

# Bridging and Routing Features for the Cisco uBR904 Cable Modem

---

The following sections are provided:

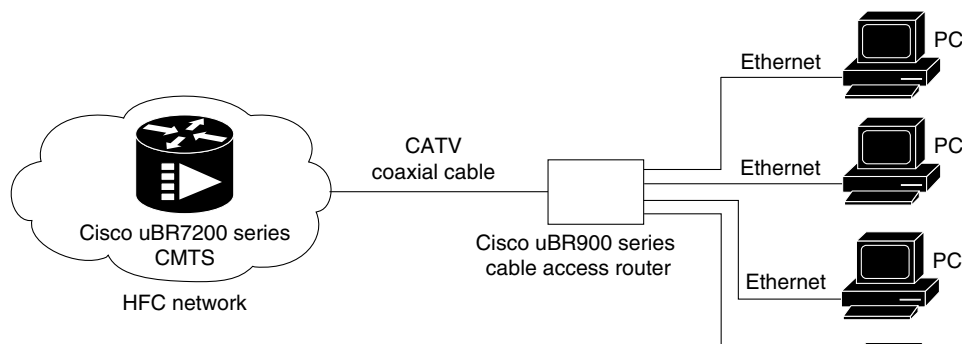
- Feature Summary on page 1
- Prerequisites on page 3
- Supported MIBs and RFCs on page 3
- Functional Description on page 4
- Configuration Scenarios on page 6
- Configuration Tasks on page 9
- Command Reference on page 13
- What to do Next on page 24

## Feature Summary

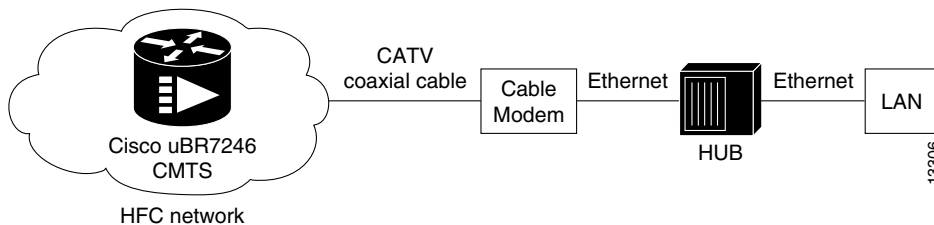
The Cisco uBR904 cable modem is a fully functional Cisco IOS router with DOCSIS compliance for data-over-cable connections. The Cisco uBR904 is a compact device that has the familiar features and programming interface of other routers in Cisco's extensive line of small- and medium-sized business product offerings. The Cisco uBR904 provides packet data transport for TCP/IP applications between home or office computers and the cable headend.

You can configure your cable modem to act as a bridge or router. See Figure 1 and Figure 2. For more detailed description of these scenarios, see the "Configuration Scenarios" section on page 6.

**Figure 1 Cisco uBR904 in a Bridging Configuration**



**Figure 2 Cisco uBR904 in a Routing Configuration with a Hub**



## Benefits

- Enabling the cost-effective deployment of advanced routing capabilities deep into the cable network
- Providing a universal platform for deployment of both current and future modem technologies via modular upgrades while protecting the operator’s invested capital
- Leveraging Cisco’s industry-standard routing hardware and Cisco IOS software to deliver advanced network services and applications

## List of Terms

**CATV**—Originally stood for Community Antenna Television. Now refers to any cable (coaxial/fiber) based system that provides television services.

**Cable modem**—Any device that modulates and demodulates digital data onto a CATV plant.

**Cable router**—A modular chassis-based router optimized for the data over CATV HFC applications.

**Channel**—A specific frequency allocation and bandwidth. Downstream channels used for television in the U. S. are 6 MHz wide.

**CM**—Cable modem.

**CMTS**—Cable Modem Termination System. Any DOCSIS compliant headend cable router, such as the Cisco uBR7246.

**Downstream**—The set of frequencies used to send data from a headend to a subscriber.

**Headend**—Central distribution point for a CATV system. Video signals are received here from satellite (either co-located or remote), frequency converted to the appropriate channels, combined with locally originated signals, and rebroadcast onto the HFC plant. For a CATV data system, the headend is the typical place to link between the HFC system and any external data networks.

**HFC**—Hybrid fiber-coaxial (cable). Older CATV systems were provisioned using only coaxial cable. Modern systems use fiber transport from the headend to an optical node located in neighborhood to reduce system noise. Coax runs from the node to the subscriber. The fiber plant is generally a star configuration with all optical node fibers terminating at a headend. The coaxial cable part of the system is generally a trunk-and-branch configuration.

**Host**—Any end-user computer system that connects to a network. The term host here refers to computer systems connected to the LAN interface of the cable modem.

