



Configuring the Cisco uBR7200 Series MC16E 8MHz Cable Modem Card

This feature module describes the MC16E 8MHz cable modem card for Cisco uBR7200 series universal broadband routers.

The MC16E card is designed to operate on cable plants where 8MHz channel widths are used. It uses the entire 8MHz channel for data communications and provides a high level of bandwidth connectivity.

Cisco IOS releases from 12.0(7)T, 12.0(7)XR2, 12.1 mainline, 12.1(1)T and higher, and SC trains 12.0(8)SC, 12.0(9)SC and higher support the Cisco uBR-MC16E on the uBR7223, uBR7246, and uBR7246 chassis.

The MC16E cable modem card provides one downstream and six upstream connections to the cable network, similar to the MC16C cable modem card, except that it supports the ITU J.83 Annex A physical layer and the proposed EuroDOCSIS (Annex A) standard (Cable Labs ECR RFI-R-98036).

The MC16E card has the following differences with the current MC16C card:

- Downstream 36.125 MHz interface with an 8 MHz DAVIC/DVB channel width and interleave factor of I=12, J=17
- Downstream symbol rate of 6.592 Msymbols/sec at 256 QAM
- Downstream channel range of 85 to 860 MHz
- Upstream channel range from 5 to 65 MHz
- Supported in the Cisco uBR7200 series MIBs
- Supports EuroDOCSIS-compliant cable modems and set top boxes (STBs)

All cable interface commands have been updated to support the MC16E cable modem card.

This feature module includes the following sections:

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Feature Overview

The Cisco uBR7200 series universal broadband routers support downstream and upstream traffic to and from Data Over Cable Service Interface Specification (DOCSIS)-based cable modems (CMs) and set-top box (STB) units with integrated EuroDOCSIS modems.

The Cisco MC16E cable modem card contains one downstream modulator and six upstream demodulators for connection to the cable network. The card supports the following defaults: 256 QAM at 40 Mbps downstream and 16 QAM at 5 Mbps upstream. It supports EuroDOCSIS 8MHz Phase Alternating Line (PAL) and Systeme Electronique Couleur Avec Memoire (SECAM) channel plans, supporting downstream rates of 85 to 860MHz range and upstream ranges of 5 to 65MHz. The card outputs +40dBmV and +/-2dB.

The MC16E supports full 8MHz operation. The card has a differing symbol rate (6.952Msym/sec). It transmits downstream IF signals to an upconverter at a frequency of 36.125MHz.

