-connectors		—

Table 2 describes the LEDs on the Cisco uBR-MC88V cable interface line card.

Table 2 Cisco uBR-MC88V Cable Interface Line Card LEDs

LED Label	Status	Description
Enabled	Green	The line card is operating normally.
	Off	Either the card is shut down or the slot is not working.
US0 through US7	Green	Upstream-enabled path is configured and able to pass traffic.
	Off	Upstream port is not enabled.
DS0 through DS1	Green	RF-enabled downstream path is configured and able to pass traffic out through the upconverter at radio frequencies.
	Off	RF is not enabled. Note The LED status of a DS port becomes Off only when all the four RF channels on the port are disabled.

Table 3 shows the supported DOCSIS modulation schemes.

Table 3 Supported DOCSIS and EuroDOCSIS Modulation Schemes

Cable Interface Line Card	Downstream Modulation	Upstream Modulation
Cisco uBR-MC88V	64-QAM ¹ , 256-QAM	QPSK ² , 8-, 16-, 32-, 64-QAM

1. QAM = Quadrature Amplitude Modulation

2. QPSK = Quadrature Phase Shift Keying

Benefits

The Cisco uBR-MC88V cable interface line card provides the following benefits:

- Additional flexibility for cable operators in partitioning the cable plant to address growing subscriber bandwidth demands; enables cost-effective scalability of services and subscribers.
- Hardware-based support for DOCSIS 2.0 (apart from DOCSIS 1.1 features) and DOCSIS 3.0 features such as S-CDMA, Upstream Channel Bonding, and other DOCSIS 3.0 downstream features.

Stacking Number Configuration

A new command, **rf-channel stacking**, was introduced in Cisco IOS Release 12.2(33)SCD to suppress a carrier or mute an RF channel on the Cisco uBR-MC88V line card. By default, the stacking number is configured as 4. If you change the default stacking number configuration, traffic loss may occur on the active channels. That is, if you change the stacking number from 4 to 2, traffic is interrupted on the RF channels 0 and 1.

However, traffic loss does not occur if you do not change the stacking number configuration when shutting down an RF channel using the **rf-channel rf-shutdown** command.



Note

We recommend that you do not change the default stacking number configuration. You can change the default configuration when you want RF diagnostics performed on a particular channel. For example, if you want to perform RF diagnostics on RF channel 2, you need to change the default stacking number configuration to 2 to completely mute this channel.

For more information about the **rf-channel stacking** command, see the *Cisco IOS CMTS Cable Command Reference* at the following URL:

http://www.cisco.com/en/US/docs/ios/cable/command/reference/cbl_14_q_to_sg.html

Onboard Failure Logging

The Onboard Failure Logging (OBFL) feature enables storage and collection of critical failure information in the NVRAM of the line card. The Cisco uBR-MC88V cable interface line card supports OBFL in Cisco IOS Release 12.2(33)SCD and later.

The OBFL stored data assists in understanding and debugging field failures upon Return Material Authorization (RMA) of a field-replaceable unit at repair and failure analysis sites.

OBFL records operating temperatures, voltages, hardware uptime, and any other important events that assist onboard diagnosis in case of hardware failures.

For more information on the feature, see the *Onboard Failure Logging* feature guide located at the following URL:

http://www.cisco.com/en/US/docs/ios/12_2sx/12_2sxh/feature/guide/sxhobfl.html



Note

The sample output documented in the *Onboard Failure Logging* feature guide might slightly vary for Cisco CMTS routers.

How to Configure the Cisco uBR-MC88V Cable Interface Line Card

This section describes the steps for configuring the Cisco uBR-MC88V line card at startup. These procedures provide only the initial, basic configuration for the line card.

The universal broadband router must be operational before beginning the following basic configuration procedures for the line card:

- [Configuring an Integrated Cable Controller Interface on the Cisco uBR-MC88V Line Card, page 6](#) (required)
- [Configuring a Cable Interface on the Cisco uBR-MC88V Line Card, page 10](#) (required)
- [Configuring an Integrated Cable Interface on the Cisco uBR-MC88V Line Card, page 14](#) (required)
- [Configuring a Wideband Cable Interface on the Cisco uBR-MC88V Line Card, page 16](#) (required)
- [Configuring the Fiber Node on the Cisco uBR-MC88V Line Card, page 19](#) (required)

Configuring an Integrated Cable Controller Interface on the Cisco uBR-MC88V Line Card

Every downstream port on the Cisco uBR-MC88V line card is configured as an integrated cable controller. Every Cisco uBR-MC88V line card can have up to two integrated cable controllers. You will have to configure all RF channel parameters such as downstream channel ID, frequency, and modulation rates on the controller interface.

SUMMARY STEPS

1. **enable**
2. **configure terminal**
3. **controller integrated-cable** *slot/port*
4. **rf-channel** *rf-port* **cable downstream channel-id** *channel-id*
5. **rf-channel** *rf-port* **frequency** {*freq* | **none**}[**annex** {**A** | **B**} **modulation** {**64** | **256**} [**interleave-depth** *value*]]
6. **rf-channel** *rf-port* **rf-power** *power-level*
7. **no rf-channel** *rf-port* **rf-shutdown**
8. **end**

DETAILED STEPS

	Command or Action	Purpose
Step 1	<p>enable</p> <p>Example: Router> enable</p>	<p>Enables privileged EXEC mode.</p> <ul style="list-style-type: none"> • Enter your password if prompted.
Step 2	<p>configure terminal</p> <p>Example: Router# configure terminal Router(config)#</p>	<p>Enters global configuration mode.</p>
Step 3	<p>controller integrated-cable <i>slot/port</i></p> <p>Example: Router(config)# controller integrated-cable 5/1</p>	<p>Enters controller configuration mode to configure the Cisco uBR-MC88V integrated cable controller.</p> <ul style="list-style-type: none"> • <i>slot</i>—Slot where the line card resides. <ul style="list-style-type: none"> – Cisco uBR7246VXR router: The valid range is from 3 to 6. – Cisco uBR7225VXR router: The valid range is from 1 to 2. • <i>port</i>—Downstream port number on the line card. The valid port value is 0 or 1.
Step 4	<p>rf-channel <i>rf-port</i> cable downstream channel-id <i>channel-id</i></p> <p>Example: Router(config-controller)# rf-channel 0 cable downstream channel-id 97</p>	<p>Assigns a downstream channel ID to an RF channel in controller configuration mode.</p> <ul style="list-style-type: none"> • <i>rf-port</i>—RF channel number on the physical port of the line card. The valid range is from 0 to 3. • <i>channel-id</i>—Unique channel ID. The valid range is from 1 to 255. <p>Note We recommend you to retain the system-generated default channel IDs instead of configuring it.</p>