**MAC layer**—Media Access Control sublayer. Controls access by the cable modem to the CMTS and to the upstream data slots.

**MCNS**—Multimedia Cable Network System Partners Ltd., a consortium of cable companies representing the majority of homes in the U.S. and Canada who have decided to drive a standard with the goal of having interoperable cable modems.

**MSO**—Multiple System Operator

**QAM**—Modulation scheme mostly used in the downstream direction (QAM-64, QAM-256). QAM-16 is expected to be usable in the upstream direction. Numbers indicate number of code points per symbol. The QAM rate or the number of points in the QAM constellation can be computed by 2 raised to the power of <number of bits/symbol>.

**QPSK**—Modulation scheme used in the upstream direction. Supports two data bits per symbol.

**Subscriber Unit (SU)**—An alternate term for cable modem. See *cable modem*.

**Upstream**—The set of frequencies used to send data from a subscriber to the headend.

## Prerequisites

You have performed all the installation prerequisites as defined in the following publications:

- *Cisco uBR7246 Installation and Configuration Guide*
- *Cisco uBR7246 Universal Broadband Router Cable Modem Card Installation and Configuration*
- *Cisco uBR904 Cable Modem Installation and Configuration Guide*
- *Quick Start Guide Cisco uBR904 Cable Modem Cabling and Setup*

## Supported MIBs and RFCs

The Cisco uBR904 cable modem supports the following:

- **Radio Frequency Interface Specification**—This specification is developed by the Multimedia Cable Network System (MCNS) consortium. It defines the radio-frequency interface specification for high-speed data-over-cable systems.
- **Cisco Standard MIBs**—The Cisco Standard MIBs consist of CiscoWorks. CiscoWorks is the network management program for planning, troubleshooting, and monitoring Cisco internetworks. CiscoWorks uses SNMP protocols to monitor all SNMP devices.
  - For more information about CiscoWorks on CCO, follow this path:  
**Products & Ordering: Cisco Products: Network Management: CiscoWorks**
  - For more information about CiscoWorks on the Documentation CD-ROM, follow this path:  
**Cisco Product Documentation: Network Management: CiscoWorks**
- **RF Interface MIB**—The Radio Frequency Interface (RFI) MIB is specific to cable Data Over Cable Interface Specification (DOCSIS) implementations. The RIF MIB provides an interface that permits management of the Cisco uBR904 cable modem over the cable or Ethernet interface. Using SNMP management applications, this MIB allows access to statistics such as MAC, driver configuration, and counters through its interface.
- **Cable Device MIB**—The Cable Device MIB records statistics related to the configuration and status of the Cisco uBR904 cable modem. Statistics include an events log and device status. The Cable Device MIB is very similar to the RFI MIB in that both allow access to statistics; they are different in that the Cable Device MIB reports statistics on the Cisco uBR904 cable modem, while the RFI MIB reports statistics on the radio frequency transmissions over the cable television line.