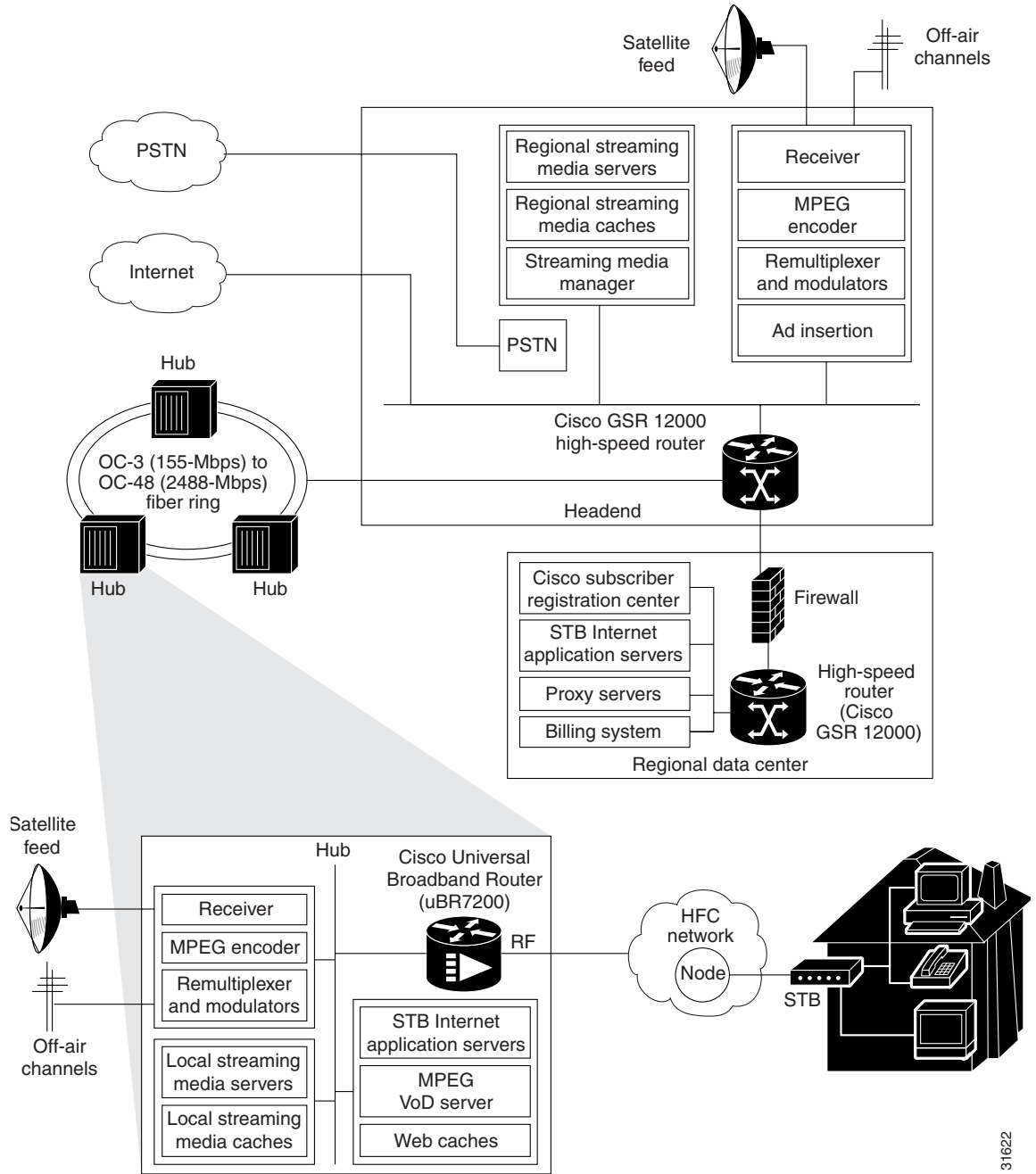
The MC16E card uses the ITU J.83 Annex A physical layer and EuroDOCSIS (Annex A) standard—CableLabs ECR, RFI-R-98036. It should not be used in production cable plants that support a 6MHz channel plan.

**Note**

The difference between DOCSIS and EuroDOCSIS is at the physical layer. Supporting EuroDOCSIS requires the Cisco MC16E cable modem card, appropriate upconverters that support an 8MHz PAL or SECAM channel plan, appropriate diplex filters, and EuroDOCSIS-based CMs or STBs containing integrated EuroDOCSIS CMs.

Figure 1 illustrates the Cisco cable network architecture.

Figure 1 Cable Network Architecture



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The cable headend brings national and regional content, including satellite and off-the-air video, the Internet backbone, and dial access to the cable network. The headend reformats this content to be sent to hubs over the high-speed optical fiber network.

The hub combines regional programming with local content, and sends the combined content to the hybrid fiber coaxial (HFC) cable network.

The HFC network distributes this content to subscriber devices, including cable modems and STBs. Interfaces on a digital STB allow connection to a television and one or more personal computers using an ethernet connection. The regional data center is often located at the headend or connected to the headend with a high-speed fiber network. It contains STB and cable modem provisioning servers (such as the Cisco Subscriber Registration System [CSRC]), STB Internet application servers that bring Internet services to the television, and billing proxy servers.

Benefits

The MC16E cable modem card:

- Allows cable plants running Annex A full use of the available plant spectrum more efficiently. It provides a better utilization of the available channel and increased downstream bandwidth on an individual channel.
- Provides 5 to 65MHz frequency range on the upstream ports.

An 8MHz plant operates on the upstream between 5 and 65MHz. There is a greater range of channel choices for finding a clean upstream communication channel.