Command or Action	Purpose
<p>Step 5</p> <pre>rf-channel <i>rf-port</i> frequency {<i>freq</i> none} [annex {A B} modulation {64 256} [interleave-depth <i>value</i>]]</pre> <p>Example:</p> <pre>Router(config-controller)# rf-channel 0 frequency 453000000 annex B modulation 256 interleave-depth 32</pre>	<p>Configures the frequency of an RF channel in controller configuration mode.</p> <ul style="list-style-type: none"> • <i>rf-port</i>—RF channel number on the physical port of the line card. The valid range is from 0 to 3. • <i>freq</i>—Center frequency for the RF channel. The valid range for each RF channel is different based on the Annex type. • none—Removes the specified frequency if the RF channel is shut down. • annex {A B}—Indicates the MPEG framing format for each RF channel. <ul style="list-style-type: none"> – A—Annex A. Indicates that the downstream is compatible with the European MPEG framing format specified in ITU-TJ.83 Annex A. – B—Annex B. Indicates that the downstream is compatible with the North American MPEG framing format specified in ITU-TJ.83 Annex B. • modulation {64 256}—Indicates the modulation rate (64 or 256 QAM) for each RF channel. • interleave-depth value—Indicates the downstream interleave depth. For annex A, the interleave value is 12. For annex B, the valid values are 8, 16, 32, 64, and 128. <p>Note When the frequency, annex, or modulation is changed, it is reflected across all RF channels in the port. The frequency is automatically assigned using the 6 Mhz or 8 Mhz range based on the annex. The range of the frequency depends on the RF channel being configured.</p>

	Command or Action	Purpose
Step 6	<p>rf-channel <i>rf-port</i> rf-power <i>power-level</i></p> <p>Example: Router(config-controller)# rf-channel 0 rf-power 50.6</p>	<p>Sets the RF power output level in the controller integrated cable mode. The RF power for an RF channel is based on the power mode.</p> <ul style="list-style-type: none"> <i>rf-port</i>—RF channel number on the physical port of the line card. The valid range is from 0 to 3. <i>power-level</i>—Desired RF output power level in dBmV. The valid range is from 44 to 63 dBmV. The format is XY.Z. By default, .Z is added as .0. <p>There are four modes of power levels. Mode indicates the number of RF channels enabled on the physical port. The RF channel stacking number configuration determines the power mode on the Cisco uBR-MC88V line card.</p> <ul style="list-style-type: none"> – Single Mode: The RF channel stacking number equals to 1 in this mode. The valid range is from 45 to 63 dBmV. (Channel 0 is enabled while the other channels are disabled.) – Dual Mode: The RF channel stacking number equals to 2 in this mode. The valid range is from 48 to 56 dBmV. (Channels 0 and 1 are enabled; channels 2 and 3 are disabled.) – Tri Mode: The RF channel stacking number equals to 3 in this mode. The valid range is from 46 to 54 dBmV. (Channels 0, 1, and 2 are enabled; channel 3 is disabled.) – Quad Mode: The RF channel stacking number equals to 4. The valid range is from 44 to 52 dBmV. (Channels 0, 1, 2, and 3 are enabled.)
Step 7	<p>no rf-channel <i>rf-port</i> rf-shutdown</p> <p>Example: Router(config-controller)# no rf-channel 0 rf-shutdown</p>	<p>Enables the RF channel.</p>
Step 8	<p>end</p> <p>Example: Router(config-controller)# end</p>	<p>Exits controller configuration mode and returns to privileged EXEC mode.</p>

Example

The following example shows how to configure an integrated cable controller interface on the Cisco uBR-MC88V line card:

```

Router# enable
Router# configure terminal
Router(config)# controller integrated-cable 5/1
Router(config-controller)# rf-channel 0 cable downstream channel-id 21
Router(config-controller)# rf-channel 0 frequency 393000000 annex B modulation 256qam interleave 8
Router(config-controller)# rf-channel 0 rf-power 50.0
Router(config-controller)# no rf-channel 0 rf-shutdown

```

```

Router(config-controller)# rf-channel 1 cable downstream channel-id 22
Router(config-controller)# rf-channel 1 frequency 399000000 annex B modulation 256qam
interleave 16
Router(config-controller)# rf-channel 1 rf-power 50.0
Router(config-controller)# no rf-channel 1 rf-shutdown
Router(config-controller)# rf-channel 2 cable downstream channel-id 23
Router(config-controller)# rf-channel 2 frequency 405000000 annex B modulation 256qam
interleave 32
Router(config-controller)# rf-channel 2 rf-power 50.0
Router(config-controller)# no rf-channel 2 rf-shutdown
Router(config-controller)# rf-channel 3 cable downstream channel-id 24
Router(config-controller)# rf-channel 3 frequency 411000000 annex B modulation 256qam
interleave 64
Router(config-controller)# rf-channel 3 rf-power 50.0
Router(config-controller)# no rf-channel 3 rf-shutdown
Router(config-controller)# end

```

**Note**

When you specify the RF channel parameters for the first RF channel on the integrated cable controller, all RF channel parameters except the interleave depth value are autoconfigured for the rest of the RF channels that are shared on the integrated cable controller. For example, if the frequency on RF channel 0 is configured, the frequency on the other RF channels are automatically configured based on the frequency value of RF channel 0.

Configuring a Cable Interface on the Cisco uBR-MC88V Line Card

The cable interface is the MAC domain interface that hosts integrated cable interfaces and associates upstream channels with the integrated cable interfaces.

