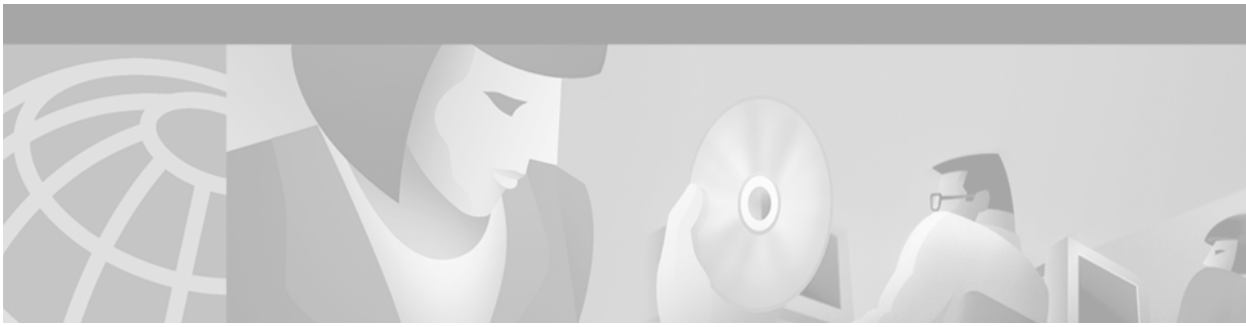

Cisco CVA120 Series Cable Voice Adapter Features

Part Number: OL-0805-02
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Cisco IOS Release 12.1(5)XU2

This feature module describes the Cisco CVA120 Series Cable Voice Adapters, its major benefits, and how to configure it. This document includes the following major sections:

Feature Overview

The Cisco CVA120 Series Cable Voice Adapters is a residential voice-enabled cable modem that provides high-speed data and voice services to home offices and homes over an Internet Protocol (IP). The Cisco CVA120 Series Cable Voice Adapters can deliver data at speeds exceeding analog dial up or Integrated Services Digital Network (ISDN) lines. The supported telephony features allow the Multiple Service Operator (MSO) to provide primary line voice service and secondary line service, using a single coaxial cable connection.

The Cisco CVA120 Series Cable Voice Adapters functions at its most basic level as a cable modem—a modulator/demodulator that provides high-speed network access on the cable television system to residential and small office/home office (SOHO) subscribers.

The Cisco CVA120 Series Cable Voice Adapters can optionally provide Voice over IP (VoIP) services, allowing subscribers to make telephone, modem, and fax calls over TCP/IP networks such as the Internet. These calls can be made to other VoIP devices, or to telephone, modem, or fax devices on the regular telephone network (the Public Telephone Switched Network, commonly known as PTSN). Custom class features such as 3-way calling, caller id, call return, and distinctive ringing are supported.

The Cisco CVA120 Series Cable Voice Adapters is equipped with both an Ethernet port and USB port. An optional uninterruptible power supply (UPS) can also provide power to the unit when the main AC-input power supply fails. The cable voice adapter is also designed to configure easily after installation by automatically registering itself on the network.

Cisco CVA120 Series Cable Voice Adapter Models

The Cisco CVA120 Series Cable Voice Adapter is available in two models, depending on the cable networking standard that is being used:

- The Cisco CVA122 Cable Voice Adapter supports the DOCSIS standard, which was developed with service providers to ensure that any DOCSIS-certified cable modem can interoperate with any bidirectional, DOCSIS-qualified CMTS. The DOCSIS standard supports the North American National Television Systems Committee (NTSC) channel plan, with 6 MHz channel widths, a downstream range of 88 to 860MHz, and an upstream range of 5 to 42 MHz.
- The Cisco CVA122E Cable Voice Adapter supports the EuroDOCSIS standard, which is almost identical to the DOCSIS standard, except that it supports the European Phase Alternating Line (PAL) and Systeme Electronique Couleur Avec Memoire (SECAM) channel plans, with 8 MHz channel widths, a downstream range of 88 to 860MHz, and an upstream range of 5 to 65 MHz.

Note Information about DOCSIS and EuroDOCSIS requirements and current specifications are available at the CableLabs web site at http://www.cablelabs.com.

Both models of the Cisco CVA120 Series Cable Voice Adapter feature one F-connector interface to the cable system, one RJ-45 (10BASE-T Ethernet) hub port, one USB device port, and two RJ-11 analog voice ports. The USB interface enables the cable voice adapter to connect to a PC with a USB interface, without having the user to open the unit and install an Ethernet network interface card (NIC). If supported by the PC and service provider, PCs can be connected to the cable voice adapter using both the Ethernet and USB interfaces.

Note Unless otherwise indicated, the terms Cisco CVA120 Series Cable Voice Adapter and cable voice adapter refer to both the Cisco CVA122 Cable Voice Adapter and Cisco CVA122E Cable Voice Adapter.

The Cisco CVA120 Series Cable Voice Adapter uses its cable interface to connect to the CMTS over the Hybrid/Fiber Coax (HFC) cable system. A personal computer (PC) connects to the Cisco CVA120 Series Cable Voice Adapter through either the Ethernet or USB interface. The Cisco CVA120 Series Cable Voice Adapter then provides Internet access by forwarding traffic between the PC and the CMTS. Subscribers can use the Cisco CVA120 Series Cable Voice Adapter to create high-speed, permanent access to the Internet, without the need for telco-based services such as leased lines.

If supported by the service provider, the Cisco CVA120 Series Cable Voice Adapter can connect to multiple PCs by attaching a PC to each interface (Ethernet and USB). In addition, the Cisco CVA120 Series Cable Voice Adapter's Ethernet interface can connect to an Ethernet hub, and multiple computers can then be connected to the hub.

Note You can connect the Cisco CVA120 Series Cable Voice Adapter to only one PC using the USB port because the cable voice adapter acts as a USB peripheral device. The cable voice adapter can also connect to a USB hub, which connects multiple peripherals to one PC, but the USB hub cannot connect multiple PCs to the cable voice adapter.

Bridging Operations

The Cisco CVA120 Series Cable Voice Adapter provides IP bridging for one or more PCs and other customer premises equipment (CPE) when acting as a DOCSIS/EuroDOCSIS-compliant cable modem. In bridging mode, traffic from the cable voice adapter's Ethernet and USB interfaces is transparently forwarded on to the cable interface for transmission to the CMTS. Similarly, the cable voice adapter receives traffic on the cable interface and forwards it to the PCs attached to the Ethernet and USB interfaces.

Note In bridging mode, the PCs must be assigned IP addresses in the same subnet as the CMTS. Typically, a Dynamic Host Configuration Protocol (DHCP) server at the headend automatically assigns the IP addresses to each PC that is authorized to connect to the Cisco CVA120 Series Cable Voice Adapter.

You can connect a PC directly to the Ethernet port or to the USB port. You can connect a PC to both the Ethernet and USB ports, if this configuration is supported by the service provider.

In bridging mode, if only one PC is connected to both the Ethernet and USB interface ports, the cable voice adapter learns which port is in operation first, puts that MAC address in the bridge table, and forwards traffic from that port to the cable interface. If CPE devices are connected to both the Ethernet and USB ports, both ports are active. In this case the first CPE device that generates an Address Resolution Protocol (ARP) request that maps its IP address to a MAC address is put into the bridge table first and that CPE device will have its traffic forwarded first.

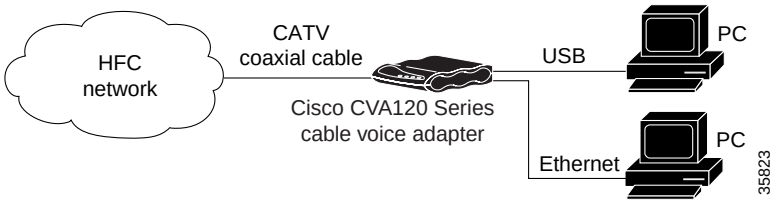
Also, if supported by the service provider, you can connect an Ethernet hub directly to the Ethernet port and then connect multiple PCs to the hub. In bridging mode, the Cisco CVA120 Series Cable Voice Adapter supports a maximum 254 PCs, depending on the maximum number allowed by the CMTS.

By default, one PC is supported for each Cisco CVA120 Series Cable Voice Adapter. This PC can be connected to either the Ethernet port or the USB port. If two PCs are connected to each port, then only the first PC that is discovered is allowed to access the network. The service provider can change this limit by changing the MAX CPE parameter in the DOCSIS configuration file. However, the CMTS at the headend can also enforce its own limit on CPE devices, and the CMTS limit overrides the MAX CPE parameter. So if the headend allows only one PC per cable voice adapter, subscribers can connect only one PC to the cable voice adapter, even if the MAX CPE parameter is set to the maximum value of 254.

Note For better network performance, Cisco recommends a maximum limit of 16 CPE devices; this recommended maximum might be less depending on the services that the subscriber has purchased.

See Figure 1 for a typical configuration.

Figure 1 Cisco CVA120 Series Cable Voice Adapter in a Bridging Configuration



Note All Cisco IOS releases that support the Cisco CVA120 Series Cable Voice Adapter support basic DOCSIS/EuroDOCSIS connectivity that provides both high-speed Internet data access and VoIP connectivity.

The Cisco CVA120 Series Cable Voice Adapter ships from the factory with a Cisco IOS software image stored in nonvolatile Flash memory that supports DOCSIS/EuroDOCSIS-compliant IP bridging data operations.

Voice Operations

The Cisco CVA120 Series Cable Voice Adapter supports Voice over IP (VoIP), which transmits voice, modem, and fax calls over a TCP/IP network such as the Internet. Depending on the services purchased from the cable service provider, subscribers can place and receive calls without using the local exchange carrier.

The cable voice adapter contains two voice ports, which support two simultaneous voice, modem, and fax calls. You can connect a single-line analog telephone, fax, or modem device to each voice port, or you can connect a dual-line telephone device to the first voice port.

You can also connect multiple telephones, modems, and fax devices to each of the voice ports. However, the multiple telephones act as extensions to each voice line, so that only one call at a time can be made per voice port.

Note The Cisco CVA120 Series Cable Voice Adapter supports only analog Foreign Exchange Station (FXS) telephone, modem, and fax devices. You cannot connect Foreign Exchange Office (FXO) devices, such as a PBX, to the cable voice adapter voice ports.

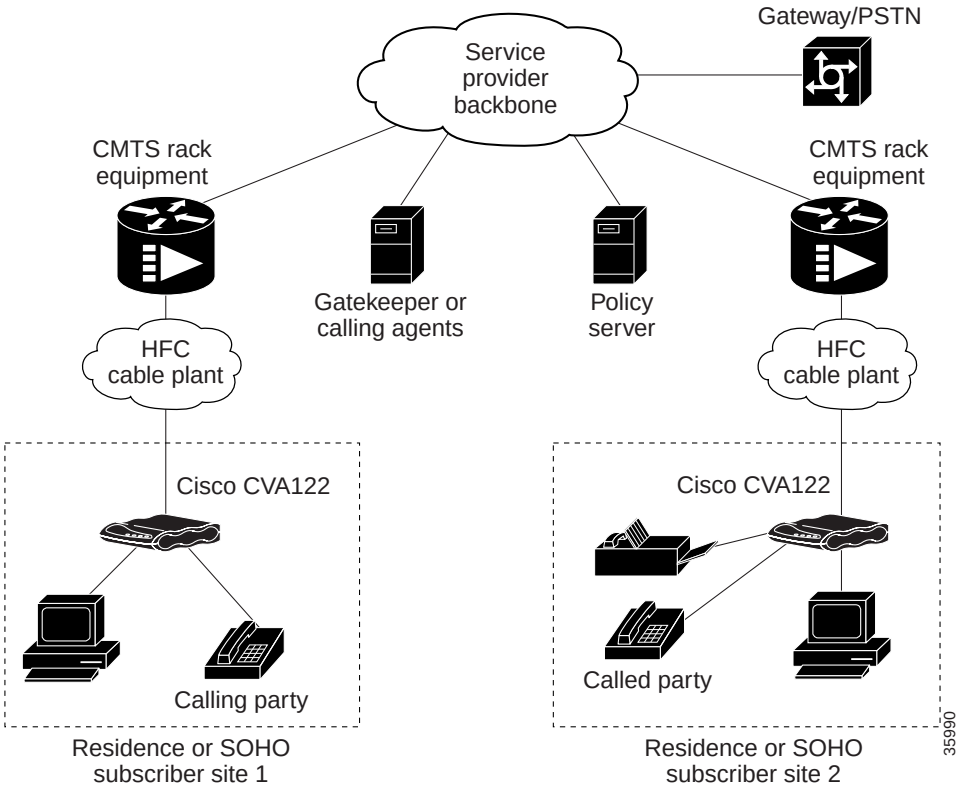
Voice signals are packetized and transported in compliance with the following protocols:

- H.323v2—Second version of an International Telecommunications Union (ITU) standard that specifies call signaling and control protocols for an IP data network.
- Simple Gateway Control Protocol (SGCP) Version 1.1—A signaling protocol under review by the Internet Engineering Task Force (IETF).
- Media Gateway Control Protocol (MGCP) Version 0.1—A proposed IETF voice control protocol intended to eventually supersede the existing SCGP 1.1 protocol.

Note The Cisco CVA120 Series Cable Voice Adapter supports both H.323 and SGCP/MGCP call controls, but only one method can be active at a time.

Figure 2 illustrates a broadband cable system that supports VoIP transmission.

Figure 2 Simplified VoIP Network



The CMTS at the headend routes IP telephony calls from the point of origination to the destination, transmitting them along with other traffic (both voice and data). To route voice calls across the local IP network to a destination on the Internet or the Public Switched Telephone Network (PSTN), the Cisco CVA120 Series Cable Voice Adapter and CMTS deploy IP telephony as a local-loop bypass service.

One of the following call routing methods is then used, depending on the protocol being used:

- If using H.323v2, the cable voice adapter acts as the H.323v2 gateway that forwards the voice packets to the CMTS, which then sends them to a telephony gatekeeper. The gatekeeper transmits the packets to their ultimate destination.
- If using SGCP or MGCP, the Cisco CVA120 Series Cable Voice Adapter acts as the residential gateway that forwards the voice packets to the CMTS, which then connects to the external call agent (SGCP or MGCP) or media gateway controller (MGCP). The call agent or controller determines how to transmit the call across the network to the trunking gateway that is its ultimate destination.

The gateway at the destination typically interconnects the IP network to the Public Switched Telephone Network (PSTN) so that calls can be made to any phone, not just those that are part of the IP telephony network.

Voice calls are digitized, encoded, compressed, and packetized in an originating gateway; and then, decompressed, decoded, and reassembled in the destination gateway. A server maintains subscriber profiles and policy information. See the Cisco service provider voice documentation set if you have Cisco gatekeeper, gateway, or other applicable products.

Caution In certain countries, the provisioning of voice telephony over the Internet or use of these products may be prohibited and subject to laws, regulations or licenses, including requirements applicable to the use of the products under telecommunications and other laws and regulations. Each customer must comply with all such applicable laws in the country where the customer intends to use the product.

Voice Handling

Typically, voice calls made using the Public Switched Telephone Network (PSTN) require 64 Kbps of bandwidth when transmitted across digital systems. With IP telephony, however, telephone calls can be delivered at rates as low as 8000 bps in a packet format using different compression algorithms. Depending on the Cisco IOS software image being used, the Cisco CVA120 Series Cable Voice Adapter supports the following algorithms:

- G.711 A-Law—64000 bps PCM uncompressed encoding, using the A-Law standard used in most of the world except for North America and a few other countries.
- G.711 Mu-Law—64000 bps PCM uncompressed encoding, using the Mu-Law standard used in North America and a few other countries.
- G.723—5300 bps (ACELP) and 6300 bps (MPMLQ) compressed encoding designed for H.323 voice systems.
- G.723 Annex A—5300 bps (ACELP) and 6300 bps (MPMLQ) compressed encoding that provides voice activity detection (VAD) and Comfort Noise Generation (CNG).
- G.726 16000 bps, 24000 bps, and 32000 bps compressed adaptive differential PCM (ADPCM) encoding that can handle temporary overloads in the voice traffic.
- G.728—16000 bps low-delay variation of code excited linear prediction (CELP) voice compression that provides a good compromise between voice quality and signal compression.
- G.729—8000 bps compressed CS-ACELP encoding (default for telephone calls).
- G.729 Annex B—8000 bps compressed CS-ACELP encoding using the Annex B format that implements algorithms for voice activity detection (VAD), discontinuous transmission (DTX), and comfort noise generation (CNG).

To achieve acceptable voice quality and reduce network bandwidth usage, several voice processing techniques are used. Digital Signal Processors (DSPs) provide the stream-to-packet and packet-to-stream conversion, and voice processing capabilities. Typical voice processing services include echo cancellation, voice compression, Voice Activity Detection (VAD) or silence compression, and Dual Tone Multi-Frequency (DTMF) tone detection and generation.

Quality of Service Support

Data traffic typically is sent only on a “best effort” basis, and if a packet is lost or delayed, it can be easily retransmitted without significantly affecting the connection. Such delays and losses are unacceptable, however, for real-time traffic such as voice calls.

For this reason, the CMTS and cable voice adapter router assign separate service identifiers (SIDs) for the voice and data traffic flows. Each SID has a separate class of service (CoS) that determines how its traffic flow is handled, allowing voice traffic to have a higher priority than the data traffic.

The CMTS and router can use different traffic shaping mechanisms to ensure that the higher priority voice traffic always has the bandwidth it needs. This allows voice calls (and other real-time traffic) to share the same channel as data traffic, without the quality of the voice calls being degraded by bursty data transmissions.

Note Separate CoS flows are available only when the cable voice adapter is connected to a CMTS that supports multiple classes of service. In addition, the cable voice adapter's configuration file must enable multiple classes of service.

The DOCSIS 1.0 specification does not support multiple CoS flows, so when the cable voice adapter interoperates with a DOCSIS 1.0 CMTS, voice and data traffic are both transmitted on a "best effort" basis. This can cause poorer voice quality and lower data throughput when calls are being made from the router's telephone ports.

The Cisco CVA120 Series Cable Voice Adapter supports the following service classes:

- The first CoS in the cable voice adapter's configuration file is configured as the "Tiered Best Effort Type Class" and is the default CoS for data traffic. The class has no minimum upstream rate specified for the channel.

  This service class is assigned to the primary SID for the cable voice adapter. In addition to being used for data traffic, the cable voice adapter uses this SID for all MAC message exchanges with the CMTS, and for SNMP management traffic.

  All traffic using this SID is transmitted on a "best effort" basis, but data traffic within this class can be prioritized into eight different priority levels. Although all data traffic still has lower priority than the voice traffic, this allows certain data traffic (such as MAC messages) to be given higher priority than other data traffic. The CMTS system administrator defines the traffic priority levels and must include the traffic priority fields in the configuration file downloaded to the cable voice adapter.

- The cable voice adapter then assigns a secondary CoS for each voice port; each secondary CoS is associated with a secondary SID that is used for the voice port. If using a Cisco IOS image that supports dynamic multi-SID assignment, these secondary SIDs are automatically created when a call is placed from one of the voice ports. When the call terminates, the secondary SID associated with it is deleted. If the Cisco IOS image does not support multi-SIDs, static SIDs are created for each of the voice ports during the power-on provisioning process, permanently reserving the bandwidth needed for the voice traffic.

  The CMTS system administrator typically configures these secondary classes of service so that they have higher quality of service (QoS) classes for use by higher priority voice traffic. These classes should also have a minimum upstream data rate specified for the channel to guarantee a specific amount of bandwidth for the corresponding traffic flows. When static SIDs are used, that bandwidth is always reserved for voice calls; however, when dynamic multi-SID assignment is used, that bandwidth is reserved only when the voice calls are active.

H.323v2 Protocol

In architectures using the VoIP H.323v2 protocol stack, the session application manages two call legs for each call: a telephony leg managed by the voice telephony service provider, and the VoIP leg managed by the cable system operator—the VoIP service provider. Use of the H.323v2 protocol typically requires a dial plan and mapper at the headend or other server location to map IP addresses to telephone numbers.

When both legs of the call have been set up, the session application creates a conference between them. The opposite leg's transmit routine for voice packets is given to each provider. The CMTS router passes data to the gateway and gatekeeper. The H.323v2 protocol stack provides signaling using H.225 and feature negotiation using H.245.

Note For more information on using H.323v2, see the document *H.323 Version 2 Support*, available on CCO and the Documentation CD-ROM.

To make and receive H.323 calls, the Cisco CVA120 Series Cable Voice Adapter must be configured for the following:

- The IP address of the gateway for the destination dialed—In all situations, these IP addresses can be configured statically using the command-line interface (CLI) with **voip dial peer group** commands. If you are using Cisco gatekeeper products that are running Cisco IOS Release 12.0(5)T or higher images, the cable voice adapter can obtain these addresses dynamically from the gatekeeper using the Registration, Admission, and Status (RAS) protocol.
- The telephone numbers of the attached devices—In all situations, these IP addresses can be configured statically using the CLI **pots port** commands. When using Cisco Network Registrar (CNR) version 3.0 or higher, the IP addresses can be configured with the **relay.tcl** and **setrouter.tcl** scripts. If you are using Cisco gatekeeper products that are running Cisco IOS Release 12.0(5)T or higher images, you can obtain these addresses dynamically from CNR. The telephone numbers of attached devices are then sent in DHCP response messages. When the cable voice adapter processes the DHCP response, it automatically creates the **pots dial peer** for each port, creates the **voip dial peer** for the RAS target, and starts the H.323v2 RAS gateway support.

Note To support voice configurations using Cisco gatekeeper products with RAS, Cisco IOS Release 12.0(5)T or higher images with gatekeeper support are required. The headend must have IP multicast enabled. The cable interface must be designated as the default for RAS to discover the gatekeeper. The gatekeeper then resolves all dialed destinations sent to the RAS protocol.

SGCP and MGCP Protocol Stack

The Cisco CVA120 Series Cable Voice Adapter supports the Simple Gateway Control Protocol (SGCP) and Media Gateway Control Protocol (MGCP). Both MGCP and SGCP are signaling protocols that interact with a remote call agent (CA) to provide call setup and teardown for VoIP calls.

Using the call agent, SGCP and MGCP communicate with the voice gateways, dynamically resolving and routing calls. This creates a distributed system that enhances performance, reliability, and scalability while still appearing as a single VoIP gateway to external clients.

The remote call agent also provides the signaling and feature negotiation that would otherwise be provided by the Cisco CVA120 Series Cable Voice Adapter when using the H.323v2 protocol. Similarly, the call agent also provides the mapping of IP addresses to telephone numbers, eliminating the dial plan mapper and static configurations that are required on the router when using the H.323v2 protocol.

The SGCP and MGCP protocols implement the gateway functionality using both trunk and residential gateways. The Cisco CVA120 Series Cable Voice Adapter functions in this mode as a residential gateway with two endpoints.

SGCP and MGCP can preserve Signaling System 7 (SS7) style call control information, and preserve additional network information such as routing information and authentication, authorization, and accounting (AAA) security information. SGCP and MGCP allow voice calls to originate and terminate on the Internet, and allow one end to terminate on the Internet and the other to terminate on a telephone on the PSTN.

IP Routing Operations

The Cisco CVA120 Series Cable Voice Adapter can be configured for IP routing mode. To operate in routing mode, the Cisco CVA120 Series Cable Voice Adapter supports:

- Dynamic Host Configuration Protocol (DHCP) Proxy Support
- Routing Information Protocol Version 2

Dynamic Host Configuration Protocol Proxy Support

The DHCP proxy support feature is useful in the following situations:

- When the Cisco CVA120 Series Cable Voice Adapter is configured for routing mode, an IP address must be assigned to its Ethernet interface. The DHCP proxy support feature allows an external DHCP server to assign an IP address to the Ethernet interface, as opposed to having to assign it manually with the appropriate CLI commands.
- When network address translation (NAT) is used, an inside global address pool must be created on the Ethernet interface. The DHCP proxy support feature allows a DHCP server to assign an IP address that automatically creates the NAT address pool, as opposed to manually specifying a static IP address with the appropriate CLI commands.

When configured for DHCP proxy support, during startup the Cisco CVA120 Series Cable Voice Adapter sends a proxy DHCP request to the DHCP server using the Ethernet interface's MAC address. The DHCP server replies with a second IP address that the router assigns to either the Ethernet interface or to the NAT pool, depending on which option was specified.

This feature was introduced in Cisco IOS Release 12.1(1)T.

Routing Information Protocol Version 2

When configured for routing mode, the Cisco CVA120 Series Cable Voice Adapter defaults to using the Routing Information Protocol Version 2 (RIPv2). In routing mode, the Cisco CVA120 Series Cable Voice Adapter automatically configures itself to use the headend's IP address as its IP default gateway. This allows the Cisco CVA120 Series Cable Voice Adapter to send packets not intended for the Ethernet interface to the headend.

RIPv2 routing is useful for small internetworks because it optimizes Network Interface Center (NIC)-assigned IP addresses by defining Variable-Length Subnet Masks (VLSMs) for network addresses, and it allows Classless Interdomain Routing (CIDR) addressing schema.

This feature was introduced in Cisco IOS Release 12.0(4)XI1.

Note The Cisco CVA120 Series Cable Voice Adapter supports only static routes and the RIPv2 routing protocol.

Upgrading the Software Image

When Cisco IOS images are updated to new releases, the service provider can download them as needed to Cisco CVA120 Series Cable Voice Adapters installed in the field (based on the software licenses purchased). See the Cisco CVA120 Series Cable Voice Adapter Release Notes for a complete list of features and Cisco IOS images that are currently supported.

Service providers can use the Cisco CVA120 Series Cable Voice Adapter's Media Access Controller (MAC) address to uniquely identify each particular unit in the field. The CMTS uses this value to download the proper DOCSIS configuration file to the Cisco CVA120 Series Cable Voice Adapter before beginning operation.

The DOCSIS configuration file can also contain the name of the software image that the Cisco CVA120 Series Cable Voice Adapter should be running. If necessary, the CMTS can also download the proper software image to the cable voice adapter and force it to reboot using the new image.

The download of the DOCSIS configuration file usually takes only a few seconds and is done every time the Cisco CVA120 Series Cable Voice Adapter reboots. The download of the software image can take several minutes to complete, during which time network connectivity is not available. However, the software image must be downloaded only once, until the subscriber needs to be updated with a new or updated image.

Downloading the Cisco IOS Software Image

A Cisco IOS software image is preloaded on the Cisco CVA120 Series Cable Voice Adapter before it is shipped from the factory. However, when updated software images are available, a new Cisco IOS software image can be downloaded to a cable voice adapter installed in the field.

The DOCSIS configuration file can contain a filename for the software image that the Cisco CVA120 Series Cable Voice Adapter runs. If this filename does not match the software image that is currently installed on the cable voice adapter, the cable voice adapter must use the TFTP protocol to download the new image from the server specified in the DOCSIS configuration file.

After the new software image has been downloaded, the Cisco CVA120 Series Cable Voice Adapter resets itself and repeats the entire power-on and provisioning process. This includes downloading the DOCSIS configuration file again. However, because the software image is stored in nonvolatile Flash memory, the cable voice adapter does not have to download it again—the software download occurs only when the service provider specifies a new software image filename in the DOCSIS configuration file.

If the Cisco CVA120 Series Cable Voice Adapter cannot download the new image, it retries the download, as many as 16 attempts. If the cable voice adapter still cannot download the image, it falls back to its previous software image and attempts to go online with that image.

The service provider can also force the Cisco CVA120 Series Cable Voice Adapter to download new software by putting a new image filename in the DOCSIS configuration file and resetting the cable voice adapter. This should be done only after warning the customer that the modem will be offline for several minutes.

Note Because it can take several minutes for this download to be accomplished and for the Cisco CVA120 Series Cable Voice Adapter to repeat its power-on sequence, the desired software image can also be installed on the router at the warehouse. In this case, the DOCSIS configuration files for each cable voice adapter should also be updated with the proper filename.

Downloading the Cisco IOS Configuration File

The DOCSIS configuration file uses the type 43 Vendor-Specific Options field to specify that the Cisco CVA120 Series Cable Voice Adapter should download a Cisco IOS configuration file. See the "DOCSIS Configuration File" section on page 21 for more information.

Note Downloading a Cisco IOS configuration file is not usually required for plug-and-play bridging. Instead, it is normally used to configure the advanced feature sets.

Upgrading the ROM Monitor Software

The Cisco CVA120 Series Cable Voice Adapter supports both a primary and secondary ROM Monitor (ROMMON). The primary ROMMON is permanently installed, but a secondary ROMMON is upgradable.

After power-on or a hard system reset, the primary ROMMON initially takes control. It then checks for the presence of a secondary ROMMON and if present, verifies that the secondary ROMMON has the correct checksum. If the secondary ROMMON passes these validation tests, the primary ROMMON then passes control to the secondary ROMMON, which then performs the power-on self-test and hardware initialization, and then loads and executes the Cisco IOS software image. Otherwise, the primary ROMMON remains in control and continues the boot process.

This approach allows the secondary ROMMON to be safely upgraded when new software is available. If the file transfer is interrupted, however, or if the new ROMMON software becomes corrupted, the primary ROMMON is still available to boot the cable voice adapter and load the Cisco IOS software image.

To upgrade the secondary ROMMON, use the **copy tftp rommon:** privileged EXEC command. See the following example:

```
Router> enable
Router# copy tftp rommon:
Address or name of remote host []? 192.168.100.172
Source filename []? cva120-rboot-mz
Accessing tftp://192.168.100.172/cva120-rboot-mz...
Loading cva120-rboot-mz from 192.168.100.172 (via cable-modem0): !

WARNING...

Do not attempt ROMMON upgrades unless you know what you are doing.
Writing to ROMMON must not be interrupted.
Do not reset the cable modem during this operation.
Do what you can to ensure power to the cable modem is not interrupted.

The cable modem will automatically reloaded after ROMMON
upgrade is successfully completed.

Do you want to continue?[confirm] yes
!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!
[OK - 243260/486400 bytes]
```

If the download of the secondary ROMMON is successful, the cable voice adapter is automatically reloaded to transfer control to the new ROMMON.

Caution If the download of the secondary ROMMON is interrupted by a power cycle, reset, or network interruption, the secondary ROMMON will become corrupted. You must then reset the cable voice adapter to allow the primary ROMMON to take control and reboot the system. After the system has rebooted with the primary ROMMON, you can repeat the download of the secondary ROMMON.

Benefits

Voice Over IP

The multiple service operator (MSO) can offer telephony service to their customers, increasing the MSO's monthly revenues. Customers can receive additional services that are competitively priced with existing services. Since the Cisco CVA120 Series Cable Voice Adapter's software is Cisco IOS-based, it has been proven reliable and feature rich.

USB and Ethernet Ports

Having both USB and Ethernet ports, an MSO can meet the needs of the consumers. A home office consumer can connect multiple PCs or devices to the Cisco CVA120 Series Cable Voice Adapter using the Ethernet plug, and, simultaneously, another family member can use the USB port for a second computer.

Primary Line Support

By offering an Uninterruptible Power Supply (UPS) backup battery, the MSO allows the end user to place calls and receive calls through the Cisco CVA120 Series Cable Voice Adapter even though the power might be out. In the event of a power outage, the customer has phone service for two hours of continuous talk time or eight hours of stand-by. Additionally, the battery signals to the MSO if it needs service, so that the MSO can contact the customer to replace it. The battery also has an LED to alert the end customer if it is running low.

Plug-and-Play Registration

After the Cisco CVA120 Series Cable Voice Adapter is installed, it automatically registers itself on the network and retrieves an IP address. The cable voice adapter is easy to install and installs quickly, thus saving the MSO money.

Switched Interface

Because the USB and Ethernet can be configured as independent switched interfaces, consumers can protect their data. Where one user can access confidential information on a web site, the other user is incapable of interfering with that data. One end user could be on a corporate web site, while the other end user is in a chat room without compromising any corporate confidential information.

Investment Protection for the MSO

The MSO, knowing that Cisco supports the evolving standards, is able to offer new services. As the customer premises equipment (CPE) devices are roughly 50% of the network upgrade costs, the CPE has a software roadmap that supports new features and call controls. The Cisco CVA120 Series Cable Voice Adapter's hardware is designed with additional memory capacity that is adequate to plan for new features and call controls.

Restrictions

- Bridging support—The Cisco CVA120 Series Cable Voice Adapter interoperates with DOCSIS cable networks. Cisco IOS Release 12.1(5)XU2 does not support bridging traffic across a non-DOCSIS cable network.
- DOCSIS CLI commands removed—Cisco IOS Release 12.1(5)XU2 has removed a number of commands from the CLI to comply with DOCSIS requirements that restrict access to commands that change DOCSIS parameters. DOCSIS management can no longer be done using CLI commands.
- IP Address negotiation—The DOCSIS specifications require that a cable modem obtain its IP address at power-on or reset from a DHCP server that is available through the cable interface. For this reason, the Cisco CVA120 Series Cable Voice Adapter defaults to a configuration that uses the **ip address docsis** command for the cable interface. It is not possible to override this setting by specifying a specific static IP address. To assign a static IP address to the cable voice adapter, configure the DHCP server so that it assigns the desired IP address on the basis of the unit's MAC address.
- Using access lists 100, 101, and 102—Access lists 100, 101, and 102 are reserved for DOCSIS use and should never be configured manually on the Cisco CVA120 Series Cable Voice Adapter. Instead, use any access lists 103 through 199.
- Using multiple PCs—The MAX CPE parameter in a Cisco CVA120 Series Cable Voice Adapter's DOCSIS configuration file determines how many PCs (or other CPE devices) are supported by the cable voice adapter. The default value for the MAX CPE parameter is 1, which means that only one PC can be connected to the cable voice adapter.

  The DOCSIS 1.0 specification states that a CMTS cannot age-out MAC addresses for CPE devices, so the first PC that is connected to the Cisco CVA120 Series Cable Voice Adapter is normally the only one that the CMTS recognizes as valid. If a subscriber replaces an existing PC or changes its network interface card (NIC) to one that has a different MAC address, the CMTS does not allow the PC to come online because this exceeds the maximum number of CPE devices specified by the MAX CPE parameter. A similar result would occur if a user decides to move a PC from one Cisco CVA120 Series Cable Voice Adapter to another.

Related Documents

Refer to the following Cisco documents for related information. The documents can be found online at Cisco Connection Online (CCO) or on the Documentation CD-ROM. You can also order printed copies of most current documents.

Note The list that follows is not all-inclusive. New documents and revisions occur frequently.

Cisco CVA120 Series Cable Voice Adapter

- *Cisco CVA120 Series Cable Voice Adapter Hardware Installation Guide*
- *Cisco Cable CPE Error Messages*
- DOCSIS CPE Configurator help
- Release Notes for each release of Cisco IOS software for the Cisco CVA120 Series Cable Voice Adapter

CMTS Hardware Installation Publications

- *Cisco uBR7200 Series Universal Broadband Router Hardware Installation Guide*
- *Cisco uBR7200 Series Universal Broadband Router Software Configuration Guide*
- *Cisco uBR7200 Series Universal Broadband Router Cable Modem Card Installation and Configuration*
- *Cisco uBR7200 Series Universal Broadband Router Port Adapter Installation and Configuration*
- *Cisco uBR7200 Series Universal Broadband Router 550-Watt DC-Input Power Supply Replacement Instructions*
- *Cisco uBR7200 Series Universal Broadband Router Subchassis and Midplane Replacement Instructions*
- *Cisco uBR7200 Series Rack-Mount and Cable-Management Kit Installation Instructions*
- *Cisco uBR7200 Series Universal Broadband Router Fan Tray Replacement Instructions*
- *Cisco uBR7200 Series Universal Broadband Router Feature Enhancements*

Cisco IOS Publications

- *Cisco IOS Release 12.1 New Feature Documentation* for feature module descriptions on Cisco IOS Release 12.1-based releases
- *Cisco IOS Release 12.1 Configuration Guides and Command References* for task and command descriptions on Cisco IOS Release 12.1-based releases

Note Use the Cisco IOS Command Reference Master Indexes to obtain document pointers for specific software release feature sets and commands.

Configuration Editor and Network Management Publications

- *Cisco Cable Configuration Guide* for information on the Cisco Network Registrar (CNR) product
- CiscoView: Internetworking Device Monitoring and Management
- CiscoView Incremental Installation Quick Reference Guide
- CiscoWorks documentation for networks that use the Simple Network Management Protocol (SNMP) to monitor the Cisco CVA120 Series Cable Voice Adapters.

Subscriber Publications

- *Quick Start, Cisco CVA122/CVA122E Subscriber Setup* card
- *Cisco CVA122/CVA122E Quick Start User Guide*

Supported Platforms

Cisco CVA122 Cable Voice Adapter

Cisco CVA122E Cable Voice Adapter

Supported Standards, MIBs, and RFCs

Standards

The Cisco CVA120 Series Cable Voice Adapter supports the following Data-Over-Cable Service Interface Specifications (DOCSIS) standards:

- Baseline Privacy Interface Specification (SP-BPI-IO2-990319)
- Cable Modem to Customer Premise Equipment Interface Specification (SP-CMCI-I03-991115)
- Radio Frequency Interface Specification (SP-RFI-I05-991105)
- USB CM Interface Acceptance Test Plan (TP-USBATP-D01-990910)

Information about these specifications is available at the CableLabs web site at http://www.cablelabs.com.