- Provides an option for cable operators to offer data and video with a standards-based low-cost and readily available CPE (set-top boxes).
- Translates the volume economies of DOCSIS CPE (STB and cable modems) into the cable markets with 8MHz channel plans.
- Provides IF output compliant with European upconverters (36.125MHz). It interoperates with existing 8MHz upconverters.
- Provides a higher upstream frequency range (5 to 65MHz) than the MC16C or other cable modem cards. Reduces scarcity of upstream bandwidth, and gives you a wider choice for upstream channel space. It offers an additional 20MHz of cleaner spectrum for return path services.
- Provides 36 Mbps at 64 QAM modulation and 51 Mbps at 256 QAM during full utilization of 8MHz bandwidth.

Restrictions

- The MC16E card supports only Annex A operation and should not be used in production cable plants that support a 6MHz channel plan.
- Only Cisco IOS Releases from 12.0(7)T, 12.0(7)XR2, 12.1 Mainline, 12.1(1)T and higher, and SC trains 12.0(8)SC, 12.0(9)SC, and higher support the Cisco uBR-MC16E on the Cisco uBR7223, uBR7246, and uBR7246 chassis.
- In the Cisco uBR7200 series routers with MC16E cable modems, interleave on the downstream ports is fixed. It cannot be configured.

Related Documents

For additional information on the Cisco uBR7200 series and cable modem cards, see:

- *Cisco uBR7200 Series Universal Broadband Router Hardware Installation Guide*
- *Cisco uBR7200 Series Universal Broadband Router Software Configuration Guide*
- *Cisco uBR7200 Series Cable Modem Card Hardware Installation Guide*
- *Cisco uBR7200 Series Universal Broadband Router Software Release Notes and Features*
- *Cisco uBR7200 Series Universal Broadband Router Cable Modem Card Installation and Configuration*

Supported Platforms

The MC16E cable modem card is supported in the platforms:

- Cisco uBR7223
- Cisco uBR7246
- Cisco uBR7246 VXR

Supported Standards, MIBs, and RFCs

Standards

The MC16E card supports the ITU J.83 Annex A physical layer and EuroDOCSIS (Annex A) standard—CableLabs ECR, RFI-R-98036.

MIBs

- This feature is supported by Cisco uBR7200 series MIBs and DOCSIS MIBs enhancing the manageability of customer infrastructures.

For descriptions of supported MIBs and how to use MIBs, see the Cisco MIB web site on CCO at <http://www.cisco.com/public/sw-center/netmgmt/cmtk/mibs.shtml>.

RFCs

No new or modified RFCs are supported by this feature.

Prerequisites

Before you configure the Cisco uBR7200 series universal broadband router with the MC16E card:

- Make sure that the cable plant has a channel plan to use the MC16E card and that the EuroDOCSIS channel equipment is installed.
- Verify that you are using the Cisco IOS software Release that supports the MC16E card.
- Ensure your network is designed to support reliable broadband data transmission.

At minimum, your network must include:

- Computer on the WAN side of your Cisco uBR7200 series configured as a DHCP server to assign IP addresses to cable modems or set-top boxes on the hybrid fiber coaxial (HFC) network.
- Cisco uBR7200 series-compatible IF-to-RF upconverter installed in the downstream data path at your headend site. The upconverter is installed between the Cisco uBR7200 series and the combiner.

The combiner refers to all cables, amplifiers, and taps at the headend or cable distribution center that connect the Cisco uBR7200 series to the HFC network.

- Diplex filters installed in the downstream RF path between the cable modems and the cable modem cards in the Cisco uBR7200 series. RG-59 headend coaxial cable with the maximum braid available (60 percent + 40 percent braid), double foil, and the correct connector for this cable.
- Complete a basic configuration of the Cisco uBR7200 series. This includes, as a minimum, the following tasks:
 - Configure a host name and password for the Cisco uBR7200 series.
 - Configure the Cisco uBR7200 series to support IP.
 - Install and configure at least one port adapter to provide backbone connectivity.
 - Install at least one Cisco MC16E cable modem card in the appropriate slot of the Cisco uBR7200 series chassis.

Configuration Tasks

See the following sections for configuration tasks for the MC16E cable modem card.