SUMMARY STEPS

1. **enable**
2. **configure terminal**
3. **interface cable** *slot/port*
4. **downstream integrated-cable** *slot/port* **rf-channel** *rf-port* **upstream** *grouplist*
5. **cable upstream max-ports** *n*
6. **cable upstream** *logical-port* **connector** *physical-port*
7. **cable upstream** *n* **docsis-mode** {*atdma* | *scdma* | *scdma-d3* | *tdma* | *tdma-atdma*}
8. **cable upstream** *n* **channel-width** *first-choice-width* [*last-choice-width*]
9. **cable upstream** *n* **minislot-size** *size*
10. **cable upstream** *n* **range-backoff** {*automatic* | *start end*}
11. **cable upstream** *n* **modulation-profile** *primary-profile-number* [*secondary-profile-number*] [*tertiary-profile-number*]
12. **cable upstream bonding-group** *id*
13. **upstream** *id*
14. **exit**
15. **no cable upstream** *n* **shutdown**
16. **end**

DETAILED STEPS

	Command or Action	Purpose
Step 1	enable Example: Router> enable	Enables privileged EXEC mode. <ul style="list-style-type: none"> Enter your password if prompted.
Step 2	configure terminal Example: Router# configure terminal Router(config)#	Enters global configuration mode.
Step 3	interface cable slot/port Example: Router(config)# interface cable 5/1	Enters the interface configuration mode from the global configuration mode. <ul style="list-style-type: none"> <i>slot</i>—Slot where the line card resides. <ul style="list-style-type: none"> Cisco uBR7246VXR router: The valid range is from 3 to 6. Cisco uBR7225VXR router: The valid range is from 1 to 2. <i>port</i>—Downstream port number on the line card. The valid port value is 0 or 1.
Step 4	downstream integrated-cable slot/port rf-channel rf-port upstream grouplist Example: Router(config-if)# downstream integrated-cable 5/1 rf-channel 3	Configures the RF channels from the Cisco uBR-MC88V cable interface line card to the primary channels in a MAC domain on the same slot and port. <ul style="list-style-type: none"> <i>slot</i>—Slot where the line card resides. <ul style="list-style-type: none"> Cisco uBR7246VXR router: The valid range is from 3 to 6. Cisco uBR7225VXR router: The valid range is from 1 to 2. <i>port</i>—Downstream port number on the line card. The allowed port value is 0 or 1. <i>rf-port</i>—RF channel number. The valid range is from 0 to 3. upstream grouplist—Specifies the upstream logical identifier. The valid range is dependent on the number of upstream ports configured using the cable upstream max-ports command. If the maximum upstream port number is 8, the valid range for the upstream logical identifier is from 0 to 7. If the maximum upstream port number is 4, the valid range for the upstream logical identifier is from 0 to 3.
Step 5	cable upstream max-ports n Example: Router(config-if)# cable upstream max-ports 4	Configures the maximum number of upstreams on a downstream interface on the Cisco uBR-MC88V cable interface line card. <i>n</i> —Number of upstream ports. The valid range is from 1 to 8. The default value is 4.

	Command or Action	Purpose
Step 6	<p>cable upstream <i>logical-port</i> connector <i>physical-port</i></p> <p>Example: Router(config-if)# cable upstream 0 connector 0</p>	<p>Maps an upstream port to a physical port on the Cisco uBR-MC88V cable interface line card for use with a particular downstream.</p> <ul style="list-style-type: none"> • <i>logical-port</i>—Upstream port number for the logical port assignment. The number of logical ports is configured with the cable modulation-profile command. The valid range is from 0 to 7. • <i>physical-port</i>—Upstream port number for the actual physical port. The valid range is from 0 to 7.
Step 7	<p>cable upstream <i>n</i> docsis-mode {atdma scdma scdma-d3 tdma tdma-atdma}</p> <p>Example: Router(config-if)# cable upstream 0 docsis-mode tdma</p>	<p>Configures an upstream to use modulation profiles.</p> <ul style="list-style-type: none"> • <i>n</i>—Upstream port number. The valid range is from 0 to 7. • atdma—Indicates the upstream only for DOCSIS 2.0 Advanced Time Division Multiple Access (A-TDMA) modulation profiles. • scdma—Indicates the upstream only for DOCSIS 2.0 Synchronous Code Division Multiple Access (S-CDMA) modulation profiles. • scdma-d3—Indicates the upstream only for DOCSIS 3.0 S-CDMA modulation profiles. • tdma—Indicates the upstream only for DOCSIS 1.0 and DOCSIS 1.1 Time Division Multiple Access (TDMA) modulation profiles. The default DOCSIS mode is tdma. • tdma-atdma—Indicates the upstream for both A-TDMA and TDMA operation (mixed mode).
Step 8	<p>cable upstream <i>n</i> channel-width <i>first-choice-width</i> [<i>last-choice-width</i>]</p> <p>Example: Router(config-if)# cable upstream 0 channel-width 1600000 1600000</p>	<p>Specifies an upstream channel width for an upstream port.</p> <ul style="list-style-type: none"> • <i>n</i>—Upstream port number. The valid range is from 0 to 7. • <i>first-choice-width</i>—Upstream channel width in hertz (Hz). Valid values for the Cisco uBR-MC88V line card are: <ul style="list-style-type: none"> – 1600000 (channel width 1600 kHz, symbol rate 1280 ksym/sec) – 200000 (channel width 200 kHz, symbol rate 160 ksym/sec) – 3200000 (channel width 3200 kHz, symbol rate 2560 ksym/sec) – 400000 (channel width 400 kHz, symbol rate 320 ksym/sec) – 6400000 (channel width 6400 kHz, symbol rate 5120 ksym/sec) – 800000 (channel width 800 kHz, symbol rate 640 ksym/sec) • <i>last-choice-width</i>—Upstream channel width in hertz. The valid values are the same as those for the <i>first-choice-width</i> parameter, but for proper operation, the <i>last-choice-width</i> should be equal to or less than the <i>first-choice-width</i> value.