MIBs

The Cisco CVA120 Series Cable Voice Adapter supports the following MIBS:

- Radio Frequency Interface MIBs—These MIBs are for DOCSIS-compliant radio frequency interfaces in cable modems and CMTS. This MIB includes support for the MIB attributes defined in RFC 2670.
- Cable device MIBs—These MIBs are for DOCSIS-compliant cable modems and CMTS to record statistics related to the configuration and status of the cable modem. These MIBs include support for the MIB attributes defined in RFC 2669.

Note The Cable Device MIB is very similar to the RFI MIB in that both allow access to cable-related statistics. However, the Cable Device MIB provides statistics on the cable modem, and the RFI MIB provides statistics on the radio frequency transmissions over the cable television line.

- Cisco standard MIBs—These MIBs are common across most of Cisco's router platforms. If your network management applications are already configured to support other Cisco routers, such as the Cisco 2600 series or Cisco 7200 series, no further configuration is needed unless the version of Cisco IOS software being used has updated these MIBs.
  - CISCO-PRODUCT-MIB
  - CISCO-SYSLOG-MIB
  - CISCO-FLASH-MIB
  - BRIDGE-MIB
  - IF-MIB
  - CiscoWorks/CiscoView support
  - SNMP standard MIBs—Required by any agent supporting SNMPv1 or SNMPv2 network management
- Uninterruptible Power Supply (UPS) and Power MIBs—These MIBs describe the Cisco CVA120 Series Cable Voice Adapter's onboard environmental monitor, which includes information about the status of the UPS and the power supply. The power and UPS attributes are described in the table, ciscoEnvMonSupplyStatusTable. To send a trap or interrupt request whenever the cable voice

adapter switches between its onboard AC power supply and the UPS, set the ciscoEnvMonEnableRedundantSupplyNotification attribute to “true” to enable the ciscoEnvMonRedundantSupplyNotification trap.

- Cable-specific MIBs—These MIBs provide information about the cable interface and related information on the Cisco CVA120 Series Cable Voice Adapter. They include both DOCSIS-required MIBs and Cisco-specific enterprise MIBs. If your network management applications have not already been configured for the cable voice adapter, these MIBs must be loaded.

  Table 1 shows the cable-specific MIBs that are supported on the Cisco CVA120 Series Cable Voice Adapter.

Table 1 Supported MIBs for the Cisco CVA120 Series Cable Voice Adapter

MIB Filename	Description
SNMPv2-SMI.my SNMPv2-SMI-V1SMI.my	This module specifies the Structure of Management Information (SMI) for SNMPv2, as defined in RFC 1902.
SNMPv2-TC.my SNMPv2-TC-V1SMI.my	This module defines the textual conventions as specified in pages 4, 10, and 11 of RFC 854.
CISCO-SMI.my CISCO-SMI-V1SMI.my	This module specifies the Structure of Management Information (SMI) for the Cisco enterprise MIBs.
CISCO-TC.my CISCO-TC-V1SMI.my	This module defines the textual conventions used in the Cisco enterprise MIBs.
IF-MIB.my IF-MIB-V1SMI.my	This module describes generic objects for the Layer 3 network interface sublayers. This MIB is an updated version of MIB-II’s *if* table, and incorporates the extensions defined in RFC 1229.
CISCO-CABLE-SPECTRUM-MIB.my CISCO-CABLE-SPECTRUM-MIB-V1SMI.my	This module describes the spectrum management flap list attributes.
DOCS-IF-MIB.my DOCS-IF-MIB-V1SMI.my	This module describes the DOCSIS-compliant Radio Frequency (RF) interfaces in cable modems and cable modem termination systems, as described in RFC 2670.
DOCS-BPI-MIB.my DOCS-BPI-MIB-V1SMI.my	This module describes the attributes for the DOCSIS-specified Baseline Privacy Interface (BPI) on cable modems and the CMTS.
CISCO-DOCS-EXT-MIB.my CISCO-DOCS-EXT-MIB-V1SMI.my	This module extends the DOCSIS standard RFI MIB (DOCS-IF-MIB) with Cisco-specific extensions, such as QoS attributes and connection status and other information regarding the cable modems and CPE devices supported by the CMTS.
DOCS-CABLE-DEVICE-MIB.my DOCS-CABLE-DEVICE-MIB-V1SMI.my	This module was previously known as the CABLE-DEVICE-MIB and contains cable-related objects for DOCSIS-compliant cable modems, as specified in RFC 2669.
USB-MIB.my	This module describes the cable voice adapter’s Universal Serial Bus (USB) interface and is based on an IETF draft (*draft-dolnik-usb-mib-02.txt*), which is available on the IETF web site at http://www.ietf.org/internet-drafts/.

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

The Cisco CVA120 Series Cable Voice Adapter supports the following Request for Comments (RFC) specifications:

- RFC 1229—Extensions to the Generic-Interface MIB
- RFC 1631—The IP Network Address Translator (NAT)
- RFC 1902—Structure of Management Information for Version 2 of the Simple Network Management Protocol (SNMPv2)
- RFC 2669—DOCSIS Cable Device MIB Cable Device Management Information Base for DOCSIS compliant Cable Modems and Cable Modem Termination Systems
- RFC 2670—DOCSIS Cable Device MIB Cable Device Management Information Base for DOCSIS compliant Cable Modems and Cable Modem Termination Systems

For more information on each RFC, see the IETF web site at http://www.ietf.org/rfc.

Prerequisites

Site Requirements

Before going to a subscriber site to install the Cisco CVA120 Series Cable Voice Adapter, verify that the following have been done:

- Ensure that a coaxial cable connection is run from the cable TV trunk to the subscriber building or residence.

Note Cisco recommends that a dedicated (new) CATV cable drop be run from the grounding block directly to the Cisco CVA120 Series Cable Voice Adapter. If such a drop is not available, careful qualification of existing cable is often necessary. Cable ground should be connected to the grounding system of the building or residence as close to the point of cable entry as practical and according to the local and national electrical regulations (for the United States, see the National Electrical Code Section 820-40 guidelines for proper grounding).

- Verify that each subscriber site is characterized at the headend to support upstream transmission, and meets DOCSIS upstream and downstream RF requirements. Observe procedures in the *NCTA Recommended Practises for Measurements on Cable Television Systems*. Also see the “Cabling” section of the *Cisco CVA122 Cable Voice Adapter Hardware Installation Guide*.
- Some sites specify that high pass filters must be installed on every tap drop that does not carry upstream data, voice, or IPPV services.

Note Installing a high pass filter between the Cisco CVA120 Series Cable Voice Adapter and the headend will prevent the cable voice adapter from connecting to the headend.

- Ensure that all required headend routing and network interface equipment is installed, configured, and operational. Ensure that DHCP, Cisco IOS images, and configuration files have been created and pushed to appropriate servers so that each Cisco CVA120 Series Cable Voice Adapter, when

initialized, can transmit a DHCP request, receive an IP address, obtain TFTP and TOD server addresses, and download a configuration file (and updated software image) in compliance with DOCSIS and the procedures in place for your network.

- Ensure that each subscriber site meets the operating requirements specified in the "Site Requirements" section of the *Cisco CVA122/CVA122E Hardware Installation Guide*.
- Ensure that all supported equipment at a subscriber site—PCs, telephones, modems, fax devices, and Ethernet hub—is installed and operational. Ensure telephones at subscriber sites support touch-tone (DTMF) dialing.
- Verify that all PCs at all subscriber locations meet the minimum computing requirements. If you are using USB connectivity, verify that the USB driver software has been installed; otherwise, verify that Internet connectivity is set for the Ethernet interface. See the "PC Subsystem" section of the *Cisco CVA122/CVA122E Cable Voice Adapter Hardware Installation Guide* for procedures to verify TCP/IP and DHCP PC settings when onsite.

  Each service provider has its own recommendations and requirements for the CPE devices that are connected to the network. However, at the very minimum a PC should meet the requirements listed in Table 2.

Table 2 PC Minimum Requirements for the Cisco CVA120 Series Cable Voice Adapter

	Ethernet Connectivity	USB Connectivity
Operating System[1]	Windows 95, Windows NT, Windows 98, Windows 98SE, Windows 2000	Windows 98, Windows 98, Windows 2000, Windows Millennium
Processor	33 MHz 486 processor (75 MHz Pentium or greater is recommended)	75 MHz 486 processor (Windows 98 and Windows 98SE) 150 MHz Pentium processor (Windows Millennium) 133 MHz Pentium processor (Windows 2000)
Memory	16 MB	24 MB (Windows 98 and Windows 98SE), 32MB (Windows Millennium), 128 MB (Windows 2000)
Internet Software	Internet browser	Internet browser
Networking Hardware	Ethernet network interface card (NIC)	USB-capable computer
Networking Cable	Straight-through 10Base T Ethernet cable with RJ-45 connectors[2]	Host-to-device USB cable (type "A" to type "B")
Networking Software	Ethernet software driver and TCP/IP networking software (typically supplied with the Ethernet network card)	USB software driver[2] and TCP/IP networking software
Configuration	DHCP enabled ("Obtain an IP address automatically")	DHCP enabled ("Obtain an IP address automatically")

1. The service provider might support other types of PCs and CPE devices for network connectivity. At the minimum, these CPE devices must meet the following requirements: 10Base T Ethernet connectivity, TCP/IP networking software, and the ability to obtain an IP address using the DHCP protocol.
2. Supplied with the Cisco CVA120 Series Cable Voice Adapter.

- Ensure that you bring sufficient cables to connect all devices at all subscriber locations. For simultaneous TV and computer usage at a subscriber site, obtain cable splitters and directional couplers as appropriate to install when you install the Cisco CVA120 Series Cable Voice Adapter.
- The Cisco CVA120 Series Cable Voice Adapter automatically obtains its IP address from the headend DHCP server at power-up. Typically, the PCs at the subscriber site are also configured to use DHCP to obtain their IP addresses. If this is not the case, obtain the static IP addresses for each PC from the applicable system administrator, along with the appropriate gateway and DNS information.
- If the cable voice adapter is being configured for VoIP services, obtain the phone numbers and IP addresses that the service provider has assigned to each of the voice ports on the Cisco CVA120 Series Cable Voice Adapter.

Environmental

Follow the operating and nonoperating environmental site requirements for operation of the Cisco CVA120 Series Cable Voice Adapter, as specified in the *Cisco CVA122/CVA122E Cable Voice Adapter Hardware Installation Guide.*

Power

Follow the recommendations for power supply and power cord described in the *Cisco CVA122 Cable Voice Adapter Hardware Installation Guide.* Verify that the power source is within the values outlined in Appendix A of the *Cisco CVA122/CVA122E Cable Voice Adapter Hardware Installation Guide.*

Cabling

Follow the recommendations for radio interference, coaxial cable quality, and distance limitations described in the “Cabling” section of the *Cisco CVA122/CVA122E Cable Voice Adapter Hardware Installation Guide.*

Configuration Tasks

This section describes the tasks that must be done to configure the Cisco CVA120 Series Cable Voice Adapter for normal operation as a DOCSIS-compliant cable modem. Because of DOCSIS regulations and because of the size of most cable modem networks, configuring the cable voice adapter is not normally done manually. Instead, the following configuration files are created and made available to the cable voice adapter on servers running at the headend, so that it can automatically configure itself at system power-on and reset. Each task in the list indicates if the task is optional or required.

- DHCP Server Configuration—The Cisco CVA120 Series Cable Voice Adapter obtains its IP address from a DHCP server at system power-on. (required)
- DOCSIS Configuration File—The Cisco CVA120 Series Cable Voice Adapter autoconfigures itself at system power-on by downloading a configuration file in the particular format required by the DOCSIS specifications. (required)
- Cisco IOS Configuration File and Commands—The Cisco CVA120 Series Cable Voice Adapter can optionally configure itself for additional features by downloading a Cisco IOS configuration file that contains CLI commands to be executed. (required for VoIP operations, IP routing mode, and Network Address Translation (NAT) capability).

DHCP Server Configuration

The DOCSIS specification (SP-RFI-IO5-991105 or later revision) requires that a DOCSIS-compliant cable modem connect to a DHCP server at power-on or reset to establish temporary IP connectivity with the cable network. This enables the cable modem to download the additional configuration information needed to establish a permanent connection with the headend and cable network.

The DHCP server can be a CMTS with DHCP server capabilities (such as a Cisco uBR7200 series universal broadband router), or it can be a dedicated server located at the headend. The server can be configured manually for each cable modem, or the server can be part of an automated provisioning system such as Cisco Network Registrar (CNR).

The DHCP server provides the information shown in Table 3 to each cable modem.

Note If the modem fails to obtain any of the information it is seeking, it displays an error messsage. All such messages are explained in the *Cisco Cable CPE Error Messages* book, viewable online at www.cisco.com/univercd/cc/td/doc/product/cable/cab_modm/ubcmerrs.pdf .

Table 3 DHCP Server Parameters

Parameter	Description
IP address for the cable modem's cable interface	This IP address typically is assigned dynamically but the service provider can also statically assign IP addresses on the basis of each modem's MAC address. **Note** When the cable voice adapter is in DOCSIS-bridging mode, it automatically assigns this IP address to both the cable and Ethernet interfaces. When the cable voice adapter is in routing mode, it assigns this IP address only to the cable interface; the IP address for the Ethernet interface must be configured separately.
IP subnet mask for the cable modem's cable interface	This subnet mask typically is used for all cable modems using the same downstream, but this depends on the setup of the CMTS network and subscribers' needs.
IP address for the TFTP server	This TFTP server provides the DOCSIS configuration file to the cable modem and is typically a dedicated server located at the headend.
IP address for the DHCP relay agent	A DHCP relay agent is required if the DHCP server is located on a network other than the IP address assigned to the cable modem's cable interface. The DHCP relay agent is also used if the DHCP server is providing IP addresses to the CPE devices that are connected to the cable modem and the CPE devices are on a subnet other than the cable modem.
Complete filename for the DOCSIS configuration file	This is the filename for the DOCSIS configuration file that the cable modem should download from the TFTP server.
IP address for one or more time of day (ToD) servers	The cable modem uses the ToD server to get the current date and time so that it can accurately timestamp its SNMP messages and error log entries.

Table 3 DHCP Server Parameters (continued)

Parameter	Description
One or more IP addresses for the gateways that will forward IP traffic from the cable modem	Typically, the CMTS acts as the default gateway for the cable modem. **Note** Typically, the DHCP server sets the default gateway for DOCSIS cable modems. When this is done on Cisco routers, the default gateway does not appear in the Cisco IOS configuration file, this indicates that the gateway is being set by the DHCP server and not by the configuration file. To display the default gateway, use the **show ip default-gateway** command.
One or more IP addresses for System Log (SYSLOG) servers	The cable modem can send its error log messages to the SYSLOG servers, which are optional and typically located at the headend.

After making a successful DHCP request, the cable modem contacts the ToD server to get the current date and time. The cable voice adapter also begins the TFTP download of the DOCSIS configuration file, which is described in the next section, “DOCSIS Configuration File.”

Note At this point in the registration process, the DHCP server provides an IP address only for the cable modem, not for the CPE devices it is connecting to the network.

DOCSIS Configuration File

The DOCSIS specification requires that a DOCSIS-compliant cable modem downloads a DOCSIS configuration file during its power-on or reset sequence. This file must be in the format described in the SP-RFI-IO5-991105 specification (or later revision) and must contain the information shown in Table 4.

Note The parameters shown in Table 4 are organized according to the categories used in the Cisco DOCSIS Cable Modem Configuration tool, which is available on CCO at http://www.cisco.com/support/toolkit/CableModem.

Table 4 DOCSIS Configuration File Parameters

Parameter[1]	Description
Radio Frequency Parameters	
Downstream Frequency	Specifies the center frequency (in multiples of 62500 Hz) for the downstream channel to be used by the cable voice adapter. (This parameter does not need to be specified in the configuration file because the cable voice adapter will scan the downstream for available frequencies, but it can be specified to ensure that the cable voice adapter conforms to the provider’s channel plan.)
Upstream Channel ID	Specifies channel ID for the upstream channel to be used by the cable voice adapter. (This parameter does not need to be specified in the configuration file because it can be set dynamically by the CMTS during provisioning.)

Table 4 DOCSIS Configuration File Parameters (continued)

Parameter[1]	Description
Network Access Configuration	Determines whether CPE devices attached to the cable modem are allowed access to the cable network. The default is to allow access for CPE devices (which is required for normal operations).
Class of Service	
Class of Service ID	Specifies the ID for this class of service (1 through 16).
Maximum Downstream Rate	Specifies the maximum downstream data rate (in bits/sec) allowed for traffic associated with this class of service. (This is a limit, not a guarantee of service.)
Maximum Upstream Rate	Specifies the maximum upstream data rate (in bits/sec) allowed for traffic associated with this class of service. (This is a limit, not a guarantee of service.)
Upstream Channel Priority	Specifies the priority for upstream traffic (0 through 7, where 7 is highest priority).
Minimum Upstream Rate	Specifies the minimum upstream data rate (in bits/sec) that is guaranteed for traffic associated with this class of service.
Maximum Upstream Channel Burst	Specifies the maximum size of burst traffic to be allowed on this upstream channel. The size is specified in bytes, 0 through 65535, where 0 is no limit. If this field is set to a nonzero value, it should be set to at least 1800 so that it is greater than the maximum Ethernet frame size of 1518 plus the associated packet overhead).
Class of Service Privacy Enable	Specifies whether BPI encryption should be enabled on traffic associated with this class of service (1 enables BPI encryption, 0 disables BPI encryption).
Vendor Specific Options	
Vendor ID	The three-byte Organization Unique Identifier for the vendor, which is also usually the first three bytes of the cable modem's MAC address. This value is usually expressed as a hexadecimal number. This field should be **00000C** for Cisco Systems equipment.
Vendor-Specific Options	Contains any arbitrary values that are defined by the manufacturer of the cable modem. The Cisco CVA120 Series Cable Voice Adapter uses this field to identify the Cisco IOS configuration file that should be downloaded (if any). Arbitrary Cisco IOS commands can also be specified in this field.
SNMP Management	
SNMP Write-Access Control and SNMP MIB Objects	Allows the service provider to set arbitrary SNMP attributes on the cable modem. For the Cisco CVA120 Series Cable Voice Adapter, these two fields are typically used to enable SNMP management of the cable voice adapter because SNMP management is disabled by default. **Note** If using the Cisco DOCSIS Cable Modem Configurator tool, you can enable SNMP management by filling in the IP address for the SNMP manager. The Configurator tool then prepares the proper MIB objects to enable SNMP access.
Baseline Privacy Interface Configuration	
Authorize Wait Timeout	Specifies the retransmission interval, in seconds, of Authorization Request messages from the Authorize Wait state. Valid values are 2 through 30 seconds.
Reauthorize Wait Timeout	Specifies the retransmission interval, in seconds, of Reauthorization Request messages from the Authorize Wait state. Valid values are 2 through 30 seconds.
Authorization Grace Timeout	Specifies the grace period for re-authorization, in seconds. Valid values are 1 through 1800 seconds.

Table 4 DOCSIS Configuration File Parameters (continued)

Parameter[1]	Description
Operational Wait Timeout	Specifies the retransmission interval, in seconds, of Key Requests from the Operational Wait state. Valid values are 1 through 10 seconds.
Rekey Wait Timeout	Specifies the retransmission interval, in seconds, of Key Requests from the Rekey Wait state. Valid values are 1 through 10 seconds.
TEK Grace Time	Specifies the grace period for re-keying, in seconds. Valid values are 1 through 1800 seconds.
Authorize Reject Wait Timeout	Specifies how long, in seconds, a cable modem waits in the Authorize Reject Wait state after receiving an Authorization Reject. Valid values are 60 through 1800 seconds.
Customer Premises Equipment	
Maximum Number of CPEs	Determines the maximum number of PCs and other CPE devices that can use the cable modem to connect to the cable network. The default value is 1. The Cisco CVA120 Series Cable Voice Adapter supports a maximum number of 254 CPE devices, but the CMTS can also impose its own limit on the number of CPE devices.
CPE Ethernet MAC Address	Configures the cable modem with the MAC addresses for one or more CPE devices that are allowed to connect to the cable network. Entering values in this field is optional because the cable modem can learn the MAC addresses of CPE devices dynamically, up to the maximum allowable number. However, DOCSIS cable modems give priority to the CPE devices whose MAC addresses are in the configuration file.
Software Upgrade	
TFTP Software Server IP Address	Specifies the IP address for the TFTP server that will provide software images. This server does not necessarily have to be the same TFTP server that provided the DOCSIS configuration file.
Software Image Filename	Specifies the fully qualified path name for the software image that the cable modem should be running. If necessary, the cable modem uses TFTP to download this image from the software server.
Miscellaneous	
Concatenation Support	Specifies whether the cable modem supports DOCSIS 1.1 concatenation of upstream packet requests.
Use RFC2104 HMAC-MD5	Specifies the algorithm used to compute the CMTS Message Integrity Check (MIC). If yes, the HMAC-MD5 algorithm specified in RFC 2104 is used; otherwise, the algorithm specified by RFC 1321 is used. (The algorithm used must match the one used on the CMTS.) **Note** Because the RFC 1321 algorithm can be reversed, Cisco strongly recommends the use of only the more secure HMAC-MD5 algorithm.

1. The DOCSIS configuration file also contains fields for one-way cable modems that use telco-return, but these fields do not apply to the Cisco CVA120 Series Cable Voice Adapter, which is a two-way cable modem.

Cisco IOS Configuration File and Commands

The DOCSIS configuration file uses the type 43 Vendor-Specific Options field to specify that the cable voice adapter should download a Cisco IOS configuration file. The Cisco IOS configuration file is an ASCII text file that contains the CLI commands needed to configure the Cisco CVA120 Series Cable Voice Adapter for advanced features that are not specified in the DOCSIS configuration file.

Downloading a Cisco IOS configuration file is not normally required for plug-and-play DOCSIS IP bridging. However, downloading a configuration file is required to configure the cable voice adapter for Voice over IP (VoIP) operations.

Table 5 shows the values that are entered in the Vendor-Specific Information Field (VSIF) to download a Cisco IOS configuration file.

Table 5 Downloading a Cisco IOS Configuration File

Field	Value
Subtype	128
Length	(number of characters in the filename)
Filename	Complete filename, including path, for the Cisco IOS configuration file on the TFTP servers specified in the DOCSIS configuration file. **Note** The Cisco IOS configuration file can contain only global configuration mode commands, not Privileged EXEC commands.

An optional way of configuring the Cisco CVA120 Series Cable Voice Adapter is to specify individual CLI commands as part of the VSIF field in the DOCSIS configuration file. Table 6 shows the values that are entered to specify a CLI command that should be executed after the cable voice adapter processes the DOCSIS configuration file and comes online.

Table 6 Specifying CLI Commands

Field	Value
Subtype	131
Length	(number of characters in the command)
CLI Command	The ASCII characters of one CLI global configuration command, as you would type it at the CLI prompt. To specify multiple commands, use this option once for each command. **Note** You can specify only global configuration mode commands, not Privileged EXEC commands, in this field.

Tip The VSIF option to include CLI commands in the DOCSIS configuration file should be used to specify a very limited number of commands for specialized applications. To perform a more substantial configuration of the cable voice adapter, use VSIF option 128 to download a Cisco IOS configuration file.

Configuration Examples

This section provides the following configuration examples:

- DOCSIS-Compliant IP Bridging (Data-Only Mode)
- Configuring for Routing Mode
- Configuring Routing with DHCP Server
- NAT/PAT Configuration
- H.323v2 Static Bridging Configuration
- H.323v2 Dynamic Mapping Configuration
- SGCP Configuration
- MGCP Configuration

DOCSIS-Compliant IP Bridging (Data-Only Mode)

The DOCSIS-compliant IP bridging mode configures the Cisco CVA120 Series Cable Voice Adapter for data-only connection to the cable network and Internet. This is the default configuration.

```
version 12.1
service config
no service pad
service timestamps debug uptime
service timestamps log uptime
no service password-encryption
!
hostname cva120
!
clock timezone - 4
ip subnet-zero
no ip routing
!
voice-port 0
 input gain -2
!
voice-port 1
 input gain -2
!
interface Ethernet0
 ip address negotiated
 no ip directed-broadcast
 no ip route-cache
 bridge-group 59
 bridge-group 59 spanning-disabled
!
interface cable-modem0
 ip address docsis
 no ip directed-broadcast
 no ip route-cache
 no ip mroute-cache
 bridge-group 59
 bridge-group 59 spanning-disabled
!
interface USB0
 ip address negotiated
 no ip route-cache
 no ip mroute-cache
```

```
 arp timeout 0
 bridge-group 59
 bridge-group 59 spanning-disabled
!
ip classless
no ip http server
no ip http cable-monitor
no service finger
!
!
line con 0
 transport input none
line vty 0 4
!
end
```

This configuration example shows the following requirements for DOCSIS-compliant bridging:

- IP routing is disabled.
- No IP address is assigned to the cable interface; instead, the **ip address docsis** command indicates that a DHCP server assigns an IP address to the cable interface. The Ethernet and USB interfaces use the same IP address because the cable voice adapter is acting as a bridge between the different interfaces, making them part of the same IP network. When the cable voice adapter is in DOCSIS-bridging mode, the IP addresses are automatically assigned during the provisioning process.

Configuring for Routing Mode

The Cisco CVA120 Series Cable Voice Adapter must be configured for routing mode to use advanced features. The routing mode is also required if the PCs attached to the cable voice adapter are on a private network or on a different subnet than the subnet used by the CMTS.

The following steps are required to configure routing mode on the Cisco CVA120 Series Cable Voice Adapter:

- Disable DOCSIS/EuroDOCSIS-compliant bridging on the cable interface with the **no cable modem compliant bridge** interface command.
- Remove the bridge group on the cable and Ethernet interfaces with the **no bridge group** interface command.
- Configure the RIPv2 routing protocol (or static routes) on the cable and Ethernet interfaces.

To configure the Cisco CVA120 Series Cable Voice Adapter, log in to the router, enter global configuration mode, and enter the following commands:

	Command	Purpose
Step 1	cva120(config)# **int c 0**	Enter interface configuration mode for the cable interface.
Step 2	cva120(config-if)# **no cable-modem compliant bridge**	Disable DOCSIS/EuroDOCSIS-compliant bridging.
Step 3	cva120(config-if)# **no bridge group** *number*	Remove the bridge group.
Step 4	cva120(config-if)# **ip address docsis**	Configure the cable interface to receive an IP address from the DHCP server.
Step 5	cva120(config-if)# **exit**	Return to global configuration mode.

	Command	Purpose
Step 6	cva120(config)# **int e 0**	Enter interface configuration mode for Ethernet 0.
Step 7	cva120(config-if)# **no bridge group** *number*	Remove the bridge group.
Step 8	cva120(config-if)# **ip address** *ip-address subnet-mask*	Enter the Ethernet interface's IP address and subnet mask.
Step 9	cva120(config-if)# **exit**	Return to global configuration mode.
Step 10	cva120(config)# **int usb 0**	Enter interface configuration mode for USB 0.
Step 11	cva120(config-if)# **no bridge group** *number*	Remove the bridge group.
Step 12	cva120(config-if)# **ip address** *ip-address subnet-mask*	Enter the USB interface's IP address and subnet mask.
Step 13	cva120(config-if)# **exit**	Return to global configuration mode.
Step 14	cva120(config)# **ip routing**	Enable IP routing for the router.
Step 15	**To use RIPv2:**	
	cva120(config)# **router rip**	Enter router configuration mode.
	cva120(config-router)# **version 2**	Enable RIP version 2 routing.
	cva120(config-router)# **network** *cable-network-number*	Enable routing on the cable interface's IP network.
	cva120(config-router)# **network** *Ethernet-network-number*	Enable routing on the Ethernet interface's IP network.
	cva120(config-router)# **network** *USB-network-number*	Enable routing on the USB interface's IP network.
	cva120(config-router)# **exit**	Return to global configuration mode.
Step 16	cva120(config)# **no cdp run**	(Optional) Disable the Cisco Discovery Protocol (CDP) on the router. CDP is a proprietary protocol for the discovery of Cisco routers running protocols other than TCP/IP; because DOCSIS cable data networks are primarily TCP/IP networks, CDP is not necessary on the cable voice adapter.
Step 17	cva120(config)# **ip default-gateway** *ip-address*	Set the default gateway for routing (typically, this is the CMTS).
Step 18	cva120(config)# **ip classless**	(Optional) Enable the forwarding of packets that are destined for unrecognized subnets to the best supernet route.
Step 19	cva120(config)# **ip route 0.0.0.0 0.0.0.0** *ip-address*	(Optional) Establish a static route so that all packets without an established route are forwarded to the default gateway (typically the *ip-address* should be the IP address for the CMTS), regardless of any routing metrics.
Step 20	cva120(config-if)# **Ctrl-z**	Return to privileged EXEC mode.
Step 21	cva120# **copy running-config startup-config** Building configuration...	Save the configuration to nonvolatile memory so that it will not be lost in the event of a reset, power cycle, or power outage.
Step 22	cva120# **show startup-config**	Display the configuration file that was just created.

To verify that routing is enabled, enter the **show startup-config** command. The following example shows a sample configuration file for basic data-only routing mode; the relevant commands are shown in bold.

```
version 12.1
service config
no service pad
service timestamps debug uptime
service timestamps log uptime
no service password-encryption
!
hostname Router
!
clock timezone - 4
ip subnet-zero
!
voice-port 0
!
voice-port 1
!
interface Ethernet0
 ip address 172.16.10.1 255.255.255.0
 no ip directed-broadcast
 ip rip send version 2
 ip rip receive version 2
!
interface USB0
 ip address 172.16.20.1 255.255.255.0
 no ip directed-broadcast
 ip rip send version 2
 ip rip receive version 2
!
interface cable-modem0
 ip address docsis
 no ip directed-broadcast
 ip rip send version 2
 ip rip receive version 2
 no cable-modem compliant bridge
!
 router rip
 version 2
 network 10.0.0.0
 network 172.16.10.0
 network 172.16.20.0
!
ip classless
no ip http server
no service finger
!
!
line con 0
 transport input none
line vty 0 4
!
end
```

Note The previous configuration assumes that the DHCP server assigns an IP address to the cable interface that is in the class A private network (10.0.0.0).

Configuring Routing with DHCP Server

When in routing mode, the Cisco CVA120 Series Cable Voice Adapter can act as a DHCP server for the CPE devices it is connecting to the cable network. A service provider then does not have to be concerned about providing IP addresses to all of the PCs at a subscriber's site. Instead, the provider supplies a pool of IP addresses that the cable voice adapter then allocates to the PCs as needed.

Note The Cisco CVA120 Series Cable Voice Adapter must be configured for routing mode to act as a DHCP server. If in bridging mode, you can configure the router to proxy DHCP client requests to the DHCP server at the headend by giving the **cable helper-address** *dhcp-server-ip-address* **host** interface configuration command. (The **ip helper-address** and **ip forward-protocol** interface configuration commands can also be used for this purpose.)

To configure the Cisco CVA120 Series Cable Voice Adapter to act as a DHCP server, log in to the router, enter global configuration mode, and enter the following commands:

	Command	Purpose
Step 1	cva120(config)# **ip dhcp pool** *pool-name*	Create an address pool for the DHCP server named *pool-name* and enter DHCP configuration mode.
Step 2	cva120(config-dhcp)# **network** *IP-network-number subnet-mask*	Specify the network number and subnet mask for the IP address pool. These IP addresses should be part of the subnet provided by the CMTS cable interface. For example, **network 10.17.91.0 255.255.255.0** reserves the IP addresses 10.17.91.1–10.17.91.254 for CPE devices.
Step 3	cva120(config-dhcp)# **domain-name** *domain-name*	The domain name that should be assigned to CPE devices (for example, **cisco.com**).
Step 4	cva120(config-dhcp)# **dns-server** *ip-address*	The IP address for the DNS server provided by the service provider that will service the DNS requests from the CPE devices. More than one DNS server can be specified.
Step 5	cva120(config-dhcp)# **default-router** *ip-address*	The IP address for the default router for the CPE devices (typically, this is the CMTS). More than one default router can be specified.
Step 6	cva120(config-dhcp)# **exit**	Return to global configuration mode.
Step 7	cva120# **show startup-config**	Display the configuration file that was just created.

To verify that the DHCP server is enabled, enter the **show startup-config** command. A sample configuration file for a Cisco CVA120 Series Cable Voice Adapter acting as a DHCP server is displayed below. The relevant commands are shown in bold.

```
version 12.1
service config
no service pad
service timestamps debug uptime
service timestamps log uptime
no service password-encryption
!
hostname Router
!
clock timezone - 4
ip subnet-zero
```

```
!
ip dhcp pool Clients
 network 192.168.100.0 255.255.255.0
 domain-name cisco.com
 dns-server 192.168.100.17
 default-router 192.168.101.1
!
voice-port 0
!
voice-port 1
!
interface Ethernet0
 ip address 192.168.100.1 255.255.0.0
 no ip directed-broadcast
 ip rip send version 2
 ip rip receive version 2
!
interface USB0
 shutdown
!
interface cable-modem0
 ip address docsis
 no ip directed-broadcast
 ip rip send version 2
 ip rip receive version 2
 no cable-modem compliant bridge
!
 router rip
 version 2
 network 10.0.0.0
 network 192.168.100.0
!
ip classless
no ip http server
no service finger
!
!
line con 0
 transport input none
line vty 0 4
!
end
```

Note The previous configuration assumes that the DHCP server assigns an IP address to the cable interface that is in the class A private network (10.0.0.0).

NAT/PAT Configuration

All Cisco IOS images for the Cisco CVA120 Series Cable Voice Adapter support both Network Address Translation (NAT) and Port Address Translation (PAT). This allows a private network that is connected to the cable voice adapter to use the same IP address when communicating through the cable interface to the Internet or other public networks.

With the Cisco CVA120 Series Cable Voice Adapter, the “inside” network is the private network connected to the cable voice adapter’s Ethernet interface, and the “outside” network is the network accessed through the cable network (such as the Internet or a company Intranet). The inside addresses are translated to an external IP address that is valid in the outside network.

Note NAT/PAT is not typically used for an USB interface because only one computer can be connected through the USB interface.

The following commands show a typical configuration:

	Command	Purpose
Step 1	cva120(config)# **ip nat inside source list** *list-id* **interface cable-modem0 overload**	Enable translation of the inside source addresses—the "inside" addresses are translated before being presented to the "outside" network. The *list-id* specifies an access-list that defines the IP addresses that will be used, and **overload** specifies that multiple inside IP addresses can use the same outside IP address (but using different port numbers to unique identify each inside host).
Step 2	cva120(config)# **interface Ethernet0**	Enter interface configuration mode for the cable voice adapter's Ethernet interface.
Step 3	cva120(config-if)# **ip nat inside**	Specify that the Ethernet is the "inside" of the NAT/PAT translation.
Step 4	cva120(config-if)# **exit**	Exit interface configuration mode.
Step 5	cva120(config)# **interface cable-modem0**	Enter interface configuration mode for the cable voice adapter's cable interface.
Step 6	cva120(config-if)# **ip nat outside**	Specify that the cable interface is the "outside" of the NAT/PAT translation.
Step 7	cva120(config-if)# **exit**	Exit interface configuration mode.
Step 8	cva120(config)# **access-list** *list-id* **permit any**	Create the access list specified by the *list-id* parameter in the **ip nat inside source** command. (This particular example specifies that all IP addresses should be accepted; the filter can be as complex as needed to include or exclude any combination of IP addresses.)
Step 9	cva120# **copy running-config startup-config** Building configuration...	Save the configuration to nonvolatile memory so that it will not be lost in the event of a reset, power cycle, or power outage.
Step 10	cva120# **show startup-config**	Display the configuration file that was just created.

Note Additional options, such as static IP address translation, are possible when using NAT/PAT. For more information about the Easy IP and NAT/PAT feature set, see the *Dial-Related Addressing Services* documentation, available on CCO and the Documentation CD-ROM.

The following configuration shows an example of a Cisco CVA120 Series Cable Voice Adapter that performs NAT/PAT translation on all IP addresses connected to the cable voice adapter's Ethernet interface. The external IP address is overloaded so that multiple IP addresses on the internal network can use the same IP address over the cable interface; different port numbers are used to uniquely identify each device on the Ethernet interface. The relevant commands are shown in bold.

```
version 12.1
```

```
no service pad
service timestamps debug uptime
service timestamps log uptime
no service password-encryption
!
hostname cva120
!
!
voice-port 0
 input gain -2
!
voice-port 1
 input gain -2
!
ip nat inside source list 1 interface cable-modem0 overload
clock timezone - -4
!
!
interface Ethernet0
 ip address negotiated
! This example assumes an IP address of “10.1.1.1 255.255.255.0”
 ip nat inside
 no ip route-cache
 bridge-group 59
 bridge-group 59 spanning-disabled
!
interface cable-modem0
 ip address docsis
 ip nat outside
 no keepalive
 no ip route-cache
 bridge-group 59
 bridge-group 59 spanning-disabled
!
interface USB0
 ip address negotiated
 no ip route-cache
 no ip mroute-cache
 arp timeout 0
 bridge-group 59
 bridge-group 59 spanning-disabled
!
ip default-gateway 192.168.100.2! This value is set by the DHCP server
ip classless
no ip http server
no ip http cable-monitor
no service finger
ip route 0.0.0.0 0.0.0.0 192.168.100.2
access-list 1 permit any
!
!
line con 0
line vty 0 4
 login
!
end
```

Note This configuration assumes that the DHCP server assigns an IP address to the cable interface that is in the class C private network (192.168.100.0).