- Bring up the Router – Follow the basic steps in the *Cisco uBR7200 Series Universal Broadband Router Software Configuration Guide*.
- Enter the fixed center frequency for your downstream RF carrier in Hz.
- Activate the downstream carrier.
- Set the upstream frequency.
- Activate the upstream ports.
- Exit.

Enter **exit** to go back to the configuration mode.

At this point, enter the next interface to configure or **exit** to return to the enable mode:

```
Router(config)#exit
Router#
%SYS-5-CONFIG_I: Configured from console by console. (normal message and doesn't
indicate an error)
```

Configuring the MC16E Cable Card

	Command	Purpose
Step 1	Router# configure terminal	Enter configuration mode.
Step 2	Router (config)# interface <i>type slot/port</i>	Configure the interface where: <ul style="list-style-type: none"> - <i>type</i> = cable - <i>slot</i> = slot number in chassis (slot numbers begin with a 0) - <i>port</i> = port number on cable modem slot (port numbers begin with a 0)
Step 3	Router (config-int) # cable downstream frequency <i>down-freq-hz</i>	Enter the fixed center frequency for your downstream RF carrier in Hz. The downstream frequency command is an information-only command. Currently it has no effect on external upconverters. The downstream frequency command reflects the digital carrier frequency, which is the center frequency of the downstream RF carrier (the channel) for that downstream port. The downstream frequency is set on the upconverter connected to the downstream port. The digital carrier frequency is specified to be the center of an 8MHz channel. The digital carrier frequency is not the same as the video carrier frequency.
Step 4	Router (config-int) # no shutdown	Activate a downstream port on a cable modem card for digital data transmissions over the HFC network.

	Command	Purpose
Step 5	Router (config-int) # cable upstream port frequency <i>up-freq-hz</i>	<p>Enter the fixed center frequency for the upstream RF carrier (in Hz) and port number from 0 to 5.</p> <p>You must set the upstream frequency of the RF output to comply with the expected input frequency of the Cisco MC16E cable modem card. To set the upstream frequency, enter a fixed frequency of the upstream RF carrier for an upstream port. The valid range for a fixed upstream frequency is 5,000,000 Hz to 65,000,000 Hz.</p> <p>Ensure that the upstream frequency selected does not interfere with the frequencies used for any other upstream applications running in the cable plant.</p> <p>The cable interface does not operate until you either set a fixed upstream frequency or create and configure a spectrum group.</p> <p>Repeat this command for each port used.</p>
Step 6	Router (config-int) # no cable upstream port shutdown	<p>Activate the RF carrier on the upstream ports. Each upstream port must be activated to enable upstream data from the cable modems or set-top boxes on your network to the Cisco uBR7200 series router.</p> <p>Repeat this command for each port used.</p>
Step 7	Router (config-int) # exit	Enter exit to go back to the configuration mode.