	Command or Action	Purpose
Step 9	<p>command <code>cable upstream n minislot-size size</code></p> <p>Example: Router(config-if)# cable upstream 0 minislot-size 4</p>	<p>Specifies the minislot size (in ticks) for a specific upstream interface.</p> <ul style="list-style-type: none"> <i>n</i>—Upstream port number. The valid range is from 0 to 7. <i>size</i>—Minislot size in time ticks. Valid minislot sizes are 2, 4, 8, 16, 32, 64, and 128.
Step 10	<p>command <code>cable upstream n range-backoff {automatic start end}</code></p> <p>Example: Router(config-if)# cable upstream 0 range-backoff 3 6</p>	<p>Specifies automatic or configured initial ranging backoff calculation.</p> <ul style="list-style-type: none"> <i>n</i>—Upstream port number. The valid range is from 0 to 7. <i>automatic</i>—Fixed data backoff start and end values. <i>start</i>—Binary exponential algorithm. Sets the start value for initial ranging backoff. Valid values are from 0 to 15. <i>end</i>—Binary exponential algorithm. Sets the end value for initial ranging backoff. Valid values are from 0 to 15.
Step 11	<p>command <code>cable upstream n modulation-profile primary-profile-number [secondary-profile-number] [tertiary-profile-number]</code></p> <p>Example: Router(config-if)# cable upstream 0 modulation-profile 21</p>	<p>Assigns one or two modulation profiles to an upstream port.</p> <ul style="list-style-type: none"> <i>n</i>—Upstream port number. The valid range is from 0 to 7. <i>primary-profile-number</i>—Primary modulation profile for the upstream port. <i>secondary-profile-number</i>—Secondary modulation profile for the upstream port. This is used when noise on the upstream increases to the point that the primary modulation profile can no longer be used. Valid values are the same as for the primary modulation profile. <i>tertiary-profile-number</i>—Tertiary modulation profile for the upstream port.
Step 12	<p>command <code>cable upstream bonding-group id</code></p> <p>Example: Router(config-if)# cable upstream bonding-group 200</p>	<p>Creates the bonding group on the specified cable interface and enters upstream bonding configuration mode.</p> <ul style="list-style-type: none"> <i>id</i>—Bonding group ID on the cable interface. The valid range is from 1 to 65535.
Step 13	<p>command <code>upstream id</code></p> <p>Example: Router(config-upstream-bonding)# upstream 0</p>	<p>Adds upstream channels to the upstream bonding group.</p>
Step 14	<p>command <code>exit</code></p> <p>Example: Router(config-upstream-bonding)# exit</p>	<p>Exits upstream bonding configuration mode and returns to the interface configuration mode.</p>

	Command or Action	Purpose
Step 15	no cable upstream <i>n</i> shutdown Example: Router(config-if)# no cable upstream 0 shutdown	Enables a single upstream port. <i>n</i> —Upstream port number. The valid range is from 0 to 7.
Step 16	end Example: Router(config-if)# end	Exits interface configuration mode and returns to privileged EXEC mode.

Example

The following example shows how to configure a cable interface on the Cisco uBR-MC88V line card:

```
Router> enable
Router# configure terminal
Router(config)# interface cable 5/1
Router(config-if)# downstream integrated-cable 5/1 rf-channel 3 upstream 3
Router(config-if)# cable upstream max-ports 4
Router(config-if)# cable upstream 0 connector 0
Router(config-if)# cable upstream 0 docsis-mode tdma
Router(config-if)# cable upstream 0 channel-width 1600000 1600000
Router(config-if)# cable upstream 0 minislot-size 4
Router(config-if)# cable upstream 0 range-backoff 3 6
Router(config-if)# cable upstream 0 modulation-profile 21
Router(config-if)# cable upstream bonding-group 200
Router(config-upstream-bonding)# upstream 0
Router(config-upstream-bonding)# upstream 1
Router(config-upstream-bonding)# upstream 2
Router(config-upstream-bonding)# upstream 3
Router(config-upstream-bonding)# exit
Router(config-if)# no cable upstream 0 shutdown
Router(config-if)# end
```

Configuring an Integrated Cable Interface on the Cisco uBR-MC88V Line Card

An integrated cable (IC) interface is used as the primary channel on the Cisco uBR-MC88V cable interface line card.

SUMMARY STEPS

1. **enable**
2. **configure terminal**
3. **interface integrated-cable *slot/port:rf-channel***
4. **shutdown**
5. **cable dynamic-bw-sharing**
6. **no shutdown**
7. **cable rf-bandwidth-percent *percent-value* [remaining ratio *excess-value*]**
8. **end**

DETAILED STEPS

	Command or Action	Purpose
Step 1	enable Example: Router> enable	Enables privileged EXEC mode. <ul style="list-style-type: none"> • Enter your password if prompted.
Step 2	configure terminal Example: Router# configure terminal Router(config)#	Enters global configuration mode.
Step 3	interface integrated-cable <i>slot/port:rf-channel</i> Example: Router(config)# interface integrated-cable 5/1:0	Enters the interface configuration mode. <ul style="list-style-type: none"> • <i>slot</i>—Slot where the line card resides. <ul style="list-style-type: none"> – Cisco uBR7246VXR router: The valid range is from 3 to 6. – Cisco uBR7225VXR router: The valid range is from 1 to 2. • <i>port</i>—Downstream port number on the line card. The valid port value is 0 or 1. • <i>rf-channel</i>—RF channel number. The valid range is from 0 to 3.
Step 4	shutdown Example: Router(config-if)# shutdown	Shuts down the integrated cable interface. Note You must shut down a particular interface before enabling dynamic bandwidth sharing (DBS) on that interface.
Step 5	cable dynamic-bw-sharing Example: Router(config-if)# cable dynamic-bw-sharing	Enables dynamic bandwidth sharing on the integrated cable interface.
Step 6	no shutdown Example: Router(config-if)# no shutdown	Enables the integrated cable interface.

	Command or Action	Purpose
Step 7	<p>cable rf-bandwidth-percent <i>percent-value</i> [remaining ratio <i>excess-value</i>]</p> <p>Example: Router(config-if)# cable rf-bandwidth-percent 96</p>	<p>Enables either static or dynamic bandwidth percentage sharing for an integrated cable interface in interface configuration mode.</p> <ul style="list-style-type: none"> <i>percent-value</i>—Static bandwidth allocation of a downstream RF channel. The valid range is from 1 to 100. remaining ratio <i>excess-value</i>—(Optional) Specifies the ratio of the remaining or excess bandwidth that can be allocated to the integrated cable interface. The valid range is from 1 to 100. The default value is 1. <p>Note This option is available only when dynamic bandwidth sharing is enabled on the Cisco uBR-MC88V cable interface line card.</p>
Step 8	<p>end</p> <p>Example: Router(config-if)# end</p>	<p>Exits interface configuration mode and returns to privileged EXEC mode.</p>

Example

The following example shows how to configure an integrated cable interface.

```
Router> enable
Router# configure terminal
Router(config)# interface integrated-cable 5/1:0
Router(config-if)# shutdown
Router(config-if)# cable dynamic-bw-sharing
Router(config-if)# no shutdown
Router(config-if)# cable rf-bandwidth-percent 96
Router(config-if)# end
```

Configuring a Wideband Cable Interface on the Cisco uBR-MC88V Line Card

A wideband cable interface is a logical representation of the channels in the bonding group and is configured using the **interface wideband-cable** command.