H.323v2 Static Bridging Configuration

The Cisco CVA120 Series Cable Voice Adapter can support voice calls using an H.323v2 static dialing map. This requires the following minimum configuration:

- Create a local dial peer for each voice port that will receive incoming calls. This requires configuring each voice port on the cable voice adapter with the phone numbers for the devices attached to those voice ports. The Cisco CVA120 Series Cable Voice Adapter uses these numbers to determine which voice port should receive the call. Typically, the complete phone number or extension is specified for each port. When the cable voice adapter receives an incoming call, all digits in the number are matched and stripped off, and the voice port is connected to the call.

Note The voice ports on the Cisco CVA120 Series Cable Voice Adapter support only FXS devices.

- Configure a remote dial peer for each possible destination for outgoing calls. This requires specifying the phone numbers for the destination devices. Use the following guidelines for what numbers to enter:
  - For a single telephony device, such as a one-line phone or fax machine, enter the complete phone number or extension.
  - To direct a group of numbers to a specific destination—such as the extensions used on a remote PBX—enter a pattern matching the prefix used for those lines; an asterisk (*) matches any number of digits and a period (.) matches a single digit. For example, "**572***" matches any phone numbers starting with 572, but "**572.**" matches only the numbers 5720–5729.

  You must also specify the IP address for the destination host that will deliver the call to the telephony device (or if the destination device is an IP telephone, the IP address for that telephone). You can optionally specify an IP precedence level for the type of service (ToS) bits in the IP header to signify that these voice packets should be given higher priority in transit across the IP network.

  You can also specify which coding/decoding (codec) algorithm should be used if it is not being done by the CoS.

These functions are done using the **dial-peer** command, as shown in the following table:

	Command	Purpose
Step 1	**To configure incoming calls on the voice ports:** cva120(config)# **dial-peer voice** *id-number* **pots**	**Repeat this sequence for each voice port.** Specify a unique *id-number* for this incoming dial-peer and enter dial-peer configuration mode.
Step 2	cva120(config-dial-peer)# **destination-pattern** *digits*	Specify the telephone numbers associated with this voice port.
Step 3	cva120(config-dial-peer)# **port** [**0** | **1**]	Specify the voice port that is attached to this telephony equipment: **0** (V1), **1** (V2).
Step 4	cva120(config-dial-peer)# **dtmf-relay** [**cisco-rtp**] [**h245-signal**] [**h245-alphanumeric**]	Optionally configure the dial peer to support out of band signaling of DTMF tones.
Step 5	cva120(config-dial-peer)# **exit**	Exit dial-peer configuration mode.
Step 6	**Repeat through Step 12 for each possible outgoing destination:** cva120(config)# **dial-peer voice** *id-number* **voip**	Specify a unique *id-number* for this outgoing dial-peer and enter dial-peer configuration mode.
Step 7	cva120(config-dial-peer)# **destination-pattern** *digits*	Specify the telephone numbers associated with this dial-peer.

	Command	Purpose
Step 8	cva120(config-dial-peer)# **session target** [**ipv4:***ipaddress* | **dns:***hostname*]	Specify the destination IP address or hostname for this dial-peer. This could be the IP address or hostname for either an IP telephone or another router or host providing voice services.
Step 9	cva120(config-dial-peer)# **ip precedence** *number*	(Optional) Specify an IP packet precedence level (1 through 5) for packets carrying calls to this dial peer (1 through 5, where 5 is the highest precedence for normal IP flows).
Step 10	cva120(config-dial-peer)# **code** [**g711alaw** | **g711ulaw** | **g729r8** | **g728**]	(Optional) Specify the codec algorithm to be used for these calls. The default is g729r8 (8Kbps compression; A-Law and Mu-Law are 64Kbps compression); g728 specifies G.728 (16 Kbps compression) and is not available in all images.
Step 11	cva120(config-dial-peer)# **dtmf-relay** [**cisco-rtp**] [**h245-signal**] [**h245-alphanumeric**]	Optionally configure the dial peer to support out of band signaling of DTMF tones.
Step 12	cva120(config-dial-peer)# **exit**	Exit dial-peer configuration mode.
Step 13	cva120# **copy running-config startup-config** Building configuration...	Save the configuration to nonvolatile memory so that it will not be lost in the event of a reset, power cycle, or power outage.
Step 14	cva120# **show startup-config**	Display the configuration file that was just created.

Note The ID numbers assigned using the **dial-peer voice** command must be unique but they are local to the Cisco CVA120 Series Cable Voice Adapter. These numbers are used only when you configure each particular dial peer and have no meaning when dialing numbers or routing calls are done.

The following example shows a Cisco CVA120 Series Cable Voice Adapter set up to support bridging and a static H.323 dial map with the following characteristics:

- Voice port V1 is connected to a telephony device that receives calls for the number 4123.
- Voice port V2 is connected to a telephony device that receives calls for the number 4124.
- Outgoing calls to the numbers 6000 through 6999 are routed to the dial peer at IP address 10.1.71.65.
- Outgoing calls to the numbers 7000 through 7999 are routed to the dial peer at IP address 10.1.71.75. These calls are sent with an IP ToS precedence of “5” and use the G.711 Mu-law codec algorithm. The commands that set up the H.323v2 dial map are shown in bold:

```
version 12.1
no service pad
service timestamps debug uptime
service timestamps log uptime
no service password-encryption
!
hostname cva120
!
clock timezone - 3
ip subnet-zero
no ip routing
!
!
voice-port 0
```

```
 input gain -2
!
voice-port 1
 input gain -2
!
dial-peer voice 1 pots
 destination-pattern 4123
 port 0
!
dial-peer voice 2 pots
 destination-pattern 4124
 port 1
!
dial-peer voice 1001 voip
 destination-pattern 6...
 session target ipv4:10.1.71.65
 dtmf-relay cisco-rtp h245-signal h245-alphanumeric
!
dial-peer voice 1002 voip
 destination-pattern 7...
 ip precedence 5
 codec g711ulaw
 session target ipv4:10.1.71.75
 dtmf-relay cisco-rtp h245-signal h245-alphanumeric
!
!
interface Ethernet0
 no ip directed-broadcast
 no ip route-cache
 bridge-group 59
 bridge-group 59 spanning-disabled
!
interface cable-modem0
 ip address docsis
 no ip directed-broadcast
 no ip route-cache
 cable-modem downstream saved channel 537000000 26
 bridge-group 59
 bridge-group 59 spanning-disabled
!
interface USB0
 ip address negotiated
 no ip route-cache
 no ip mroute-cache
 arp timeout 0
 bridge-group 59
 bridge-group 59 spanning-disabled
!
ip classless
no ip http server
no ip http cable-monitor
no service finger
!
line con 0
 exec-timeout 0 0
 transport input none
line vty 0 4
 login
end
```

H.323v2 Dynamic Mapping Configuration

The Cisco CVA120 Series Cable Voice Adapter supports using the Registration, Admission, and Status (RAS) protocol to allow a remote gatekeeper to translate phone numbers (E.164 addresses) to the IP addresses of specific dial peers. This allows the gatekeeper to maintain a central database of dial peers, so that this information does not have to be entered into static dial maps on every router that is acting as a voice gateway.

The example shown in this section assumes that Cisco Network Registrar (CNR) Version 3.0 or higher is being used as the DHCP server. CNR assigns the E.164 addresses to local voice ports and uses DHCP to define the E.164 addresses-to-port assignments.

The gatekeeper can be a Cisco router, such as the Cisco 3620, with a Cisco IOS image that supports the gatekeeper function. The Cisco CVA120 Series Cable Voice Adapter acts as the H.323v2 gateway and creates the dial peers, starts H.323 RAS gateway support, and registers the E.164 addresses with the gatekeeper. The gatekeeper resolves the remote peers' IP addresses when the cable voice adapter sends a request using RAS.

Note Support for RAS and H.323v2 in Cisco gatekeeper products is found in Cisco IOS Release 12.0(5)T or higher. Support for multiple classes of service when using Cisco CMTS equipment is found in Cisco IOS Release 12.0(4)XI or higher.

If you are not using CNR or Cisco gatekeeper products running Cisco IOS Release 12.0(5)T software, use a static dial-map as shown in the "H.323v2 Static Bridging Configuration" section on page 32.

You must do the following to configure the Cisco CVA120 Series Cable Voice Adapter for dynamic mapping:

- Configure the local dial-peers—This is done in the same way as for a static H.323v2 dial map.
- Configure the remote dial-peers—This is done in the same way as for a static H.323v2 dial map, except that instead of specifying a target IP address or host name, you specify **ras** as the target.
- Enable the VoIP gateway function using the **gateway** global configuration command.
- Configure the cable modem interface to be the gateway interface.

These functions are done using the commands shown in the following table:

	Command	Purpose
Step 1	**To configure incoming calls on the voice ports:** cva120(config)# **dial-peer voice** *id-number* **pots**	**Repeat this sequence for each voice port.** Specify a unique *id-number* for this incoming dial-peer and enter dial-peer configuration mode.
Step 2	cva120(config-dial-peer)# **destination-pattern** *digits*	Specify the telephone numbers associated with this voice port.
Step 3	cva120(config-dial-peer)# **port** [**0** |**1**]	Specify the voice port that is attached to this telephony equipment: **0** (V1), **1** (V2).
Step 4	cva120(config-dial-peer)# **dtmf-relay** [**cisco-rtp**] [**h245-signal**] [**h245-alphanumeric**]	Optionally configure the dial peer to support out of band signaling of DTMF tones.
Step 5	cva120(config-dial-peer)# **exit**	Exit dial-peer configuration mode.

	Command	Purpose
Step 6	**Configure the possible outgoing destinations:** cva120(config)# **dial-peer voice** *id-number* **voip**	**Repeat through Step 10 for each possible outgoing destination:** Specify a unique *id-number* for this outgoing dial-peer and enter dial-peer configuration mode.
Step 7	cva120(config-dial-peer)# **destination-pattern** *digits*	Specify the telephone numbers associated with this dial-peer.
Step 8	cva120(config-dial-peer)# **session target ras**	Specify that RAS will be used to resolve the destination for the dial-peer.
Step 9	cva120(config-dial-peer)# **dtmf-relay** [**cisco-rtp**] [**h245-signal**] [**h245-alphanumeric**]	Optionally configure the dial-peer to support out of band signaling of DTMF tones.
Step 10	cva120(config-dial-peer)# **exit**	Exit dial-peer configuration mode.
Step 11	cva120(config)# **gateway**	Enable the VoIP gateway on the Cisco CVA120 Series Cable Voice Adapter.
Step 12	cva120(config)# **interface cable-modem 0**	Enter interface configuration mode for the cable interface.
Step 13	cva120(config-if)# (enter appropriate cable interface configuration commands)	Enter whatever commands are needed to configure the cable interface such as IP address, downstream channel, whether DOCSIS-bridging is enabled, and so forth.
Step 14	cva120(config-if)# **h323-gateway voip interface**	Specify that the cable interface is the H.323 Gateway VoIP interface.
Step 15	cva120(config-if)# **h323-gateway voip id** *gatekeeper-id* **ipaddr** *IP-address port-number*	Identify the RAS gatekeeper by specifying its gatekeeper ID (which must match the ID configured on the gatekeeper), its IP address, and the port number which services gateway requests.
Step 16	cva120(config-if)# **h323-gateway voip h323-id** *interface-id*	Specify the H.323 ID for this interface. This ID is any string that uniquely identifies this gateway to the gatekeeper. Typically, this is the gateway's name and domain (such as **cva122@cisco.com**).
Step 17	cva120(config-if)# **h323-gateway voip tech-prefix** *prefix*	(Optional) Specify a technology prefix to identify the type of service this gateway can provide. If more than one service is being provided, give this command for each separate technology prefix. (The prefix is defined at the gatekeeper and can be up to 11 characters long, with the pound sign (#) as the last character.)
Step 18	cva120(config-if)# **exit**	Exit interface configuration mode.
Step 19	cva120# **copy running-config startup-config** Building configuration...	Save the configuration to nonvolatile memory so that it will not be lost in the event of a reset, power cycle, or power outage.
Step 20	cva120# **show startup-config**	Display the configuration file that was just created.

Note For additional information on the gateway configuration commands, see the document *Configuring H.323 VoIP Gateway for Cisco Access Platforms*, available on CCO and the Document CD-ROM.

The following configuration shows a Cisco CVA120 Series Cable Voice Adapter configured for routing mode and using RAS dynamic mapping with the following characteristics:

- The cable voice adapter's V1 voice port is connected to a telephone or fax machine with the number 1000, and the V2 voice port is connected to a telephone or fax machine with the number 1001.
- Four remote dial-peers are configured, with the numbers 1000, 1001, 2000, and 2001. All use the G.711 Mu-Law CODEC and the RAS protocol is used to resolve their number-address mapping.
- The cable interface is configured as the gatekeeper interface, using the gatekeeper named **gatekeeper3620** at the IP address **10.1.70.50** and at port **1719**. The cable voice adapter identifies itself as the gateway named **cva120** with a tech-prefix of **1#**.

The commands related to the dial mapping are in bold.

```
version 12.2
service config
no service pad
service timestamps debug uptime
service timestamps log uptime
no service password-encryption
!
hostname cva120
!
clock timezone - 4
ip subnet-zero
ip host-routing
!
voice-port 0
 input gain -2
!
voice-port 1
 input gain -2
!
dial-peer voice 1 pots
 destination-pattern 1000
 port 0
!
 dial-peer voice 2 pots
 destination-pattern 1001
 port 1
!
dial-peer voice 10 voip
 destination-pattern 1001
 codec g711ulaw
 session target ras
!
dial-peer voice 20 voip
 destination-pattern 1000
 codec g711ulaw
 session target ras
!
dial-peer voice 30 voip
 destination-pattern 2000
 codec g711ulaw
 session target ras
!
dial-peer voice 40 voip
 destination-pattern 2001
 codec g711ulaw
session target ras
!
gateway
!
```

```
!
interface Ethernet0
 ip address negotiated
 no ip directed-broadcast
 no ip route-cache
 no ip mroute-cache
 bridge-group 59
 bridge-group 59 spanning-disabled
!
interface cable-modem0
 ip address docsis
 no ip directed-broadcast
 no ip route-cache
 no ip mroute-cache
 no keepalive
 h323-gateway voip interface
 h323-gateway voip id gatekeeper3620 ipaddr 10.1.70.50 1719
 h323-gateway voip h323-id cva120
 h323-gateway voip tech-prefix 1#
 bridge-group 59
 bridge-group 59 spanning-disabled
!
interface USB0
 ip address negotiated
 no ip route-cache
 no ip mroute-cache
 arp timeout 0
 bridge-group 59
 bridge-group 59 spanning-disabled
!
ip classless
no ip http server
no ip http cable-monitor
no service finger
!
!
line con 0
 transport input none
line vty 0 4
!
end
```

Note This configuration assumes that the DHCP server assigns an IP address to the cable interface that is in the class A private network (10.0.0.0).

SGCP Configuration

The Cisco CVA120 Series Cable Voice Adapter can use the SGCP protocol for routing voice calls. This transfers the dial mapping to an external call agent, so that the VoIP gateways do not have to be individually configured with the dial mappings.

You must do the following to configure the Cisco CVA120 Series Cable Voice Adapter for a dynamic mapping configuration:

- Enable SGCP operation on the Cisco CVA120 Series Cable Voice Adapter.
- Specify the SGCP call agent's IP address.
- Configure the local dial-peers to be SGCP applications.
- Optionally enable the sending of SNMP traps for SGCP.

Note You do not need to configure remote dial-peers when you are using SGCP.

The configuration functions are done using the commands shown in the following table:

	Command	Purpose
Step 1	**To configure incoming calls on the voice ports:** cva120(config)# **dial-peer voice** *id-number* **pots**	**Repeat this sequence for each voice port.** Specify a unique *id-number* for this incoming dial-peer and enter dial-peer configuration mode.
Step 2	cva120(config)# **application SGCPAPP**	Specify that this dial-peer is handled as an SGCP application.
Step 3	cva120(config-dial-peer)# **destination-pattern** *digits*	Specify the telephone numbers associated with this voice port.
Step 4	cva120(config-dial-peer)# **port [0** | **1**]	Specify the voice port that is attached to this telephony equipment: **0** (V1), **1** (V2).
Step 5	cva120(config-dial-peer)# **exit**	Exit dial-peer configuration mode.
Step 6	cva120(config)# **sgcp**	Enable SGCP operations on the cable voice adapter.
Step 7	cva120(config)# **sgcp call-agent** *ip-address* [*port*]	Specify the IP address and optional UDP port number for the SGCP call-agent. If no port number is given, the default of 2427 (the well-known SGCP port number) is used.
Step 8	cva120(config)# **snmp-server enable traps xgcp**	(Optional) If SNMP management is used for this router, specify that SGCP and related traps be sent to the SNMP manager.
Step 9	cva120# **copy running-config startup-config** Building configuration...	Save the configuration to nonvolatile memory so that it will not be lost in the event of a reset, power cycle, or power outage.
Step 10	cva120# **show startup-config**	Display the configuration file that was just created.

The following configuration shows a Cisco CVA120 Series Cable Voice Adapter that uses SGCP for the routing of its voice calls. Two voice ports are defined. The relevant commands are shown in bold.

```
version 12.1
no service pad
service timestamps debug uptime
service timestamps log uptime
no service password-encryption
!
hostname cva120
!
!
clock timezone - 0 6
ip subnet-zero
no ip routing
ip domain-name cisco.com
ip name-server 4.0.0.32
!
sgcp
sgcp call-agent 10.186.1.36
!
xgcp snmp sgcp
```

```
!
!
voice-port 0
 input gain -2
!
voice-port 1
 input gain -2
!
dial-peer voice 100 pots
 application SGCPAPP
 destination-pattern 5551212
 port 0
!
dial-peer voice 101 pots
 application SGCPAPP
 destination-pattern 5551213
 port 1
!
process-max-time 200
!
interface Ethernet0
 no ip directed-broadcast
 no ip route-cache
 no ip mroute-cache
 bridge-group 59
 bridge-group 59 spanning-disabled
!
interface cable-modem0
 ip address docsis
 no ip directed-broadcast
 no ip route-cache
 no ip mroute-cache
 cable-modem downstream saved channel 699000000 27
 bridge-group 59
 bridge-group 59 spanning-disabled
!
interface USB0
 ip address negotiated
 no ip route-cache
 no ip mroute-cache
 arp timeout 0
 bridge-group 59
 bridge-group 59 spanning-disabled
!
ip classless
no ip http server
no ip http cable-monitor
no service finger
!
line con 0
 transport input none
line vty 0 4
 login
!
end
```

MGCP Configuration

The Cisco CVA120 Series Cable Voice Adapter supports the MGCP protocol for routing voice calls. This transfers the dial mapping to an external call agent or to a Media Gateway Controller, so that the VoIP gateways do not have to be individually configured with the dial mappings.

You must do the following to configure the Cisco CVA120 Series Cable Voice Adapter for MGCP routing of voice calls:

- Enable MGCP operation on the Cisco CVA120 Series Cable Voice Adapter.
- Specify the MGCP call agent's IP address.
- Configure the local dial-peers to be MCGP applications.
- Optionally specify the MGCP packages to be supported.
- Optionally change a number of MGCP parameters.

Note You do not need to configure remote dial-peers when you are using MGCP.

The configuration functions are done using the commands shown in the following table:

	Command	Purpose
Step 1	**To configure incoming calls on the voice ports:** cva120(config)# **dial-peer voice** *id-number* **pots**	**Repeat this sequence for each voice port.** Specify a unique *id-number* for this incoming dial-peer and enter dial-peer configuration mode.
Step 2	cva120(config)# **application MGCPAPP**	Specify that this dial-peer is handled as an MGCP application.
Step 3	cva120(config-dial-peer)# **port** [**0** | **1**]	Specify the voice port that is attached to this telephony equipment: **0** (V1), **1** (V2).
Step 4	cva120(config-dial-peer)# **exit**	Exit dial-peer configuration mode.
Step 5	cva120(config)# **mgcp**	Enable MGCP operations on the cable voice adapter.
Step 6	cva120(config)# **mgcp call-agent** *ip-address* [*port*] [**service-type sgcp** | **mgcp**]	Specify the IP address and optional UDP port number for the MGCP call-agent. If no port number is given, the default is 2427. The default **service-type** is **mgcp**, but **sgcp** can be specified to ignore RSIP error messages.
Step 7	cva120(config)# **mgcp dtmf-relay** { **codec** | **low-bit-rate** } **mode** { **cisco** | **out-of-band** }	(Optional) Enables the accurate forwarding of touchtone digits during a voice call. Use **codec** to specify the G.711 codec or **low-bit-rate** to specify the G.729 codec. Use a **mode** of **cisco** to transmit the tones with the Cisco proprietary method; if the remote gateway is not a Cisco router, use **out-of-band** instead.
Step 8	cva120(config)# **mgcp ip-tos** { **high-reliability** | **high-throughput** | **low-cost** | **low-delay** | **precedence** *value* }	(Optional) Enable IP Type of Services (TOS) for the voice connections, and specify the value for the IP precedence bit (the default IP precedence is 3).
Step 9	cva120(config)# **mgcp max-waiting-delay** *value*	(Optional) Specify the number of milliseconds to wait after a restart (default of 3000) before connecting with the call agent. If used, these values should be staggered among gateways to avoid having large numbers of gateways connecting with the call agent at the same time after a mass restart.

	Command	Purpose
Step 10	cva120(config)# **mgcp modem passthru** { **cisco** | **ca** }	(Optional) Enable the transmission and reception of modem and fax data. If the remote gateway is a Cisco router, specify **cisco**; otherwise, specify **ca** (default) to allow the data to pass-through the call-agent.
Step 11	cva120(config)# **mgcp package-capability** { **line-package** | **dtmf-package** | **gm-package** | **rtp-package** }	(Optional) Specify that the Cisco CVA120 Series Cable Voice Adapter supports a particular package capability. Give this command multiple times to enable multiple packages. Use this command before using the **mgcp default-package** command.
Step 12	cva120(config)# **mgcp default-package** { **line-package** | **dtmf-package** | **gm-package** }	(Optional) Specify the default package type for the media gateway; defaults to **line-package**.
Step 13	cva120(config)# **mgcp playout** { **adaptive** *init-value min-value max-value* | **fixed** *init-value* }	(Optional) Change the jitter buffer packet size in milliseconds for MGCP calls, using either an adaptive range or a fixed value. The default is **adaptive 60 4 200**.
Step 14	cva120(config)# **mgcp request retries** *count*	(Optional) Specify the number of times a call request message is transmitted to a call agent before timing out. The default is 3 times.
Step 15	cva120(config)# **mgcp request timeout** *timeout*	(Optional) Specify the number of milliseconds to wait for a response to a request before retransmitting or timing out the request. The default is 500 milliseconds.
Step 16	cva120(config)# **mgcp restart-delay** *value*	(Optional) Specify the value (in seconds) used in Restart in Progress (RSIP) messages to indicate the delay before the connection is torn down. The default delay is 0 seconds.
Step 17	cva120(config)# **mgcp vad**	(Optional) Enable Voice Activity Detection (VAD) to turn silence suppression on. The default disables VAD.
Step 18	cva120# **copy running-config startup-config** Building configuration...	Save the configuration to nonvolatile memory so that it will not be lost in the event of a reset, power cycle, or power outage.
Step 19	cva120# **show startup-config**	Display the configuration file that was just created.

The following configuration shows a Cisco CVA120 Series Cable Voice Adapter configured in DOCSIS-bridging mode that uses MGCP for controlling its voice calls. The relevant commands are shown in bold.

```
version 12.2
no service pad
service timestamps debug uptime
service timestamps log uptime
no service password-encryption
!
hostname cva120
!
!
clock timezone - 0 6
ip subnet-zero
```

```
no ip routing
ip domain-name cisco.com
ip name-server 10.0.0.32
!
 mgcp
 mgcp call-agent 10.186.1.36
 mgcp modem passthru ca
 mgcp package-capability dtmf-package
 mgcp package-capability line-package
 mgcp default-package line-package
!
xgcp snmp sgcp
!
!
voice-port 0
 input gain -2
!
voice-port 1
 input gain -2
!
dial-peer voice 100 pots
 application MGCPAPP
 port 0
!
dial-peer voice 101 pots
 application MGCPAPP
 port 1
!
process-max-time 200
!
interface Ethernet0
 no ip directed-broadcast
 no ip route-cache
 no ip mroute-cache
 bridge-group 59
 bridge-group 59 spanning-disabled
!
interface cable-modem0
 ip address docsis
 no ip directed-broadcast
 no ip route-cache
 no ip mroute-cache
 bridge-group 59
 bridge-group 59 spanning-disabled
!
interface USB0
 ip address negotiated
 no ip route-cache
 no ip mroute-cache
 arp timeout 0
 bridge-group 59
 bridge-group 59 spanning-disabled
!
ip classless
no ip http server
no ip http cable-monitor
no service finger
!
!
line con 0
 transport input none
line vty 0 4
 login
!
```

```
end
```

Command Reference

This section describes the commands for the Cisco CVA120 Series Cable Voice Adapter that are new or changed from the commands described in the Cisco IOS Release 12.1 command reference publications. All other commands used with this feature are documented in the Cisco IOS Release12.1 command reference publications.

- cable dhcp-proxy
- cable-modem compliant bridge
- cable-modem voip clock-internal
- dtmf-relay
- h323-gateway voip bind srcaddr
- interface cable-modem
- interface usb
- ip address docsis
- ip http cable-monitor
- ping docsis
- show bridge cable-modem
- show controllers cable-modem
- show controllers cable-modem bpkm
- show controllers cable-modem des
- show controllers cable-modem filters
- show controllers cable-modem lookup-table
- show controllers cable-modem mac
- show controllers cable-modem phy
- show controllers cable-modem qos
- show controllers cable-modem tuner
- show controllers usb
- show dhcp
- show interfaces cable-modem
- show interfaces usb
- show voice port
- voice-port

cable dhcp-proxy

To configure the Cisco CVA120 Series Cable Voice Adapter so that it configures its Ethernet interface or Network Address Translation (NAT) address pool with an IP address supplied by the DHCP server, use the **cable dhcp-proxy** cable interface command. To disable this feature (so that you can then manually assign an IP address to the Ethernet interface or NAT address pool), use the no form of this command.

cable dhcp-proxy {**interface ethernet** *number* | **nat** *pool-name*}

no cable dhcp-proxy {**interface ethernet** *number* | **nat** *pool-name*}

Note This command cannot be used when the Cisco CVA120 Series Cable Voice Adapter is configured for DOCSIS bridging.

Syntax Description

interface ethernet *number*	The Ethernet interface to be assigned the static IP address from the DHCP server. (Because the Cisco CVA120 Series Cable Voice Adapter has only one Ethernet interface, the only allowable *number* is **0**). **Note** This option should be used only when the Cisco CVA120 Series Cable Voice Adapter is configured for routing mode.
nat *pool-name*	The name of the NAT pool to be created using the IP address and subnet mask supplied by the DHCP server. (This is equivalent to giving the **ip nat pool** *pool-name start-ip end-ip* **netmask** *subnet* command, using the IP address and subnet mask supplied by the DHCP server.)

Defaults

No default behavior or values.

Command Modes

Interface configuration (cable interface only)

Command History

Release	Modification
12.1(1)T	This command was introduced for the Cisco uBR924 cable access router.
12.1(3)XL	Support was added for the Cisco uBR905 cable access router.
12.1(5)XU2	Support was added for the Cisco CVA120 Series Cable Voice Adapter.

Usage Guidelines

This command is useful in the following situations:

- When the Cisco CVA120 Series Cable Voice Adapter is configured for routing mode, an IP address must be assigned to its Ethernet interface. Without the **cable dhcp-proxy** command, this IP address must be a static IP address assigned either by using a Cisco IOS configuration file or by manually entering the necessary interface configuration CLI commands. The **cable dhcp-proxy** command allows a DHCP server to assign an IP address to the Ethernet interface.

- When network address translation (NAT) is used, an inside global address pool must be created on the Ethernet interface. Without the **cable dhcp-proxy** command, this must be done by specifying a static IP address in the **ip nat pool** *pool-name start-ip end-ip* **netmask** *subnet* command. The **cable dhcp-proxy** command allows a DHCP server to assign an IP address that automatically creates the NAT address pool.

  When using this option, you must also use the following NAT configuration commands:

  – Use the **ip nat inside** interface command to configure the Ethernet interface as the "inside" interface.

  – Use the **ip nat outside** interface command to configure the cable interface as the "outside" interface.

  – Specify the **overload** option with the **ip nat** global configuration command because the NAT pool created by the **cable dhcp-proxy** command contains only one IP address.

After configuring the Cisco CVA120 Series Cable Voice Adapter with the **cable dhcp-proxy** command, reboot the router. During the DOCSIS provisioning process, the router sends a DHCP client request to obtain an IP address for the cable interface.

The router then sends a proxy DHCP request to the DHCP server using the Ethernet interface's MAC address. The DHCP server replies with a second IP address that the router assigns to either the Ethernet interface or to the NAT pool, depending on which option was used in the **cable dhcp-proxy** command.

Note When replying to the proxy request for the Ethernet interface, the DHCP server should assign an IP address on the same network as the CPE devices that are attached to the router's Ethernet interface.

Examples

The following example configures the Cisco CVA120 Series Cable Voice Adapter so that it makes a proxy DHCP request to obtain an IP address for its Ethernet interface:

```
cva120(config)# int c0
cva120(config-if)# cable dhcp-proxy interface Ethernet 0
```

The following example creates a NAT address pool with the IP address assigned by the DHCP server; this IP address must be in the network attached to the Ethernet address (which in this case is 192.168.100.0).

```
cva120(config)# ip nat inside source list 1 pool net-208 overload
cva120(config)# interface cable0
cva120(config-if)# ip nat outside
cva120(config-if)# no cable compliant bridge
cva120(config-if)# cable dhcp-proxy nat net-208
cva120(config-if)# exit
cva120(config)# interface ethernet0
cva120(config-if)# ip address 192.168.100.94 255.255.255.0
cva120(config-if)# ip nat inside
cva120(config-if)# exit
cva120(config)# access-list 1 permit 192.168.100.0 0.0.0.255
cva120(config)#
```

cable-modem compliant bridge

To enable DOCSIS/EuroDOCSIS-compliant bridging for a cable access router interface at startup, use the **cable-modem compliant bridge** cable interface configuration command. To disable DOCSIS-compliant bridging (which is required to enable routing mode), use the **no** form of this command.

cable-modem compliant bridge

no cable-modem compliant bridge

Syntax Description

This command has no arguments or keywords.

Defaults

DOCSIS/EuroDOCSIS-compliant bridging is enabled by default.

Command Modes

Cable interface configuration

Command History

Release	Modification
11.3(4)NA	This command was introduced for the Cisco uBR904 cable access router.
12.0(4)XI1	Support was added for the Cisco uBR924 cable access router.
12.1(1)XD	Support was added for the Cisco uBR914 cable DSU.
12.1(3)XL	Support was added for the Cisco uBR905 cable access router.
12.1(5)XU2	Support was added for the Cisco CVA120 Series Cable Voice Adapter.

Usage Guidelines

It is normally not necessary to enter this command in data-over-cable bridging applications because DOCSIS-compliant bridging is enabled by default. However, to configure the router for full transparent bridging or for routing mode, use the **no** form of the command and then configure the router as desired using the appropriate CLI commands.

Examples

The following example shows how to enter the **cable-modem compliant bridge** command for a cable access router interface, starting from global configuration mode:

```
cva120(config)# interface cable-modem 0
cva120(config-if)# cable-modem compliant bridge
```

cable-modem voip clock-internal

To enable the Cisco CVA120 Series Cable Voice Adapter's internal clock for VoIP calls, use the **cable-modem voip clock-internal** cable interface configuration command. To disable the cable voice adapter's internal clock, so that it uses the clock from the cable interface for VoIP calls, use the no form of this command.

cable-modem voip clock-internal

no cable-modem voip clock-internal

Syntax Description

This command has no keywords or arguments.

Defaults

The default is to use the clock from the cable interface for VoIP calls.

Command Modes

Cable interface configuration.

Command History

Release	Modification
12.1(4)T	This command was introduced for the Cisco uBR924 cable access router.
12.1(5)XU2	Support was added for the Cisco CVA120 Series Cable Voice Adapter.

Usage Guidelines

This command enables the cable voice adapter's internal clock, allowing it to make VoIP calls over the Ethernet and USB interfaces even when the cable interface is down or disconnected. If the CMTS is a Cisco uBR7200 series with a Cisco Cable Clock Card, this command disables the use of that clock.

This command can be used when the cable voice adapter is in both DOCSIS IP bridging and routing mode. However, when the cable voice adapter is operating in DOCSIS IP bridging mode, VoIP packets are transmitted out only on the cable interface, so the router must be operating in routing mode to transmit voice packets out the Ethernet and USB interfaces.

Examples

The following example enables the cable voice adapter's internal clock:

```
cva122(config)# interface cable0
cva122(config-if)# cable-modem voip clock-internal
cva122(config-if)#
```

dtmf-relay

To configure the Cisco CVA120 Series Cable Voice Adapter so that it transmits Dual-Tone Multifrequency (DTMF) tones as out of band signals during H.323 voice calls, use the **dtmf-relay** dial-peer voice configuration command. To return to the default configuration (which is to transmit DTMF tones as part of the voice traffic), use the no form of this command.

dtmf-relay [**cisco-rtp**] [**h245-alphanumeric**] [**h245-signal**]

no dtmf-relay

Syntax Description

cisco-rtp	Forwards DTMF tones using the Real-Time Transport Protocol (RTP) with a Cisco proprietary payload type. **Note** RTP is a proprietary Cisco protocol that interoperates only between two Cisco access servers or routers running Cisco IOS images that support the RTP protocol. This typically requires Cisco IOS 12.0(5)T or later releases; see the router's release notes for complete information.
h245-alphanumeric	Forwards DTMF tones using the H.245 Alphanumeric User Input Indication method. This transmits each tone using a fixed duration of 500 milliseconds. Supports tones 0-9, *, #, and A-D.
h245-signal	Forwards DTMF tones using the H.245 Signal User Input Indication method. This transmits each tone using the original duration. Supports tones 0-9, *, #, and A-D.

Defaults

By default, DTMF tones are transmitted inband, as part of the voice traffic.

Command Modes

Dial-peer voice configuration.

Command History

Release	Modification
12.0(7)XR and 12.1(1)T	This command was introduced for the Cisco uBR924 cable access router.
12.1(5)XU2	Support was added for the Cisco CVA120 Series Cable Voice Adapter.

Usage Guidelines

DTMF tones are generated when you press the keypad digits on a touch-tone phone. DTMF tones are most commonly used to dial calls, but they can also be used during a call to interact with an Interactive Voice Response (IVR) system, such as voicemail, automated banking services and so on. By default, DTMF tones are transmitted along with the regular voice traffic, but this can cause problems with some IVR systems.

In particular, IVR systems might not recognize DTMF tones when using highly compressed CODECs such as G.729a. These CODECs are highly optimized for voice frequencies, but they can distort DTMF tones, preventing IVR systems from recognizing the tones. To avoid this problem, use one or more of the following methods of transmitting DTMF tones in an out of band channel, separately from the voice traffic:

- Cisco RTP—This transmits the DTMF tones using a proprietary encoding that allows them to use the same RTP channel as the voice traffic. This method accurately transports DTMF tones but requires the use of Cisco gateways at both the originating and terminating endpoints of the H.323 call.
- H.245 Alphanumeric—This transmits DTMF tones through a separate H.245 signaling channel using H.245 User Input Indication messages. Tones are transmitted as alphanumeric digits with a fixed duration of 500 milliseconds. This method is required for all H.323v2 compliant systems.
- H.245 Signal—This transmits DTMF tones through a separate H.245 signaling channel using H.245 User Input Indication messages. This method preserves both the tone information and the original duration of the tone, which allows the caller to use services that require you to press a key for a particular length of time. For example, a popular calling card feature allows you to break out of an existing call by pressing the pound (#) key for more than two seconds and then make a second call without having to hang up in between.