## Functional Description

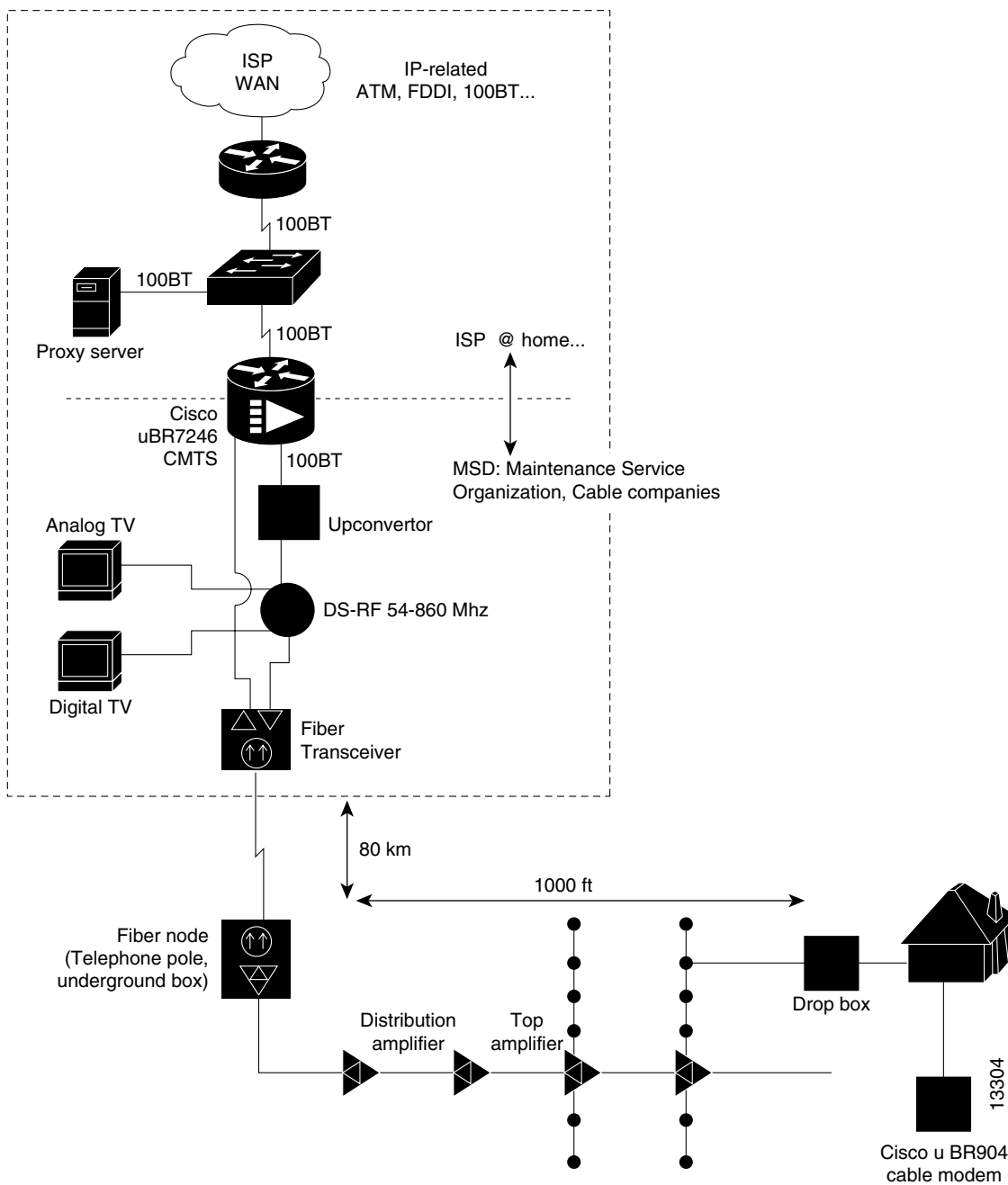
The Cisco uBR904 cable modem is configured automatically using a configuration file generated by the cable modem operator and delivered via the Cisco uBR7246 universal broadband router installed at the cable headend. The Cisco uBR7246 universal broadband router provides a path from the Cisco uBR904 cable modem to the DHCP server for PC address assignment.

The personal computer(s) connected to the cable modem must be configured for Internet Protocol (IP). In addition, the cable service provider must have a correctly configured network Dynamic Hierarchical Control Protocol (DHCP) server and EIA downstream channel. Using DHCP, the universal broadband router assigns an IP address to the cable modem each time it connects to the network. The IP address identifies the computer on the network and enables the universal broadband router to route data to and from your PC.

When the cable modem is installed, and the connected PC is configured for IP and has DHCP services enabled and communication to the headend is established, the Cisco uBR7246 universal broadband router downloads configuration information to the cable modem. The initial configuration connection to the headend can take several minutes.

See Figure 3 for a sample network topology.

Figure 3 CMTS to Cable Modem Network Sample Topology



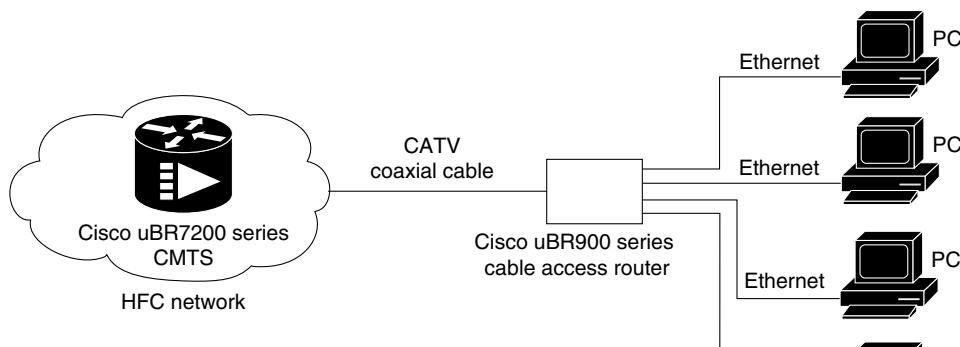
# Configuration Scenarios

You can configure your cable modem to act as a bridge or router. The following sections give a brief description of both scenarios.

## Bridging

In this scenario, the cable modem acts as a bridge for up to three PCs plugged directly into three of the four Ethernet ports on the cable modem and the Internet connected via the coaxial cable. All three Ethernet ports are treated as one Ethernet interface by the Cisco IOS software. The IP address for the PC and the coaxial cable interface are in the same subnet.