Restrictions

The maximum number of wideband cable interfaces that can be configured on the Cisco uBR-MC88V line card is 12. A single controller can have up to six wideband cable interfaces on the Cisco uBR-MC88V line card.

SUMMARY STEPS

1. **enable**
2. **configure terminal**
3. **interface wideband-cable** *slot/port:wb_channel*
4. **shutdown**
5. **cable dynamic-bw-sharing**

6. **no shutdown**
7. **cable bundle** *n*
8. **cable rf-channel** *rf-port* [**bandwidth-percent** *bw-percent*] [**remaining ratio** *excess-value*]
9. **cable rf-channel controller** *port channel rf-port bandwidth-percent bw-percent*
10. **cable bonding-group-id** *bonding-group-id*
11. **end**

DETAILED STEPS

	Command or Action	Purpose
Step 1	enable Example: Router> enable	Enables privileged EXEC mode. <ul style="list-style-type: none"> • Enter your password if prompted.
Step 2	configure terminal Example: Router# configure terminal Router(config)#	Enters global configuration mode.
Step 3	interface wideband-cable <i>slot/port:wb_channel</i> Example: Router(config)# interface wideband-cable 5/1:0	Enters the wideband cable interface mode from the global configuration mode. <ul style="list-style-type: none"> • <i>slot</i>—Slot where the line card resides. <ul style="list-style-type: none"> – Cisco uBR7246VXR router: The valid range is from 3 to 6. – Cisco uBR7225VXR router: The valid range is from 1 to 2. • <i>port:wb_channel</i>—Downstream port number on the line card. The allowed port value is 0 or 1. The valid range for wideband channel is from 0 to 5.
Step 4	shutdown Example: Router(config-if)# shutdown	Shuts down the wideband cable interface. Note You must shut down a particular interface before enabling dynamic bandwidth sharing (DBS) on that interface.
Step 5	cable dynamic-bw-sharing Example: Router(config-if)# cable dynamic-bw-sharing	Enables dynamic bandwidth sharing on the wideband cable interface.
Step 6	no shutdown Example: Router(config-if)# no shutdown	Enables the wideband cable interface.
Step 7	cable bundle <i>n</i> Example: Router(config-if)# cable bundle 1	Configures a cable interface to an interface bundle. <ul style="list-style-type: none"> • <i>n</i>—Bundle identifier. The valid range is from 1 to 255.

Command or Action	Purpose
<p>Step 8</p> <pre>cable rf-channel <i>rf-port</i> [bandwidth-percent <i>bw-percent</i>] [remaining ratio <i>excess-value</i>]</pre> <p>Example: Router(config-if)# cable rf-channel 0 bandwidth-percent 25</p>	<p>Configures the RF channel bandwidth that is allocated to a specified wideband channel or bonding group.</p> <ul style="list-style-type: none"> <i>rf-port</i>—RF channel physical port on the field-programmable gate array (FPGA). bandwidth-percent <i>bw-percent</i>—(Optional) Indicates the bandwidth percentage from this RF channel that is used for the wideband interface. The valid range is from 0 to 100. If the bandwidth percentage is not used, the default bandwidth value is 100 percent. remaining ratio <i>excess-value</i>—(Optional) Indicates the ratio of the excess bandwidth that is allocated to the wideband interface. The valid range is from 1 to 100. The default value is 1. <p>Note This option is available only when dynamic bandwidth sharing is enabled on the Cisco uBR-MC88V cable interface line card.</p>
<p>Step 9</p> <pre>cable rf-channel controller <i>port</i> channel <i>rf-port</i> bandwidth-percent <i>bw-percent</i></pre> <p>Example: Router(config-if)# cable rf-channel controller 1 channel 1 bandwidth-percent 50</p>	<p>Configures the RF channel bandwidth percentage on another controller on the same line card.</p> <ul style="list-style-type: none"> controller <i>port</i>—Specifies the controller port value. Valid values are 0 and 1. channel <i>rf-port</i>—Specifies the RF port. bandwidth-percent <i>bw-percent</i>—(Optional) Indicates the bandwidth percentage from this RF channel that is used for the wideband interface. The valid range is from 0 to 100 percent. If the bandwidth percentage is not used, the default bandwidth value is 100 percent.
<p>Step 10</p> <pre>cable bonding-group-id <i>bonding-group-id</i></pre> <p>Example: Router(config-if)# cable bonding-group-id 40</p>	<p>Configures the bonding group ID.</p> <ul style="list-style-type: none"> <i>bonding-group-id</i>—Bonding group ID. The valid range is from 1 to 144.
<p>Step 11</p> <pre>end</pre> <p>Example: Router(config-if)# end</p>	<p>Exits interface configuration mode and returns to privileged EXEC mode.</p>

Example

The following example shows how to configure a wideband cable interface on the Cisco uBR-MC88V cable interface line card:

```
Router> enable
Router# configure terminal
Router(config)# interface wideband-cable 5/1:0
Router(config-if)# shutdown
Router(config-if)# cable dynamic-bw-sharing
Router(config-if)# no shutdown
Router(config-if)# cable bundle 1
```

```

Router(config-if)# cable rf-channel 0 bandwidth-percent 25
Router(config-if)# cable rf-channel 1 bandwidth-percent 25
Router(config-if)# cable rf-channel controller 1 channel 1 bandwidth-percent 50
Router(config-if)# cable rf-channel controller 1 channel 2 bandwidth-percent 50
Router(config-if)# cable bonding-group-id 40
Router(config-if)# end

```

Configuring the Fiber Node on the Cisco uBR-MC88V Line Card

The fiber node configuration must be done in accordance with the physical plant topology.

To always have a valid fiber node:

- Downstream channels in a fiber node should have unique frequency and downstream channel ID.
- All downstream channels in a fiber node should belong to the same bundle.
- Upstream with distinct frequency must be specified.