You can enable more than one DTMF relay option for a particular dial peer, to support multiple destinations that might use different methods. If you enable more than one option, and if the peer is capable of receiving DTMF in more than one of these formats, the router selects the DTMF format with the highest priority:

1. Cisco RTP (highest priority)
2. H.245 Signal
3. H.245 Alphanumeric
4. None—DTMF is sent inband

Examples

The following example configures an outgoing dial peer so that DTMF tones to that destination are transmitted using the Cisco RTP protocol, if this configuration is supported by the remote end; otherwise, the DTMF tones are transmitted using the H.245 signaling protocol.

```
cva120(config)# dial-peer voice 100 voip
cva120(config-dial-peer)# destination-pattern 555-1212
cva120(config-dial-peer)# session target ipv4:192.168.100.110
cva120(config-dial-peer)# dtmf-relay cisco-rtp h245-signal
cva120(config-dial-peer)# exit
cva120(config)#
```

The following example reconfigures the above dial peer and disables out of band DTMF signaling, so that the DTMF tones are sent inband, as part of the voice traffic:

```
cva120(config)# dial-peer voice 100 voip
cva120(config-dial-peer)# no dtmf-relay
cva120(config-dial-peer)# exit
cva120(config)#
```

Related Commands

Command	Description
codec	Specifies the voice coder rate of speech for a dial peer.
dial-peer	Enters dial peer voice configuration mode.

h323-gateway voip bind srcaddr

To configure the Cisco CVA120 Series Cable Voice Adapter so that H.323 VoIP traffic is sent using the Ethernet interface's IP address, use the **h323-gateway voip bind srcaddr** interface configuration command. To return to the default configuration (which is to use the cable interface's IP address for H.323 VoIP traffic), use the no form of this command.

h323-gateway voip bind srcaddr *ip-address*

no h323-gateway voip bind srcaddr

Syntax Description

ip-address	Specifies the IP address to be used for outgoing H.323 traffic, which includes H.225, H.245, and RAS messages. This typically is the IP address assigned to the Ethernet interface.

Defaults

No defaults assigned. By default, H.323 traffic is transmitted with the IP address assigned to the cable interface.

Command Modes

Interface configuration

Command History

Release	Modification
12.1(2)T	This command was introduced for the Cisco uBR924 cable access router.
12.1(5)XU2	Support was added for the Cisco CVA120 Series Cable Voice Adapter.

Usage Guidelines

The **h323-gateway voip bind srcaddr** command can be used with any interface, but it is primarily used with the Cisco CVA120 Series Cable Voice Adapter's Ethernet interface when configuring a virtual private network (VPN). In this configuration, the **h323-gateway voip bind srcaddr** command configures the router so that VoIP traffic is sent using the IP address of the Ethernet interface (as opposed to the default behavior, which is to use the IP address of the default outgoing interface, which is the cable interface).

The **h323-gateway voip bind srcaddr** command allows the enterprise network to maintain the H.323 gatekeeper and gateway in the enterprise network's address space. Without the **h323-gateway voip bind srcaddr** command, outgoing voice traffic uses the IP address of the cable interface. This requires that the H.323 gatekeeper and gateway be maintained in the cable service provider's address space, which is not desirable if the enterprise needs to control the voice network and VPN configuration.

Note The **h323-gateway voip bind srcaddr** command can be used only when the Cisco CVA120 Series Cable Voice Adapter is operating in routing mode. This command has no effect when the router is operating in DOCSIS bridging mode.

Examples

The following example shows the Ethernet interface being configured with the IP address of 192.168.100.94, and that H.323 traffic will be transmitted using that IP address:

```
cva120(config)# interface ethernet0
cva120(config-if)# ip address 192.168.100.94 255.255.255.0
cva120(config-if)# h323-gateway voip bind srcaddr 192.168.100.94
cva120(config-if)#
```

The following example disables the H.323 binding, so that H.323 voice traffic is transmitted using the cable interface's IP address:

```
cva120(config-if)# no h323-gateway voip bind srcaddr
cva120(config-if)#
```

Related Commands

Command	Description
h323-gateway voip h323-id	Defines the H.323 name that identifies this Cisco CVA120 Series Cable Voice Adapter gateway to its associated gatekeeper.
h323-gateway voip id	Defines the name and IP address of the gatekeeper for this gateway.
h323-gateway voip interface	Configures the interface as an H.323 interface.
h323-gateway voip tech-prefix	Defines the technology prefix that the gateway uses to register with the gatekeeper.

interface cable-modem

To enter the interface configuration mode for the cable interface on a Cisco CVA120 Series Cable Voice Adapter, enter the **interface cable-modem** global configuration command.

interface cable-modem *number*

Syntax Description

number	The interface number of the cable interface (always 0 for the Cisco CVA120 Series Cable Voice Adapter).

Defaults

Disabled

Command Modes

Global configuration

Command History

Release	Modification
11.3(4)NA	This command was introduced for the Cisco uBR904 cable access router.
12.0(4)XI1	Support was added for the Cisco uBR924 cable access router.
12.1(1)XD	Support was added for the Cisco uBR914 cable DSU.
12.1(3)XL	Support was added for the Cisco uBR905 cable access router.
12.1(5)XU2	Support was added for the Cisco CVA120 Series Cable Voice Adapter.

Usage Guidelines

When this command is entered, the Cisco CVA120 Series Cable Voice Adapter switches from global configuration mode to interface configuration mode.

Examples

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

```
cva120(config)# interface cable-modem 0
cva120(config-if)# cable-modem ?
  compliant    Enter compliant modes for interface
  downstream   Downstream channel characteristics
  fast-search  Enable/disable the DS fast search
  upstream     upstream channel characteristics
  voip         Options for Voice over IP traffic over the cable interface

cva120(config-if)#
```

Related Commands

Command	Description
cable-modem compliant bridge	Enables DOCSIS-compliant transparent bridging on the Cisco CVA120 Series Cable Voice Adapter at startup.

interface usb

To enter the interface configuration mode for the Universal Serial Bus (USB) interface on a Cisco CVA120 Series Cable Voice Adapter, enter the **interface usb** global configuration command.

interface usb *number*

Syntax Description

number	The interface number of the USB interface (always 0 for the Cisco CVA120 Series Cable Voice Adapter).

Defaults

Disabled

Command Modes

Global configuration

Command History

Release	Modification
12.1(5)XU2	This command was introduced for the Cisco CVA120 Series Cable Voice Adapter.

Usage Guidelines

When this command is entered, the Cisco CVA120 Series Cable Voice Adapter switches from global configuration mode to interface configuration mode for the USB interface.

Examples

The following example enters the interface configuration mode for the USB interface:

```
cva120(config)# interface usb 0
cva120(config-if)#?
Interface configuration commands:

access-expression       Build a bridge boolean access expression
arp                     Set arp type (arpa, probe, snap) or timeout
bandwidth               Set bandwidth informational parameter
bridge-group            Transparent bridging interface parameters
carrier-delay           Specify delay for interface transitions
cdp                     CDP interface subcommands
crypto                  Encryption/Decryption commands
custom-queue-list       Assign a custom queue list to an interface
default                 Set a command to its defaults
delay                   Specify interface throughput delay
description             Interface specific description
exit                    Exit from interface configuration mode
fair-queue              Enable Fair Queuing on an Interface
h323-gateway            Configure H323 Gateway
help                    Describes the interactive help system
hold-queue              Set hold queue depth
ip                      Interface Internet Protocol config commands
keepalive               Enable keepalive
load-interval           Specify interval for load calculation for an interface
logging                 Configure logging for an interface
mac-address             Manually set interface MAC address
```

```
max-reserved-bandwidth  Maximum Reservable Bandwidth on an interface
mtu                     Set the interface Maximum Transmission Unit (MTU)
no                      Negate a command or set its defaults
ntp                     Configure NTP
priority-group          Assign a priority group to an interface
random-detect           Enable Weighted Random Early Detection (WRED) on an interface
service-policy          Configure QoS Service Policy
shutdown                Shut down the selected interface
snmp                    Modify SNMP interface parameters
standby                 Interface HSRP configuration commands
timeout                 Define timeout values for this interface
traffic-shape           Enable Traffic Shaping on an interface or sub-interface
transmit-interface      Assign a transmit interface to a receive-only interface
tx-ring-limit           Configure PA level transmit ring limit
```

Related Commands

Command	Description
show interfaces usb	Displays configuration and status information for the USB interface.

ip address docsis

To specify that the cable access router should use the DHCP protocol to assign an IP address for its cable interface (as required by the DOCSIS specification), use the **ip address docsis** global configuration command. To disable the use of DHCP, use the no form of this command.

ip address docsis

no ip address docsis

Syntax Description

There are no key words or arguments for this command.

Defaults

The cable access router uses the DHCP protocol, as required by the DOCSIS specification, to assign an IP address to its cable interface during system power-on.

Command Modes

Global configuration

Command History

Release	Modification
12.1(3)XL	This command was introduced for the Cisco uBR905 cable access router.
12.1(4)T	Support was added for the Cisco uBR924 cable access router.
12.1(5)XU2	Support was added for the Cisco CVA120 Series Cable Voice Adapter.

Usage Guidelines

The **ip address docsis** command configures the cable access router so that it obtains its IP address from a DHCP server at system power-on, which is a requirement for DOCSIS operation. Using the **no ip address docsis** command prevents the cable access router from operating in DOCSIS networks and should be used only in lab or test networks.

The cable access router defaults to configuring its cable interface with the **ip address docsis** command.

Note Previous Cisco IOS software releases for the cable access routers used either the **ip address negotiated** and **ip address dhcp** commands to specify that the cable interface should obtain its IP address from a DHCP server. These commands should no longer be used for the cable interface on cable access routers.

Examples

The following example configures the cable access router so that it obtains the IP address for its cable interface from a DHCP server:

```
cva120(config)# ip address docsis
cva120(config)#
```

Related Commands

Command	Description
cable dhcp-proxy	Specifies that DHCP should be used to assign an IP address to the Cisco CVA120 Series Cable Voice Adapter's Ethernet interface.
ip address negotiated	Specifies that a serial interface should use the PPP/IPCP (IP Control Protocol) to obtain an IP address at system power-on. (This command can be used only for serial interfaces.)
ip http dhcp	Specifies the use of the DHCP protocol to obtain an IP address for any interface except the cable interface at system power-on.

ip http cable-monitor

To enable the Cisco CVA120 Series Cable Voice Adapter's onboard cable monitor web server, use the **ip http cable-monitor** global configuration command. To disable the cable monitor and turn off all access to the onboard Cisco web server, use the no form of this command.

ip http cable-monitor {**basic** | **advance**} [*URL-IP-address URL-mask*]

no ip http cable-monitor

Syntax Description

basic	Displays only the basic status and performance pages.
advance	Displays all status and diagnostic pages. **Note** The cable monitor should not be used in advanced mode without first implementing a secure password strategy on the Cisco CVA120 Series Cable Voice Adapter. Enabling the cable monitor in advanced mode without setting an encrypted enabled password could provide information that would allow remote users to change the router's configuration.
URL-IP-address	Specifies the IP address for the cable monitor. This parameter, along with the *URL-mask* parameter, also defines the network that provides the IP address pool used by the temporary DHCP server when the cable interface goes down.
URL-mask	Specifies the subnet mask for the cable monitor. This parameter, along with the *URL-IP-address* parameter, also defines the network that provides the IP address pool used by the temporary DHCP server when the cable interface goes down.

Defaults

For *URL-IP-address*, 192.168.100.1

For *URL-mask*, 255.255.255.0

Command Modes

Global configuration

Command History

Release	Modification
12.1(1)T	This command was introduced for the Cisco uBR924 cable access router.
12.1(1)XD	Support was added for the Cisco uBR914 cable DSU.
12.1(3)XL	Support was added for the Cisco uBR905 cable access router.
12.1(5)XU2	Support was added introduced for the Cisco CVA120 Series Cable Voice Adapter.

Usage Guidelines

This command enables the cable monitor, an onboard web server that displays current status, troubleshooting, and performance information. The cable monitor can be accessed in two ways:

- When the Cisco CVA120 Series Cable Voice Adapter has established connectivity with the CMTS over the cable interface, a service technician can use a web browser to remotely access the router and display the desired information.
- When the cable network is not operational and the Cisco CVA120 Series Cable Voice Adapter is not online, the subscriber can access the tool with a PC connected to the router's Ethernet ports. Technicians can then prompt the user for the information they need to determine the source of the problem.

Enabling the cable monitor also enables the Cisco web server that is onboard the Cisco CVA120 Series Cable Voice Adapter (which is the equivalent to giving the **ip http server** command). However, when the cable monitor is enabled, all other access, including CLI access, to the onboard web server is automatically disabled.

Disabling the cable monitor using the **no ip http cable-monitor** command also automatically disables the Cisco web server (which is the equivalent of giving the **no ip http server** command).

The *URL-IP-address* and *URL-mask* parameters also specify that the class C private network 192.168.100.0 is the default address pool for the temporary DHCP server that activates when the cable interface goes down.

Examples

The following example enables the cable monitor for advanced mode, in which all status and diagnostic pages are displayed:

```
cva120(config)# ip http cable-monitor advance
cva120(config)#
```

The following example disables both the cable monitor and the Cisco web server, preventing all web server access to the Cisco CVA120 Series Cable Voice Adapter:

```
cva120(config)# no ip http cable-monitor
cva120(config)#
```

Related Commands

Command	Description
ip http port	Configures the TCP port number for the router's HTTP web server (the default is the well-known web server port of 80).
ip http server	Enables and disables the router's HTTP web server.

Note The **ip http** command also supports two options, **access-class** and **authentication**, that should not be used when the cable monitor is enabled.

ping docsis

To determine whether a specific cable modem is online and reachable from the cable interface on the Cisco CVA120 Series Cable Voice Adapter, use the **ping docsis** privileged EXEC command.

ping docsis{*mac-addr* | *ip-addr*}

Syntax Description

mac-addr	MAC address. Specifies the 48-bit hardware address of the cable modem.
ip-addr	IP address. Specifies the IP address of the cable modem.

Defaults

No default behavior or values.

Command Modes

Privileged EXEC

Command History

Release	Modification
11.3(4)NA	This command was introduced for the Cisco uBR904 cable access router.
12.0(4)XI1	Support was added for the Cisco uBR924 cable access router.
12.1(1)XD	Support was added for the Cisco uBR914 cable DSU.
12.1(3)XL	Support was added for the Cisco uBR905 cable access router.
12.1(5)XU2	Support was added for the Cisco CVA120 Series Cable Voice Adapter.

Examples

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

```
cva120# ping docsis 172.00.00.00

Queueing 5 MAC-layer station maintenance intervals, timeout is 25 msec:
!!!!!
Success rate is 100 percent (5/5)
cva120#
```

show bridge cable-modem

To display bridging information for a Cisco CVA120 Series Cable Voice Adapter, enter the **show bridge cable-modem** privileged EXEC command.

show bridge cable-modem *number*

Syntax Description

number	The interface number of the cable interface on the rear panel of the Cisco CVA120 Series Cable Voice Adapter.

Defaults

No default behavior or values.

Command Modes

Privileged EXEC

Command History

Release	Modification
11.3(4)NA	This command was introduced for the Cisco uBR904 cable access router.
12.0(4)XI1	Support was added for the Cisco uBR924 cable access router.
12.1(1)XD	Support was added for the Cisco uBR914 cable DSU.
12.1(3)XL	Support was added for the Cisco uBR905 cable access router.
12.1(5)XU2	Support was added for the Cisco CVA120 Series Cable Voice Adapter.

Examples

The following example is sample output for this command:

```
cva120# show bridge cable-modem 0

Total of 300 station blocks, 298 free
Codes: P - permanent, S - self

Bridge Group 59:
```

Table 7 describes the significant fields shown in the display.

Table 7 show bridge cable-modem Field Descriptions

Field	Description
Total of 300 station blocks	Total number of forwarding database elements in the system. The memory to hold bridge entries is allocated in blocks of memory sufficient to hold 300 individual entries. When the number of free entries falls below 25, another block of memory sufficient to hold another 300 entries is allocated. Thus, the total number of forwarding elements in the system is expanded dynamically, as needed, limited by the amount of free memory in the router.
Bridge Group	The number of the bridge group to which this interface is assigned.

Related Commands

Command	Description
show dhcp	Displays the current DHCP settings on point-to-point interfaces.
show interfaces cable-modem	Displays information about the Cisco CVA120 Series Cable Voice Adapter cable interface.

show controllers cable-modem

To display high-level controller information about a Cisco CVA120 Series Cable Voice Adapter, use the **show controllers cable-modem** privileged EXEC command.

show controllers cable-modem *number*

Syntax Description

number	Controller number inside the Cisco CVA120 Series Cable Voice Adapter.

Defaults

No default behavior or values.

Command Modes

Privileged EXEC

Command History

Release	Modification
11.3(4)NA	This command was introduced for the Cisco uBR904 cable access router.
12.0(4)XI1	Support was added for the Cisco uBR924 cable access router.
12.1(1)XD	Support was added for the Cisco uBR914 cable DSU.
12.1(3)XL	Support was added for the Cisco uBR905 cable access router.
12.1(5)XU2	Support was added for the Cisco CVA120 Series Cable Voice Adapter.

Usage Guidelines

The **show controllers cable-modem** display begins with information from the first few registers of the Broadcom BCM3300 chip. Next is buffer information for the receive, receive MAC message, buffer descriptor, and packet descriptor rings. Then MIB statistics from the BCM3300 chip are shown, followed by DMA base registers to indicate where the rings start, global control and status information, and finally interrupts for the interrupt code.

When using this command, be sure to check the tx_count and the tx_head and tx_tail values for the buffer descriptor (TX BD) and packet descriptor (TX PD) rings. The tx_count should be greater than 0, and the tx_head and tx_tail values should not be equal. If these values do not change for a long period of time, this indicates there are packets stuck on the ring. This condition is often caused by the headend not giving grants.

Examples

Following is sample output for the **show controllers cable-modem 0** command:

```
cva120# show controllers cable-modem 0
BCM Cable interface 0:
BCM3300 unit 0, idb 0x200EB4, ds 0x82D4748, regaddr = 0x800000, reset_mask 0x80
station address 0010.7b43.aa01 default station address 0010.7b43.aa01
PLD VERSION: 32

MAC State is ranging_2_state, Prev States = 7
MAC mcfilter 01E02F00 data mcfilter 01000000

DS: BCM 3116 Receiver: Chip id = 2
US: BCM 3037 Transmitter: Chip id = 30B4
```

```
Tuner: status=0x00
Rx: tuner_freq 699000000, symbol_rate 5055849, local_freq 11520000
    snr_estimate 33406, ber_estimate 0, lock_threshold 26000
    QAM in lock, FEC in lock, qam_mode QAM_64
Tx: tx_freq 20000000, power_level 0x3E, symbol_rate 1280000

DHCP: TFTP server = 4.0.0.32, TOD server = 4.0.0.188
      Security server = 0.0.0.0, Timezone Offset = 0.0.4.32
      Config filename =

buffer size 1600

RX data PDU ring with 32 entries at 0x201D40
  rx_head = 0x201D78 (7), rx_p = 0x831BE04 (7)
    00 pak=0x8326318 buf=0x225626 status=0x80 pak_size=0
    01 pak=0x83241A0 buf=0x21DE5A status=0x80 pak_size=0
    02 pak=0x83239C0 buf=0x21C22A status=0x80 pak_size=0
    03 pak=0x8328C70 buf=0x22EA22 status=0x80 pak_size=0
    04 pak=0x8325F28 buf=0x22480E status=0x80 pak_size=0
    05 pak=0x8327CB0 buf=0x22B1C2 status=0x80 pak_size=0
    06 pak=0x8323BB8 buf=0x21C936 status=0x80 pak_size=0

RX MAC message ring with 8 entries at 0x201E80
  rx_head_mac = 0x201E88 (1), rx_p_mac = 0x831BE80 (1)
    00 pak=0x8326120 buf=0x224F1A status=0x80 pak_size=0
    01 pak=0x8324590 buf=0x21EC72 status=0x80 pak_size=0
    02 pak=0x8323FA8 buf=0x21D74E status=0x80 pak_size=0
    03 pak=0x8326EE8 buf=0x22806E status=0x80 pak_size=0
    04 pak=0x8328E68 buf=0x22F12E status=0x80 pak_size=0
    05 pak=0x8327AB8 buf=0x22AAB6 status=0x80 pak_size=0
    06 pak=0x8328880 buf=0x22DC0A status=0x80 pak_size=0
    07 pak=0x8326CF0 buf=0x227962 status=0xA0 pak_size=0

TX BD ring with 8 entries at 0x201FB8, tx_count = 0
  tx_head = 0x201FD8 (4), head_txp = 0x831BF20 (4)
  tx_tail = 0x201FD8 (4), tail_txp = 0x831BF20 (4)
    00 pak=0x000000 buf=0x200000 status=0x00 pak_size=0
    01 pak=0x000000 buf=0x200000 status=0x00 pak_size=0
    02 pak=0x000000 buf=0x200000 status=0x00 pak_size=0
    03 pak=0x000000 buf=0x200000 status=0x00 pak_size=0
    04 pak=0x000000 buf=0x200000 status=0x00 pak_size=0
    05 pak=0x000000 buf=0x200000 status=0x00 pak_size=0
    06 pak=0x000000 buf=0x200000 status=0x00 pak_size=0
    07 pak=0x000000 buf=0x200000 status=0x20 pak_size=0

TX PD ring with 8 entries at 0x202038, tx_count = 0
  tx_head_pd = 0x202838 (4)
  tx_tail_pd = 0x202838 (4)
    00 status=0x00 bd_index=0x0000 len=0x0000 hdr_len=0x0000
    ehdr: 01 06 02 74 34 11
    01 status=0x00 bd_index=0x0001 len=0x0000 hdr_len=0x0000
    ehdr: 01 06 02 74 34 11
    02 status=0x00 bd_index=0x0002 len=0x0000 hdr_len=0x0000
    ehdr: 01 06 02 74 34 11
    03 status=0x00 bd_index=0x0003 len=0x0000 hdr_len=0x0000
    ehdr: 01 06 02 74 34 11
    04 status=0x00 bd_index=0x0004 len=0x0000 hdr_len=0x0000
    ehdr: 01 06 02 74 34 11
    05 status=0x00 bd_index=0x0005 len=0x0000 hdr_len=0x0000
    ehdr: 01 06 02 74 34 11
    06 status=0x00 bd_index=0x0006 len=0x0000 hdr_len=0x0000
    ehdr: 01 06 02 74 34 11
    07 status=0x20 bd_index=0x0007 len=0x0000 hdr_len=0x0000
```

```
    ehdr: 01 06 02 74 34 11

MIB Statistics
  DS fifo full = 0, Rerequests = 0
  DS mac msg overruns = 0, DS data overruns = 0
  Qualified maps = 348, Qualified syncs = 73
  CRC fails = 0, HDR chk fails = 0
  Data pdus = 0, Mac msgs = 423
  Valid hdrs = 423

BCM3300 Registers:
downstream dma:
  ds_data_bd_base=0x001D40, ds_mac_bd_base=0x001E80
  ds_data_dma_ctrl=0x98, ds_mac_dma_ctrl=0xD8
  ds_dma_data_index=0x0007, ds_dma_msg_index=0x0000
upstream dma:
  us_bd_base=0x001FB8, us_pd_base=0x002038
  us_dma_ctrl=0x80, us_dma_tx_start=0x00
Global control and status:
  global_ctrl_status=0x00
interrupts:
  irq_pend=0x0008, irq_mask=0x00F7
```

Table 8 briefly describes some of the fields shown in the display. For more information, see the Broadcom documentation for the BCM3300 chip.

Table 8 show controllers cable-modem display

Field	Description
BCM3300 unit	The unit number of this BCM3300 chip.
idb	Interface description block number.
ds	Downstream channel.
regaddr	Indicates the start of the BCM3300 registers.
reset_mask	Indicates the bit to hit when resetting the chip.
station address	MAC address of this Cisco CVA120 Series Cable Voice Adapter interface.
default station address	Default MAC address assigned by the factory for this Cisco CVA120 Series Cable Voice Adapter.
PLD VERSION	PLD version of the BCM3300 chip.
MAC state	Current MAC state of the Cisco CVA120 Series Cable Voice Adapter.
Prev States	Number of states that have previously existed since initialization.
MAC mcfilter	MAC control filter for MAC messages.
data mcfilter	MAC control filter for data.
DS	Downstream Broadcom receiver chip number and ID.
US	Upstream Broadcom transmitter chip number and ID.
Tuner: status	Current status of the tuner.

Table 8 show controllers cable-modem display (continued)

Field	Description
Rx: tuner_freq	Downstream frequency (in Hz) that the Cisco CVA120 Series Cable Voice Adapter searched for and found.
symbol_rate	Downstream frequency in symbols per second.
local_freq	Frequency on which the transmitter and the tuner communicate.
snr_estimate	Estimate of signal-to-noise ratio (SNR) in Db X 1000.
ber_estimate	Estimate of bit error rate (always 0).
lock_threshold	Minimum signal-to-noise ratio (SNR) that the Cisco CVA120 Series Cable Voice Adapter will accept as a valid lock.
qam_mode	The modulation scheme used in the downstream direction.
Tx: tx_freq	Upstream frequency sent to the Cisco CVA120 Series Cable Voice Adapter by the CMTS in the UCD message.
power_level	Transmit power level as set in the hardware, expressed as a hexadecimal value. The units are unique to the hardware used. Use the **show controllers cable-modem 0 mac state** command to see the power level in dBmV.
symbol_rate	Upstream frequency in symbols per second.
TFTP server	IP address of the TFTP server at the headend.
TOD server	IP address of the time-of-day server at the headend.
Security server	IP address of the security server at the headend.
Timezone Offset	Correction received from the DHCP server to synchronize the Cisco CVA120 Series Cable Voice Adapter time clock with the CMTS.
Config filename	Name of the file stored on the cable company's TFTP server that contains operational parameters for the Cisco CVA120 Series Cable Voice Adapter.
buffer size	Size in bytes of the BCM3300 message buffers.
RX data PDU ring:	Indicates the memory location of the beginning of buffer information for the receive data ring.
rx_head	Indicates current head buffer descriptor.
rx_p	Indicates current head packet descriptor.
RX MAC message ring:	Indicates the memory location of the beginning of buffer information for the receive MAC message ring.
rx_head_mac	Indicates current head buffer descriptor.
rx_p_mac	Indicates current head packet descriptor.

Table 8 show controllers cable-modem display (continued)

Field	Description
TX BD ring:	Indicates the memory location of the beginning of buffer information for the transmit buffer descriptor ring.
tx_count tx_head	If tx_count is 0, or if tx_head and tx_tail are equal and there is no change for a period of time, this means there are packets stuck on the ring. This condition can be caused by the headend not giving grants.
head_txp	The next packet descriptor to get used, along with its index.
tx_tail tail_txp	The next packet descriptor to get sent, along with its index. When head_txp and tail_txp are the same, the transmit queue is empty.
TX PD ring:	Indicates the memory location of the beginning of buffer information for the transmit packet descriptor ring.
tx_head_pd	Indicates current head packet descriptor.
tx_tail_pd	Indicates current tail packet descriptor.
ehdr	Extended MCNS header.
MIB Statistics:	
DS fifo full	Number of times the downstream input first-in first-out (FIFO) buffer became full on the Cisco CVA120 Series Cable Voice Adapter.
rerequests	Number of times a bandwidth request generated by the Cisco CVA120 Series Cable Voice Adapter was not responded to by the CMTS.
DS mac msg overruns	Number of times the Cisco CVA120 Series Cable Voice Adapter's DMA controller had a downstream MAC message and there were no free MAC message buffer descriptors to accept the message.
DS data overruns	Number of times the Cisco CVA120 Series Cable Voice Adapter' DMA controller had downstream data and there were no free data PDU buffer descriptors to accept the data.
Qualified maps	Number of times a MAP message passed all filtering requirements and was received by the Cisco CVA120 Series Cable Voice Adapter.
Qualified syncs	Number of times a timestamp message was received by the Cisco CVA120 Series Cable Voice Adapter.
CRC fails	Number of times a MAC message failed a cyclic redundancy (CRC) check.
HDR chk fails	Number of times a MAC header failed its 16-bit CRC check. The MAC header CRC is a 16-bit Header Check Sequence (HCS) field that ensures the integrity of the MAC header even in a collision environment.
Data pdus	Total number of data PDUs (protocol data units) of all types received by the Cisco CVA120 Series Cable Voice Adapter.
Mac msgs	Number of MAC messages received by the Cisco CVA120 Series Cable Voice Adapter.
Valid hdrs	Number of valid headers received by the Cisco CVA120 Series Cable Voice Adapter, including PDU headers, MAC headers, and headers only.

Table 8 show controllers cable-modem display (continued)

Field	Description
Global control and status:	Used to reset the BCM3300 chip.
interrupts:	Hexadecimal values of the pending IRQ interrupt and IRQ mask.

Related Commands

Command	Description
show controllers cable-modem bpkm	Displays information about the baseline privacy key management exchange between the Cisco CVA120 Series Cable Voice Adapter and the CMTS.
show controllers cable-modem des	Displays information about the Data Encryption Standard (DES) engine registers.
show controllers cable-modem filters	Displays the registers in the MAC hardware that are used for filtering received frames.
show controllers cable-modem lookup-table	Displays the mini-slot lookup table inside a Cisco CVA120 Series Cable Voice Adapter.
show controllers cable-modem mac	Displays detailed MAC-layer information for a Cisco CVA120 Series Cable Voice Adapter.
show controllers cable-modem phy	Displays the contents of the registers used in the downstream physical hardware of the Cisco CVA120 Series Cable Voice Adapter.
show controllers cable-modem tuner	Displays the settings for the upstream and downstream tuners used by a Cisco CVA120 Series Cable Voice Adapter.

show controllers cable-modem bpkm

To display information about the baseline privacy key management exchange between the Cisco CVA120 Series Cable Voice Adapter and the headend CMTS, use the **show controllers cable-modem bpkm** privileged EXEC command.

show controllers cable-modem *number* **bpkm**

Syntax Description

number	Controller number inside the Cisco CVA120 Series Cable Voice Adapter.

Defaults

No default behavior or values.

Command Modes

Privileged EXEC

Command History

Release	Modification
11.3(4)NA	This command was introduced for the Cisco uBR904 cable access router.
12.0(4)XI1	Support was added for the Cisco uBR924 cable access router.
12.1(1)XD	Support was added for the Cisco uBR914 cable DSU.
12.1(3)XL	Support was added for the Cisco uBR905 cable access router.
12.1(5)XU2	Support was added for the Cisco CVA120 Series Cable Voice Adapter.

Usage Guidelines

Baseline privacy key management exchanges take place only when both the Cisco CVA120 Series Cable Voice Adapter and the CMTS are running code images that support baseline privacy, and the privacy class of service is enabled using the configuration file that is downloaded to the cable access router. Baseline privacy code images for the Cisco CVA120 Series Cable Voice Adapter contain **k1** in the code image name.

Examples

The following output is displayed when the headend CMTS does not have baseline privacy enabled:

```
cva120# show controllers cable-modem 0 bpkm
CM Baseline Privacy Key Management
  configuration (in seconds):
      authorization wait time:    10
      reauthorization wait time:  10
      authorization grace time:   600
      operational wait time:      1
      rekey wait time:            1
      tek grace time:             600
      authorization rej wait time: 60
  kek state:    STATE_B_AUTH_WAIT
  sid 4:
      tek state: No resources assigned
```

Table 9 describes the fields shown in the display.

Table 9 show controllers cable-modem bpkm display

Field	Description
authorization wait time	The number of seconds the Cisco CVA120 Series Cable Voice Adapter waits for a reply after sending the Authorization Request message to the CMTS.
reauthorization wait time	The number of seconds the Cisco CVA120 Series Cable Voice Adapter waits for a reply after it has sent an Authorization Request message to the CMTS in response to a reauthorization request or an Authorization Invalid message from the CMTS.
authorization grace time	The number of seconds before the current authorization is set to expire that the grace timer begins, signaling the Cisco CVA120 Series Cable Voice Adapter to begin the reauthorization process.
operational wait time	The number of seconds the TEK state machine waits for a reply from the CMTS after sending its initial Key Request for its SID's keying material.
rekey wait time	The number of seconds the TEK state machine waits for a replacement key for this SID after the TEK grace timer has expired and the request for a replacement key has been made.
tek grace time	The number of seconds before the current TEK is set to expire that the TEK grace timer begins, signaling the TEK state machine to request a replacement key.
authorization rej wait time	Number of seconds the Cisco CVA120 Series Cable Voice Adapter waits before sending another Authorization Request message to the CMTS after it has received an Authorization Reject message.
kek state	The current state of the key encryption key that the CMTS uses to encrypt the traffic encryption keys it sends to the Cisco CVA120 Series Cable Voice Adapter.
tek state	The current state of the traffic encryption key state machine for the specified SID.

Related Commands

Command	Description
show controllers cable-modem	Displays high-level controller information about a Cisco CVA120 Series Cable Voice Adapter.
show controllers cable-modem des	Displays information about the Data Encryption Standard (DES) engine registers.
show controllers cable-modem filters	Displays the registers in the MAC hardware that are used for filtering received frames.
show controllers cable-modem lookup-table	Displays the mini-slot lookup table inside a Cisco CVA120 Series Cable Voice Adapter.
show controllers cable-modem mac	Displays detailed MAC-layer information for a Cisco CVA120 Series Cable Voice Adapter.
show controllers cable-modem phy	Displays the contents of the registers used in the downstream physical hardware of the Cisco CVA120 Series Cable Voice Adapter.
show controllers cable-modem tuner	Displays the settings for the upstream and downstream tuners used by a Cisco CVA120 Series Cable Voice Adapter.

show controllers cable-modem des

To display information about the Data Encryption Standard (DES) engine registers, use the **show controllers cable-modem des** privileged EXEC command**.**

show controllers cable-modem *number* **des**

Syntax Description

number	Controller number inside the Cisco CVA120 Series Cable Voice Adapter.

Defaults

No default behavior or values.

Command Modes

Privileged EXEC

Command History

Release	Modification
11.3(4)NA	This command was introduced for the Cisco uBR904 cable access router.
12.0(4)XI1	Support was added for the Cisco uBR924 cable access router.
12.1(1)XD	Support was added for the Cisco uBR914 cable DSU.
12.1(3)XL	Support was added for the Cisco uBR905 cable access router.
12.1(5)XU2	Support was added for the Cisco CVA120 Series Cable Voice Adapter.

Examples

DES engine registers are displayed in the following example:

```
cva120# show controllers cable-modem 0 des
downstream des:
  ds_des_key_table:
    key 0: even 0, odd 0
    key 1: even 0, odd 0
    key 2: even 0, odd 0
    key 3: even 0, odd 0
  ds_des_cbc_iv_table:
    iv  0: even 0, odd 0
    iv  1: even 0, odd 0
    iv  2: even 0, odd 0
    iv  3: even 0, odd 0
  ds_des_sid_table:
    sid_1=0x0000, sid_2=0x0000, sid_3=0x0000, sid_4=0x0000
  ds_des_sid_enable=0x80, ds_des_ctrl=0x2E
  ds_des_sv=0x0F00
  ds_unencrypted_length=0x0C
upstream des:
  us_des_key_table:
    key 0: even 0, odd 0
    key 1: even 0, odd 0
    key 2: even 0, odd 0
    key 3: even 0, odd 0
  us_des_cbc_iv_table:
    iv  0: even 0, odd 0
    iv  1: even 0, odd 0
```

```
   iv  2: even 0, odd 0
   iv  3: even 0, odd 0
pb_req_bytes_to_minislots=0x10
us_des_ctrl=0x00, us_des_sid_1= 0x1234
ds_unencrypted_length=0x0C
```

Table 10 briefly describes some of the fields shown in the display. For more information, see the Broadcom documentation for the BCM3300 chip.

Table 10 show controllers cable-modem des display

Field	Description
ds_des_key_table	Table showing downstream DES keys.
ds_des_cbc_iv_table	Table of downstream DES Cipher Block Chaining (CBC) mode information.
ds_des_sid_table	Table showing the SID values to be enabled for DES encryption.
ds_des_sid_enable	Controls which SID entries in the SID table are enabled for encryption. In the previous example, none of the entries are enabled for encryption.
ds_des_ctrl	Control register that controls the operating mode of the downstream DES engine.
ds_des_sv	DES security version register; the range of the version field in the Baseline Privacy Interface (BPI) extended headers that are accepted by the hardware. High byte is upper limit, low byte is lower limit. The Cisco CVA120 Series Cable Voice Adapter will accept versions 0 to 15.
ds_unencrypted_length	Specifies the number of bytes that are unencrypted at the beginning of the MAC frame. The value 0x0C means that the first 12 bytes are not encrypted, which is what the DOCSIS Baseline Privacy specification calls for.
us_des_key_table	Table showing upstream DES keys.
us_des_cbc_iv_table	Table of upstream DES Cipher Block Chaining (CBC) mode information.
us_des_ctrl	Control register that controls the operating mode of the upstream DES engine. The value 0x24 means that the upstream is configured to enable decryption and to use CBC mode.