**Figure 4 Cisco uBR904 in a Bridging Configuration**



You can set up your bridging solution using one of these methods:

- Configure automatically using Cisco Fast Step software. For details, see the *Cisco uBR904 Cable Modem Cabling and Setup Quick Start Guide* that shipped with your cable modem.
- Set up the basic configuration with minimum user input using Plug and Play. We recommend this method if you want DOCSIS-compliant bridging. If your cable service provider is using DHCP, you do not need IP addresses for the PCs. Simply plug in the cables and run without using Cisco Fast Step software or doing any configuration. See the section “Configuring Plug-and-Play Bridging” for details.
- Set up advanced bridging using the System Configuration dialog box in the setup facility. See the chapter “Configuring Advanced Routing or Bridging Using Setup” in the *Cisco uBR904 Cable Modem Installation and Configuration Guide* for details.
- Configure manually using the Command Line Interface (CLI). See the sections “Switching from Bridging to Routing” and “Customizing the Cable Modem Interface” for details.

The bridging configuration is the default configuration for the Cisco uBR904 cable modem.

## Sample Configuration

This is a typical bridging configuration for a single PC connected to the cable modem. Note that the configuration for multiple PCs (maximum three) is the same.

```

version 11.3
no service pad
no service password-encryption
!
hostname Router
!

```

```

!
no ip routing
!
!
!
interface Ethernet0
no ip route-cache
bridge-group 59
bridge-group 59 spanning-disabled
!
interface cable-modem0
no ip address
no ip route-cache
no keepalive
bridge-group 59
bridge-group 59 spanning-disabled
!
ip classless
!
line con 0
line vty 0 4
login
!
end

```

When the cable interface is up, the following lines are dynamically included in cable interface configuration.

```

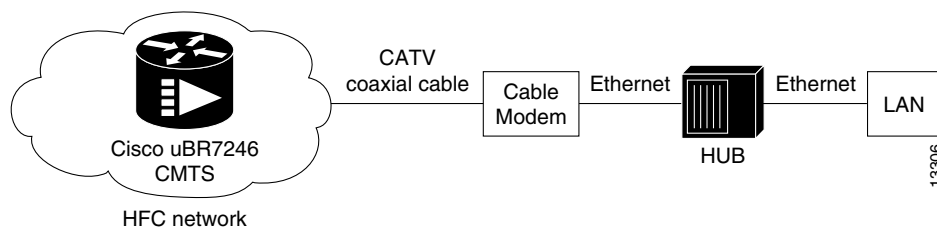
ip address 188.188.1.40 255.255.0.0
cable-modem downstream saved channel 699000000 34

```

## Routing

In this scenario, the cable modem acts as a router to connect to existing networks behind it. A typical use would be if you are connecting the Cisco uBR904 cable modem directly to four PCs via the Ethernet ports or to an internal Ethernet hub, which is connected to an existing PC network.

**Figure 5 Cisco uBR904 in a Routing Configuration with a Hub**



The cable modem is automatically configured to use the IP address of the headend cable router as the cable modem's default IP gateway.

You can configure your cable modem to function like a router using one of the following methods:

- Configure automatically using Cisco Fast Step software. For details, see the *Cisco uBR904 Cable Modem Cabling and Setup Quick Start Guide* that shipped with your cable modem.
- Set up advanced routing using the System Configuration dialog box in the setup facility. See the chapter "Configuring Advanced Routing or Bridging Using Setup" in the *Cisco uBR904 Cable Modem Installation and Configuration Guide* for details.

- Configure manually using the Command Line Interface (CLI). See the sections “Switching from Bridging to Routing” and “Customizing the Cable Modem Interface” for details.

### Sample Configuration

The cable IP address and downstream channel are auto-configured:

```
!
version 11.3
no service pad
no service password-encryption
!
hostname Router
!
!
!
!
interface Ethernet0
ip address 4.0.0.33 255.0.0.0
ip rip send version 2
ip rip receive version 2
!
interface cable-modem0
ip address 188.188.1.40 255.255.0.0
ip rip send version 2
ip rip receive version 2
no keepalive
cable-modem downstream saved channel 699000000 34
no cable-modem compliant bridge
!
router rip
network 4.0.0.0
network 188.188.0.0
!
ip classless
ip route 0.0.0.0 0.0.0.0 188.188.1.1
!
line con 0
line vty 0 4
login
!
end
```

## Configuration Tasks

Choose from the following tasks to connect the cable modem to the HFC network:

- Configuring Plug-and-Play Bridging
- Switching from Bridging to Routing
- Customizing the Cable Modem Interface

---

**Note** Console sessions and TTY sessions are supported by the cable modem.

---

## Configuring Plug-and-Play Bridging

The cable modem will automatically configure both the cable interface and bridging functionality. No Cisco IOS commands need to be manually entered.

If your cable service provider is using a DHCP server, you do not need IP addresses for the PCs. Simply plug in the cables and turn on the cable modem.