For details about the fiber node configuration, see the *Cable Fiber Node Best Practices for the uBR10k* document at the following URL:

http://www.cisco.com/en/US/tech/tk86/tk804/technologies_tech_note09186a00807f32fd.shtml

SUMMARY STEPS

1. **enable**
2. **configure terminal**
3. **cable fiber-node** *fiber-node-id*
4. **downstream integrated-cable** *slot/port rf-channel rf-port*
5. **upstream cable** *slot connector port-number*
6. **end**

DETAILED STEPS

	Command or Action	Purpose
Step 1	enable Example: Router> enable	Enables privileged EXEC mode. • Enter your password if prompted.
Step 2	configure terminal Example: Router# configure terminal Router(config)#	Enters global configuration mode.
Step 3	cable fiber-node <i>fiber-node-id</i> Example: Router(config)# cable fiber-node 1	Enters the fiber-node configuration mode to configure a fiber node. <i>fiber-node-id</i> —Unique numerical ID of the fiber node. The valid range is from 1 to 256.

	Command or Action	Purpose
Step 4	<p>downstream integrated-cable <i>slot/port</i> rf-channel <i>rf-port</i></p> <p>Example: Router(config-fiber-node)# downstream integrated-cable 5/1 rf-channel 0</p>	<p>Configures the downstreams on the fiber node of the Cisco uBR-MC88V cable interface line card.</p> <ul style="list-style-type: none"> <i>slot</i>—Slot where the line card resides. <ul style="list-style-type: none"> Cisco uBR7246VXR router: The valid range is from 3 to 6. Cisco uBR7225VXR router: The valid range is from 1 to 2. <i>port</i>—Downstream port number on the line card. The valid port value is 0 or 1. <i>rf-port</i>—RF channel number. The valid range is from 0 to 3.
Step 5	<p>upstream cable <i>slot connector</i> <i>port-number</i></p> <p>Example: Router(config-fiber-node)# upstream cable 5 connector 4-7</p>	<p>Configures upstream cable connector for a fiber node.</p> <ul style="list-style-type: none"> <i>slot</i>—Slot where the line card resides. <ul style="list-style-type: none"> Cisco uBR7246VXR router: The valid range is from 3 to 6. Cisco uBR7225VXR router: The valid range is from 1 to 2. <i>port-number</i>—A range of physical upstream port numbers on the cable interface line card. This can be one or more port numbers or a range of port numbers separated by a hyphen or combinations of both. The valid range for upstream port numbers is from 0 to 7.
Step 6	<p>end</p> <p>Example: Router(config-fiber-node)# end</p>	<p>Exits fiber-node configuration mode and returns to privileged EXEC mode.</p>

Example

The following example shows how to configure the fiber node on the Cisco uBR-MC88V cable interface line card on the Cisco uBR-MC88V cable interface line card.

```
Router> enable
Router# configure terminal
Router(config)# cable fiber-node 1
Router(config-fiber-node)# downstream integrated-cable 5/1 rf-channel 0
Router(config-fiber-node)# cable upstream 5/1 connector 0-3
Router(config-fiber-node)# end
```

Configuration Example for the Cisco uBR-MC88V Line Card

The following is an example of basic configuration details of the Cisco uBR-MC88V line card on a Cisco uBR 7246VXR router:

```
controller Integrated-Cable 5/0
rf-channel 0 cable downstream channel-id 17
rf-channel 0 frequency 453000000 annex B modulation 256qam interleave 32
rf-channel 0 rf-power 52.0
no rf-channel 0 rf-shutdown
rf-channel 1 cable downstream channel-id 18
rf-channel 1 frequency 459000000 annex B modulation 256qam interleave 32
rf-channel 1 rf-power 52.0
no rf-channel 1 rf-shutdown
rf-channel 2 cable downstream channel-id 19
rf-channel 2 frequency 465000000 annex B modulation 256qam interleave 32
rf-channel 2 rf-power 52.0
no rf-channel 2 rf-shutdown
rf-channel 3 cable downstream channel-id 20
rf-channel 3 frequency 471000000 annex B modulation 256qam interleave 32
rf-channel 3 rf-power 52.0
no rf-channel 3 rf-shutdown

controller Integrated-Cable 5/1
rf-channel 0 cable downstream channel-id 21
rf-channel 0 frequency 477000000 annex B modulation 256qam interleave 32
rf-channel 0 rf-power 52.0
no rf-channel 0 rf-shutdown
rf-channel 1 cable downstream channel-id 22
rf-channel 1 frequency 483000000 annex B modulation 256qam interleave 32
rf-channel 1 rf-power 52.0
no rf-channel 1 rf-shutdown
rf-channel 2 cable downstream channel-id 23
rf-channel 2 frequency 489000000 annex B modulation 256qam interleave 32
rf-channel 2 rf-power 52.0
no rf-channel 2 rf-shutdown
rf-channel 3 cable downstream channel-id 24
rf-channel 3 frequency 495000000 annex B modulation 256qam interleave 32
rf-channel 3 rf-power 52.0
no rf-channel 3 rf-shutdown

interface Cable5/0
downstream Integrated-Cable 5/0 rf-channel 0-3
cable mtc-mode
cable rcp-control verbose
cable enable-trap cmonoff-notification
cable enable-trap cmonoff-interval 500
no cable packet-cache
cable bundle 1
cable upstream max-ports 4
cable upstream bonding-group 1
upstream 1
upstream 2
upstream 3
attributes 8000000
cable upstream 0 connector 0
cable upstream 0 frequency 9000000
cable upstream 0 channel-width 3200000 3200000
cable upstream 0 docsis-mode atdma
cable upstream 0 minislots-size 2
cable upstream 0 range-backoff 3 6
cable upstream 0 modulation-profile 221
no cable upstream 0 shutdown
```

```

cable upstream 1 connector 1
cable upstream 1 frequency 13000000
cable upstream 1 channel-width 3200000 3200000
cable upstream 1 docsis-mode atdma
cable upstream 1 minislots-size 2
cable upstream 1 range-backoff 3 6
cable upstream 1 modulation-profile 221
no cable upstream 1 shutdown
cable upstream 2 connector 2
cable upstream 2 frequency 17000000
cable upstream 2 channel-width 3200000 3200000
cable upstream 2 docsis-mode atdma
cable upstream 2 minislots-size 2
cable upstream 2 range-backoff 3 6
cable upstream 2 modulation-profile 221
no cable upstream 2 shutdown
cable upstream 3 connector 3
cable upstream 3 frequency 21000000
cable upstream 3 channel-width 3200000 3200000
cable upstream 3 docsis-mode atdma
cable upstream 3 minislots-size 2
cable upstream 3 range-backoff 3 6
cable upstream 3 modulation-profile 221
no cable upstream 3 shutdown

interface Integrated-Cable5/0:0
cable bundle 1
cable dynamic-bw-sharing
cable rf-bandwidth-percent 30

interface Wideband-Cable5/0:0
cable bundle 1
cable bonding-group-id 13
cable dynamic-bw-sharing
cable rf-channel 0 bandwidth-percent 40
cable rf-channel 1 bandwidth-percent 40
cable rf-channel 2 bandwidth-percent 40

cable fiber-node 1
description FN1-slot5
downstream Integrated-Cable 5/0 rf-channel 0-3
upstream Cable 5 connector 0-3