Related Commands

Command	Description
show controllers cable-modem	Displays high-level controller information about a Cisco CVA120 Series Cable Voice Adapter.
show controllers cable-modem bpkm	Displays information about the baseline privacy key management exchange between the Cisco CVA120 Series Cable Voice Adapter and the CMTS.
show controllers cable-modem filters	Displays the registers in the MAC hardware that are used for filtering received frames.
show controllers cable-modem lookup-table	Displays the mini-slot lookup table inside a Cisco CVA120 Series Cable Voice Adapter.
show controllers cable-modem mac	Displays detailed MAC-layer information for a Cisco CVA120 Series Cable Voice Adapter.

show controllers cable-modem phy	Displays the contents of the registers used in the downstream physical hardware of the Cisco CVA120 Series Cable Voice Adapter.
show controllers cable-modem tuner	Displays the settings for the upstream and downstream tuners used by a Cisco CVA120 Series Cable Voice Adapter.

show controllers cable-modem filters

To display the registers in the MAC hardware that are used for filtering received frames, use the **show controllers cable-modem filters** privileged EXEC command**.**

show controllers cable-modem *number* **filters**

Syntax Description

number	Controller number inside the Cisco CVA120 Series Cable Voice Adapter.

Defaults

No default behavior or values.

Command Modes

Privileged EXEC

Command History

Release	Modification
11.3(4)NA	This command was introduced for the Cisco uBR904 cable access router.
12.0(4)XI1	Support was added for the Cisco uBR924 cable access router.
12.1(1)XD	Support was added for the Cisco uBR914 cable DSU.
12.1(3)XL	Support was added for the Cisco uBR905 cable access router.
12.1(5)XU2	Support was added for the Cisco CVA120 Series Cable Voice Adapter.

Usage Guidelines

Some of the filtering parameters are MAC hardware addresses, Service IDs (SIDs), and upstream channel IDs.

Examples

MAC and SID filter information is displayed in the following example:

```
cva120# show controllers cable-modem 0 filters
downstream mac message processing:
  ds_mac_da_filters:
    filter_1=0010.7b43.aa01, filter_2=0000.0000.0000
    filter_3=0000.0000.0000, filter_4=0000.0000.0000
  ds_mac_da_filter_ctrl=0x71, ds_mac_msg_sof=0x0000
  ds_mac_da_mc=01E02F00
  map_parser_sids:
    sid_1=0x0000, sid_2=0x0000, sid_3=0x0000, sid_4=0x0000
  ds_mac_filter_ctrl=0x00, us_channel_id=0x0000
  ds_pid=0x0000, mac_msg_proto_ver=FF 00
  reg_rang_req_sid=0x0000
downstream data processing:
  ds_data_da_filter_table:
    filter_1 0010.7b43.aa01, filter_2 0000.0000.0000
    filter_3 0000.0000.0000, filter_4 0000.0000.0000
  ds_data_da_filter_ctrl=0x61, ds_pdu_sof=0xDEAD
  ds_data_da_mc=01000000

upstream processing:
  us_ctrl_status=0x04, Minislots per request=0x01
```

```
burst_maps:
  map[0]=0 map[1]=0 map[2]=0 map[3]=0
bytes_per_minislot_exp=0x04
us_map_parser_minislot_adv=0x03, ticks_per_minislot=0x08, maint_xmit=0x0001
us_sid_table:
  sid_1=0x0000, sid_2=0x0000, sid_3=0x0000, sid_4=0x0000
max_re_req=0x0010, rang_fifo=0x00
```

Table 11 briefly describes some of the fields shown in the display. For more information, see the Broadcom documentation for the BCM3300 chip.

Table 11 show controllers cable-modem filters display

Field	Description
ds_mac_da_filters	Shows the MAC address of the cable interface and the MAC address of any Ethernet MAC it is bridging.
ds_mac_da_filter_ctrl	Downstream MAC filter control for data.
ds_mac_msg_sof	Downstream MAC message start of frame.
ds_mac_da_mc	Downstream MAC control filter for data.
map_parser_sids	Service IDs used for upstream bandwidth allocation.
ds_mac_filter_ctrl	Downstream MAC filter control for MAC messages.
us_channel_id	Upstream channel ID.
ds_pid	Downstream packet ID
mac_msg_proto_ver	Version of the MAC management protocol in use.
reg_rang_req_sid	Service ID (SID) field of the ranging request message.
ds_data_da_filter_table	Downstream data processing filter table.
ds_data_da_filter_ctrl	Downstream data processing filter control.
ds_pdu_sof	Downstream PDU start of frame.
ds_data_da_mc	Downstream data processing MAC control.
us_ctrl_status	Upstream control status.
Minislots per request	Length of each registration request in mini-slots.
burst_maps	Maps the burst profiles saved in the BCM3037 registers to interval usage codes (IUCs).
bytes_per_minislot_exp	Number of bytes per expansion mini-slot.
ticks_per_minislot	Number of time ticks (6.25-microsecond intervals) in each upstream mini-slot.
maint_xmit	Number of initial maintenance transmit opportunities.
us_sid_table	Upstream service ID table.
max_re_req	Maximum number of registration rerequests allowed.
rang_fifo	Number of ranging requests that can be held in the first-in-first-out (FIFO) buffer.

Related Commands

Command	Description
show controllers cable-modem	Displays high-level controller information about a Cisco CVA120 Series Cable Voice Adapter.
show controllers cable-modem bpkm	Displays information about the baseline privacy key management exchange between the Cisco CVA120 Series Cable Voice Adapter and the CMTS.
show controllers cable-modem des	Displays information about the Data Encryption Standard (DES) engine registers.
show controllers cable-modem lookup-table	Displays the mini-slot lookup table inside a Cisco CVA120 Series Cable Voice Adapter.
show controllers cable-modem mac	Displays detailed MAC-layer information for a Cisco CVA120 Series Cable Voice Adapter.
show controllers cable-modem phy	Displays the contents of the registers used in the downstream physical hardware of the Cisco CVA120 Series Cable Voice Adapter.
show controllers cable-modem tuner	Displays the settings for the upstream and downstream tuners used by a Cisco CVA120 Series Cable Voice Adapter.

show controllers cable-modem lookup-table

To display the mini-slot lookup table inside a Cisco CVA120 Series Cable Voice Adapter, use the **show controllers cable-modem lookup-table** privileged EXEC command.

show controllers cable-modem *number* **lookup-table**

Syntax Description

number	Controller number inside the Cisco CVA120 Series Cable Voice Adapter.

Defaults

No default behavior or values.

Command Modes

Privileged EXEC

Command History

Release	Modification
11.3(4)NA	This command was introduced for the Cisco uBR904 cable access router.
12.0(4)XI1	Support was added for the Cisco uBR924 cable access router.
12.1(1)XD	Support was added for the Cisco uBR914 cable DSU.
12.1(3)XL	Support was added for the Cisco uBR905 cable access router.
12.1(5)XU2	Support was added for the Cisco CVA120 Series Cable Voice Adapter.

Usage Guidelines

This command displays the details of the lookup table. The driver uses this table to convert the size of the packets that the Cisco CVA120 Series Cable Voice Adapter wants to transmit into a bandwidth request to the CMTS in mini-slots. The contents of this table are affected by the upstream symbol rate that is negotiated between the CMTS and the cable access router.

Use this table to look up the packet size and determine how many mini-slots are needed.

Examples

The mini-slot lookup table is displayed in the following example:

```
cva120# show controllers cable-modem 0 lookup-table
Max Burst Size (minislots) = 0x6
Max Burst Length (bytes) = 0x4B

PHY Overhead Lookup Table:

000:    01 06 06 06 06 06 06 06 06 06 06 06 06 06 06 06
010:    06 06 06 06 06 06 06 06 06 06 06 06 06 06 06 06
020:    06 06 06 06 06 06 06 06 06 06 06 06 06 06 06 06
030:    06 06 06 06 06 06 06 06 06 06 06 06 06 06 06 06
040:    06 06 06 06 06 06 06 06 06 06 06 06 10 10 10 10
050:    10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10
060:    10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10
070:    10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10
080:    10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10
090:    10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10
0A0:    10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10
```

```
0B0:    10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10
0C0:    10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10
0D0:    10 10 10 10 10 10 10 10 10 10 10 10 10 1F 1F 1F
0E0:    1F 1F 1F 1F 1F 1F 1F 1F 1F 1F 1F 1F 1F 1F 1F 1F
0F0:    1F 1F 1F 1F 1F 1F 1F 1F 1F 1F 1F 1F 1F 1F 1F 1F
100:    1F 1F 1F 1F 1F 1F 1F 1F 1F 1F 1F 1F 1F 1F 1F 1F
110:    1F 1F 1F 1F 1F 1F 1F 1F 1F 1F 1F 1F 1F 1F 1F 1F
120:    1F 1F 1F 1F 1F 1F 1F 1F 1F 1F 1F 1F 1F 1F 1F 1F
130:    1F 1F 1F 1F 1F 1F 1F 1F 1F 1F 1F 1F 1F 1F 1F 1F
140:    1F 1F 1F 1F 1F 1F 1F 1F 1F 1F 1F 1F 1F 1F 1F 1F
150:    1F 1F 1F 1F 1F 1F 1F 1F 1F 1F 1F 1F 1F 1F 1F 1F
160:    1F 1F 1F 1F 1F 1F 1F 1F 1F 1F 1F 1F 1F 1F 1F 1F
170:    1F 1F 1F 1F 1F 1F 1F 1F 1F 1F 1F 1F 1F 1F 1F 1F
180:    1F 1F 1F 1F 1F 1F 1F 1F 1F 1F 1F 1F 1F 1F 1F 1F
190:    1F 1F 1F 1F 1F 1F 1F 1F 1F 1F 1F 1F 1F 1F 1F 1F
1A0:    1F 1F 1F 1F 1F 1F 1F 1F 1F 1F 1F 1F 1F 1F 1F 1F
1B0:    1F 1F 1F 1F 1F 1F 1F 1F 1F 2D 2D 2D 2D 2D 2D 2D
1C0:    2D 2D 2D 2D 2D 2D 2D 2D 2D 2D 2D 2D 2D 2D 2D 2D
1D0:    2D 2D 2D 2D 2D 2D 2D 2D 2D 2D 2D 2D 2D 2D 2D 2D
1E0:    2D 2D 2D 2D 2D 2D 2D 2D 2D 2D 2D 2D 2D 2D 2D 2D
1F0:    2D 2D 2D 2D 2D 2D 2D 2D 2D 2D 2D 2D 2D 2D 2D 2D
200:    2D 2D 2D 2D 2D 2D 2D 2D 2D 2D 2D 2D 2D 2D 2D 2D
210:    2D 2D 2D 2D 2D 2D 2D 2D 2D 2D 2D 2D 2D 2D 2D 2D
220:    2D 2D 2D 2D 2D 2D 2D 2D 2D 2D 2D 2D 2D 2D 2D 2D
230:    2D 2D 2D 2D 2D 2D 2D 2D 2D 2D 2D 2D 2D 2D 2D 2D
240:    2D 2D 2D 2D 2D 2D 2D 2D 2D 2D 2D 2D 2D 2D 2D 2D
250:    2D 2D 2D 2D 2D 2D 2D 2D 2D 2D 2D 2D 2D 2D 2D 2D
260:    2D 2D 2D 2D 2D 2D 2D 2D 2D 2D 2D 2D 2D 2D 2D 2D
270:    2D 2D 2D 2D 2D 2D 2D 2D 2D 2D 2D 2D 2D 2D 2D 2D
280:    2D 2D 2D 2D 2D 2D 2D 2D 2D 2D 2D 2D 2D 2D 2D 2D
290:    2D 2D 2D 2D 2D 3C 3C 3C 3C 3C 3C 3C 3C 3C 3C 3C
2A0:    3C 3C 3C 3C 3C 3C 3C 3C 3C 3C 3C 3C 3C 3C 3C 3C
2B0:    3C 3C 3C 3C 3C 3C 3C 3C 3C 3C 3C 3C 3C 3C 3C 3C
2C0:    3C 3C 3C 3C 3C 3C 3C 3C 3C 3C 3C 3C 3C 3C 3C 3C
2D0:    3C 3C 3C 3C 3C 3C 3C 3C 3C 3C 3C 3C 3C 3C 3C 3C
2E0:    3C 3C 3C 3C 3C 3C 3C 3C 3C 3C 3C 3C 3C 3C 3C 3C
2F0:    3C 3C 3C 3C 3C 3C 3C 3C 3C 3C 3C 3C 3C 3C 3C 3C
300:    3C 3C 3C 3C 3C 3C 3C 3C 3C 3C 3C 3C 3C 3C 3C 3C
310:    3C 3C 3C 3C 3C 3C 3C 3C 3C 3C 3C 3C 3C 3C 3C 3C
320:    3C 3C 3C 3C 3C 3C 3C 3C 3C 3C 3C 3C 3C 3C 3C 3C
330:    3C 3C 3C 3C 3C 3C 3C 3C 3C 3C 3C 3C 3C 3C 3C 3C
340:    3C 3C 3C 3C 3C 3C 3C 3C 3C 3C 3C 3C 3C 3C 3C 3C
350:    3C 3C 3C 3C 3C 3C 3C 3C 3C 3C 3C 3C 3C 3C 3C 3C
360:    3C 3C 3C 3C 3C 3C 3C 3C 3C 3C 3C 3C 3C 3C 3C 3C
370:    3C 4B 4B 4B 4B 4B 4B 4B 4B 4B 4B 4B 4B 4B 4B 4B
380:    4B 4B 4B 4B 4B 4B 4B 4B 4B 4B 4B 4B 4B 4B 4B 4B
390:    4B 4B 4B 4B 4B 4B 4B 4B 4B 4B 4B 4B 4B 4B 4B 4B
3A0:    4B 4B 4B 4B 4B 4B 4B 4B 4B 4B 4B 4B 4B 4B 4B 4B
3B0:    4B 4B 4B 4B 4B 4B 4B 4B 4B 4B 4B 4B 4B 4B 4B 4B
3C0:    4B 4B 4B 4B 4B 4B 4B 4B 4B 4B 4B 4B 4B 4B 4B 4B
3D0:    4B 4B 4B 4B 4B 4B 4B 4B 4B 4B 4B 4B 4B 4B 4B 4B
3E0:    4B 4B 4B 4B 4B 4B 4B 4B 4B 4B 4B 4B 4B 4B 4B 4B
3F0:    4B 4B 4B 4B 4B 4B 4B 4B 4B 4B 4B 4B 4B 4B 4B 4B
400:    4B 4B 4B 4B 4B 4B 4B 4B 4B 4B 4B 4B 4B 4B 4B 4B
410:    4B 4B 4B 4B 4B 4B 4B 4B 4B 4B 4B 4B 4B 4B 4B 4B
420:    4B 4B 4B 4B 4B 4B 4B 4B 4B 4B 4B 4B 4B 4B 4B 4B
430:    4B 4B 4B 4B 4B 4B 4B 4B 4B 4B 4B 4B 4B 4B 4B 4B
440:    4B 4B 4B 4B 4B 4B 4B 4B 4B 4B 4B 4B 5A 5A 5A 5A
450:    5A 5A 5A 5A 5A 5A 5A 5A 5A 5A 5A 5A 5A 5A 5A 5A
460:    5A 5A 5A 5A 5A 5A 5A 5A 5A 5A 5A 5A 5A 5A 5A 5A
470:    5A 5A 5A 5A 5A 5A 5A 5A 5A 5A 5A 5A 5A 5A 5A 5A
480:    5A 5A 5A 5A 5A 5A 5A 5A 5A 5A 5A 5A 5A 5A 5A 5A
490:    5A 5A 5A 5A 5A 5A 5A 5A 5A 5A 5A 5A 5A 5A 5A 5A
4A0:    5A 5A 5A 5A 5A 5A 5A 5A 5A 5A 5A 5A 5A 5A 5A 5A
```

```
4B0:    5A 5A 5A 5A 5A 5A 5A 5A 5A 5A 5A 5A 5A 5A 5A 5A
4C0:    5A 5A 5A 5A 5A 5A 5A 5A 5A 5A 5A 5A 5A 5A 5A 5A
4D0:    5A 5A 5A 5A 5A 5A 5A 5A 5A 5A 5A 5A 5A 5A 5A 5A
4E0:    5A 5A 5A 5A 5A 5A 5A 5A 5A 5A 5A 5A 5A 5A 5A 5A
4F0:    5A 5A 5A 5A 5A 5A 5A 5A 5A 5A 5A 5A 5A 5A 5A 5A
500:    5A 5A 5A 5A 5A 5A 5A 5A 5A 5A 5A 5A 5A 5A 5A 5A
510:    5A 5A 5A 5A 5A 5A 5A 5A 5A 5A 5A 5A 5A 5A 5A 5A
520:    5A 5A 5A 5A 5A 5A 5A 5A 5A 68 68 68 68 68 68 68
530:    68 68 68 68 68 68 68 68 68 68 68 68 68 68 68 68
540:    68 68 68 68 68 68 68 68 68 68 68 68 68 68 68 68
550:    68 68 68 68 68 68 68 68 68 68 68 68 68 68 68 68
560:    68 68 68 68 68 68 68 68 68 68 68 68 68 68 68 68
570:    68 68 68 68 68 68 68 68 68 68 68 68 68 68 68 68
580:    68 68 68 68 68 68 68 68 68 68 68 68 68 68 68 68
590:    68 68 68 68 68 68 68 68 68 68 68 68 68 68 68 68
5A0:    68 68 68 68 68 68 68 68 68 68 68 68 68 68 68 68
5B0:    68 68 68 68 68 68 68 68 68 68 68 68 68 68 68 68
5C0:    68 68 68 68 68 68 68 68 68 68 68 68 68 68 68 68
5D0:    68 68 68 68 68 68 68 68 68 68 68 68 68 68 68 68
5E0:    68 68 68 68 68 68 68 68 68 68 68 68 68 68 68 68
5F0:    68 68 68 68 68 68 68 68 68 68 68 68 68 68 68 68
600:    68 68 68 68 68 77 77 77 77 77 77 77 77 77 77 77
610:    77 77 77 77 77 77 77 77 77 77 77 77 77 77 77 77
620:    77 77 77 77 77 77 77 77 77 77 77 77 77 77 77 77
630:    77 77 77 77 77 77 77 77 77 77 77 77 77 77 77 77

PHY Reverse Lookup Table:

00:    0000 0000 0000 0000 0000 0000 004B 0000
08:    0000 0000 0000 0000 0000 0000 0000 0000
10:    00DC 00DC 00DC 00DC 00DC 00DC 00DC 00DC
18:    00DC 00DC 00DC 00DC 00DC 00DC 00DC 01B8
20:    01B8 01B8 01B8 01B8 01B8 01B8 01B8 01B8
28:    01B8 01B8 01B8 01B8 01B8 0294 0294 0294
30:    0294 0294 0294 0294 0294 0294 0294 0294
38:    0294 0294 0294 0294 0370 0370 0370 0370
40:    0370 0370 0370 0370 0370 0370 0370 0370
48:    0370 0370 0370 044C 044C 044C 044C 044C
50:    044C 044C 044C 044C 044C 044C 044C 044C
58:    044C 044C 0528 0528 0528 0528 0528 0528
60:    0528 0528 0528 0528 0528 0528 0528 0528
68:    0604 0604 0604 0604 0604 0604 0604 0604
70:    0604 0604 0604 0604 0604 0604 0604 06E0
78:    06E0 06E0 06E0 06E0 06E0 06E0 06E0 06E0
80:    06E0 06E0 06E0 06E0 06E0 06E0 07BC 07BC
88:    07BC 07BC 07BC 07BC 07BC 07BC 07BC 07BC
90:    07BC 07BC 07BC 07BC 07BC 0898 0898 0898
98:    0898 0898 0898 0898 0898 0898 0898 0898
A0:    0898 0898 0898 0974 0974 0974 0974 0974
A8:    0974 0974 0974 0974 0974 0974 0974 0974
B0:    0974 0974 0A50 0A50 0A50 0A50 0A50 0A50
B8:    0A50 0A50 0A50 0A50 0A50 0A50 0A50 0A50
C0:    0A50 0B2C 0B2C 0B2C 0B2C 0B2C 0B2C 0B2C
C8:    0B2C 0B2C 0B2C 0B2C 0B2C 0B2C 0B2C 0B2C
D0:    0C08 0C08 0C08 0C08 0C08 0C08 0C08 0C08
D8:    0C08 0C08 0C08 0C08 0C08 0C08 0CE4 0CE4
E0:    0CE4 0CE4 0CE4 0CE4 0CE4 0CE4 0CE4 0CE4
E8:    0CE4 0CE4 0CE4 0CE4 0CE4 0DC0 0DC0 0DC0
F0:    0DC0 0DC0 0DC0 0DC0 0DC0 0DC0 0DC0 0DC0
F8:    0DC0 0DC0 0DC0 0DC0 0E9C 0E9C 0E9C 0E9C
```

Related Commands

Command	Description
show controllers cable-modem	Displays high-level controller information about a Cisco CVA120 Series Cable Voice Adapter.
show controllers cable-modem bpkm	Displays information about the baseline privacy key management exchange between the Cisco CVA120 Series Cable Voice Adapter and the CMTS.
show controllers cable-modem des	Displays information about the Data Encryption Standard (DES) engine registers.
show controllers cable-modem filters	Displays the registers in the MAC hardware that are used for filtering received frames.
show controllers cable-modem mac	Displays detailed MAC-layer information for a Cisco CVA120 Series Cable Voice Adapter.
show controllers cable-modem phy	Displays the contents of the registers used in the downstream physical hardware of the Cisco CVA120 Series Cable Voice Adapter.
show controllers cable-modem tuner	Displays the settings for the upstream and downstream tuners used by a Cisco CVA120 Series Cable Voice Adapter.

show controllers cable-modem mac

To display detailed MAC-layer information for a Cisco CVA120 Series Cable Voice Adapter, use the **show controllers cable-modem mac** command in privileged EXEC mode.

show controllers cable-modem *number* **mac** [**errors** | **hardware** | **log** | **resets** | **state**]

Syntax Description

number	Controller number inside the Cisco CVA120 Series Cable Voice Adapter.
errors	(Optional) Displays a log of the error events that are reported to SNMP. This keyword enables you to look at the error events without accessing a MIB.
hardware	(Optional) Displays all MAC hardware registers.
log	(Optional) Displays a history of MAC log messages, up to 1023 entries. This is the same output that is displayed when using the **debug cable-modem mac log** command.
resets	(Optional) Extracts all of the reset causes out of the MAC log file and summarizes them in a mini report.
state	(Optional) Displays a summary of the MAC state.

Defaults

No default behavior or values.

Command Modes

Privileged EXEC

Command History

Release	Modification
11.3(4)NA	This command was introduced for the Cisco uBR904 cable access router.
12.0(4)XI1	Support was added for the Cisco uBR924 cable access router.
12.1(1)XD	Support was added for the Cisco uBR914 cable DSU.
12.1(3)XL	Support was added for the Cisco uBR905 cable access router.
12.1(5)XU2	Support was added for the Cisco CVA120 Series Cable Voice Adapter.

Usage Guidelines

MAC log messages are written to a circular log file even when debugging is not turned on. These messages include timestamps, events, and information pertinent to these events. Use the **show controllers cable-modem mac log** command to view MAC log messages.

If the Cisco CVA120 Series Cable Voice Adapter interface fails to come up or resets periodically, the MAC log will capture what happened. For example, if an address is not obtained from the DHCP server, an error is logged, initialization starts over, and the Cisco CVA120 Series Cable Voice Adapter scans for a downstream frequency.

The most useful keywords for troubleshooting a Cisco CVA120 Series Cable Voice Adapter are **log**, **errors**, and **resets**. See the following examples for typical output.

Example 1

The following sample display shows the MAC log file for a cable-modem interface that has successfully registered with the CMTS:

```
cva120# show controllers cable-modem 0 mac log
00:14:24:    864.124 CMAC_LOG_DRIVER_INIT_IDB_RESET             0x080B7430
00:14:24:    864.128 CMAC_LOG_LINK_DOWN
00:14:24:    864.132 CMAC_LOG_RESET_FROM_DRIVER
00:14:24:    864.134 CMAC_LOG_STATE_CHANGE                      wait_for_link_up_state
00:14:24:    864.138 CMAC_LOG_LINK_UP
00:14:24:    864.142 CMAC_LOG_STATE_CHANGE                      ds_channel_scanning_state
00:14:24:    864.270 CMAC_LOG_WILL_SEARCH_DS_FREQUENCY_BAND     81/453000000/855000000/6000000
00:14:24:    864.276 CMAC_LOG_WILL_SEARCH_DS_FREQUENCY_BAND     82/93000000/105000000/6000000
00:14:24:    864.280 CMAC_LOG_WILL_SEARCH_DS_FREQUENCY_BAND     83/111025000/117025000/6000000
00:14:24:    864.286 CMAC_LOG_WILL_SEARCH_DS_FREQUENCY_BAND     84/231012500/327012500/6000000
00:14:24:    864.290 CMAC_LOG_WILL_SEARCH_DS_FREQUENCY_BAND     85/333025000/333025000/6000000
00:14:24:    864.294 CMAC_LOG_WILL_SEARCH_DS_FREQUENCY_BAND     86/339012500/399012500/6000000
00:14:24:    864.300 CMAC_LOG_WILL_SEARCH_DS_FREQUENCY_BAND     87/405000000/447000000/6000000
00:14:24:    864.304 CMAC_LOG_WILL_SEARCH_DS_FREQUENCY_BAND     88/123012500/129012500/6000000
00:14:24:    864.310 CMAC_LOG_WILL_SEARCH_DS_FREQUENCY_BAND     89/135012500/135012500/6000000
00:14:24:    864.314 CMAC_LOG_WILL_SEARCH_DS_FREQUENCY_BAND     90/141000000/171000000/6000000
00:14:24:    864.320 CMAC_LOG_WILL_SEARCH_DS_FREQUENCY_BAND     91/219000000/225000000/6000000
00:14:24:    864.324 CMAC_LOG_WILL_SEARCH_DS_FREQUENCY_BAND     92/177000000/213000000/6000000
00:14:24:    864.330 CMAC_LOG_WILL_SEARCH_DS_FREQUENCY_BAND     93/55752700/67753300/6000300
00:14:24:    864.334 CMAC_LOG_WILL_SEARCH_DS_FREQUENCY_BAND     94/79753900/85754200/6000300
00:14:24:    864.340 CMAC_LOG_WILL_SEARCH_DS_FREQUENCY_BAND     95/175758700/211760500/6000300
00:14:24:    864.344 CMAC_LOG_WILL_SEARCH_DS_FREQUENCY_BAND     96/121756000/169758400/6000300
00:14:24:    864.348 CMAC_LOG_WILL_SEARCH_DS_FREQUENCY_BAND     97/217760800/397769800/6000300
00:14:24:    864.354 CMAC_LOG_WILL_SEARCH_DS_FREQUENCY_BAND     98/73753600/115755700/6000300
00:14:24:    864.358 CMAC_LOG_WILL_SEARCH_DS_FREQUENCY_BAND     99/403770100/997799800/6000300
00:14:24:    864.364 CMAC_LOG_WILL_SEARCH_SAVED_DS_FREQUENCY    213000000
00:14:25:    865.450 CMAC_LOG_UCD_MSG_RCVD                      1
00:14:25: %LINK-3-UPDOWN: Interface cable-modem0, changed state to up
00:14:26:    866.200 CMAC_LOG_DS_64QAM_LOCK_ACQUIRED            213000000
00:14:26:    866.204 CMAC_LOG_DS_CHANNEL_SCAN_COMPLETED
00:14:26:    866.206 CMAC_LOG_STATE_CHANGE                      wait_ucd_state
00:14:26: %LINEPROTO-5-UPDOWN: Line protocol on Interface cable-modem0, changed state to down
00:14:27:    867.456 CMAC_LOG_UCD_MSG_RCVD                      1
00:14:29:    869.470 CMAC_LOG_UCD_MSG_RCVD                      1
00:14:29:    869.472 CMAC_LOG_ALL_UCDS_FOUND
00:14:29:    869.476 CMAC_LOG_STATE_CHANGE                      wait_map_state
00:14:29:    869.480 CMAC_LOG_UCD_NEW_US_FREQUENCY              20000000
00:14:29:    869.484 CMAC_LOG_SLOT_SIZE_CHANGED                 8
00:14:29:    869.564 CMAC_LOG_FOUND_US_CHANNEL                  1
00:14:31:    871.484 CMAC_LOG_UCD_MSG_RCVD                      1
00:14:31:    871.692 CMAC_LOG_MAP_MSG_RCVD
00:14:31:    871.694 CMAC_LOG_INITIAL_RANGING_MINISLOTS         40
00:14:31:    871.696 CMAC_LOG_STATE_CHANGE                      ranging_1_state
00:14:31:    871.700 CMAC_LOG_RANGING_OFFSET_SET_TO             9610
00:14:31:    871.704 CMAC_LOG_POWER_LEVEL_IS                    32.0  dBmV (commanded)
00:14:31:    871.708 CMAC_LOG_STARTING_RANGING
00:14:31:    871.710 CMAC_LOG_RANGING_BACKOFF_SET               0
00:14:31:    871.714 CMAC_LOG_RNG_REQ_QUEUED                    0
00:14:32:    872.208 CMAC_LOG_RNG_REQ_TRANSMITTED
00:14:32:    872.216 CMAC_LOG_RNG_RSP_MSG_RCVD
00:14:32:    872.218 CMAC_LOG_RNG_RSP_SID_ASSIGNED              16
00:14:32:    872.222 CMAC_LOG_ADJUST_RANGING_OFFSET             2853
00:14:32:    872.224 CMAC_LOG_RANGING_OFFSET_SET_TO             12463
00:14:32:    872.228 CMAC_LOG_ADJUST_TX_POWER                   8
00:14:32:    872.230 CMAC_LOG_POWER_LEVEL_IS                    34.0  dBmV (commanded)
00:14:32:    872.234 CMAC_LOG_STATE_CHANGE                      ranging_2_state
00:14:32:    872.238 CMAC_LOG_RNG_REQ_QUEUED                    16
```

```
00:14:32:    872.848 CMAC_LOG_RNG_REQ_TRANSMITTED
00:14:32:    872.852 CMAC_LOG_RNG_RSP_MSG_RCVD
00:14:32:    872.856 CMAC_LOG_RANGING_SUCCESS
00:14:32:    872.874 CMAC_LOG_STATE_CHANGE                        dhcp_state
00:14:33:    873.386 CMAC_LOG_DHCP_ASSIGNED_IP_ADDRESS            188.188.1.62
00:14:33:    873.388 CMAC_LOG_DHCP_TFTP_SERVER_ADDRESS            4.0.0.32
00:14:33:    873.392 CMAC_LOG_DHCP_TOD_SERVER_ADDRESS             4.0.0.32
00:14:33:    873.396 CMAC_LOG_DHCP_SET_GATEWAY_ADDRESS
00:14:33:    873.398 CMAC_LOG_DHCP_TZ_OFFSET                      60
00:14:33:    873.402 CMAC_LOG_DHCP_CONFIG_FILE_NAME               platinum.cm
00:14:33:    873.406 CMAC_LOG_DHCP_ERROR_ACQUIRING_SEC_SVR_ADDR
00:14:33:    873.410 CMAC_LOG_DHCP_COMPLETE
00:14:33:    873.536 CMAC_LOG_STATE_CHANGE                        establish_tod_state
00:14:33:    873.546 CMAC_LOG_TOD_REQUEST_SENT
00:14:33:    873.572 CMAC_LOG_TOD_REPLY_RECEIVED                  3140961992
00:14:33:    873.578 CMAC_LOG_TOD_COMPLETE
00:14:33:    873.582 CMAC_LOG_STATE_CHANGE                        security_association_state
00:14:33:    873.584 CMAC_LOG_SECURITY_BYPASSED
00:14:33:    873.588 CMAC_LOG_STATE_CHANGE                        configuration_file_state
00:14:33:    873.592 CMAC_LOG_LOADING_CONFIG_FILE                 platinum.cm
00:14:34: %LINEPROTO-5-UPDOWN: Line protocol on Interface cable-modem0, changed state to up
00:14:34:    874.728 CMAC_LOG_CONFIG_FILE_PROCESS_COMPLETE
00:14:34:    874.730 CMAC_LOG_STATE_CHANGE                        registration_state
00:14:34:    874.734 CMAC_LOG_REG_REQ_MSG_QUEUED
00:14:34:    874.744 CMAC_LOG_REG_REQ_TRANSMITTED
00:14:34:    874.754 CMAC_LOG_REG_RSP_MSG_RCVD
00:14:34:    874.756 CMAC_LOG_COS_ASSIGNED_SID                    1/16
00:14:34:    874.760 CMAC_LOG_RNG_REQ_QUEUED                      16
00:14:34:    874.768 CMAC_LOG_REGISTRATION_OK
00
:14:34:    874.770 CMAC_LOG_REG_RSP_ACK_MSG_QUEUED             0
00:14:34:    874.774 CMAC_LOG_STATE_CHANGE                        establish_privacy_state
00:14:34:    874.778 CMAC_LOG_PRIVACY_NOT_CONFIGURED
00:14:34:    874.780 CMAC_LOG_STATE_CHANGE                        maintenance_state
00:14:34:    874.784 CMAC_LOG_REG_RSP_ACK_MESSAGE_EVENT
00:14:34:    874.788 CMAC_LOG_REG_RSP_ACK_MSG_SENT
```

If the DHCP server cannot not be reached, the error will look like this in the MAC log:

```
00:14:32:    872.874 CMAC_LOG_STATE_CHANGE                        dhcp_state
00:14:33:    873.386 CMAC_LOG_RNG_REQ_TRANSMITTED
00:14:33:    873.388 CMAC_LOG_RNG_RSP_MSG_RCVD
00:14:33:    873.386 CMAC_LOG_RNG_REQ_TRANSMITTED
00:14:33:    873.392 CMAC_LOG_RNG_RSP_MSG_RCVD
00:14:33:    873.396 CMAC_LOG_WATCHDOG_TIMER
00:14:33:    873.398 CMAC_LOG_RESET_DHCP_WATCHDOG_EXPIRED
00:14:33:    873.402 CMAC_LOG_STATE_CHANGE                        reset_interface_state
00:14:33:    873.406 CMAC_LOG_DHCP_PROCESS_KILLED
```

Example 2

MAC error log information is displayed in the following example, which is also reported using SNMP:

```
cva120# show controllers cable-modem 0 mac errors
 74373.574 R02.0  No Ranging Response received.  T3 time-out.
 74374.660 R02.0  No Ranging Response received.  T3 time-out.
 74375.508 R02.0  No Ranging Response received.  T3 time-out.
 74375.748 R02.0  No Ranging Response received.  T3 time-out.
 74375.748 R03.0  Ranging Request Retries exhausted.
 74376.112 R02.0  No Ranging Response received.  T3 time-out.
 74376.354 R02.0  No Ranging Response received.  T3 time-out.
 74376.778 R02.0  No Ranging Response received.  T3 time-out.
 74377.442 R02.0  No Ranging Response received.  T3 time-out.
```

This output indicates that the Cisco CVA120 Series Cable Voice Adapter has acquired a downstream lock, successfully read a UCD, and successfully read a MAP. However, the cable voice adapter was unable to communicate with the CMTS after ranging through all upstream transmit power levels. The Cisco CVA120 Series Cable Voice Adapter tried to communicate with the CMTS 16 times without success, after which it reset the cable interface to try to find a better downstream frequency.

If the DHCP server could not be reached, the error would look like this in the MAC error display:

```
cva120# show controllers cable-modem 0 mac errors
497989.804 D01.0  Discover sent no Offer received.  No available DHCP Server.
498024.046 D01.0  Discover sent no Offer received.  No available DHCP Server.
498058.284 D01.0  Discover sent no Offer received.  No available DHCP Server.
```

Example 3

The **show controllers cable-modem 0 mac resets** command shows only the entries in the MAC log that begin with the field CMAC_LOG_RESET. Collectively presenting these fields provides you with a summary of the most recent reasons why the cable interface was reset.

Reset messages and brief explanations are included in the following examples; however, the reset messages do not commonly occur.