### Verify

To verify that the cable modem is configured for Plug-and-Play bridging, enter the **show startup-config EXEC** command. The configuration should look like this:

```
uBR904# show startup-config
Building configuration...
Current configuration:
!
version 11.3
no service pad
no service password-encryption
!
hostname uBR904
!
no ip routing
!
interface Ethernet0
no ip address
no ip route-cache
bridge-group 59
bridge-group 59 spanning-disabled
!
interface cable-modem0
no ip address
no ip route-cache
no keepalive
cable-modem downstream saved channel 699000000 36
bridge-group 59
bridge-group 59 spanning-disabled
!
ip classless
!
line con 0
line vty 0 4
login
!
end
```

## Switching from Bridging to Routing

If you are using one or more PCs directly connected to your cable modem, you can change the cable modem from acting as a bridge to acting as a router. Note that you can use a maximum of three PCs directly connected to your cable modem in a bridging scenario but you can use four PCs directly connected to your cable modem in a routing scenario. See the section “Configuration Scenarios” for details on both these configurations.

### Configure

Use the following steps to switch your cable modem from a bridging to a routing setup.

| Step | Command   | Purpose   |
|------|---|---|
| 1    | uBR904> <b>enable</b><br>uBR904#  | Enter enable mode.<br><br>You have entered enable mode when the prompt changes to uBR904#.                                    |
| 2    | uBR904# <b>configure terminal</b><br>Enter configuration commands, one per line. End with CNTL/Z.<br>uBR904 (config)#   | Enter global configuration mode. You have entered the global configuration mode when the prompt changes to uBR904 (config) #. |
| 3    | uBR904 (config)# <b>interface cable-modem 0</b>   | Specify the cable modem interface.  |
| 4    | uBR904 (config-if)# <b>no cable-modem compliant bridge</b><br>uBR904 (config-if)# <b>exit</b>   | Turn off MCNS auto-configured bridging.   |
| 5    | uBR904 (config)# <b>ip routing</b><br>uBR904 (config)# <b>router rip</b><br>uBR904 (config-router)# <b>network 188.188.0.0</b><br>uBR904 (config-router)# <b>network 4.0.0.0</b><br>uBR904 (config-router)# <b>exit</b> | Configure IP routing using RIP.   |
| 6    | uBR904 (config)# <b>interface cable-modem 0</b><br>uBR904 (config-if)# <b>ip rip receive v 2</b><br>uBR904 (config-if)# <b>ip rip send version 2</b><br>uBR904 (config-if)# <b>exit</b>                                 | Configure the RIP routing protocol on the cable modem interface.  |
| 7    | uBR904 (config)# <b>interface ethernet 0</b><br>uBR904 (config-if)# <b>ip rip receive v 2</b><br>uBR904 (config-if)# <b>ip rip send version 2</b>   | Configure the routing protocol on the Ethernet interface.   |
| 8    | uBR904 (config-if)# <b>Ctrl-Z</b><br>uBR904#<br><br>%SYS-5-CONFIG_I: Configured from console by console   | Return to enable mode.<br><br>This message is normal and does not indicate an error.  |
| 9    | uBR904# <b>copy running-config startup-config</b><br>uBR904# <b>exit</b>  | Save the configuration changes to NVRAM so that they are not lost during resets, power cycles, or power outages.              |

---

## Verify

To verify that no bridging is configured, routing is enabled, and the routing protocol on the interfaces is configured, enter the **show startup-config** command:

```
uBR904# show startup-config
Building configuration...

Current configuration:
!
version 11.3
no service pad
no service password-encryption
service udp-small-servers
service tcp-small-servers
!
hostname ubR904
!
!
ip host sw-lab-fw 4.0.0.1
ip domain-name cisco.com
ip name-server 171.69.209.10
clock timezone EST 2
!
!
interface Ethernet0
 ip address 4.0.0.33 255.0.0.0
 ip rip send version 2
 ip rip receive version 2
 no keepalive
!
interface cable-modem0
 ip address 188.188.1.42 255.255.0.0
 ip rip send version 2
 ip rip receive version 2
 no keepalive
 cable-modem downstream saved channel 699000000 39
 cable-modem downstream search-band 88 453000000 855000000 6000000
 cable-modem downstream search-band 89 930000000 1050000000 6000000
 cable-modem downstream search-band 90 111250000 117250000 6000000
 cable-modem downstream search-band 91 231012500 327012500 6000000
 cable-modem downstream search-band 92 333015000 333015000 6000000
 cable-modem downstream search-band 93 339012500 399012500 6000000
 cable-modem downstream search-band 94 405000000 447000000 6000000
 cable-modem downstream search-band 95 123015000 129015000 6000000
 cable-modem downstream search-band 96 135012500 135012500 6000000
 cable-modem downstream search-band 97 141000000 171000000 6000000
 cable-modem downstream search-band 98 219000000 225000000 6000000
 cable-modem downstream search-band 99 177000000 213000000 6000000
 cable-modem downstream search-band 100 910000000 860000000
!
router rip
 network 4.0.0.0
 network 188.188.0.0
!
ip default-gateway 188.188.1.1
ip classless
!
line con 0
line vty 0 4
 login
!
end
```

## Customizing the Cable Modem Interface

Different geographical regions and different cableplants use different frequency bands. The cable modem uses a built-in default frequency scanning feature to address this issue. After the cable modem finds a successful downstream frequency channel, it saves the channel and power setting to NVRAM. The cable modem recalls this value the next time it needs to synchronize its frequency or register with the CMTS.