Verifying Your Settings

To check the value of the settings you have entered, enter the **show running-config** command:

```
Router# show running-config

Current configuration:
!
version 12.0
service timestamps debug uptime
service timestamps log uptime
no service password-encryption
!
hostname R7732-06-uBR7246-CE
!
!
cable modulation-profile 1 request 0 16 1 8 16qam scrambler 152
no-diff 128 fixed uw16
cable modulation-profile 1 initial 5 34 0 48 16qam scrambler 152
no-diff 256 fixed uw16
cable modulation-profile 1 station 5 34 0 48 16qam scrambler 152
no-diff 256 fixed uw16
cable modulation-profile 1 short 6 75 6 8 16qam scrambler 152 no-diff
144 fixeduw8
cable modulation-profile 1 long 8 220 0 8 16qam scrambler 152 no-diff
160 fixeduw8
cable modulation-profile 2 request 0 16 1 8 qpsk scrambler 152 no-diff
64 fixeduw8
cable modulation-profile 2 initial 5 34 0 48 qpsk scrambler 152
no-diff 128 fixed uw16
cable modulation-profile 2 station 5 34 0 48 qpsk scrambler 152
no-diff 128 fixed uw16
cable modulation-profile 2 short 5 75 6 8 qpsk scrambler 152 no-diff
72 fixed uw8
cable modulation-profile 2 long 8 220 0 8 qpsk scrambler 152 no-diff
80 fixed uw8
!
no cable qos permission create
no cable qos permission update
cable qos permission modems
!
!
!
!
ip subnet-zero
ip host abrick 223.255.254.254
!
!
!
interface Loopback0
 ip address 222.2.4.1 255.255.255.255
 no ip directed-broadcast
!
interface Loopback1
 ip address 111.0.4.1 255.255.255.255
 no ip directed-broadcast
!
interface Loopback2
 ip address 111.0.4.2 255.255.255.255
 no ip directed-broadcast
```

```
!  
interface FastEthernet0/0  
 ip address 1.8.93.9 255.255.0.0  
 no ip directed-broadcast  
!  
interface Cable3/0  
 ip address 3.214.1.1 255.255.255.0  
 no ip directed-broadcast  
 load-interval 30  
 no keepalive  
 cable helper-address 1.8.93.100  
 cable downstream annex A  
 cable downstream modulation 64qam  
 cable downstream frequency 669000000  
 cable upstream 0 frequency 5008000  
 cable upstream 0 power-level 0  
 no cable upstream 0 shutdown  
 cable upstream 1 frequency 10000000  
 cable upstream 1 power-level 0  
 no cable upstream 1 shutdown  
 cable upstream 2 frequency 15008000  
 cable upstream 2 power-level 0  
 no cable upstream 2 shutdown  
 cable upstream 3 frequency 20000000  
 cable upstream 3 power-level 0  
 no cable upstream 3 shutdown  
 cable upstream 4 frequency 55008000  
 cable upstream 4 power-level 0  
 no cable upstream 4 shutdown  
 cable upstream 5 frequency 60000000  
 cable upstream 5 power-level 0  
 no cable upstream 5 shutdown  
!  
 ip default-gateway 1.8.0.1  
 ip classless  
 ip route 223.255.254.254 255.255.255.255 1.8.0.1  
!  
 snmp-server engineID local 00000009020000D0BA1EED00  
 snmp-server community public RO  
 snmp-server community private RW  
!  
 alias exec scm show cable modem  
!  
 line con 0  
  exec-timeout 0 0  
  transport input none  
 line aux 0  
 line vty 0 4  
  password lab  
  login  
!  
end
```