In the following example, the configuration file downloaded from the TFTP server could not be read. The file might not exist, or the file might have incorrect permissions.

```
cva120# show controllers cable-modem 0 mac resets
 62526.114 CMAC_LOG_RESET_CONFIG_FILE_READ_FAILED
 62564.368 CMAC_LOG_RESET_T4_EXPIRED
 62677.178 CMAC_LOG_RESET_CONFIG_FILE_READ_FAILED
 62717.462 CMAC_LOG_RESET_CONFIG_FILE_READ_FAILED
 62757.746 CMAC_LOG_RESET_CONFIG_FILE_READ_FAILED
 62796.000 CMAC_LOG_RESET_T4_EXPIRED
 62908.808 CMAC_LOG_RESET_CONFIG_FILE_READ_FAILED
 62949.092 CMAC_LOG_RESET_CONFIG_FILE_READ_FAILED
 62989.380 CMAC_LOG_RESET_CONFIG_FILE_READ_FAILED
 63029.662 CMAC_LOG_RESET_CONFIG_FILE_READ_FAILED
 63069.944 CMAC_LOG_RESET_CONFIG_FILE_READ_FAILED
 63110.228 CMAC_LOG_RESET_CONFIG_FILE_READ_FAILED
 63148.484 CMAC_LOG_RESET_T4_EXPIRED
 63261.296 CMAC_LOG_RESET_CONFIG_FILE_READ_FAILED
```

The following example shows that the DHCP server could not be reached, or that it took too long to respond.

```
cva120# show controllers cable-modem 0 mac resets
497989.804 CMAC_LOG_RESET_DHCP_WATCHDOG_EXPIRED
498024.046 CMAC_LOG_RESET_DHCP_WATCHDOG_EXPIRED
498058.284 CMAC_LOG_RESET_DHCP_WATCHDOG_EXPIRED
```

The following example indicates that an event in the cable interface driver caused the interface to reset. This often occurs because the interface has just been shutdown or cleared.

```
cva120# show controllers cable-modem 0 mac resets
527986.444 CMAC_LOG_RESET_FROM_DRIVER
528302.042 CMAC_LOG_RESET_FROM_DRIVER
528346.600 CMAC_LOG_RESET_FROM_DRIVER
528444.494 CMAC_LOG_RESET_FROM_DRIVER
```

Table 12 lists the fields displayed by the **show controllers cable-modem mac resets** command:

Table 12 show controllers cable-modem mac resets display

Message	Description
CMAC_LOG_RESET_CONFIG_FILE_PARSE_FAILED	The format of the DOCSIS configuration file acquired from the TFTP server is not acceptable.
CMAC_LOG_RESET_LOSS_OF_SYNC	Synchronization with the CMTS has been lost (SYNC messages are not being received).
CMAC_LOG_RESET_T4_EXPIRED	Maintenance ranging opportunities for this Cisco CVA120 Series Cable Voice Adapter are not being received from the CMTS.
CMAC_LOG_RESET_DHCP_WATCHDOG_EXPIRED	The DHCP server took too long to respond.
CMAC_LOG_RESET_TOD_WATCHDOG_EXPIRED	The Time Of Day server took too long to respond.
CMAC_LOG_RESET_PRIVACY_WATCHDOG_EXPIRED	The baseline privacy exchange with the CMTS took too long.
CMAC_LOG_RESET_CHANGE_US_WATCHDOG_EXPIRED	The Cisco CVA120 Series Cable Voice Adapter was unable to transmit a response to a UCC-REQ message.
CMAC_LOG_RESET_SECURITY_WATCHDOG_EXPIRED	The “full security” exchange with the CMTS took too long.
CMAC_LOG_RESET_CONFIG_FILE_WATCHDOG_EXPIRED	The TFTP server took too long to respond.
CMAC_LOG_RESET_ALL_FREQUENCIES_SEARCHED	All downstream frequencies to be searched have been searched. **Note** This message indicates that downstream frequencies were found, but the Cisco CVA120 Series Cable Voice Adapter failed to acquire a downstream lock.
CMAC_LOG_RESET_T2_EXPIRED	Initial ranging opportunities are not being received.
CMAC_LOG_RESET_T3_RETRIES_EXHAUSTED	The CMTS failed too many times to respond to a RNG-REQ message. **Note** After 16 T3 timeouts, the Cisco CVA120 Series Cable Voice Adapter will reset the cable interface.
CMAC_LOG_RESET_RANGING_ABORTED	The CMTS commanded the Cisco CVA120 Series Cable Voice Adapter to abort the ranging process.
CMAC_LOG_RESET_NO_MEMORY	The Cisco CVA120 Series Cable Voice Adapter has run out of memory.
CMAC_LOG_RESET_CANT_START_PROCESS	The Cisco CVA120 Series Cable Voice Adapter was unable to start an internal process necessary to complete ranging and registration.

Table 12 show controllers cable-modem mac resets display (continued)

Message	Description
CMAC_LOG_RESET_CONFIG_FILE_READ_FAILED	The reading of the configuration file from the TFTP server failed. **Note** The file might not exist, or it might have incorrect permissions.
CMAC_LOG_RESET_AUTHENTICATION_FAILURE	The Cisco CVA120 Series Cable Voice Adapter failed authentication as indicated in a REG-RSP message from the CMTS.
CMAC_LOG_RESET_SERVICE_NOT_AVAILABLE	The CMTS has failed the Cisco CVA120 Series Cable Voice Adapter's registration because a required or requested class of service is not available.
CMAC_LOG_RESET_T6_RETRIES_EXHAUSTED	The CMTS failed too many times to respond to a REG-REQ message.
CMAC_LOG_RESET_MAINTENANCE_WATCHDOG_DRIVER	The Cisco CVA120 Series Cable Voice Adapter MAC layer failed to detect a change in the interface driver.
CMAC_LOG_RESET_NET_ACCESS_MISSING	The Network Access parameter is missing from the DOCSIS configuration file.
CMAC_LOG_RESET_FAILED_WRITE_ACCESS_CONTROL	The Cisco CVA120 Series Cable Voice Adapter was unable to set the Write Access Control for an SNMP parameter as specified by the DOCSIS configuration file.
CMAC_LOG_RESET_DHCP_FAILED	The DHCP server did not respond with all the required values. The required values are: • IP address • Network mask • TFTP server IP address • TOD server IP address • DOCSIS configuration file name • Time zone offset
CMAC_LOG_RESET_CANT_START_DS_TUNER_PRCESS	The Cisco CVA120 Series Cable Voice Adapter was unable to start the internal process that is used to manage the downstream tuner.
CMAC_LOG_RESET_TOO_MANY_DS_LOCKS_LOST	Downstream QAM/FEC lock has been lost too many times.
CMAC_LOG_RESET_NO_SEND_TO_DS_TUNER_PROCESS	The Cisco CVA120 Series Cable Voice Adapter MAC-layer process was unable to communicate with the downstream tuner management process.
CMAC_LOG_RESET_DS_TUNER_WATCHDOG	The downstream tuner process failed to report its continuing operation for a long period of time.

Table 12 show controllers cable-modem mac resets display (continued)

Message	Description
CMAC_LOG_RESET_UNABLE_TO_SET_MIB_OBJECT	The Cisco CVA120 Series Cable Voice Adapter was unable to set an SNMP parameter as specified by the DOCSIS configuration file.
CMAC_LOG_RESET_MIB_OBJECT_PROCESS_WATCHDOG	The internal MIB object took too long to process the entries in the DOCSIS configuration file.

Example 4

The following example display for the **show controllers cable-modem 0 mac hardware** command shows the detailed configuration of the interface driver and the MAC-layer hardware. The most informative piece of data is the station address (hardware address). The MIB statistics reflect the MAC hardware counters for various events, but these counters are typically reset every few seconds, so their contents are not accurate in this display.

```
cva120# show controllers cable-modem 0 mac hardware
PLD VERSION: 32

BCM3300 unit 0, idb 0x200EB4, ds 0x82D4748, regaddr = 0x800000, reset_mask
0x80
station address 0010.7b43.aa01 default station address 0010.7b43.aa01
MAC mcfilter 01E02F00 data mcfilter 01000000

buffer size 1600
RX data PDU ring with 32 entries at 0x201D40
  rx_head = 0x201D40 (0), rx_p = 0x82D4760 (0)
    00 pak=0x82DF844 buf=0x227F1A status=0x80 pak_size=0
    01 pak=0x82E0BF4 buf=0x22C56A status=0x80 pak_size=0
    02 pak=0x82DF454 buf=0x22710A status=0x80 pak_size=0
    03 pak=0x82DF64C buf=0x227812 status=0x80 pak_size=0
    04 pak=0x82E0024 buf=0x229B3A status=0x80 pak_size=0
    05 pak=0x82DBF2C buf=0x21B332 status=0x80 pak_size=0
    06 pak=0x82DFE2C buf=0x229432 status=0x80 pak_size=0
    07 pak=0x82E0FE4 buf=0x22D37A status=0x80 pak_size=0
    08 pak=0x82DF064 buf=0x2262FA status=0x80 pak_size=0
    09 pak=0x82DEC74 buf=0x2254EA status=0x80 pak_size=0
    10 pak=0x82DEA7C buf=0x224DE2 status=0x80 pak_size=0
    11 pak=0x82DE884 buf=0x2246DA status=0x80 pak_size=0
    12 pak=0x82DE68C buf=0x223FD2 status=0x80 pak_size=0
    13 pak=0x82DE494 buf=0x2238CA status=0x80 pak_size=0
    14 pak=0x82DE29C buf=0x2231C2 status=0x80 pak_size=0
    15 pak=0x82DE0A4 buf=0x222ABA status=0x80 pak_size=0
    16 pak=0x82DDEAC buf=0x2223B2 status=0x80 pak_size=0
    17 pak=0x82DDCB4 buf=0x221CAA status=0x80 pak_size=0
    18 pak=0x82DDABC buf=0x2215A2 status=0x80 pak_size=0
    19 pak=0x82DD8C4 buf=0x220E9A status=0x80 pak_size=0
    20 pak=0x82DD6CC buf=0x220792 status=0x80 pak_size=0
    21 pak=0x82DD4D4 buf=0x22008A status=0x80 pak_size=0
    22 pak=0x82DD2DC buf=0x21F982 status=0x80 pak_size=0
    23 pak=0x82DD0E4 buf=0x21F27A status=0x80 pak_size=0
    24 pak=0x82DCEEC buf=0x21EB72 status=0x80 pak_size=0
    25 pak=0x82DCCF4 buf=0x21E46A status=0x80 pak_size=0
    26 pak=0x82DCAFC buf=0x21DD62 status=0x80 pak_size=0
    27 pak=0x82DC904 buf=0x21D65A status=0x80 pak_size=0
    28 pak=0x82DC70C buf=0x21CF52 status=0x80 pak_size=0
    29 pak=0x82DC514 buf=0x21C84A status=0x80 pak_size=0
    30 pak=0x82DC31C buf=0x21C142 status=0x80 pak_size=0
```

```
    31 pak=0x82DC124 buf=0x21BA3A status=0xA0 pak_size=0
RX MAC message ring with 8 entries at 0x201E80
  rx_head_mac = 0x201EB0 (6), rx_p_mac = 0x82D480C (6)
    00 pak=0x82E0DEC buf=0x22CC72 status=0x80 pak_size=0
    01 pak=0x82E021C buf=0x22A242 status=0x80 pak_size=0
    02 pak=0x82E060C buf=0x22B052 status=0x80 pak_size=0
    03 pak=0x82E11DC buf=0x22DA82 status=0x80 pak_size=0
    04 pak=0x82DFC34 buf=0x228D2A status=0x80 pak_size=0
    05 pak=0x82E09FC buf=0x22BE62 status=0x80 pak_size=0
    06 pak=0x82DEE6C buf=0x225BF2 status=0x80 pak_size=0
    07 pak=0x82DFA3C buf=0x228622 status=0xA0 pak_size=0
TX BD ring with 8 entries at 0x201FB8, tx_count = 0
  tx_head = 0x201FB8 (0), head_txp = 0x82D4888 (0)
  tx_tail = 0x201FB8 (0), tail_txp = 0x82D4888 (0)
    00 pak=0x000000 buf=0x200000 status=0x00 pak_size=0
    01 pak=0x000000 buf=0x200000 status=0x00 pak_size=0
    02 pak=0x000000 buf=0x200000 status=0x00 pak_size=0
    03 pak=0x000000 buf=0x200000 status=0x00 pak_size=0
    04 pak=0x000000 buf=0x200000 status=0x00 pak_size=0
    05 pak=0x000000 buf=0x200000 status=0x00 pak_size=0
    06 pak=0x000000 buf=0x200000 status=0x00 pak_size=0
    07 pak=0x000000 buf=0x200000 status=0x20 pak_size=0
TX PD ring with 8 entries at 0x202038, tx_count = 0
  tx_head_pd = 0x202038 (0)
  tx_tail_pd = 0x202038 (0)
    00 status=0x00 bd_index=0x0000 len=0x0000 hdr_len=0x0000
    ehdr:  00 00 00 2E FF FF
    01 status=0x00 bd_index=0x0001 len=0x0000 hdr_len=0x0000
    ehdr:  00 00 00 2E FF FF
    02 status=0x00 bd_index=0x0002 len=0x0000 hdr_len=0x0000
    ehdr:  00 00 00 2E FF FF
    03 status=0x00 bd_index=0x0003 len=0x0000 hdr_len=0x0000
    ehdr:  00 00 00 2E FF FF
    04 status=0x00 bd_index=0x0004 len=0x0000 hdr_len=0x0000
    ehdr:  00 00 00 2E 00 00
    05 status=0x00 bd_index=0x0005 len=0x0000 hdr_len=0x0000
    ehdr:  00 00 00 2E 00 00
    06 status=0x00 bd_index=0x0006 len=0x0000 hdr_len=0x0000
    ehdr:  00 00 00 00 00 00
    07 status=0x20 bd_index=0x0007 len=0x0000 hdr_len=0x0000
    ehdr:  00 00 00 00 00 00

MIB Statistics
  DS fifo full = 0, Rerequests = 0
  DS mac msg overruns = 0, DS data overruns = 0
  Qualified maps = 0, Qualified syncs = 0
  CRC fails = 0, HDR chk fails = 0
  Data pdus = 0, Mac msgs = 0
  Valid hdrs = 0
BCM3300 Registers:
downstream dma:
  ds_data_bd_base=0x001D40, ds_mac_bd_base=0x001E80
  ds_data_dma_ctrl=0x98, ds_mac_dma_ctrl=0x98
  ds_dma_data_index=0x0000, ds_dma_msg_index=0x0000
upstream dma:
  us_bd_base=0x001FB8, us_pd_base=0x002038
  us_dma_ctrl=0x00, us_dma_tx_start=0x00
global control and status:
  global_ctrl_status=0x00
interrupts:
  irq_pend=0x0018, irq_mask=0x00E7
timing recovery circuit:
  loop_enable=0x00, minislot_divisor=0x00
  K0_ctrl=0x06, K1_ctrl=0x07, acq_threshhold=0x01
```

```
  err_threshhold=0x04, timeout_threshold=0xFF
  nco_bias=0x4F7004F7, ranging_offset=0x00000000
  ts_err=0x00, sync_valid=0x00, delta_F=0x00
  timeout_err=0x00
spi:
  dynamic_ctrl=0x09, static_ctr=0x9F, autonomous=0x01
  irq_ack=0x00, spi_cmd=0x51, spi_addr=0x11
  spi_data= FF/00/00/00/00/00/00
burst profiles:
  profile 0:
             01 19 1D 00 00 00 00 00 00 00 00 00 00 00 00
             00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
             00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
             00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
  profile 1:
             01 19 1D 03 00 00 00 00 00 00 00 00 00 00 00
             00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
             00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
             00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
  profile 2:
             01 19 1D 04 00 00 00 00 00 00 00 00 00 00 00
             00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
             00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
             00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
  profile 3:
             00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
             00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
             00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
             00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
```

Most of the fields in this display are described in Table 18 on page 109; Table 13 describes the MIB statistics shown in the display.

Table 13 MIB Statistics Display

Field	Description
DS fifo full	Number of times the downstream receive buffer on the Cisco CVA120 Series Cable Voice Adapter has become full.
Rerequests	Number of registration requests sent by the Cisco CVA120 Series Cable Voice Adapter to the CMTS.
DS mac msg overruns	Number of times the DMA controller has had a downstream MAC message and there were no free MAC message buffer descriptors to accept the message.
DS data overruns	Number of times the DMA controller has had downstream data and there were no free data PDU buffer descriptors to accept the data.
Qualified maps	Number of valid MAP messages received by the Cisco CVA120 Series Cable Voice Adapter.
Qualified syncs	Number of times the Cisco CVA120 Series Cable Voice Adapter has received synchronization with the downstream channel.
CRC fails	Number of cyclic redundancy checksums generated by the far-end device that did not match the checksums calculated from the message portions of the packets received.

Table 13 MIB Statistics Display (continued)

Field	Description
HDR check fails	Number of cyclic redundancy checksums generated by the far-end device that did not match the checksums calculated from the MAC headers of the packets received. The MAC header CRC is a 16-bit Header Check Sequence (HCS) field that ensures the integrity of the MAC header even in a collision environment.
Data pdus	Total number of data PDUs (protocol data units) of all types received by the cable interface.
Mac msgs	Number of MAC messages received by the cable interface.
Valid hdrs	Number of valid MAC headers received by the cable interface.

Below the MIB statistics in the **show controllers cable-modem 0 mac hardware** display, the BCM3300 registers section shows the DMA locations of the indicated processing routines of the Broadcom 3220 MAC chip within the Cisco CVA120 Series Cable Voice Adapter.

Example 5

The **show controllers cable-modem mac state** command summarizes the state of the cable MAC layer and provides a list of downstream search frequency bands and the order in which they are searched. If the cable MAC layer is in the `wait_for_link_up_state`, the information shown in the display corresponds to the last time the interface was up. This allows useful information to be acquired from this display even though the modem has not been able to range and register. The normal operational state of the interface is the `maintenance_state`.

```
cva120# show controller cable-modem 0 mac state
MAC State:                  maintenance_state
Ranging SID:                5
Registered:                 TRUE
Privacy Established:        TRUE

MIB Values:
  Mac Resets:       0
  Sync lost:        0
  Invalid Maps:     0
  Invalid UCDs:     0
  Invalid Rng Rsp:  0
  Invalid Reg Rsp:  0
  T1 Timeouts:      0
  T2 Timeouts:      0
  T3 Timeouts:      4
  T4 Timeouts:      0
  Range Aborts:     0

DS ID:                      1
DS Frequency:               663000000
DS Symbol Rate:             5056941
DS QAM Mode                 64QAM
DS Search:
  88 453000000 855000000 6000000
  89  93000000 105000000 6000000
  90 111250000 117250000 6000000
  91 231012500 327012500 6000000
  92 333015000 333015000 6000000
  93 339012500 399012500 6000000
```

```
  94 405000000 447000000 6000000
  95 123015000 129015000 6000000
  96 135012500 135012500 6000000
  97 141000000 171000000 6000000
  98 219000000 225000000 6000000
  99 177000000 213000000 6000000

US ID:                      1
US Frequency:               20000000
US Power Level:             34.0 (dBmV)
US Symbol Rate:             1280000
Ranging Offset:             12460
Mini-Slot Size:             8
Change Count:               4


Preamble Pattern:           CC CC CC CC CC CC CC CC  CC CC CC CC CC CC 0D 0D
                               A9 17 D9 C3 52 2F B3 86  A4 5F 67 0D 48 BE CE 1A
                               91 7D 9C 35 22 FB 38 6A  45 F6 70 D4 8B EC E1 A9
                               17 D9 C3 52 2F B3 86 A4  5F 67 0D 48 BE CE 1A 91
                               F3 F3 F3 F3 F3 F3 F3 F3  F3 F3 F3 F3 F3 F3 F3 F3
                               F3 F3 F3 F3 F3 F3 F3 F3  F3 F3 F3 F3 33 F7 33 F7
                               88 84 04 4C C4 84 C0 0C  44 08 08 CC 8C 0C 80 48
                               88 40 44 CC 48 4C 00 C4  40 80 8C C8 C0 C8 04 88
Burst Descriptor  0:
  Interval Usage Code:      1
  Modulation Type:          1
  Differential Encoding:    2
  Preamble Length:          64
  Preamble Value Offset:    56
  FEC Error Correction:     0
  FEC Codeword Info Bytes:  16
  Scrambler Seed:           338
  Maximum Burst Size:       1
  Guard Time Size:          8
  Last Codeword Length:     1
  Scrambler on/off:         1
Burst Descriptor  1:
  Interval Usage Code:      3
  Modulation Type:          1
  Differential Encoding:    2
  Preamble Length:          128
  Preamble Value Offset:    0
  FEC Error Correction:     5
  FEC Codeword Info Bytes:  34
  Scrambler Seed:           338
  Maximum Burst Size:       0
  Guard Time Size:          48
  Last Codeword Length:     1
  Scrambler on/off:         1
Burst Descriptor  2:
  Interval Usage Code:      4
  Modulation Type:          1
  Differential Encoding:    2
  Preamble Length:          128
  Preamble Value Offset:    0
  FEC Error Correction:     5
  FEC Codeword Info Bytes:  34
  Scrambler Seed:           338
  Maximum Burst Size:       0
  Guard Time Size:          48
  Last Codeword Length:     1
  Scrambler on/off:         1
```

```
Burst Descriptor  3:
  Interval Usage Code:      5
  Modulation Type:          1
  Differential Encoding:    2
  Preamble Length:          72
  Preamble Value Offset:    48
  FEC Error Correction:     5
  FEC Codeword Info Bytes:  75
  Scrambler Seed:           338
  Maximum Burst Size:       0
  Guard Time Size:          8
  Last Codeword Length:     1
  Scrambler on/off:         1
Config File:
Network Access:             TRUE
  Vendor ID:                0.240.30
    Baseline Privacy:
    Auth. Wait Timeout:     10
    Reauth. Wait Timeout:   10
    Auth. Grace Time:       600
    Op. Wait Timeout:       1
    Retry Wait Timeout:     1
    TEK Grace Time:         600
    Auth. Reject Wait Time: 60
  COS  1:
    Assigned SID:           5
    Max Downstream Rate:    4000000
    Max Upstream Rate:      2000000
    Upstream Priority:      7
    Min Upstream Rate:      100000
    Max Upstream Burst:     12
    Privacy Enable:         TRUE
Ranging Backoff Start:      0 (at initial ranging)
Ranging Backoff End:        4 (at initial ranging)
Data Backoff Start:         0 (at initial ranging)
Data Backoff End:           4 (at initial ranging)
IP Address:                 0.0.0.0
Net Mask:                   0.0.0.0

TFTP Server IP Address:     223.255.254.254
Time Server IP Address:     188.188.1.5
Config File Name:           muck/ebuell/tftp/cm_conf
Time Zone Offset:           -28800
```

Table 14 describes the fields shown in the display.

Table 14 show controller cable-modem mac state Display

Field	Description
MAC State	Current operational state of the MAC layer of the Cisco CVA120 Series Cable Voice Adapter.
Ranging SID	Service ID used for ranging requests.
Registered	Indicates whether or not the Cisco CVA120 Series Cable Voice Adapter is currently registered with the CMTS.
Privacy Established	Indicates whether or not keys for baseline privacy have been exchanged between the Cisco CVA120 Series Cable Voice Adapter and the CMTS, establishing privacy.

Table 14 show controller cable-modem mac state Display (continued)

Field	Description
Mac Resets	Number of times the Cisco CVA120 Series Cable Voice Adapter reset or initialized this interface.
Sync lost	Number of times the Cisco CVA120 Series Cable Voice Adapter lost synchronization with the downstream channel.
Invalid Maps	Number of times the Cisco CVA120 Series Cable Voice Adapter received invalid MAP messages.
Invalid UCDs	Number of times the Cisco CVA120 Series Cable Voice Adapter received invalid UCD messages.
Invalid Rng Rsp	Number of times the Cisco CVA120 Series Cable Voice Adapter received invalid ranging response messages.
Invalid Reg Rsp	Number of times the Cisco CVA120 Series Cable Voice Adapter received invalid registration response messages.
T1 Timeouts	Number of timeouts caused by the Cisco CVA120 Series Cable Voice Adapter not receiving a valid upstream channel descriptor (UCD) from the CMTS within the specified time.
T2 Timeouts	Number of timeouts caused by the Cisco CVA120 Series Cable Voice Adapter not receiving a maintenance broadcast for ranging opportunities from the CMTS within a specified time.
T3 Timeouts	Number of timeouts caused by the Cisco CVA120 Series Cable Voice Adapter not receiving a response within a specified time from the CMTS to a RNG-REQ message during initial maintenance.
T4 Timeouts	Number of timeouts caused by the Cisco CVA120 Series Cable Voice Adapter not receiving a response within a specified time from the CMTS to a periodic maintenance request.
Range Aborts	Number of times the ranging process was aborted by the CMTS.
DS ID	Identifier of the downstream channel on which this MAC management message has been transmitted. This identifier is arbitrarily chosen by the CMTS and is only unique within the MAC-sublayer domain.
DS Frequency	Downstream frequency acquired by the Cisco CVA120 Series Cable Voice Adapter during its last initialization sequence.
DS Symbol Rate	Downstream frequency in symbols per second.
DS QAM Mode	Downstream modulation scheme being used by the Cisco CVA120 Series Cable Voice Adapter.
DS Search	Frequency bands scanned by the Cisco CVA120 Series Cable Voice Adapter when searching for a downstream channel. The Cisco CVA120 Series Cable Voice Adapter's default frequency bands correspond to the North American EIA CATV channel plan for 6 MHz channel slots between 90 MHz and 858 MHz.
US ID	Identifier of the upstream channel to which this MAC management message refers. This identifier is arbitrarily chosen by the CMTS and is only unique within the MAC-sublayer domain.
US Frequency	Transmission frequency used by the Cisco CVA120 Series Cable Voice Adapter in the upstream direction.

Table 14 show controller cable-modem mac state Display (continued)

Field	Description
US Power Level	Transmit power level of the Cisco CVA120 Series Cable Voice Adapter in the upstream direction.
US Symbol Rate	Upstream frequency in symbols per second.
Ranging Offset	Delay correction (in increments of 6.25 milliseconds/64) applied by the Cisco CVA120 Series Cable Voice Adapter to the CMTS upstream frame time, derived at the Cisco CVA120 Series Cable Voice Adapter. Used to synchronize the upstream transmissions in the time division multiple access (TDMA) scheme, this value is roughly equal to the round-trip delay of the Cisco CVA120 Series Cable Voice Adapter from the CMTS.
Mini-Slot Size	Size T of the mini-slot for this upstream channel in units of the timebase tick of 6.25 s. Allowable values are 2, 4, 8, 16, 32, 64, or 128.
Change Count	Incremented by 1 by the CMTS whenever any of the values of this channel descriptor change. If the value of this count in a subsequent upstream channel descriptor (UCD) remains the same, the Cisco CVA120 Series Cable Voice Adapter can quickly decide that the remaining fields have not changed, and can disregard the remainder of the message.
Preamble Pattern	Byte pattern used for the preamble.
Burst Descriptor:	A compound type/length/value (TLV) encoding that defines, for each type of upstream usage interval, the physical-layer characteristics that are used during that interval. Each burst descriptor is given an identifying number.
Interval Usage Code	Each upstream transmit burst belongs to a class which is given a number called the IUC (interval usage code). Bandwidth MAP messages are used by IUC codes to allocate upstream time slots. The following types are currently defined: 1. Request: bandwidth request slot 2. Request/Data: bandwidth request or data slot 3. Initial Maintenance: initial link registration contention slot 4. Station Maintenance: link keep-alive slot 5. Short Data Grant: short data burst slot 6. Long Data Grant: long data burst slot
Modulation Type	Upstream modulation format. (1 = QPSK; 2 = 16QAM)
Differential Encoding	Indicates whether or not differential encoding is used. (1 = yes; 2 = no)
Preamble Length	Length of the preamble in bits. This value must be an integral number of symbols—a multiple of 2 for QPSK; a multiple of 4 for 16QAM.
FEC Error Correction	Length of the forward error correction in bytes. The range is 0 through 10 bytes; a value of 0 implies no forward error correction.
FEC Codeword Info Bytes	Number of information bytes in the FEC codeword.
Scrambler Seed	15-bit seed value loaded at the beginning of each burst after the register has been cleared. Not used if scrambler is off.
Maximum Burst Size	Maximum number of mini-slots that can be transmitted during this burst type. When the interval type is Short Data Grant, this value must be greater than 0. If this value is 0, the burst size is limited elsewhere.

Table 14 show controller cable-modem mac state Display (continued)

Field	Description
Guard Time Size	Amount of time in symbols between the center of the last symbol of a burst and the center of the first symbol of the preamble of an immediately following burst in an upstream transmission from the Cisco CVA120 Series Cable Voice Adapter to the CMTS.
Last Codeword Length	Indicates whether or not the length of the last codeword is fixed or shortened. (1 = fixed; 2 = shortened)
Scrambler on/off	Indicates whether or not a scrambler is enabled in the upstream modulator. (1 = on; 2 = off)
Network Access	Indicates whether or not the Cisco CVA120 Series Cable Voice Adapter has access to the HFC network.
Vendor ID	Unique identifier specifying the cable modem manufacturer.
Auth. Wait Timeout	Number of seconds the Cisco CVA120 Series Cable Voice Adapter waits for a reply after sending the Authorization Request message to the CMTS.
Reauth. Wait Timeout	Number of seconds the Cisco CVA120 Series Cable Voice Adapter waits for a reply after it has sent an Authorization Request message to the CMTS in response to a reauthorization request or an Authorization Invalid message from the CMTS.
Auth. Grace Time	Number of seconds before the current authorization is set to expire that the grace timer begins, signaling the Cisco CVA120 Series Cable Voice Adapter to begin the reauthorization process.
Op. Wait Timeout	Number of seconds the TEK state machine waits for a reply from the CMTS after sending its initial Key Request for its SID's keying material.
Retry Wait Timeout	Number of seconds the TEK state machine waits for a replacement key for this SID after the TEK grace timer has expired and the request for a replacement key has been made.
TEK Grace Time	Number of seconds before the current TEK is set to expire that the TEK grace timer begins, signaling the TEK state machine to request a replacement key.
Auth. Reject Wait Time	Number of seconds the Cisco CVA120 Series Cable Voice Adapter waits before sending another Authorization Request message to the CMTS after it has received an Authorization Reject message.
Assigned SID	Service ID assigned by the CMTS for the corresponding service class.
Max Downstream Rate	Maximum downstream rate in bits per second that the CMTS is permitted to forward to CPE unicast MAC addresses learned or configured as mapping to this Cisco CVA120 Series Cable Voice Adapter. (This does not include MAC packets addressed to broadcast or multicast MAC addresses.)
Max Upstream Rate	Maximum upstream rate in bits per second that the Cisco CVA120 Series Cable Voice Adapter is permitted to forward to the RF network. This includes PDU data packets addressed to broadcast or multicast addresses.
Upstream Priority	Relative priority assigned to this service class for data transmission in the upstream channel. Higher numbers indicate higher priority.

Table 14 show controller cable-modem mac state Display (continued)

Field	Description
Min Upstream Rate	Date rate in bits per second that are guaranteed to this service class on the upstream channel.
Max Upstream Burst	Maximum transmit burst in bytes allowed for this service class on the upstream channel.
Privacy Enable	Indicates whether or not Baseline Privacy is enabled for this service class.
Ranging Backoff Start	Initial back-off window for initial ranging contention, expressed as a power of 2. Valid values are from 0 to 15.
Ranging Backoff End	Final back-off window for initial ranging contention, expressed as a power of 2. Valid values are from 0 to 15.
Data Backoff Start	Initial back-off window for contention data and requests, expressed as a power of 2. Valid values are from 0 to 15.
Data Backoff End	Final back-off window for contention data and requests, expressed as a power of 2. Valid values are from 0 to 15.
IP Address	IP address of the cable interface.
Net Mask	Subnet mask of the cable interface.
TFTP Server IP Address	IP address of the CMTS TFTP server.
Time Server IP Address	IP address of the CMTS Time of Day (TOD) server.
Config File Name	Name of the configuration file that is downloaded from the TFTP server to provide the Cisco CVA120 Series Cable Voice Adapter with operational parameters.
Time Zone Offset	Correction received from the DHCP server to synchronize the Cisco CVA120 Series Cable Voice Adapter's time clock with the CMTS.

Related Commands

Command	Description
show controllers cable-modem	Displays high-level controller information about a Cisco CVA120 Series Cable Voice Adapter.
show controllers cable-modem bpkm	Displays information about the baseline privacy key management exchange between the Cisco CVA120 Series Cable Voice Adapter and the CMTS.
show controllers cable-modem des	Displays information about the Data Encryption Standard (DES) engine registers.
show controllers cable-modem filters	Displays the registers in the MAC hardware that are used for filtering received frames.
show controllers cable-modem lookup-table	Displays the mini-slot lookup table inside a Cisco CVA120 Series Cable Voice Adapter.
show controllers cable-modem phy	Displays the contents of the registers used in the downstream physical hardware of the Cisco CVA120 Series Cable Voice Adapter.
show controllers cable-modem tuner	Displays the settings for the upstream and downstream tuners used by a Cisco CVA120 Series Cable Voice Adapter.

show controllers cable-modem phy

To display the contents of the registers used in the downstream physical hardware of the Cisco CVA120 Series Cable Voice Adapter, use the **show controllers cable-modem phy** privileged EXEC command.

show controllers cable-modem phy {**receive** | **transmit**}

Syntax Description

receive	Displays all receiver registers in the downstream physical hardware.
transmit	Displays all transmitter registers in the upstream physical hardware.

Defaults

No default behavior or values.

Command Modes

Privileged EXEC

Command History

Release	Modification
11.3(4)NA	This command was introduced for the Cisco uBR904 cable access router.
12.0(4)XI1	Support was added for the Cisco uBR924 cable access router.
12.1(1)XD	Support was added for the Cisco uBR914 cable DSU.
12.1(3)XL	Support was added for the Cisco uBR905 cable access router.
12.1(5)XU2	Support was added for the Cisco CVA120 Series Cable Voice Adapter.

Usage Guidelines

To understand the output from this command, consult the Broadcom specifications for the BCM3116 and BCM3037 chips.

Examples

Physical receive registers are displayed in the following example:

```
cva120# show controllers cable-modem 0 phy receive
BCM3116 Receiver Registers: Chip ID = C2C1

  rstctl=    frzctl=20  qamctl=1B  lmsctl=0B  tpctl=00  fmtctl=24
  ffectl=3F  irqsts=09  irqmask=00 stoscm=9E  rstctr=00  frzctl2=46
  dvctl=30   idepth=55  eqlctl=00  tstctl=02  berctl=00  clkset=00
  tunset=00  tunctl=03

FFC coefficient registers:
  F0=0067FFBC  F1=FF880080  F2=00C1FEFB  F3=FF75019D
  F4=00C5FD89  F5=FF6D0485  F6=FC95F690  F7=2D280000

DFE coefficient registers:
  D00=0636031E  D01=FBDD0314  D02=0077FD39  D03=001B00C6
  D04=0024FF74  D05=0015007E  D06=000CFFC4  D07=FFC0004B
  D08=0044FFF6  D09=FFE00019  D10=00190005  D11=FFD3FFAD
  D12=FFD3FFE0  D13=001A000A  D14=FFF3FFED  D15=0008FFFD
  D16=FFFC0024  D17=0023FFDF  D18=0029FFFF  D19=000D001E
  D20=00020017  D21=00250001  D22=0007FFF4  D23=FFF60014
```

```
ldsft=B0EE      ldsnre=0098AF  ldif=0D004E   ldbbi=00000000
ldbbq=00000000  ldali=032E00   ldaii=E62AF2  ldbrfo=705A05
ldbri=F9CDC200  lddrfo=007E7D  lddri=007EF0

FEC correctable error count:   0
FEC uncorrectable error count: 0
Bit Error Rate Count: 0
```

Physical transmit registers are displayed in the following example:

```
cva120# show controllers cable-modem 0 phy transmit
BCM3037 Transmitter Registers:
part_id     = 3037       rev_id      = 01
test_mode   = 00         test_input  = 00
test_misc   = 2009       rst         = 00
power       = 0000       power_2     = 00
port        = 6F         pll         = F7
map         = 66         mod         = 28
tx_oen_bdly = 14         tx_oen_edly = C8
prbs_cfg    = 00C000     baud        = 1A36E3
burst       = 0000       if_freq     = 200000
dac         = 37         tx_config   = 00

burst config 0 : prbs_init    = FFFFFF   rs      = 343E
                 fec          = 00       qam     = 01
                 pream_len    = 0018     offset  = 0000
burst config 1 : prbs_init    = FFFFFE   rs      = 033B
                 fec          = 1C       qam     = 65
                 pream_len    = 0000     offset  = 0000
burst config 2 : prbs_init    = FFFFFE   rs      = 033B
                 fec          = 1D       qam     = 65
                 pream_len    = 0000     offset  = 0000
burst config 3 : prbs_init    = FFFFFE   rs      = 033B
                 fec          = 1E       qam     = 65
burst config 4 : prbs_init    = FFFFFE   rs      = 033B
                 fec          = 1F       qam     = 65
                 pream_len    = 0000     offset  = 0000
burst config 5 : prbs_init    = FFFFFE   rs      = 033B
                 fec          = 0F       qam     = 66
                 pream_len    = 0000     offset  = 0000
Eq Coeff:
00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00

Preamble values:
CC CC CC CC CC 0D 0D CC CC CC CC CC CC CC CC 0D
04 25 01 01 01 01 02 01 02 03 02 00 40 04 02 00
40 05 01 00 06 01 10 07 02 01 52 08 01 01 09 01
08 0A 01 01 0B 01 02 04 25 03 01 01 01 02 01 02
03 02 00 50 04 02 00 30 05 01 00 06 01 22 07 02
01 52 08 01 00 09 01 30 0A 01 01 0B 01 02 04 25
04 01 01 01 02 01 02 03 02 00 40 04 02 00 40 05
01 00 06 01 22 07 02 01 52 08 01 00 09 01 30 0A
```

Related Commands

Command	Description
show controllers cable-modem	Displays high-level controller information about a Cisco CVA120 Series Cable Voice Adapter.

show controllers cable-modem bpkm	Displays information about the baseline privacy key management exchange between the Cisco CVA120 Series Cable Voice Adapter and the CMTS.
show controllers cable-modem des	Displays information about the Data Encryption Standard (DES) engine registers.
show controllers cable-modem filters	Displays the registers in the MAC hardware that are used for filtering received frames.
show controllers cable-modem lookup-table	Displays the mini-slot lookup table inside a Cisco CVA120 Series Cable Voice Adapter.
show controllers cable-modem mac	Displays detailed MAC-layer information for a Cisco CVA120 Series Cable Voice Adapter.
show controllers cable-modem tuner	Displays the settings for the upstream and downstream tuners used by a Cisco CVA120 Series Cable Voice Adapter.

show controllers cable-modem qos

To display detailed information about the Quality of Service (QoS) configuration for the Cisco CVA120 Series Cable Voice Adapter, use the **show controllers cable-modem qos** privileged EXEC command.

show controllers cable-modem *number* **qos**

Syntax Description

number	Cable interface number inside the Cisco CVA120 Series Cable Voice Adapter (should always be **0** to indicate the first and only cable interface).