However, you can customize the cable modem’s interface configuration, which deviates from the default setting that ships with the modem. For example, you may need to specify a different compliant mode, modify the saved downstream channel setting and upstream power value, or enable a faster downstream search algorithm.

---

**Note** Most cable network scenarios will not required you to use these commands. These commands are only useful for development engineers.

---

### Configure

| Command  | Purpose  |
|--|--|
| uBR904 <b>enable</b><br>uBR904#  | Enter enable mode.   |
| uBR904# <b>configure terminal</b><br>Enter configuration commands, one per line. End with CNTL/Z.<br>uBR904(config)# | Enter global configuration mode.   |
| uBR904(config)# <b>interface cable-modem 0</b>   | Specify cable modem interface 0.   |
| uBR904(config-if)# <b>cable-modem compliant {bridge   reed-solomon}</b>  | Change to a different compliant mode. Your choices are bridge or reed-solomon.   |
| uBR904(config-if)# <b>cable-modem downstream saved channel ds-frequency us-power</b>                                 | Modify the saved downstream channel setting and upstream power value. If you do this, you must specify an exact downstream frequency and a power value. <sup>1</sup> |
| uBR904(config-if)# <b>cable-modem fast-search</b>  | Enable a faster downstream search algorithm.   |

1. Use the **no cable-modem downstream saved channel ds-frequency us-power** command to remove a saved frequency and power setting from NVRAM.

---

## Command Reference

This section provides new and changed commands for the Cisco uBR904 cable modem.

All other commands used with this feature are documented in the Cisco IOS Release 11.3 command references.

New commands:

- **cable-modem compliant**
- **cable-modem downstream saved channel**
- **cable-modem fast-search**
- **interface cable-modem**
- **show interface cable-modem**

Changed commands:

- **show dhcp**
- **show bridge cable-modem**

## cable-modem compliant

To specify different compliant modes on a cable modem interface, use the **cable-modem compliant** interface configuration command. Use the **no** form of this command to disable a compliant mode.

```
cable-modem compliant { bridge | reed-solomon }  
no cable-modem compliant { bridge | reed-solomon }
```

### Syntax Description

|                     |   |
|---------------------|---|
| <b>bridge</b>       | Enables DOCSIS compliant bridging at startup. |
| <b>reed-solomon</b> | Enables reed-solomon.                         |

### Command Mode

Interface configuration

### Usage Guidelines

This command first appeared in Cisco IOS Release 11.3 NA.

### Example

This example shows how to enter this command:

```
uBR904# configure terminal  
Enter configuration commands, one per line. End with CNTL/Z.  
uBR904# interface cable-modem 0  
router(config-if) cable-modem compliant bridge  
router(config-if)
```

### Related Commands

```
cable-modem downstream saved channel  
cable-modem fast-search  
interface cable-modem  
show bridge cable-modem  
show dhcp  
show interface cable-modem
```

## cable-modem downstream saved channel

To modify the saved downstream channel setting and upstream power value on a cable modem, enter the **cable-modem downstream saved channel** interface configuration command. Use the **no** form of this command to remove the saved settings, which will be resaved upon the next initialization cycle.

```
cable-modem downstream saved channel ds-frequency us-power
no cable-modem downstream saved channel ds-frequency us-power
```

### Syntax Description

|                     |  |
|---------------------|--|
| <i>ds-frequency</i> | Downstream channel frequency in Hz, which can be between 91000000 and 860000000. |
| <i>us-power</i>     | Upstream power of the last successfully ranged session.                          |

### Default

Enabled

### Command Mode

Interface configuration

### Usage Guidelines

This command first appeared in Cisco IOS Release 11.3 NA.

This command is auto-generated by the operation of the cable MAC layer process. The MCNS DOCSIS RFI specification requires that cable modems remember the downstream frequency and upstream power of the last successfully ranged session. These parameters are called up as the first downstream frequency and upstream power to use the next time the modem is booted. This operation dramatically speeds up the channel search.

Use the **no cable-modem downstream saved channel** *ds-frequency us-power* command to remove the saved frequency and power setting from the running configuration, which will be resaved upon the next initialization cycle.