Verifying Upstream Frequency

To verify the current value of the upstream frequency, enter the **show controllers cable slot/port upstream** command for the upstream port that you just configured:

```
Router# show controllers cable 3/0 upstream
R7732-06-uBR7246-CE#sh controllers c3/0 ups
Cable3/0 Upstream 0 is up
  Frequency 5.008 MHz, Channel Width 1.600 MHz, 16-QAM Symbol Rate 1.280 Msps
  Spectrum Group is overridden
  SNR 31.5960 dB
  Nominal Input Power Level 0 dBmV, Tx Timing Offset 5661
  Ranging Backoff Start 0, Ranging Backoff End 4
  Ranging Insertion Interval automatic (50 ms)
  Tx Backoff Start 0, Tx Backoff End 4
  Modulation Profile Group 1
  part_id=0x3137, rev_id=0x03, rev2_id=0xFF
  nb_agc_thr=0x0000, nb_agc_nom=0x0000
  Range Load Reg Size=0x2C
  Request Load Reg Size=0x07
  Minislot Size in number of Timebase Ticks is = 8
  Minislot Size in Symbols =64
  Bandwidth Requests = 0x37A
  Piggyback Requests = 0x1F
  Invalid BW Requests= 0x0
  Minislots Requested= 0x11CB
  Minislots Granted = 0x11CB
  Minislot Size in Bytes = 32
  Map Advance = 4000 usecs
  UCD Count = 1082041
  DES Ctrl Reg#0 = C000C043, Reg#1 = 0
Cable3/0 Upstream 1 is up
  Frequency 10.000 MHz, Channel Width 1.600 MHz, 16-QAM Symbol Rate 1.280 Msps
  Spectrum Group is overridden
  SNR 32.6700 dB
  Nominal Input Power Level 0 dBmV, Tx Timing Offset 5661
  Ranging Backoff Start 0, Ranging Backoff End 4
  Ranging Insertion Interval automatic (50 ms)
  Tx Backoff Start 0, Tx Backoff End 4
  Modulation Profile Group 1
  part_id=0x3137, rev_id=0x03, rev2_id=0xFF
  nb_agc_thr=0x0000, nb_agc_nom=0x0000
  Range Load Reg Size=0x2C
  Request Load Reg Size=0x07
  Minislot Size in number of Timebase Ticks is = 8
  Minislot Size in Symbols =64
  Bandwidth Requests = 0x11
  Piggyback Requests = 0x9
  Invalid BW Requests= 0x0
  Minislots Requested= 0xB4
  Minislots Granted = 0xB4
  Minislot Size in Bytes = 32
  Map Advance = 4000 usecs
  UCD Count = 1081975
  DES Ctrl Reg#0 = C000C043, Reg#1 = 0
Cable3/0 Upstream 2 is up
  Frequency 14.992 MHz, Channel Width 1.600 MHz, 16-QAM Symbol Rate 1.280 Msps
  Spectrum Group is overridden
  SNR 32.4640 dB
  Nominal Input Power Level 0 dBmV, Tx Timing Offset 5662
  Ranging Backoff Start 0, Ranging Backoff End 4
  Ranging Insertion Interval automatic (50 ms)
  Tx Backoff Start 0, Tx Backoff End 4
```

```

Modulation Profile Group 1
part_id=0x3137, rev_id=0x03, rev2_id=0xFF
nb_agc_thr=0x0000, nb_agc_nom=0x0000
Range Load Reg Size=0x2C
Request Load Reg Size=0x07
Minislot Size in number of Timebase Ticks is = 8
Minislot Size in Symbols =64
Bandwidth Requests = 0x13
Piggyback Requests = 0x5
Invalid BW Requests= 0x0
Minislots Requested= 0xBD
Minislots Granted = 0xBD
Minislot Size in Bytes = 32
Map Advance = 4000 usecs
UCD Count = 1081964
DES Ctrl Reg#0 = C000C043, Reg#1 = 0
Cable3/0 Upstream 3 is up
Frequency 19.984 MHz, Channel Width 1.600 MHz, 16-QAM Symbol Rate 1.280 Msps
Spectrum Group is overridden
SNR 33.640 dB
Nominal Input Power Level 0 dBmV, Tx Timing Offset 5662
Ranging Backoff Start 0, Ranging Backoff End 4
Ranging Insertion Interval automatic (50 ms)
Tx Backoff Start 0, Tx Backoff End 4
Modulation Profile Group 1
part_id=0x3137, rev_id=0x03, rev2_id=0xFF
nb_agc_thr=0x0000, nb_agc_nom=0x0000
Range Load Reg Size=0x2C
Request Load Reg Size=0x07
Minislot Size in number of Timebase Ticks is = 8
Minislot Size in Symbols =64
Bandwidth Requests = 0x1
Piggyback Requests = 0x0
Invalid BW Requests= 0x0
Minislots Requested= 0x4
Minislots Granted = 0x4
Minislot Size in Bytes = 32
Map Advance = 4000 usecs
UCD Count = 1081962
DES Ctrl Reg#0 = C000C043, Reg#1 = 0
Cable3/0 Upstream 4 is up
Frequency 54.992 MHz, Channel Width 1.600 MHz, 16-QAM Symbol Rate 1.280 Msps
Spectrum Group is overridden
SNR 31.1260 dB
Nominal Input Power Level 0 dBmV, Tx Timing Offset 5661
Ranging Backoff Start 0, Ranging Backoff End 4
Ranging Insertion Interval automatic (50 ms)
Tx Backoff Start 0, Tx Backoff End 4
Modulation Profile Group 1
part_id=0x3137, rev_id=0x03, rev2_id=0xFF
nb_agc_thr=0x0000, nb_agc_nom=0x0000
Range Load Reg Size=0x2C
Request Load Reg Size=0x07
Minislot Size in number of Timebase Ticks is = 8
Minislot Size in Symbols =64
Bandwidth Requests = 0x1F
Piggyback Requests = 0x5
Invalid BW Requests= 0x0
Minislots Requested= 0x11A
Minislots Granted = 0x11A
Minislot Size in Bytes = 32
Map Advance = 4000 usecs
UCD Count = 1081955
DES Ctrl Reg#0 = C000C043, Reg#1 = 0