Defaults

No default behavior or values.

Command Modes

Privileged EXEC

Command History

Release	Modification
12.0(7)XR and 12.1(1)T	This command was introduced for the Cisco uBR924 cable access router.
12.1(1)XD	Support was added for the Cisco uBR914 cable DSU.
12.1(3)XL	Support was added for the Cisco uBR905 cable access router.
12.1(5)XU2	Support was added for the Cisco CVA120 Series Cable Voice Adapter.

Usage Guidelines

This command displays the four possible stream queues, the SID associated with each queue (if the queue is currently in use), and whether the SID is the primary SID, a secondary (static) SID, or a dynamic (on demand) SID. The display also shows the packets and bytes that have been transmitted and received on each stream.

Examples

The following example displays the current QoS statistics for each of the router's four queues:

```
cva120# show controllers cable-modem 0 qos

Queue   SID     SID     SFID    TX      TX              RX      RX
                Type            Pkts    Bytes           Pkts    Bytes

0       2       Primary 0       11377   2721985         12320   983969
1       52      Dynamic 52      116     13608           105     14300
2       0       NA      0       0       0               0       0
3       0       NA      0       0       0               0       0

cva120#
```

Table 15 describes significant fields shown in this display.

Table 15 show controllers cable-modem qos Field Descriptions

Field	Description
Queue	One of the four possible service flow queues that exist in the Cisco CVA120 Series Cable Voice Adapter.
SID	Service Identifier, a 14-bit integer assigned by the CMTS to each active upstream service flow.
SID Type	The type of SID: • Primary—The service flow used for best-effort data traffic and MAC maintenance messages. • Secondary—Secondary static service flows that are created at power-on provisioning for voice calls when dynamic SIDs are not active. • Dynamic—Secondary service flows that are created for on demand voice calls when using dynamic SIDs.
SFID	Service Flow Identifier, a 32-bit integer assigned by the CMTS to each service flow on the Cisco CVA120 Series Cable Voice Adapter.
TX Pkts	The number of packets that the Cisco CVA120 Series Cable Voice Adapter has transmitted on this service flow.
TX Bytes	The number of bytes that the Cisco CVA120 Series Cable Voice Adapter has transmitted on this service flow.
RX Pkts	The number of packets that the Cisco CVA120 Series Cable Voice Adapter has received on this service flow.
RX Bytes	The number of bytes that the Cisco CVA120 Series Cable Voice Adapter has received on this service flow.

Related Commands

Command	Description
show controllers cable-modem mac	Displays MAC-layer statistics showing the MAC error log, the other MAC log data, the number of MAC-layer resets, and the current MAC state.

show controllers cable-modem tuner

To display the settings for the upstream and downstream tuners used by a Cisco CVA120 Series Cable Voice Adapter, use the **show controllers cable-modem tuner** privileged EXEC command.

show controllers cable-modem tuner

Syntax Description

There are no key words or arguments for this command.

Defaults

No default behavior or values.

Command Modes

Privileged EXEC

Command History

Release	Modification
11.3(4)NA	This command was introduced for the Cisco uBR904 cable access router.
12.0(4)XI1	Support was added for the Cisco uBR924 cable access router.
12.1(1)XD	Support was added for the Cisco uBR914 cable DSU.
12.1(3)XL	Support was added for the Cisco uBR905 cable access router.
12.1(5)XU2	Support was added for the Cisco CVA120 Series Cable Voice Adapter.

Examples

Typical Cisco CVA120 Series Cable Voice Adapter tuner settings are displayed in the following example.

```
cva120# show controllers cable-modem 0 tuner
Tuner: status=0x00
Rx: tuner_freq 507000000, symbol_rate 5360736, local_freq 11520000
    snr_estimate 17488, ber_estimate 0, lock_threshold 26000
    QAM not in lock, FEC not in lock, qam_mode QAM_64
Tx: tx_freq 20000000, power_level 0x3E, symbol_rate 1280000
```

Table 16 displays the output fields and their descriptions.

Table 16 show controllers cable-modem tuner Field Descriptions

Field	Description
tuner_freq	Indicates the current downstream frequency.
symbol_rate	Indicates the downstream symbol rate in symbols per second.
local_freq	Frequency on which the transmitter and tuner communicate.
snr_estimate	Signal to noise estimate in dB X 1000.
ber_estimate	Bit error rate estimate (always 0).
lock_threshold	Minimum signal-to-noise ratio (SNR) that the Cisco CVA120 Series Cable Voice Adapter will accept as a valid lock.

Table 16 show controllers cable-modem tuner Field Descriptions (continued)

Field	Description
QAM status	Indicates if QAM/FEC lock has been acquired and the modulation mode in use.
tx_freq	Upstream frequency sent to the Cisco CVA120 Series Cable Voice Adapter by the CMTS in the UCD message.
power_level	Transmit power level as set in the hardware, given as a hexadecimal value. The units are unique to the hardware used. Use the **show controllers cable-modem 0 mac state** command to see the power level in dBmV.
symbol_rate	Indicates the upstream symbol rate in symbols per second that is negotiated between the CMTS and the cable access router.

Related Commands

Command	Description
show controllers cable-modem	Displays high-level controller information about a Cisco CVA120 Series Cable Voice Adapter.
show controllers cable-modem bpkm	Displays information about the baseline privacy key management exchange between the Cisco CVA120 Series Cable Voice Adapter and the CMTS.
show controllers cable-modem des	Displays information about the Data Encryption Standard (DES) engine registers.
show controllers cable-modem filters	Displays the registers in the MAC hardware that are used for filtering received frames.
show controllers cable-modem lookup-table	Displays the mini-slot lookup table inside a Cisco CVA120 Series Cable Voice Adapter.
show controllers cable-modem mac	Displays detailed MAC-layer information for a Cisco CVA120 Series Cable Voice Adapter.
show controllers cable-modem phy	Displays the contents of the registers used in the downstream physical hardware of the Cisco CVA120 Series Cable Voice Adapter.

show controllers usb

To display high-level controller information for the USB interface on the Cisco CVA120 Series Cable Voice Adapter, use the **show controllers usb** privileged EXEC command.

show controllers usb *number*

Syntax Description

number	Number for the USB interface (always **0** for the Cisco CVA120 Series Cable Voice Adapter).

Defaults

No default behavior or values.

Command Modes

Privileged EXEC

Command History

Release	Modification
12.1(5)XU2	This command was introduced for the Cisco CVA120 Series Cable Voice Adapter.

Usage Guidelines

The **show controllers usb** command displays the current state information for the USB interface and its controller.

Examples

The following example displays typical output for the **show controllers usb 0** command:

```
cva120# show controllers usb 0
USB CONTROLLER:

idb_info at 80ab1b14, pIdgCtx at 80bb3f80
MPC850 Internal RAM Base=10780000

I/O PORT REGISTERS:
[PADIR]=0xc0
[PAPAR]=0xf0f
[PAODR]=0xf3
[PADAT]=0x64f
[PCDIR]=0x30c
[PCPAR]=0x300
[PCSO]=0xf0
[PCDAT]=0x50c
[PCINT]=0x0
[PDDIR]=0x1ef7
[PDPAR]=0x0
[PDDAT]=0xfba

USB REGISTERS:
[USMOD]=0x1
[USADR]=0x0
[USCOM]=0x3
[USBER]=0x0
```

```
[USBMR]=0xff
[USBS]=0x0

USB PARAMETER RAM:
USB Endpoint Parameter base=107828c0, offset=0x28c0
 [RSTATE]=0x0
[RPTR]=0x0
[FRAME_N]=0x2920
[RBCNT]=0x0
[RTEMP]=0x0

USB ENDPOINTS:

ENDPOINT 0 PARAMETER BLOCK:
[USEP0]=0x10   [EP0PTR]=0x28c0
[RBASE]=0x2950
[TBASE]=0x2a50
[RFCR]=0x10
[TFCR]=0x10
[MRBLR]=0x44
[RBPTR]=0x2950
[TBPTR]=0x2a50
[USCOM]=0x3
[USBER]=0x0
[USBMR]=0xff
[USBS]=0x0

ENDPOINT 0 PARAMETER BLOCK:
[USEP0]=0x10   [EP0PTR]=0x28c0
[RBASE]=0x2950
[TBASE]=0x2a50
[RFCR]=0x10
[TFCR]=0x10
[MRBLR]=0x44
[RBPTR]=0x2950
[TBPTR]=0x2a50
[RBASE]=0x2a58
[TBASE]=0x2b58
[RFCR]=0x10
[TFCR]=0x10
[MRBLR]=0x44
[RBPTR]=0x2a58
[TBPTR]=0x2b58
[TSTATE]=0x10930d6e
[TPTR]=0x80b58cc4
[TCRC]=0xffff
[TBCNT]=0x14

ENDPOINT 1 TX BUFFER DESCRIPTORS:  (offset: ptr:length:status)
2b58: 80b58cc0:0018:0280  2b60: 00000000:0000:1000  2b68: 00000000:0000:1000
2b70: 00000000:0000:1000  2b78: 00000000:0000:1000  2b80: 00000000:2580:1000
2b88: 00000000:0000:1000  2b90: 00000000:0100:1000  2b98: 00000000:3e80:1000
2ba0: 00000000:0100:1000  2ba8: 00000000:0001:1000  2bb0: 00000000:0001:1000
2bb8: 00000000:0001:1000  2bc0: 00000000:0001:1000  2bc8: 00000000:6fa0:1000
2bd0: 00000000:0000:1000  2bd8: 00000000:0000:1000  2be0: 00000000:0000:1000
2be8: 00000000:0000:1000  2bf0: 00000000:0000:1000  2bf8: 00000000:0000:1000
2c00: 00000000:0000:1000  2c08: 00000000:0000:1000  2c10: 00000000:0000:1000
2c18: 00000000:0000:1000  2c20: 00000000:0000:1000  2c28: 00000000:0000:1000
2c30: 00000000:0000:1000  2c38: 00000000:0000:1000  2c40: 00000000:0000:1000
2c48: 00000000:0000:1000  2c50: 00000000:0000:3000
```

```
ENDPOINT 1 RX BUFFER DESCRIPTORS:  (offset: ptr:length:status)
2b58: 80bb34b0:0000:9000   2b60: 80bb34f4:0000:9000   2b68: 80bb3538:0000:9000
2b70: 80bb357c:0000:9000   2b78: 80bb35c0:0000:9000   2b80: 80bb3604:0000:9000
2b88: 80bb3648:0000:9000   2b90: 80bb368c:0000:9000   2b98: 80bb36d0:0000:9000
2ba0: 80bb3714:0000:9000   2ba8: 80bb3758:0000:9000   2bb0: 80bb379c:0000:9000
2bb8: 80bb37e0:0000:9000   2bc0: 80bb3824:0000:9000   2bc8: 80bb3868:0000:9000
2bd0: 80bb38ac:0000:9000   2bd8: 80bb38f0:0000:9000   2be0: 80bb3934:0000:9000
2be8: 80bb3978:0000:9000   2bf0: 80bb39bc:0000:9000   2bf8: 80bb3a00:0000:9000
2c00: 80bb3a44:0000:9000   2c08: 80bb3a88:0000:9000   2c10: 80bb3acc:0000:9000
2c18: 80bb3b10:0000:9000   2c20: 80bb3b54:0000:9000   2c28: 80bb3b98:0000:9000
2c30: 80bb3bdc:0000:9000   2c38: 80bb3c20:0000:9000   2c40: 80bb3c64:0000:9000
2c48: 80bb3ca8:0000:9000   2c50: 80bb3cec:0000:b000

ENDPOINT 2 PARAMETER BLOCK:
[USEP2]=0x2210   [EP2PTR]=0x2900
[RBASE]=0x2c58
[TBASE]=0x2c78
[RFCR]=0x10
[TFCR]=0x10
[MRBLR]=0x44
[RBPTR]=0x2c58
[TBPTR]=0x2c78
[TSTATE]=0x10930d6e
[TPTR]=0x80b58cc4
[TCRC]=0xffff
[TBCNT]=0x14

ENDPOINT 2 TX BUFFER DESCRIPTORS:  (offset: ptr:length:status)
2c78: 80b58cc0:0018:0280  2c80: 00000000:0000:1000  2c88: 00000000:0000:1000
2c90: 00000000:0000:1000  2c98: 00000000:0000:1000  2ca0: 00000000:0000:1000
2ca8: 00000000:0000:1000  2cb0: 00000000:0000:1000  2cb8: 00000000:0000:1000
2cc0: 00000000:0000:3000

ENDPOINT 2 RX BUFFER DESCRIPTORS:  (offset: ptr:length:status)
2c78: 80bb3d30:0000:9000   2c80: 80bb3d74:0000:9000   2c88: 80bb3db8:0000:9000
2c90: 80bb3dfc:0000:b000

ENDPOINT 3 PARAMETER BLOCK:
[USEP3]=0x3210   [EP3PTR]=0x2920
[RBASE]=0x2cc8
[TBASE]=0x2ce8
[RFCR]=0x10
[TFCR]=0x10
[MRBLR]=0x44
ENDPOINT 3 PARAMETER BLOCK:
[USEP3]=0x3210   [EP3PTR]=0x2920
[RBASE]=0x2cc8
[TBASE]=0x2ce8
[RFCR]=0x10
[TFCR]=0x10
[MRBLR]=0x44
[RBPTR]=0x2cc8
[TBPTR]=0x2ce8
[TSTATE]=0x10930d6e
[TPTR]=0x80b58cc4
[TCRC]=0xffff
[TBCNT]=0x14

ENDPOINT 3 TX BUFFER DESCRIPTORS:  (offset: ptr:length:status)
2ce8: 80b58cc0:0018:0280  2cf0: 00000000:3030:1000  2cf8: 00000000:3032:1000
2d00: 00000000:5b73:1000  2d08: 00000000:6e2d:1000  2d10: 00000000:3131:1000
2d18: 00000000:4556:1000  2d20: 00000000:4e54:1000  2d28: 00000000:4152:1000
2d30: 00000000:7972:3000
```

```
ENDPOINT 3 RX BUFFER DESCRIPTORS:  (offset: ptr:length:status)
2ce8: 80bb3e40:0000:9000   2cf0: 80bb3e84:5379:9000   2cf8: 80bb3ec8:6f6f:9000
2d00: 80bb3f0c:2c20:b000
```

Related Commands

Command	Description
show interfaces usb	Displays configuration information about the USB interface.

show dhcp

To display the current Dynamic Host Configuration Protocol (DHCP) settings on point-to-point interfaces, use the **show dhcp** privileged EXEC command.

show dhcp {**lease** | **server**}

Syntax Description

lease	Displays DHCP addresses leased from a server.
server	Displays known DHCP servers.

Defaults

No default behavior or values.

Command Modes

Privileged EXEC

Command History

Release	Modification
11.3(4)NA	This command was introduced for the Cisco uBR904 cable access router.
12.0(4)XI1	Support was added for the Cisco uBR924 cable access router.
12.1(1)XD	Support was added for the Cisco uBR914 cable DSU.
12.1(3)XL	Support was added for the Cisco uBR905 cable access router.
12.1(5)XU2	Support was added for the Cisco CVA120 Series Cable Voice Adapter.

Usage Guidelines

You can use this command on any point-to-point type of interface that uses DHCP for temporary IP address allocation.

Examples

The following is sample output for the **show dhcp lease** command:

```
cva120# show dhcp lease
Temp IP addr: 188.188.1.40  for peer on Interface: cable-modem0
Temp sub net mask: 0.0.0.0
   DHCP Lease server: 4.0.0.32, state: 3 Bound
   DHCP transaction id: 2431
   Lease: 3600 secs,  Renewal: 1800 secs,  Rebind: 3150 secs
Temp default-gateway addr: 188.188.1.1
   Next timer fires after: 00:58:01
   Retry count: 0   Client-ID: 0010.7b43.aa01
```

Table 17 describes the significant fields shown in the display.

Table 17 show dhcp lease Field Descriptions

Field	Description
Temp IP addr	IP address leased from the DHCP server for the cable access router interface.
Temp subnet mask	Temporary subnet mask assigned to the cable access router interface.
DHCP Lease server	IP address of the DHCP server that assigned an IP address to this client.
state	Current state of this client (the cable access router interface). Possible states are Bound, Renew, or Rebinding. For descriptions of these states, see RFC 2131.
DHCP transaction id	Unique number established by the Cisco CVA120 Series Cable Voice Adapter before the first request message is sent to the DHCP server. The same transaction id is used as long as the lease keeps getting renewed and is valid. If a new “discover” message is sent, a new transaction id is used.
Lease	Time (in seconds) for which the leased IP address is valid; the duration of the lease.
Renewal	Time interval (in seconds) from address assignment until the client transitions to the renewing state. When the renewal (T1) time expires, the client sends a unicast dhcp request message to the server to extend its lease. The default value of this timer is 0.5 times the duration of the lease.
Rebind	Time interval (in seconds) from address assignment until the client transitions to the rebinding state, and sends a broadcast dhcprequest message to any DHCP server to extends its lease. The default value of this timer (T2) is 0.875 times the duration of the lease.
Temp default-gateway addr	IP address of the router closest to this client on the network.
Next timer fires after	Time in hours, minutes, and seconds until the next timer expires.
Retry count	Number of times the client has sent any message to the DHCP server—most likely a request message to extend its lease. When the lease is renewed, the Retry count is reset to 0.
Client-ID	MAC address (with optional media type code) that uniquely identifies the client on the subnet for binding lookups.

The following is sample output for the **show dhcp server** command:

```
cva120# 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
    TFTP Server Name: SOHOSERVER
    TIME0: 1.2.0.250,  TIME1: 0.0.0.0
    Subnet: 255.255.255.0
```

Table 18 describes the significant fields shown in the display.

Table 18 show dhcp server 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 have been declined by the proxy client.
Releases	Number of times IP addresses have been relinquished gracefully by the client.
Bad	Number of bad packets received due to wrong length, wrong field type, or other causes.
TFTP Server Name	Name (if any) configured for the server providing TFTP downloads to the cable modem.
TIME0	IP address of the primary Time of Day (ToD) server.
TIME1	IP address of the secondary Time of Day (ToD) server.
Subnet	Subnet containing the DHCP server.

Related Commands

Command	Description
cable-modem voip best-effort	Allows voice calls to be sent upstream over the cable interface using best effort.
show bridge cable-modem	Displays bridging information for a cable modem.
show interfaces cable-modem	Displays information about the cable interface of the Cisco CVA120 Series Cable Voice Adapter.

show interfaces cable-modem

To display information about the Cisco CVA120 Series Cable Voice Adapter cable interface, use the **show interfaces cable-modem** command in either user EXEC mode or privileged EXEC mode.

show interfaces cable-modem *number* [**accounting** | **counters** | **crb** | **irb** | **type**]

Syntax Description

number	Cable access router interface number.
accounting	(Optional) Displays the number of packets of each protocol type that has been sent through the cable access router interface.
counters	(Optional) Shows MIB counters on the cable interface.
crb	(Optional) Displays concurrent routing and bridging information for each interface that has been configured for routing or bridging. This option does not really apply to the Cisco CVA120 Series Cable Voice Adapter. The option is included because it is part of the subsystem that provides DOCSIS-compliant bridging. For more information, refer to the *Bridging and IBM Networking Command Reference*.
irb	(Optional) Displays integrated routing and bridging information for each interface that has been configured for routing or bridging. This option does not really apply to the Cisco CVA120 Series Cable Voice Adapter. The option is included because it is part of the subsystem that provides DOCSIS-compliant bridging. For more information, refer to the *Bridging and IBM Networking Command Reference*.
type	(Optional) Displays information about virtual LANs associated with the interface. However, this option is not supported on the Cisco CVA120 Series Cable Voice Adapter.

Defaults

No default behavior or values.

Command Modes

User EXEC or privileged EXEC

Command History

Release	Modification
11.3(4)NA	This command was introduced for the Cisco uBR904 cable access router.
12.0(4)XI1	Support was added for the Cisco uBR924 cable access router.
12.1(1)XD	Support was added for the Cisco uBR914 cable DSU.
12.1(3)XL	Support was added for the Cisco uBR905 cable access router.
12.1(5)XU2	Support was added for the Cisco CVA120 Series Cable Voice Adapter.

Usage Guidelines

When this command is entered without a keyword, general information about the cable interface is displayed.

Examples

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

```
cva120# show interfaces cable-modem 0
  cable-modem0 is up, line protocol is up
  Hardware is BCM3300, address is 0050.7366.2439 (bia 0050.7366.2439)
  Internet address is 5.2.0.11/16
  MTU 1500 bytes, BW 27000 Kbit, DLY 1000 usec,
     reliability 255/255, txload 1/255, rxload 1/255
  Encapsulation DOCSIS, loopback not set
  Keepalive set (10 sec)
  ARP type:ARPA, ARP Timeout 04:00:00
  Last input 00:00:00, output 00:00:00, output hang never
  Last clearing of "show interface" counters 00:08:40
  Queueing strategy:fifo
  Output queue 40/40, 52787 drops; input queue 0/75, 0 drops
  5 minute input rate 2000 bits/sec, 2 packets/sec
  5 minute output rate 94000 bits/sec, 154 packets/sec
     1074 packets input, 418472 bytes, 0 no buffer
     Received 19 broadcasts, 0 runts, 0 giants, 0 throttles
     0 input errors, 0 CRC, 0 frame, 0 overrun, 0 ignored, 0 abort
     78771 packets output, 6326786 bytes, 0 underruns
     0 output errors, 0 collisions, 0 interface resets
     0 output buffer failures, 0 output buffers swapped out
```

Table 19 describes the significant fields shown in the display.

Table 19 show interfaces cable-modem Field Descriptions

Field	Description
cable-modem0 is up	Indicates that the interface is currently active. “Disabled” indicates the interface has received more than 5000 errors in one keepalive interval (10 seconds by default if keepalive is set); “administratively down” indicates the interface has been taken down by an administrator.
line protocol is up	Indicates that the software processes that handle the line protocol believe the interface is usable.
Hardware	Hardware type and MAC address.
Internet address	Internet address followed by the shorthand notation for the subnet mask.
MTU	Maximum Transmission Unit (equivalent of the maximum packet size) for the interface.
BW	Bandwidth of the interface in kilobits per second.
DLY	Delay of the interface in microseconds.
reliability	Reliability of the interface, expressed as a fraction of 255, calculated as an exponential average over a 5-minute period. (255/255 equals 100% reliability.)
tx load/rx load	Load on the interface caused by transmitting and receiving, expressed as a fraction of 255, calculated as an exponential average over a 5 minute period.
Encapsulation/loopback/keepalive	Encapsulation method assigned to the interface.
loopback	Indicates whether or not loopback is set.
keepalive	Indicates whether or not keepalives are set.

Table 19 show interfaces cable-modem Field Descriptions (continued)

Field	Description
ARP type	Type of Address Resolution Protocol configured for the interface.
ARP Timeout	Number of hours, minutes, and seconds an ARP cache entry stays in the cache.
Last input/output	Number of hours, minutes, and seconds since the last packet was successfully received/transmitted by the interface.
output hang	Number of hours, minutes, and seconds since the interface was last reset because of a transmission that took too long. When the number of hours in any of the "Last..." fields exceeds 24, the number of days and hours is displayed. If the field overflows, asterisks are printed.
Last clearing of "show interface" counters	Time at which the counters that measure cumulative statistics (such as number of bytes transmitted and received) shown in this report were last reset to zero. Note that variables that might affect routing (for example, load and reliability) are not cleared when the counters are cleared. *** indicates the elapsed time is too large to be displayed. 0:00:00 indicates the counters were cleared more than 2^{31} milliseconds (and less than 2^{32} milliseconds) ago.
Queueing strategy	Type of queueing strategy in effect on the interface.
Output queue/drops	Number of packets in the output queue followed by the size of the queue, and the number of packets dropped due to a full queue.
input queue/drops	Number of packets in the input queue followed by the size of the queue, and the number of packets dropped due to a full queue.
5 minute input rate 5 minute output rate	Average number of bits and packets received and transmitted per second in the last 5 minutes. If the interface is not in promiscuous mode, it senses network traffic that it sends and receives (rather than all network traffic). The 5-minute input and output rates should be used only as an approximation of traffic per second during a given 5-minute period. These rates are exponentially weighted averages with a time constant of 5 minutes. A period of four time constants must pass before the average is within two percent of the instantaneous rate of a uniform stream of traffic over that period.
packets input	Total number of error-free packets received by the system.
bytes input	Total number of bytes, including data and MAC encapsulation, in the error-free packets received by the system.
no buffer	Number of received packets discarded because there is no buffer space in the main system. Compare with ignored count. Broadcast storms on Ethernet networks and bursts of noise on serial lines are often responsible for no input buffer events.

Table 19 show interfaces cable-modem Field Descriptions (continued)

Field	Description
Received broadcasts	Total number of broadcast or multicast packets received by the interface.
runts	Number of packets discarded because they were smaller than the medium's minimum packet size. For example, any Ethernet packet less than 64 bytes is considered a runt.
giants	Number of packets discarded because they were larger than the medium's maximum packet size. For example, any Ethernet packet larger than 1518 bytes is considered a giant.
throttles	Number of times the receiver on the port was disabled, possibly due to buffer or processor overload.
input errors	Includes runts, giants, no buffer, CRC, frame, overrun, and ignored counts. Other input-related errors can also cause the input errors count to be increased, and some datagrams can have more than one error; therefore, this sum might not balance with the sum of enumerated input error counts.
CRC	Number of cyclic redundancy checksums (CRCs) generated by the originating LAN station or far-end device that do not match the checksum calculated from the data received. On a LAN, this usually indicates noise or transmission problems on the LAN interface or the LAN bus itself. A high number of CRCs is usually the result of collisions or a station sending bad data.
frame	Number of packets received incorrectly, having a CRC error and a noninteger number of octets. On a LAN, this is usually the result of collisions or a malfunctioning Ethernet device.
overrun	Number of times the receiver hardware was unable to hand received data to a hardware buffer because the input rate exceeded the receiver's ability to handle the data.
ignored	Number of received packets ignored by the interface because the interface hardware ran low on internal buffers. These buffers are different from the system buffers mentioned previously in the buffer description. Broadcast storms and bursts of noise can cause the ignored count to be increased.
abort	Number of packets whose receipt was aborted.
packets output	Total number of messages sent by the system.
bytes	Total number of bytes, including data and MAC encapsulation, sent by the system.
underruns	Number of times the transmitter has been running faster than the router can handle.
output errors	Sum of all errors that prevented the final transmission of datagrams out of the interface being examined. Note that this may not balance with the sum of the enumerated output errors, because some datagrams might have more than one error, and other datagrams might have errors that do not fall into any of the specifically tabulated categories.

Table 19 show interfaces cable-modem Field Descriptions (continued)

Field	Description
collisions	Number of messages retransmitted due to an Ethernet collision. This is usually the result of an overextended LAN (Ethernet or transceiver cable too long, more than two repeaters between stations, or too many cascaded multiport transceivers). A packet that collides is counted only once in output packets.
interface resets	Number of times an interface has been completely reset. This can happen if packets queued for transmission were not sent within several seconds. On a serial line, this can be caused by a malfunctioning modem that is not supplying the transmit clock signal, or by a cable problem. If the system notices that the carrier detect line of a serial interface is up, but the line protocol is down, it periodically resets the interface in an effort to restart it. Interface resets can also occur when an interface is looped back or shut down.
output buffer failures	Number of times the output buffer has failed.
output buffers swapped out	Number of times the output buffer has been swapped out.

To display the number of packets and bytes of each protocol type passing through the cable access router interface, use the **accounting** option with the **show interfaces cable-modem** command:

```
cva120# show interfaces 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
```

Table 20 describes the significant fields shown in this display.

Table 20 show interfaces cable-modem accounting Field Descriptions

Field	Description
Protocol	List of protocols operating on the cable-modem interface.
Pkts In	Number of packets of each protocol received on the interface.
Chars In	Number of bytes of each protocol received on the interface.
Pkts Out	Number of packets of each protocol sent on the interface.
Chars Out	Number of bytes of cache protocol sent on the interface.

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

```
cva120# show interfaces 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
```

Table 21 describes the counters shown in this display.

Table 21 Counters Shown in show interfaces cable-modem counters Display

Field	Description
Ranging requests sent	Number of ranging requests sent by the Cisco CVA120 Series Cable Voice Adapter to the CMTS.
Downstream FIFO full	Number of times the downstream input first-in first-out (FIFO) buffer became full on the Cisco CVA120 Series Cable Voice Adapter.
Re-requests	Number of times a bandwidth request generated by the Cisco CVA120 Series Cable Voice Adapter was not responded to by the CMTS.
DS MAC Message Overruns	Number of times the Cisco CVA120 Series Cable Voice Adapter's DMA controller had a downstream MAC message, and there were no free MAC message buffer descriptors to accept the message.
DS Data Overruns	Number of times the Cisco CVA120 Series Cable Voice Adapter DMA controller had downstream data, and there were no free data PDU buffer descriptors to accept the data.
Received MAPs	Number of times a MAP message passed all filtering requirements and was received by the Cisco CVA120 Series Cable Voice Adapter.
Received Syncs	Number of times a time-stamp message was received by the Cisco CVA120 Series Cable Voice Adapter.
Message CRC failures	Number of times a MAC message failed a cyclic redundancy (CRC) check.
Header CRC failures	Number of times a MAC header failed its 16-bit CRC check. The MAC header CRC is a 16-bit Header Check Sequence (HCS) field that ensures the integrity of the MAC header even in a collision environment.
Data PDUs	Total number of protocol data units (PDUs) of all types received by the Cisco CVA120 Series Cable Voice Adapter.
DS MAC messages	Number of MAC messages received by the Cisco CVA120 Series Cable Voice Adapter.
Valid Headers	Number of valid headers received by the Cisco CVA120 Series Cable Voice Adapter, including PDU headers, MAC headers, and headers only.
Sync losses	Number of times the Cisco CVA120 Series Cable Voice Adapter lost timebase sync with the CMTS.
Pulse losses	Number of times the Cisco CVA120 Series Cable Voice Adapter did not receive expected timestamp messages from the CMTS.
BW request failures	Number of times the Cisco CVA120 Series Cable Voice Adapter sent the maximum number of re-requests for bandwidth allocation and the request was still not granted.

Information about routing and bridging protocols and filtering on the cable access router interface is displayed in the following example:

```
cva120# show interfaces 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
```

Table 22 describes the software MAC address filter information for the cable access router interface.

Table 22 Software MAC Address Filter Information

Field	Description
Hash	Hash key/relative position in the keyed list for this MAC address filter.
Len	Length of this entry to the beginning element of this hash chain.
Address	Canonical (Ethernet ordered) MAC address of this filter.
Matches	Number of received packets that match this MAC address.
Act	Action to be taken when this address is looked up; choices are to receive or discard the packet.
Type	MAC address type.

Related Commands

Command	Description
show bridge cable-modem	Displays bridging information for a cable modem.

show interfaces usb

To display configuration information about the USB interface, use the **show interfaces usb** privileged EXEC command.

show interfaces usb *number*

Syntax Description:

number	Specifies the number of the USB interface (always **0** for the Cisco CVA120 Series Cable Voice Adapter).

Defaults

No default behavior or values.

Command Modes

Privileged EXEC

Command History

Release	Modification
12.1(5)XU2	This command was introduced for the Cisco CVA120 Series Cable Voice Adapter.

Usage Guidelines

Use the **show interfaces usb** privileged EXEC command to display configuration and status information for the USB interface.

Examples

The following is sample output from the **show interfaces usb** command for the Cisco CVA120 Series Cable Voice Adapter:

```
cva120# show interfaces usb0
USB0 is up, line protocol is down
  Hardware is M850_USB, address is 0001.64f9.22fe (bia 0001.64f9.22fe)
  Internet address is 192.168.100.1/24
  MTU 1500 bytes, BW 12000 Kbit, DLY 1000 usec,
     reliability 255/255, txload 1/255, rxload 1/255
  Encapsulation ARPA, loopback not set
  Keepalive set (10 sec)
  ARP type:ARPA, ARP Timeout 00:00:00
  Last input never, output never, 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
     0 packets input, 0 bytes, 0 no buffer
     Received 0 broadcasts, 0 runts, 0 giants, 0 throttles
     0 input errors, 0 CRC, 0 frame, 0 overrun, 0 ignored, 0 abort
     2 packets output, 120 bytes, 0 underruns
     0 output errors, 0 collisions, 0 interface resets
     0 output buffer failures, 0 output buffers swapped out
```

Related Commands

Command	Description
interface usb	Enters configuration mode for the USB interface.

show voice port

To display configuration information about a specific voice port, use the **show voice port** privileged EXEC command.

show voice port *number*

Syntax Description:

number	Indicates the RJ-11 connectors installed in the Cisco CVA120 Series Cable Voice Adapter. Valid entries are **0** (V1+V2 port) and **1** (V2 port).

Defaults

No default behavior or values.

Command Modes

Privileged EXEC

Command History

Release	Modification
12.0(4)XL	This command was introduced for the Cisco uBR924 cable access router.
12.1(5)XU2	Support was added for the Cisco CVA120 Series Cable Voice Adapter.

Usage Guidelines

This command applies to Voice over IP on the Cisco CVA120 Series Cable Voice Adapter.

Use this command to display configuration and voice interface card-specific information about a specific port.

Examples

The following is sample output from the **show voice port** command for the Cisco CVA120 Series Cable Voice Adapter:

```
cva120# show voice port 0

Foreign Exchange Station 0
 Type of VoicePort is FXS
 Operation State is DORMANT
 Administrative State is UP
 No Interface Down Failure
 Description is not set
 Noise Regeneration is enabled
 Non Linear Processing is enabled
 Music On Hold Threshold is Set to -38 dBm
 In Gain is Set to -2 dB
 Out Attenuation is Set to 0 dB
 Echo Cancellation is enabled
 Echo Cancel Coverage is set to 8 ms
 Connection Mode is normal
 Connection Number is not set
 Initial Time Out is set to 10 s
 Interdigit Time Out is set to 10 s
 Call-Disconnect Time Out is set to 60 s
 Ringing Time Out is set to 180 s
```

```
Region Tone is set for US

Analog Info Follows:
Currently processing none
Maintenance Mode Set to None (not in mtc mode)
Number of signaling protocol errors are 0
Impedance is set to 600r Ohm

Voice card specific Info Follows:
Signal Type is loopStart
Ring Frequency is 25 Hz
Hook Status is On Hook
Ring Active Status is inactive
Ring Ground Status is inactive
Tip Ground Status is inactive
Digit Duration Timing is set to 100 ms
InterDigit Duration Timing is set to 100 ms
```

Table 23 explains the fields in the sample output.

Table 23 show voice port Field Descriptions

Field	Description
Administrative State	Administrative state of the voice port.
Alias	User-supplied alias for this voice port, if any.
Coder Type	Voice compression mode used.
Connection Mode	Connection mode of the interface.
Connection Number	Full E.164 telephone number used to establish a connection with the trunk or PLAR mode.
Currently Processing	Type of call currently being processed: none, voice, or fax.
Description	Description of the voice port.
Digit Duration Timing	DTMF digit duration in milliseconds.
Echo Cancel Coverage	Echo cancel coverage for this port.
Echo Cancellation	Whether or not echo cancellation is enabled for this port.
Hook Flash Duration Timing	Maximum length of hook flash signal.
Hook Status	Hook status of the FXO/FXS interface.
Impedance	Configured terminating impedance for the E&M interface.
In Gain	Amount of gain inserted at the receiver side of the interface.
Initial Time Out	Amount of time the system waits for an initial input digit from the caller.
InterDigit Duration Timing	DTMF interdigit duration in milliseconds.
InterDigit Pulse Duration Timing	Pulse dialing interdigit timing in milliseconds.
Interdigit Time Out	Amount of time the system waits for a subsequent input digit from the caller.
Maintenance Mode	Maintenance mode of the voice port.
Music On Hold Threshold	Configured music-on-hold threshold value for this interface.