This command is only useful for development engineers.

### Example

This example shows how to disable the downstream frequency 91000000 and the upstream power level 33 dBmV from the downstream channel scan and upstream power adjustment.

```
uBR904# configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
uBR904# interface cable-modem 0
router(config-if) no cable-modem downstream saved channel 9100000 33
```

Related Commands

**cable-modem compliant**  
**cable-modem fast-search**  
**interface cable-modem**  
**show bridge cable-modem**  
**show dhcp**  
**show interface cable-modem**

## cable-modem fast-search

To enable a faster downstream search algorithm on a cable modem, use the **cable-modem fast-search** interface configuration command. Use the **no** form of this command to disable the downstream fast search feature.

```
cable-modem fast-search  
no cable-modem fast-search
```

### Syntax Description

There are no key words or arguments for this command.

### Default

Disabled

### Command Mode

Interface configuration

### Usage Guidelines

This command first appeared in Cisco IOS Release 11.3 NA.

This feature speeds up the frequency search performed by the cable modem. Normally it takes the cable modem about 30 to 50 seconds to sample 30 to 50 frequencies. The **cable-modem fast-search** command can reduce this search time. However, there may be some cases where this fast search algorithm may not perform as well as the default algorithm. Trial and error is the only way to discover how well this feature works for your environment.

### Example

This example shows how to enter this command:

```
uBR904# configure terminal  
Enter configuration commands, one per line. End with CNTL/Z.  
uBR904# interface cable-modem 0  
router(config-if) cable-modem fast-search
```

### Related Commands

```
cable-modem compliant  
cable-modem downstream saved channel  
interface cable-modem  
show bridge cable-modem  
show dhcp  
show interface cable-modem
```

## interface cable-modem

To specify the cable interface on a cable modem, use the **interface cable-modem** global configuration command.

**interface cable-modem** *number*

### Syntax Description

*number*                      The interface number inside the cable modem.

### Default

Disabled.

### Command Mode

Global configuration

### Usage Guidelines

This command first appeared in Cisco IOS Release 11.3 NA.

### Example

The following example brings up the cable modem interface 0 and displays the available configuration commands:

```
uBR904# configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
uBR904# interface cable-modem 0
uBR904(config-if)# cable-modem ?
    compliant      Enter compliant modes for interface
    downstream     Downstream channel characteristics
    fast-search     Enable/disable the DS fast search
```

### Related Commands

**cable-modem compliant**  
**cable-modem downstream saved channel**  
**cable-modem fast-search**  
**show bridge cable-modem**  
**show dhcp**  
**show interface cable-modem**

## show dhcp

To display the current DHCP settings on point-to-point interfaces, use the **show dhcp** privileged Privileged EXEC command.

```
show dhcp {server | lease}
```

### Syntax Description

|               |   |
|---------------|---|
| <b>server</b> | Show known DHCP servers.                  |
| <b>lease</b>  | Show DHCP addresses leased from a server. |

### Command Mode

Privileged EXEC

### Usage Guidelines

### Sample Display

Following is sample output for the **show dhcp lease** Privileged EXEC command:

```
uBR904# show dhcp lease
Temp IP addr: 188.188.1.40 for peer on Interface: cable-modem0
DHCP Lease server: 4.0.0.32, state: 3 Bound
DHCP transaction id: 2431
Lease: 3600 secs, Renewal: 1800 secs, Rebind: 3150 secs
Next timer fires after: 00:58:01
Retry count: 0 Client-ID: 0010.7b43.aa01
```

Following is sample output for the **show dhcp server** Privileged EXEC command:

```
uBR904# show dhcp server
DHCP server: ANY (255.255.255.255)
Leases: 1
Offers: 1 Requests: 2 Acks: 1 Naks: 0
Declines: 0 Releases: 0 Bad: 0
TIME0: 4.0.0.188, TIME1: 0.0.0.0
Subnet: 255.255.0.0
```

Table 1 describes the fields shown in the display.

**Table 1 Show DHCP Field Descriptions**

| Field       | Description  |
|-------------|--|
| DHCP server | MAC address used by the DHCP server.   |
| Leases      | Number of current leased IP addresses.                                       |
| Offers      | Number of offers for an IP address sent to a proxy-client from the server.   |
| Requests    | Number of requests for an IP address to the server.                          |
| Acks        | Number of 'acknowledge' messages sent by the server to the proxy-client.     |
| Naks        | Number of 'not acknowledge' messages sent by the server to the proxy-client. |
| Declines    | Number of offers from the server that are declined by the proxy-client.      |

**Table 1 Show DHCP Field Descriptions (Continued)**

| <b>Field</b> | <b>Description</b>  |
|--------------|---|
| Releases     | Number of times IP addresses have been relinquished gracefully by the client. |
| Bad          | Number of bad packets received from wrong length, wrong field type, etc.      |
| Subnet       | Subnet used by the DHCP server.   |