```

Verifying and Troubleshooting the Cisco uBR-MC88V Line Card Configuration

This section describes the **show** commands that you can use to verify the Cisco uBR-MC88V cable interface line card configuration.

To verify the integrated cable controller configuration details, use the **show controller integrated-cable** command as shown in the following example:

```
Router# show controller integrated-cable 4/1 config
```

```

Integrated Cable Controller 4/1:
-----
Channel 5 Annex = B Modulation = 64 QAM
Channel 6 Annex = B Modulation = 64 QAM
Channel 7 Annex = B Modulation = 64 QAM
Channel 8 Annex = B Modulation = 64 QAM

```

Jib3-DS Device Information:

```
-----
HW Rev ID: 0x00000001 SW Rev ID: 0x0001000B
Device Type: Kawad
Driver State: 3
```

Channel Resources:

```
-----
Total Non-bonded Channels.....= 8
Per-Controller Non-bonded Channels = 4
Total Bonded Channels.....= 12
Per-Controller Bonded Channels.....= 6
```

Slot-Wide Resources:

```
-----
Number of PHS Rules.....= 12288 (0x3000)
Number of BPI Table Entries...= 24576 (0x6000)
Number of Service Flows.....= 65536 (0x10000)
```

Sniffer Configuration:

```
-----
Non-Bonded Channel Mask = 0x00000000
Bonded Channel Mask.....= 0x00000000
Sniff All Enable.....= False
```

Configured Sniffer MAC Addresses:

Entry	MAC Address	Enabled
0	0000.0000.0000	False
1	0000.0000.0000	False
2	0000.0000.0000	False
3	0000.0000.0000	False
4	0000.0000.0000	False
5	0000.0000.0000	False
6	0000.0000.0000	False
7	0000.0000.0000	False
8	0000.0000.0000	False
9	0000.0000.0000	False
10	0000.0000.0000	False
11	0000.0000.0000	False
12	0000.0000.0000	False
13	0000.0000.0000	False
14	0000.0000.0000	False
15	0000.0000.0000	False

Replication Table:

```
-----
Replication Entry Index  Channel Mask
-----
```

Configured Bonding Groups:

```
-----
Bonded Channel  Channels in Bonding Group
-----
```

Sync Configuration:

```
-----
Channel  MAC Address  Interval
-----
```

DS PHY Configuration of Controller 1:

```

-----
Base Frequency = 477000000Hz
RF-Power = 52.0dBmV
Annex, modulation = Annex B, 64 QAM
Channel      Status  Interleave
-----
0           Muted   5
1           Muted   5
2           Muted   5
3           Muted   5

```

To verify information about the interface controllers, use the **show controller cable** command as shown in the following example:

```

Router# show controller cable 5/1

Cable5/1 (idb 0x9E4809C)
Hardware is MC88V (F-connector) with Integrated Up-converter
CLC CPU is MPC8548E REV 2.1

Line card information:
System information:
Interface Cable5/1
Hardware is MC88V
Board hardware version :P1

=====CPLD registers=====
Revision regsiter:          0x00020005
IC Reset:                   0x000003FF
IC Information:             0x00000013
Reset Cause:                0x00000000
Watchdog Reset:            0x00000000
Watchdog Control:          0x00000001
LED Register:               0x0000000F
Software NMI:               0x00000000
National Clk Sel Status:    0x00000000
CPU to MP Interrupt:        0x00000000
CPU to MP Interrupt en:     0x00000000
  JIB Upstream  port 0 Enabled  Bound to local = 0

```

To verify information about the upstream related statistics, use the **show controller cable** command along with the **upstream** keyword as shown in the following example:

```
Router# show controller cable 5/1 upstream 0
```

```
Cable5/1 Upstream 0 is up
Frequency 10.000 MHz, Channel Width 1.600 MHz, Symbol Rate 1.280 Msps
Modulations - Short QPSK, Long QPSK
This upstream is mapped to physical port 4
Spectrum Group is overridden
US phy MER(SNR)_estimate for good packets - 27.4111 dB
Nominal Input Power Level 0 dBmV, Tx Timing Offset 6768
Ranging Backoff Start 3, Ranging Backoff End 6
US timing offset adjustment type 0, value 0
Ranging Insertion Interval automatic (60 ms)
US throttling off
Tx Backoff Start 3, Tx Backoff End 5
Modulation Profile Group 21
Concatenation is enabled
Fragmentation is enabled
part_id=0x3140, rev_id=0x03, rev2_id=0x00
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 = 4
Minislot Size in Symbols = 32
Bandwidth Requests = 0x75A
Piggyback Requests = 0x2C8
Invalid BW Requests= 0x0
Minislots Requested= 0xE62F
Minislots Granted = 0xA23
Minislot Size in Bytes = 8
Map Advance (Dynamic) : 2940 usecs
Map Count = 4957413
Remote Map Counts: LC 5 = 4954741
UCD Count = 0
Remote UCD Counts:
  LC 5/1:0 = 5264
PHY: us errors 0 us recoveries 2
MAC PHY TSS: tss error start 0 tss error end 0
MAC PHY Status: bcm3140 status 0 lookout status 0
Not Bound to Local Downstream
MAP/UCD Replication Instructions:
  LC 5 index = 37, bitmap = 0x0010
```