```

```

Cable3/0 Upstream 5 is up
Frequency 59.984 MHz, Channel Width 1.600 MHz, 16-QAM Symbol Rate 1.280 Msps
Spectrum Group is overridden
SNR 31.1260 dB
Nominal Input Power Level 0 dBmV, Tx Timing Offset 5662
Ranging Backoff Start 0, Ranging Backoff End 4
Ranging Insertion Interval automatic (50 ms)
Tx Backoff Start 0, Tx Backoff End 4
Modulation Profile Group 1
part_id=0x3137, rev_id=0x03, rev2_id=0xFF
nb_agc_thr=0x0000, nb_agc_nom=0x0000
Range Load Reg Size=0x2C
Request Load Reg Size=0x07
Minislot Size in number of Timebase Ticks is = 8
Minislot Size in Symbols =64
Bandwidth Requests = 0xA
Piggyback Requests = 0x4
Invalid BW Requests= 0x0
Minislots Requested= 0x68
Minislots Granted = 0x68
Minislot Size in Bytes = 32
Map Advance = 4000 usecs
UCD Count = 1081954
DES Ctrl Reg#0 = C000C043, Reg#1 = 0

```

Verifying Downstream Center Frequency

To verify the current value of the center frequency enter the **show controllers cable slot/port downstream** command for the downstream port that you just configured:

- If the center frequency is fixed, the actual frequency will be displayed.
- If the center frequency is not fixed, the frequency will show that it is not set.

```

Router# show controllers cable 3/0 downstream
Cable3/0 Downstream is up
Frequency 669.0000MHz, Channel Width 8MHz, 64-QAM, Symbol Rate
6.952000 Msps
FEC ITU-T J.83 Annex A, R/S Interleave I=12, J=17
Downstream channel ID: 0

```

Monitoring and Maintaining the MC16E Cable Modem

To monitor and maintain the MC16E cable modem card, use the **show cable modem** command. This command displays information on all cable modems or set-top boxes (or a particular modem on the network).

```
Router# show cable modem
```

The **show cable modem** command now includes all the DOCSIS states, as well as other useful troubleshooting information, including last received upstream RF power level and maximum number of provisioned customer premises equipment.

DOCSIS cable modems are required to pass through successive states during registration and provisioning. Using this information, cable system administrators can isolate why a cable modem is offline or unavailable.

The Online State column contains:

offline—Cable modem considered offline
 init (r1)—Cable modem sent initial ranging
 init (r2)—Cable modem is ranging
 init (rc)—Cable modem ranging complete
 init (d)—DHCP request received
 init (i)—DHCP reply received; IP address assigned
 init(o)—Option file transfer started
 init (t)—TOD exchange started
 online—Cable modem registered, enabled for data
 online(d)—Cable modem registered, but network access for the cable modem is disabled
 online(pk)—Cable modem registered, BPI enabled and KEK assigned
 online(pt)—Cable modem registered, BPI enabled and TEK assigned
 offline—Cable modem considered offline
 reject (m)—Cable modem did attempt to register; registration was refused due to bad MIC
 reject (c)—Cable modem did attempt to register; registration was refused due to bad COS
 reject (pk)—KEK modem key assignment rejected
 reject (pt)—TEK modem key assignment rejected

Example

The following is an output of the **show cable modem** command.

```
R7732-06-uBR7246-CE#show cable modem
```

Interface	Prim Sid	Online State	Timing Offset	Rec Power	QoS	CPE	IP address	MAC address
Cable3/0/U0	1	online	5661	0.50	3	0	3.214.1.130030.8047.b3f7	
Cable3/0/U0	2	online	5661	0.75	3	0	3.214.1.110030.8047.b3d3	
Cable3/0/U0	3	online	5661	0.50	3	0	3.214.1.100030.8047.b411	
Cable3/0/U0	4	online	5661	0.50	3	0	3.214.1.120030.8047.b3df	

Command Reference

This section documents the modified commands. All other commands used with this feature are documented in the *Cisco uBR7200 Series Universal Broadband Router Software Configuration Guide*.