Related Commands

- cable-modem compliant**
- cable-modem downstream saved channel**
- cable-modem fast-search**
- interface cable-modem**
- ip address-pool**
- ip dhcp-server**
- peer default ip address**
- show bridge cable-modem**
- show interface cable-modem**



## show interface cable-modem

To display information about the cable modem's cable interface, use the **show interface cable-modem EXEC** command.

```
show interface cable-modem number [accounting | counters | crb | irb | type]
```

### Syntax Description

|                   |   |
|-------------------|---|
| <i>number</i>     | Cable modem interface number.   |
| <b>accounting</b> | (Optional) Displays the number of packets of each protocol type that has been sent through the cable modem interface. |
| <b>counters</b>   | (Optional) Shows MIB counters on the cable interface.   |
| <b>crb</b>        | (Optional) Displays routing and bridging information pertaining to the cable interface.                               |
| <b>irb</b>        | (Optional) Displays routing and bridging information pertaining to the cable interface.                               |

### Command Mode

EXEC

### Usage Guidelines

This command first appeared in Cisco IOS Release 11.3 NA.

### Sample Display

Traffic passing through the cable modem interface is shown in the following example:

```
uBR904# show interface cable-modem 0
cable-modem0 is up, line protocol is up
  Hardware is BCM3220, address is 0010.7b43.aa01 (bia 0010.7b43.aa01)
  Internet address is 188.188.1.60/16
  MTU 1500 bytes, BW 27000 Kbit, DLY 1000 usec, rely 255/255, load 1/255
  Encapsulation , loopback not set, keepalive not set
  ARP type: ARPA, ARP Timeout 04:00:00
  Last input 00:07:04, output 00:00:41, output hang never
  Last clearing of "show interface" counters never
  Queueing strategy: fifo
  Output queue 0/40, 0 drops; input queue 0/75, 0 drops
  5 minute input rate 0 bits/sec, 0 packets/sec
  5 minute output rate 0 bits/sec, 0 packets/sec
    4495 packets input, 1153221 bytes, 0 no buffer
    Received 8 broadcasts, 0 runts, 0 giants, 0 throttles
    0 input errors, 0 CRC, 0 frame, 0 overrun, 0 ignored, 0 abort
    12841 packets output, 1708272 bytes, 0 underruns
    0 output errors, 0 collisions, 11 interface resets
    0 output buffer failures, 0 output buffers swapped out
```

The following example displays the number of packets and each protocol type passing through the cable modem interface.

```
uBR904# show int cable-modem 0 accounting
cable-modem0
          Protocol    Pkts In   Chars In   Pkts Out   Chars Out
          IP           545      185502     159        90240
          Trans. Bridge 3878     964995    12597     1611142
          ARP          73       3066      86         4128
```

MIB counters on the cable interface are displayed in the next example:

```
uBR904# show int cable-modem 0 counters
Cable specific counters:
Ranging requests sent : 50982
Downstream FIFO full  : 0
Re-requests           : 7277
DS MAC Message Overruns: 0
DS Data Overruns     : 0
Received MAPs         : 254339485
Received Syncs        : 53059555
Message CRC failures  : 0
Header CRC failures   : 1394
Data PDUs             : 5853
DS MAC messages       : 307861745
Valid Headers         : 307869065
Sync losses           : 0
Pulse losses          : 1
BW request failures   : 6
```

Routing and bridging information on the cable modem interface is display in the following example:

```
uBR904# show int cable-modem 0 crb
cable-modem0

Bridged protocols on cable-modem0:
ip

Software MAC address filter on cable-modem0
Hash Len  Address           Matches Act   Type
0x00:  0 ffff.ffff.ffff     3877 RCV Physical broadcast
0x2A:  0 0900.2b01.0001      0 RCV DEC spanning tree
0x7A:  0 0010.7b43.aa01    573 RCV Interface MAC address
0xC2:  0 0180.c200.0000    0 RCV IEEE spanning tree
0xC2:  1 0180.c200.0000    0 RCV IBM spanning tree
```

## Related Commands

**cable-modem compliant**  
**cable-modem downstream saved channel**  
**cable-modem fast-search**  
**interface cable-modem**  
**show bridge cable-modem**  
**show dhcp**

## What to do Next

For additional software configuration information, refer to the following publications:

- *Cisco uBR7246 Installation and Configuration Guide*
- *Cisco uBR7246 Universal Broadband Router Cable Modem Card Installation and Configuration*
- *Cisco uBR904 Cable Modem Installation and Configuration Guide*
- *Quick Start Guide Cisco uBR904 Cable Modem Cabling and Setup*
- *Troubleshooting Tips for the Cisco uBR904 Cable Modem*