To verify the channel grouping domain (CGD) associations of a cable MAC domain, use the **show cable mac-domain cgd-associations** command as shown in the following example:

```
Router# show cable mac-domain cable cgd-associations

VXR-8#show cable mac-domain cable 5/1 cgd-associations
CGD Host Resource DS Channels Upstreams (AllUS) Active Remote DS
Ca5/1 5/1 0-3 0-3 Yes 0-3
```

To verify information about the registered and unregistered cable modems, use the **show cable modem** command as shown in the following example:

```
Router# show cable modem

MAC Address IP Address I/F MAC State Prim RxPwr Timing Num I
0016.924f.82de 40.3.192.4 C5/0/U0 online(pt) 6 0.00 6609 0 N
001e.6bfc.fc76 40.3.192.2 C5/0/U0 w-online(pt) 7 0.00 7216 1 N
001e.6bfb.29a6 40.3.192.3 C5/0/U0 w-online(pt) 8 0.00 7199 1 N
0019.474d.e222 40.3.192.6 C5/0/U1 online(pt) 9 0.50 6610 0 N
```

To verify information about the fiber node configuration, use the **show cable fiber-node** command as shown in the following example:

```
Router# show cable fiber-node

Fiber-Node Config Status
Fiber-Node 1
  Description: FN1-slot5
    downstream Integrated-Cable 5/0: 0-3
    downstream Integrated-Cable 5/1: 0-3
    upstream Cable 5: 0-7
  FN Config Status: Configured (status flags = 0x01)
  MDD Status: Valid
```

Where to Go Next

To know about the DOCSIS 3.0 features supported with the Cisco uBR-MC88V line card, see the *New Features in Cisco IOS Release 12.2(33)SCD* document at the following URL:

http://www.cisco.com/en/US/products/hw/cable/ps2217/products_feature_guides_list.html

Additional References

The following sections provide references related to the Cisco uBR-MC88V cable interface line card.

Related Documents

Related Topic	Document Title
Cable interface line card overview	<i>Cisco uBR7200 Series Cable Interface Line Card Hardware Installation Guide</i> http://www.cisco.com/en/US/docs/interfaces_modules/cable/line_cards/installation/guide/mcxxfru.html
Commands on the Cisco CMTS routers	<i>Cisco IOS CMTS Cable Command Reference</i> http://www.cisco.com/en/US/docs/ios/cable/command/reference/cbl_book.html
Installing the Cisco uBR-MC88V cable interface line card	<i>Cisco uBR-MC88V Cable Interface Line Card Quick Start Guide</i> http://www.cisco.com/en/US/docs/interfaces_modules/cable/broadband_processing_engines/ubr_mc88v/quick/start/mc88v_qsg.html
DOCSIS 3.0 features	<i>Cisco IOS CMTS Cable Software Configuration Guide, Release 12.2SC</i> http://www.cisco.com/web/techdoc/cable/Config/Sw_conf.html
Regulatory compliance and safety information	<i>Regulatory Compliance and Safety Information for Cisco uBR7200 Series Universal Broadband Routers</i> http://www.cisco.com/en/US/docs/cable/cmts/ubr7200/regulatory/compliance/ub72rcsi.html
Cisco uBR-MC88V data sheet	<i>Cisco uBR-MC88V Broadband Processing Engine with full DOCSIS 3.0 Support for the Cisco uBR7200 Series Universal Broadband Router</i> http://www.cisco.com/en/US/prod/collateral/modules/ps4969/ps10737/data_sheet_c78-570335_ps8474_Products_Data_Sheet.html

Standards

Standard	Title
No new or modified standards are supported, and support for existing standards has not been modified.	—

MIBs

MIB	MIBs Link
No new or modified MIBs are supported, and support for existing MIBs has not been modified.	To locate and download MIBs for selected platforms, Cisco IOS releases, and feature sets, use Cisco MIB Locator found at the following URL: http://www.cisco.com/go/mibs

RFCs

RFC	Title
No new or modified RFCs are supported, and support for existing RFCs has not been modified.	—

Technical Assistance

Description	Link
<p>The Cisco Support website provides extensive online resources, including documentation and tools for troubleshooting and resolving technical issues with Cisco products and technologies.</p> <p>To receive security and technical information about your products, you can subscribe to various services, such as the Product Alert Tool (accessed from Field Notices), the Cisco Technical Services Newsletter, and Really Simple Syndication (RSS) Feeds.</p> <p>Access to most tools on the Cisco Support website requires a Cisco.com user ID and password.</p>	http://www.cisco.com/cisco/web/support/index.html

Feature Information for Configuring the Cisco uBR-MC88V Cable Interface Line Card

Table 4 lists the release history for this feature.

Not all commands may be available in your Cisco IOS software release. For release information about a specific command, see the command reference documentation.

Use Cisco Feature Navigator to find information about platform support and software image support. Cisco Feature Navigator enables you to determine which Cisco IOS and Catalyst OS software images support a specific software release, feature set, or platform. To access Cisco Feature Navigator, go to <http://www.cisco.com/go/cfn>. An account on Cisco.com is not required.

**Note**

Table 4 lists only the Cisco IOS software release that introduced support for a given feature in a given Cisco IOS software release train. Unless noted otherwise, subsequent releases of that Cisco IOS software release train also support that feature.

Table 4 Feature Information for the Cisco uBR-MC88V Cable Interface Line Card

Feature Name	Releases	Feature Information
Configuring the Cisco uBR-MC88V Cable Interface Line Card	12.2(33)SCD	<p>The Cisco uBR-MC88V line card was introduced on the Cisco uBR7246VXR and Cisco uBR7225VXR universal broadband routers.</p> <p>The following sections provide information about this feature:</p> <ul style="list-style-type: none"> • Information About the Cisco uBR-MC88V Cable Interface Line Card, page 3 • How to Configure the Cisco uBR-MC88V Cable Interface Line Card, page 6 • Configuration Example for the Cisco uBR-MC88V Line Card, page 21 • Verifying and Troubleshooting the Cisco uBR-MC88V Line Card Configuration, page 22 <p>The following commands were introduced or modified:</p> <ul style="list-style-type: none"> • rf-channel stacking • controller integrated-cable • downstream integrated-cable • interface integrated-cable • interface wideband-cable

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