- cable downstream frequency
- cable downstream if-output
- cable upstream frequency
- cable upstream frequency

cable downstream frequency

To set the fixed center frequency for downstream radio frequency carrier in Hertz (Hz), use the **cable downstream frequency** command in cable interface configuration mode. To set no fixed center frequency, use the **no** form of this command.

cable downstream frequency *down-freq-hz*

no cable downstream frequency

Syntax Description	<i>down-freq-hz</i>	The known center frequency of the downstream carrier in Hz. The valid range is 85,000,000 to 860,000,000 Hz.
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Defaults	Disabled
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Command Modes	Cable interface configuration
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Command History	Release	Modification
	12.0 Mainline	This command is supported in Cisco IOS 12.0 Mainline release.
	12.07T	This command was modified to support 8MHz channel plans.
	12.08(SC)	This command was modified to support 8MHz channel plans.

Usage Guidelines

The downstream frequency of your RF output must be set to match the expected input frequency of your upconverter. To do this, enter the fixed center frequency of the downstream channel for the downstream port. (You can also select a default that does not set a specific fixed value.) The valid range for a fixed center frequency is 85,000,000 to 860,000,000Hz. The center frequency is also used to configure an IF-to-RF upconverter that must be installed in your downstream path.

The digital carrier frequency is specified to be the center of an 8.0MHz channel. For example, the European cable channel 55 spans 742.0 to 750.0MHz. The center frequency is 746.0MHz, which is the digital carrier frequency that should be configured as the downstream frequency. The typical range for current CATV headends is 88,000,000 to 860,000,000Hz.

Examples

The following example sets the downstream center frequency:

```
interface cable 6/0
 cable downstream frequency 96000000
```

cable downstream if-output

To activate a downstream port on a cable modem card for digital data transmissions over the HFC network, use the **cable downstream if-output** command in cable interface configuration mode. To disable the 36.125MHz intermediate frequency (IF) carrier, use the **no** form of this command.

cable downstream if-output

no cable downstream if-output

Syntax Description This command has no arguments or keywords.

Defaults Downstream carrier enabled

Command Modes Cable interface configuration

Command History

Release	Modification
12.1(1)T	This command is supported.
12.0	This command was modified.
11.3NA	This command was supported.

Examples

The following example enables the downstream port 0 on the cable modem card installed in slot 6 of a Cisco uBR7200 series:

```
interface cable 6/0
 cable downstream if-output
```

cable upstream frequency

To enter a fixed frequency of the upstream radio frequency (RF) carrier for an upstream port, use the **cable upstream frequency** command in cable interface configuration mode. To restore the default value for this command, use the **no** form of this command.

cable upstream *usport* **frequency** *up-freq-hz*

no cable upstream *usport* **frequency** *up-freq-hz*

Syntax Description

<i>usport</i>	Specifies the upstream port number. Valid range is from 0 to 5.
<i>up-freq-hz</i>	The upstream center frequency is configured to a fixed value. The valid range is from 5,000,000 to 65,000,000 Hz.

Defaults

Upstream center frequency is not configured to a fixed value.

Command Modes

Cable interface configuration

Command History

Release	Modification
12.0(7)T	This command was modified to support the 42 to 65MHz frequency range.
12.0(8)SC	This command was modified to support the 42 to 65MHz frequency range.
12.0(7)XR2	This command was modified to support the 42 to 65MHz frequency range.
11.3 XA	This command was supported.

Usage Guidelines

The upstream channel frequency of your RF output must be set to comply with the expected input frequency of your Cisco cable modem card. To configure an upstream channel frequency, do one of the following:

- Configure a fixed frequency between 5 and 65MHz and enable the upstream port.
- Create a global spectrum group, assign the interface to it, and enable the upstream port.

Examples

The following example configures the upstream center frequency for port 0 (located in slot 6) to 5700000 Hz:

```
interface cable 6/0
 cable upstream 0 frequency 5700000
```

■ cable upstream frequency