Table 23 show voice port Field Descriptions (continued)

Field	Description
Noise Regeneration	Whether or not background noise should be played to fill silent gaps if VAD is activated.
Non-Linear Processing	Whether or not nonlinear processing is enabled for this port.
Number of signalling protocol errors	Number of signalling protocol errors.
Operations State	Operation state of the port.
Out Attenuation	Amount of attenuation inserted at the transmit side of the interface.
Region Tone	Configured regional tone for this interface.
Ring Active Status	Ring active indication.
Ring Cadence	Configured ring cadence for this interface.
Ring Frequency	Configured ring frequency for this interface.
Ring Ground Status	Ring ground indication.
Ringing Time Out	Ringing time out duration.
Signal Type	Type of signalling for a voice port: loop-start, ground-start, wink-start, immediate, and delay-dial.
Tip Ground Status	Tip ground indication.
Type of VoicePort	Type of voice port: always FXS for the Cisco CVA120 Series Cable Voice Adapter.

Related Commands

Command	Description
show call active voice	Displays the contents of the active call table.
show call history voice	Displays the contents of the call history table.
show dial-peer voice	Displays configuration information and call statistics for dial peers.
show voice port	Displays configuration information about a specific voice port.

voice-port

To enter the voice-port configuration mode, use the **voice-port** command in global configuration mode.

voice-port *number*

Syntax Description:

number	Indicates the RJ-11 connectors that are installed in the Cisco CVA120 Series Cable Voice Adapter. Valid entries are **0** (V1+V2 port) and **1** (V2 port).

Defaults

No default behavior or values.

Command Modes

Global configuration

Command History

Release	Modification
12.0(4)XI1	This command was introduced for the Cisco uBR924 cable access router.
12.1(5)XU2	Support was added for the Cisco CVA120 Series Cable Voice Adapter.

Usage Guidelines

Use the **voice-port** global configuration command to switch to the voice-port configuration mode from the global configuration mode. Use the **exit** command to exit the voice-port configuration mode and return to the global configuration mode. See the *Cisco IOS Release 12.1 Multiservice Applications Command Reference*, available on CCO and the Documentation CD-ROM, for a list of subcommands that are supported by the **voice-port** global configuration command.

Examples

The following example accesses the voice-port configuration mode for port 0, the first voice port (labeled "V1+V2") on the Cisco CVA120 Series Cable Voice Adapter.

```
cva120# configure terminal
cva120(config)# voice-port 0
```

Related Commands

Command	Description
dial-peer voice	Enters dial-peer configuration mode, defines the type of dial peer, and defines the tag number associated with a dial peer.

Debug Commands

This section documents the following debug commands, which are not normally needed to install or configure the Cisco CVA120 Series Cable Voice Adapter:

- **debug cable-modem bpkm**
- **debug cable-modem bridge**
- **debug cable-modem error**
- **debug cable-modem interrupts**
- **debug cable-modem mac**
- **debug cable-modem mac messages dynsrv**
- **debug cable-modem map**
- **debug usb**

Additional debug commands are documented in the *Cisco IOS Release 12.1 Debug Command Reference*, available on CCO and the Documentation CD-ROM.

Caution The **debug** commands are primarily intended for use in controlled test and troubleshooting situations with a limited volume of traffic. You should use caution when enabling debug messages because sending these messages to the console consumes system resources. Turning on too many types of debug messages can adversely affect the router's network performance, depending on what messages are being displayed and the type of traffic that is occurring.

debug cable-modem bpkm

To display Baseline Privacy Interface (BPI) information, use the **debug cable-modem bpkm** command in privileged EXEC mode. To disable the debugging output, use the **no** form of this command.

debug cable-modem bpkm {**errors** | **events** | **packets**}

no debug cable-modem bpkm {**errors** | **events** | **packets**}

Syntax Description:

errors	Debugs cable modem privacy errors.
events	Debugs events related to cable baseline privacy.
packets	Debugs baseline privacy packets.

Defaults

The default is not to display any debugging messages.

Command History

Release	Modification
11.3(4)NA	This command was introduced for the Cisco uBR904 cable access router.
12.0(4)XI1	Support was added for the Cisco uBR924 cable access router.
12.1(1)XD	Support was added for the Cisco uBR914 cable DSU.
12.1(3)XL	Support was added for the Cisco uBR905 cable access router.
12.1(5)XU2	Support was added for the Cisco CVA120 Series Cable Voice Adapter.

Usage Guidelines

Baseline privacy key management exchanges take place only when both the Cisco CVA120 Series Cable Voice Adapter and the CMTS are running code images that support baseline privacy, and the privacy class of service is enabled using the configuration file that is downloaded to the cable access router. Baseline privacy code images for the Cisco CVA120 Series Cable Voice Adapter contain **k1** in the code image name.

This command should be used only while debugging cable modem operation. Displaying debugging messages consumes system resources, and turning on too many messages could negatively affect system performance.

Examples

The following example shows typical debug output when the headend does not have privacy enabled:

```
cva120# debug cable-modem bpkm errors
cm_bpkm_fsm(): machine: KEK, event/state: EVENT_4_TIMEOUT/STATE_B_AUTH_WAIT, new state:
STATE_B_AUTH_WAIT

cm_bpkm_fsm(): machine: KEK, event/state: EVENT_4_TIMEOUT/STATE_B_AUTH_WAIT, new state:
STATE_B_AUTH_WAIT

%LINEPROTO-5-UPDOWN: Line protocol on Interface cable-modem0, changed state to down
cm_bpkm_fsm(): machine: KEK, event/state: EVENT_1_PROVISIONED/STATE_A_START, new state:
STATE_B_AUTH_WAIT

%LINEPROTO-5-UPDOWN: Line protocol on Interface cable-modem0, changed state to up
```

Related Commands

Command	Description
debug cable-modem bridge	Displays bridge filter processing information.
debug cable-modem error	Displays debugging messages for the cable interface driver.
debug cable-modem interrupts	Displays information about cable modem interrupts.
debug cable-modem mac	Displays information about the cable modem MAC layer.
debug cable-modem map	Displays the timing of MAP and sync messages.

debug cable-modem bridge

The **debug cable-modem bridge** privileged EXEC command displays bridge filter processing information on a cable modem. To disable the debugging output, use the **no** form of this command.

debug cable-modem bridge

no debug cable-modem bridge

Syntax Description

This command has no keywords or arguments.

Defaults

The default is not to display any debugging messages.

Command History

Release	Modification
11.3(4)NA	This command was introduced for the Cisco uBR904 cable access router.
12.0(4)XI1	Support was added for the Cisco uBR924 cable access router.
12.1(1)XD	Support was added for the Cisco uBR914 cable DSU.
12.1(3)XL	Support was added for the Cisco uBR905 cable access router.
12.1(5)XU2	Support was added for the Cisco CVA120 Series Cable Voice Adapter.

Usage Guidelines

When the interface is down, all bridge table entries learned on the Ethernet interface are set to discard because traffic is not bridged until the cable interface has completed initialization. After the interface (the line protocol) is completely up, bridge table entries learned on the Ethernet interface program the cable's MAC data filters. The cable MAC hardware filters out any received packets whose addresses are not in the filters. In this way, the cable interface only receives packets addressed to its own MAC address or an address it has learned on the Ethernet interface.

This command should be used only while debugging cable modem operation. Displaying debugging messages consumes system resources, and turning on too many messages could negatively affect system performance.

Examples

The following shows sample display output for the **debug cable-modem bridge** command.

```
cva120# debug cable-modem bridge
%LINEPROTO-5-UPDOWN: Line protocol on Interface cable-modem0, changed state to downshut
cm_tbridge_add_entry(): MAC not initialized, discarding entry: 00e0.fe7a.186fno shut
cm_tbridge_add_entry(): MAC not initialized, discarding entry: 00e0.fe7a.186f
%LINEPROTO-5-UPDOWN: Line protocol on Interface cable-modem0, changed state to up
cm_tbridge_add_entry(): Adding entry 00e0.fe7a.186f to filter 2
```

Related Commands

Command	Description
debug cable-modem bpkm	Displays Baseline Privacy Interface (BPI) information.
debug cable-modem error	Displays debugging messages for the cable interface driver.
debug cable-modem interrupts	Displays information about cable modem interrupts.
debug cable-modem mac	Displays information about the cable modem MAC layer.
debug cable-modem map	Displays the timing of MAP and sync messages.

debug cable-modem error

The **debug cable-modem error** privileged EXEC command displays debugging messages for the cable interface driver. To disable the debugging output, use the **no** form of this command.

debug cable-modem error

no debug cable-modem error

Syntax Description

This command has no keywords or arguments.

Defaults

The default is not to display any debugging messages.

Command History

Release	Modification
11.3(4)NA	This command was introduced for the Cisco uBR904 cable access router.
12.0(4)XI1	Support was added for the Cisco uBR924 cable access router.
12.1(1)XD	Support was added for the Cisco uBR914 cable DSU.
12.1(3)XL	Support was added for the Cisco uBR905 cable access router.
12.1(5)XU2	Support was added for the Cisco CVA120 Series Cable Voice Adapter.

Usage Guidelines

This command displays detailed output about the sanity checking of received frame formats, the acquisition of downstream QAM/FEC lock, the receipt or nonreceipt of SYNC messages from the CMTS, reception errors, and bandwidth request failures.

This command should be used only while debugging cable modem operation. Displaying debugging messages consumes system resources, and turning on too many messages could negatively affect system performance.

Examples

The following shows sample display output for the **debug cable-modem error** command.

```
cva120# debug cable-modem error
*Mar  7 20:16:29: AcquireSync(): Update rate is 100 Hz
*Mar  7 20:16:30: 1st Sync acquired after 1100 ms.
*Mar  7 20:16:30: Recovery loop is locked (7/9)
*Mar  7 20:16:30: 2nd Sync acquired after 100 ms.
*Mar  7 20:16:30: Recovery loop is locked (10/15)
```

Related Commands

Command	Description
debug cable-modem bpkm	Displays Baseline Privacy Interface (BPI) information.
debug cable-modem bridge	Displays bridge filter processing information.
debug cable-modem interrupts	Displays information about cable modem interrupts.
debug cable-modem mac	Displays information about the cable modem MAC layer.
debug cable-modem map	Displays the timing of MAP and sync messages.

debug cable-modem interrupts

The **debug cable-modem interrupts** privileged EXEC command displays information about cable modem interrupts. To disable the debugging output, use the **no** form of this command.

debug cable-modem interrupts

no debug cable-modem interrupts

Syntax Description

This command has no keywords or arguments.

Defaults

The default is not to display any debugging messages.

Command History

Release	Modification
11.3(4)NA	This command was introduced for the Cisco uBR904 cable access router.
12.0(4)XI1	Support was added for the Cisco uBR924 cable access router.
12.1(1)XD	Support was added for the Cisco uBR914 cable DSU.
12.1(3)XL	Support was added for the Cisco uBR905 cable access router.
12.1(5)XU2	Support was added for the Cisco CVA120 Series Cable Voice Adapter.

Usage Guidelines

This command should be used only while debugging cable modem operation. Displaying debugging messages consumes system resources, and turning on too many messages could negatively affect system performance.

Examples

The following shows sample debug output for cable modem interrupts.

```
cva120# debug cable-modem interrupts
*** bcm3220_rx_mac_msg_interrupt ***
*** bcm3220_rx_mac_msg_interrupt ***
### bcm3220_tx_interrupt ###
*** bcm3220_rx_mac_msg_interrupt ***
### bcm3220_tx_interrupt ###
*** bcm3220_rx_mac_msg_interrupt ***
### bcm3220_tx_interrupt ###
### bcm3220_tx_interrupt ###
### bcm3220_tx_interrupt ###
### bcm3220_tx_interrupt ###
```

Related Commands

Command	Description
debug cable-modem bpkm	Displays Baseline Privacy Interface (BPI) information.
debug cable-modem bridge	Displays bridge filter processing information.
debug cable-modem error	Displays debugging messages for the cable interface driver.

Command	Description
debug cable-modem mac	Displays information about the cable modem MAC layer.
debug cable-modem map	Displays the timing of MAP and sync messages.

debug cable-modem mac

The **debug cable-modem mac** privileged EXEC command displays information about the cable modem MAC layer. To disable the debugging output, use the **no** form of this command.

debug cable-modem mac {**log** [**verbose**] | **messages**}

no debug cable-modem mac {**log** [**verbose**] | **messages**}

Syntax Description:

log	Real time MAC log display.
verbose	Displays periodic MAC layer events, such as ranging.
messages	MAC layer management messages.

Defaults

The default is not to display any debugging messages.

Command History

Release	Modification
11.3(4)NA	This command was introduced for the Cisco uBR904 cable access router.
12.0(4)XI1	Support was added for the Cisco uBR924 cable access router.
12.1(1)XD	Support was added for the Cisco uBR914 cable DSU.
12.1(3)XL	Support was added for the Cisco uBR905 cable access router.
12.1(5)XU2	Support was added for the Cisco CVA120 Series Cable Voice Adapter.

Usage Guidelines

Of all the available debug cable modem commands, the most useful is **debug cable-modem mac log**.

Mac log messages are written to a circular log file even when debugging is not turned on. These messages include timestamps, events, and information pertinent to these events. Enter the **debug cable-modem mac log** command to view Mac log messages. If you want to view this information without entering debug mode, enter the **show controllers cable-modem** *number* **mac log** command. The same information is displayed by both commands.

If the Cisco CVA120 Series Cable Voice Adapter interface fails to come up or resets periodically, the Mac log will show what happened. For example, if an address is not obtained from the DHCP server, an error is logged, initialization starts over, and the cable modem scans for a downstream frequency. The **debug cable-modem mac log** command displays the log from oldest entry to newest entry.

After initial ranging is successful (dhcp_state has been reached), further `RNG-REQ/RNG-RSP` messages and watchdog timer entries are suppressed from output unless the **verbose** keyword is used. Note that `CMAC_LOG_WATCHDOG_TIMER` entries while in the maintenance_state are normal when using the **verbose** keyword.

This command should be used only while debugging cable modem operation. Displaying debugging messages consumes system resources, and turning on too many messages could negatively affect system performance.

Examples

Example 1

This example shows sample display output from the **debug cable-modem mac log** command. The fields of the output are the time since bootup, the log message, and in some cases a parameter that gives more detail about the log entry.

```
cva120# debug cable-modem mac log
*Mar  7 01:42:59: 528302.040 CMAC_LOG_LINK_DOWN
*Mar  7 01:42:59: 528302.042 CMAC_LOG_RESET_FROM_DRIVER
*Mar  7 01:42:59: 528302.044 CMAC_LOG_STATE_CHANGE                      wait_for_link_up_state
*Mar  7 01:42:59: 528302.046 CMAC_LOG_DRIVER_INIT_IDB_SHUTDOWN          0x08098D02
*Mar  7 01:42:59: 528302.048 CMAC_LOG_LINK_DOWN
*Mar  7 01:43:05: 528308.428 CMAC_LOG_DRIVER_INIT_IDB_RESET             0x08098E5E
*Mar  7 01:43:05: 528308.432 CMAC_LOG_LINK_DOWN
*Mar  7 01:43:05: 528308.434 CMAC_LOG_LINK_UP
*Mar  7 01:43:05: 528308.436 CMAC_LOG_STATE_CHANGE                      ds_channel_scanning_state
*Mar  7 01:43:05: 528308.440 CMAC_LOG_WILL_SEARCH_DS_FREQUENCY_BAND     88/453000000/855000000/6000000
*Mar  7 01:43:05: 528308.444 CMAC_LOG_WILL_SEARCH_DS_FREQUENCY_BAND     89/93000000/105000000/6000000
*Mar  7 01:43:05: 528308.448 CMAC_LOG_WILL_SEARCH_DS_FREQUENCY_BAND     90/111250000/117250000/6000000
*Mar  7 01:43:05: 528308.452 CMAC_LOG_WILL_SEARCH_DS_FREQUENCY_BAND     91/231012500/327012500/6000000
*Mar  7 01:43:05: 528308.456 CMAC_LOG_WILL_SEARCH_DS_FREQUENCY_BAND     92/333015000/333015000/6000000
*Mar  7 01:43:05: 528308.460 CMAC_LOG_WILL_SEARCH_DS_FREQUENCY_BAND     93/339012500/399012500/6000000
*Mar  7 01:43:05: 528308.462 CMAC_LOG_WILL_SEARCH_DS_FREQUENCY_BAND     94/405000000/447000000/6000000
*Mar  7 01:43:05: 528308.466 CMAC_LOG_WILL_SEARCH_DS_FREQUENCY_BAND     95/123015000/129015000/6000000
*Mar  7 01:43:05: 528308.470 CMAC_LOG_WILL_SEARCH_DS_FREQUENCY_BAND     96/135012500/135012500/6000000
*Mar  7 01:43:05: 528308.474 CMAC_LOG_WILL_SEARCH_DS_FREQUENCY_BAND     97/141000000/171000000/6000000
*Mar  7 01:43:05: 528308.478 CMAC_LOG_WILL_SEARCH_DS_FREQUENCY_BAND     98/219000000/225000000/6000000
*Mar  7 01:43:05: 528308.482 CMAC_LOG_WILL_SEARCH_DS_FREQUENCY_BAND     99/177000000/213000000/6000000
*Mar  7 01:43:05: 528308.486 CMAC_LOG_WILL_SEARCH_SAVED_DS_FREQUENCY    663000000
*Mar  7 01:43:05: 528308.488 CMAC_LOG_WILL_SEARCH_USER_DS_FREQUENCY     663000000
*Mar  7 01:43:07: 528310.292 CMAC_LOG_DS_64QAM_LOCK_ACQUIRED            663000000
.
.
.
528383.992 CMAC_LOG_STATE_CHANGE                        registration_state
528384.044 CMAC_LOG_REG_REQ_MSG_QUEUED
528384.050 CMAC_LOG_REG_REQ_TRANSMITTED
528384.052 CMAC_LOG_REG_RSP_MSG_RCVD
528384.078 CMAC_LOG_COS_ASSIGNED_SID                    1/4
528384.102 CMAC_LOG_RNG_REQ_QUEUED                      4
528384.102 CMAC_LOG_REGISTRATION_OK
528384.102 CMAC_LOG_STATE_CHANGE                        establish_privacy_state
528384.102 CMAC_LOG_STATE_CHANGE                        maintenance_state
528388.444 CMAC_LOG_RNG_REQ_TRANSMITTED
528388.444 CMAC_LOG_RNG_RSP_MSG_RCVD
528398.514 CMAC_LOG_RNG_REQ_TRANSMITTED
528398.516 CMAC_LOG_RNG_RSP_MSG_RCVD
528408.584 CMAC_LOG_RNG_REQ_TRANSMITTED
528408.586 CMAC_LOG_RNG_RSP_MSG_RCVD
528414.102 CMAC_LOG_WATCHDOG_TIMER
528418.654 CMAC_LOG_RNG_REQ_TRANSMITTED
528418.656 CMAC_LOG_RNG_RSP_MSG_RCVD
528428.726 CMAC_LOG_RNG_REQ_TRANSMITTED
528428.728 CMAC_LOG_RNG_RSP_MSG_RCVD
528438.796 CMAC_LOG_RNG_REQ_TRANSMITTED
528438.798 CMAC_LOG_RNG_RSP_MSG_RCVD
528444.102 CMAC_LOG_WATCHDOG_TIMER
528444.492 CMAC_LOG_LINK_DOWN
528444.494 CMAC_LOG_RESET_FROM_DRIVER
528444.494 CMAC_LOG_STATE_CHANGE                        wait_for_link_up_state
528444.494 CMAC_LOG_DRIVER_INIT_IDB_SHUTDOWN            0x08098D02
528444.494 CMAC_LOG_LINK_DOWN
528474.494 CMAC_LOG_WATCHDOG_TIMER
528504.494 CMAC_LOG_WATCHDOG_TIMER
```

```
528534.494 CMAC_LOG_WATCHDOG_TIMER

0 events dropped due to lack of a chunk
```

Note The line "`0 events dropped due to lack of a chunk`" at the end of the display indicates that no log entries were discarded due to a temporary lack of memory. This means the log is accurate and reliable.

Example 2

The following example compares the output of the **debug cable-modem mac log** command with the **debug cable-modem mac log verbose** command. The **verbose** keyword displays periodic events such as ranging.

```
cva120# debug cable-modem mac log
Cable Modem mac log debugging is on
cva120#
cva120# debug cable-modem mac log verbose
Cable Modem mac log debugging is on (verbose)
cva120#
574623.810 CMAC_LOG_RNG_REQ_TRANSMITTED
574623.812 CMAC_LOG_RNG_RSP_MSG_RCVD
574627.942 CMAC_LOG_WATCHDOG_TIMER
574633.880 CMAC_LOG_RNG_REQ_TRANSMITTED
574633.884 CMAC_LOG_RNG_RSP_MSG_RCVD
574643.950 CMAC_LOG_RNG_REQ_TRANSMITTED
574643.954 CMAC_LOG_RNG_RSP_MSG_RCVD
574654.022 CMAC_LOG_RNG_REQ_TRANSMITTED
574654.024 CMAC_LOG_RNG_RSP_MSG_RCVD
574657.978 CMAC_LOG_WATCHDOG_TIMER
574664.094 CMAC_LOG_RNG_REQ_TRANSMITTED
574664.096 CMAC_LOG_RNG_RSP_MSG_RCVD
574674.164 CMAC_LOG_RNG_REQ_TRANSMITTED
574674.166 CMAC_LOG_RNG_RSP_MSG_RCVD

cva120# no debug cable-modem mac log verbose
Cable Modem mac log debugging is off
cva120#
574684.234 CMAC_LOG_RNG_REQ_TRANSMITTED
574684.238 CMAC_LOG_RNG_RSP_MSG_RCVD
```

Example 3

The following example shows display output for the **debug cable-modem mac messages** command. This command causes received cable MAC management messages to be displayed in a verbose format. The messages that are displayed are shown below:

```
cva120# debug cable-modem mac messages?
  dynsrv   dynamic service mac messages
  map      map messages received
  reg-req  reg-req  messages transmitted
  reg-rsp  reg-rsp messages received
  rng-req  rng-req  messages transmitted
  rng-rsp  rng-rsp messages received
  sync     Sync messages received
  ucc-req  ucc-req messages received
  ucc-rsp  ucc-rsp messages transmitted
  ucd      UCD messages received
  <cr>
```

The **dynsrv** keyword displays Dynamic Service Add (DSA) or Dynamic Service Delete (DSD) messages during the off-hook/on-hook transitions of a phone connected to the Cisco CVA120 Series Cable Voice Adapter.

In addition, transmitted REG-REQs are displayed in hex dump format. The output from this command is very verbose and is usually not needed for normal interface debugging. The command is most useful when attempting to attach a Cisco CVA120 Series Cable Voice Adapter to a CMTS that is not DOCSIS-qualified.

For a description of the displayed fields of each message, refer to the DOCSIS Radio Frequency Interface Specification, v1.0 (SP-RFI-I04-980724).

```
cva120# debug cable-modem mac messages
*Mar  7 01:44:06:
*Mar  7 01:44:06: UCD MESSAGE
*Mar  7 01:44:06: -----------
*Mar  7 01:44:06:   FRAME HEADER
*Mar  7 01:44:06:     FC                        - 0xC2 == MAC Management
*Mar  7 01:44:06:     MAC_PARM                  - 0x00
*Mar  7 01:44:06:     LEN                       - 0xD3
*Mar  7 01:44:06:   MAC MANAGEMENT MESSAGE HEADER
*Mar  7 01:44:06:     DA                        - 01E0.2F00.0001
*Mar  7 01:44:06:     SA                        - 00E0.1EA5.BB60
*Mar  7 01:44:06:     msg LEN                   - C1
*Mar  7 01:44:06:     DSAP                      - 0
*Mar  7 01:44:06:     SSAP                      - 0
*Mar  7 01:44:06:     control                   - 03
*Mar  7 01:44:06:     version                   - 01
*Mar  7 01:44:06:     type                      - 02 == UCD
*Mar  7 01:44:06:     RSVD                      - 0
*Mar  7 01:44:06:   US Channel ID               - 1
*Mar  7 01:44:06:   Configuration Change Count  - 4
*Mar  7 01:44:06:   Mini-Slot Size              - 8
*Mar  7 01:44:06:   DS Channel ID               - 1
*Mar  7 01:44:06:   Symbol Rate                 - 8
*Mar  7 01:44:06:   Frequency                   - 20000000
*Mar  7 01:44:06:   Preamble Pattern            - CC CC CC CC CC CC CC CC CC CC CC CC 0D 0D
*Mar  7 01:44:06:   Burst Descriptor 0
*Mar  7 01:44:06:     Interval Usage Code       - 1
*Mar  7 01:44:06:     Modulation Type           - 1 == QPSK
*Mar  7 01:44:06:     Differential Encoding     - 2 == OFF
*Mar  7 01:44:06:     Preamble Length           - 64
*Mar  7 01:44:06:     Preamble Value Offset     - 56
*Mar  7 01:44:06:     FEC Error Correction      - 0
*Mar  7 01:44:06:     FEC Codeword Info Bytes   - 16
*Mar  7 01:44:06:     Scrambler Seed            - 0x0152
*Mar  7 01:44:06:     Maximum Burst Size        - 1
*Mar  7 01:44:06:     Guard Time Size           - 8
*Mar  7 01:44:06:     Last Codeword Length      - 1 == FIXED
*Mar  7 01:44:06:     Scrambler on/off          - 1 == ON
*Mar  7 01:44:06:   Burst Descriptor 1
*Mar  7 01:44:06:     Interval Usage Code       - 3
*Mar  7 01:44:06:     Modulation Type           - 1 == QPSK
*Mar  7 01:44:06:     Differential Encoding     - 2 == OFF
*Mar  7 01:44:06:     Preamble Length           - 128
*Mar  7 01:44:06:     Preamble Value Offset     - 0
*Mar  7 01:44:06:     FEC Error Correction      - 5
*Mar  7 01:44:06:     FEC Codeword Info Bytes   - 34
*Mar  7 01:44:06:     Scrambler Seed            - 0x0152
*Mar  7 01:44:06:     Maximum Burst Size        - 0
*Mar  7 01:44:06:     Guard Time Size           - 48
*Mar  7 01:44:06:     Last Codeword Length      - 1 == FIXED
```

```
*Mar  7 01:44:06:     Scrambler on/off          - 1 == ON


*Mar  7 01:44:06:   Burst Descriptor 2
*Mar  7 01:44:06:     Interval Usage Code       - 4
*Mar  7 01:44:06:     Modulation Type           - 1 == QPSK
*Mar  7 01:44:06:     Differential Encoding     - 2 == OFF
*Mar  7 01:44:06:     Preamble Length           - 128
*Mar  7 01:44:06:     Preamble Value Offset     - 0
*Mar  7 01:44:06:     FEC Error Correction      - 5
*Mar  7 01:44:06:     FEC Codeword Info Bytes   - 34
*Mar  7 01:44:06:     Scrambler Seed            - 0x0152
*Mar  7 01:44:06:     Maximum Burst Size        - 0
*Mar  7 01:44:06:     Guard Time Size           - 48
*Mar  7 01:44:06:     Last Codeword Length      - 1 == FIXED
*Mar  7 01:44:06:     Scrambler on/off          - 1 == ON
*Mar  7 01:44:06:   Burst Descriptor 3
*Mar  7 01:44:06:     Interval Usage Code       - 5
*Mar  7 01:44:06:     Modulation Type           - 1 == QPSK
*Mar  7 01:44:06:     Differential Encoding     - 2 == OFF
*Mar  7 01:44:06:     Preamble Length           - 72
*Mar  7 01:44:06:     Preamble Value Offset     - 48
*Mar  7 01:44:06:     FEC Error Correction      - 5
*Mar  7 01:44:06:     FEC Codeword Info Bytes   - 75
*Mar  7 01:44:06:     Scrambler Seed            - 0x0152
*Mar  7 01:44:06:     Maximum Burst Size        - 0
*Mar  7 01:44:06:     Guard Time Size           - 8
*Mar  7 01:44:06:     Last Codeword Length      - 1 == FIXED
*Mar  7 01:44:06:     Scrambler on/off          - 1 == ON
*Mar  7 01:44:06:
*Mar  7 01:44:06:
*Mar  7 01:44:06: MAP MESSAGE
*Mar  7 01:44:06: -----------
*Mar  7 01:44:06:   FRAME HEADER
*Mar  7 01:44:06:     FC                        - 0xC3 == MAC Mement with Extended Header
*Mar  7 01:44:06:     MAC_PARM                  - 0x02
*Mar  7 01:44:06:     LEN                       - 0x42
*Mar  7 01:44:06:     EHDR                      - 0x00 0x00
*Mar  7 01:44:06:   MAC MANAGEMENT MESSAGE HEADER
*Mar  7 01:44:06:     DA                        - 01E0.2F00.0001
.
*Mar  7 01:44:17: RNG-RSP MESSAGE
*Mar  7 01:44:17: ---------------
*Mar  7 01:44:17:   FRAME HEADER
*Mar  7 01:44:17:     FC                        - 0xC2 == MAC Management
*Mar  7 01:44:17:     MAC_PARM                  - 0x00
*Mar  7 01:44:17:     LEN                       - 0x2B
*Mar  7 01:44:17:   MAC MANAGEMENT MESSAGE HEADER
*Mar  7 01:44:17:     DA                        - 00F0.1EB2.BB61
.
*Mar  7 01:44:20: REG-REQ MESSAGE
*Mar  7 01:44:20: ---------------
*Mar  7 01:44:20: C20000A5 000000E0  1EA5BB60 00F01EB2
*Mar  7 01:44:20: BB610093 00000301  06000004 03010104
*Mar  7 01:44:20: 1F010101 0204003D  09000304 001E8480
*Mar  7 01:44:20: 04010705 04000186  A0060200 0C070101
*Mar  7 01:44:20: 080300F0 1E112A01  04000000 0A020400
*Mar  7 01:44:20: 00000A03 04000002  58040400 00000105
*Mar  7 01:44:20: 04000000 01060400  00025807 04000000
*Mar  7 01:44:20: 3C2B0563 6973636F  06105E4F C908C655
*Mar  7 01:44:20: 61086FD5 5C9D756F  7B730710 434D5453
*Mar  7 01:44:20: 204D4943 202D2D2D  2D2D2D2D 0C040000
*Mar  7 01:44:20: 00000503 010100
*Mar  7 01:44:20:
```

```
*Mar  7 01:44:20:
*Mar  7 01:44:20: REG-RSP MESSAGE
*Mar  7 01:44:20: ---------------
*Mar  7 01:44:20:   FRAME HEADER
*Mar  7 01:44:20:     FC                          - 0xC2 == MAC Management
*Mar  7 01:44:20:     MAC_PARM                    - 0x00
*Mar  7 01:44:20:     LEN                         - 0x29
*Mar  7 01:44:20:   MAC MANAGEMENT MESSAGE HEADER
*Mar  7 01:44:20:     DA                          - 00F0.1EB2.BB61
```

Related Commands

Command	Description
debug cable-modem bpkm	Displays Baseline Privacy Interface (BPI) information.
debug cable-modem bridge	Displays bridge filter processing information.
debug cable-modem error	Displays sdebugging messages for the cable interface driver.
debug cable-modem interrupts	Display information about cable modem interrupts.
debug cable-modem map	Displays the timing of MAP and sync messages.

debug cable-modem mac messages dynsrv

To display debug messages for the dynamic service MAC-layer messages that are generated when voice calls are made using the dynamic SID feature, use the **debug cable-modem mac messages dynsrv privileged** EXEC command. To disable the debugging output, use the **no** form of this command.

debug cable-modem mac messages dynsrv

no debug cable-modem mac messages dynsrv

Syntax Description

This command has no keywords or arguments.

Defaults

No default behavior or values.

Command History

Release	Modification
12.0(7)XR and 12.1(1)T	This command was introduced for the Cisco uBR924 cable access router.
12.1(1)XD	Support was added for the Cisco uBR914 cable DSU.
12.1(3)XL	Support was added for the Cisco uBR905 cable access router.
12.1(5)XU2	Support was added for the Cisco CVA120 Series Cable Voice Adapter.

Usage Guidelines

This command begins the display of debug messages that show the dynamic service MAC messages that are generated when a voice call is made using the dynamic SID feature. Dynamic SIDs use the following DOCSIS MAC-layer messages to create a new SID when a voice call is made, and to delete it when the call is over:

- DSA-REQ—Dynamic Service Addition Request, sent to establish a new service flow.
- DSA-RSP—Dynamic Service Addition Response, sent in reply to DSA-REQ to confirm or deny the new service flow.
- DSA-ACK—Dynamic Service Addition Acknowledge, sent in reply to DSA-RSP to acknowledge the creation of the service flow.
- DSD-REQ—Dynamic Service Deletion Request, sent to delete an existing service flow when it is no longer needed (for example, when a voice call has terminated).
- DSD-RSP—Dynamic Service Deletion Response, sent in response to DSD-REQ to delete an existing service flow.

Note Dynamic Services are described in the DOCSIS 1.1 specification (SP-RFIv1.1-I03-991105 or later revision).

Examples

The following example enables the display of debug messages related to dynamic service operations:

```
cva120# debug cable-modem mac messages dynsrv
cva120#
```

The following example turns off the display of debug messages related to dynamic service operations:

```
cva120# no debug cable-modem mac messages dynsrv
cva120#
```

The following are examples of the types of debug messages that are displayed when a voice call is made. This example shows that dynamic SID 52 is created for this particular call.

```
DSA-REQ TLV's:
--------------
US Flow Scheduler(24):
 Unsolicited Grant Size               - 19:2:89
 Nominal Grant Interval               - 20:4:20000
Created New Dynamic Service State, Transaction_id = 3

DSA-REQ MESSAGE TLVS
--------------------
C2000026 00010010  07DF6854 00507366
23270014 00000301  0F000003 180A1302
00591404 00004E20

   597.721 CMAC_LOG_DSA_REQ_MESSAGE_EVENT

DSA-REQ MESSAGE
---------------
  FRAME HEADER
    FC                         - 0xC2 == MAC Management
    MAC_PARM                   - 0x00
    LEN                        - 0x26
  MAC MANAGEMENT MESSAGE HEADER
    DA                         - 0010.abcd.ef00
    SA                         - 0050.abcd.ef00
    msg LEN                    - 14
    DSAP                       - 0
    SSAP                       - 0
    control                    - 03
    version                    - 01
    type                       - 0F == DSA-REQ
    RSVD                       - 0
  Transaction ID               - 3

   597.725 CMAC_LOG_DSA_RSP_MSG_RCVD

DSA-RSP MESSAGE
---------------
  FRAME HEADER
    FC                         - 0xC2 == MAC Management
    MAC_PARM                   - 0x00
    LEN                        - 0x26
  MAC MANAGEMENT MESSAGE HEADER
    DA                         - 0050.abcd.ef00
    SA                         - 0010.abcd.ef00
    msg LEN                    - 14
    DSAP                       - 0
    SSAP                       - 0
    control                    - 03
    version                    - 01
    type                       - 10 == DSA-RSP
    RSVD                       - 0
  Transaction ID               - 3
  Response                     - 0 == DSA-RSP-OK
  SID                          - 52

Adding sid = 52 to sid_index = 1
```

```
597.729 CMAC_LOG_QOS_ADD_FLOW_SID                52
```

Related Commands

Command	Description
debug cable-modem mac messages	Displays debug messages for other types of MAC-layer messages, including MAP messages, upstream request messages, and sync messages.
show controllers cable-modem qos	Displays current statistics for each primary, secondary, and dynamic SIDs.

debug cable-modem map

The **debug cable-modem map** privileged EXEC command displays the timing from MAP messages to sync messages and the timing between MAP messages. To disable the debugging output, use the **no** form of this command.

debug cable-modem map

no debug cable-modem map

Syntax Description

This command has no keywords or arguments.

Defaults

The default is not to display any debugging messages.

Command History

Release	Modification
11.3(4)NA	This command was introduced for the Cisco uBR904 cable access router.
12.0(4)XI1	Support was added for the Cisco uBR924 cable access router.
12.1(1)XD	Support was added for the Cisco uBR914 cable DSU.
12.1(3)XL	Support was added for the Cisco uBR905 cable access router.
12.1(5)XU2	Support was added for the Cisco CVA120 Series Cable Voice Adapter.

Usage Guidelines

This command should be used only while debugging cable modem operation. Displaying debugging messages consumes system resources, and turning on too many messages could negatively affect system performance.

Examples

The following shows display output for the **debug cable-modem map** command.

```
cva120# debug cable-modem map
Cable Modem MAP debugging is on
cva120#
*Mar  7 20:12:08: 595322.942: Min MAP to sync=72
*Mar  7 20:12:08: 595322.944: Max map to map time is 40
*Mar  7 20:12:08: 595322.982: Min MAP to sync=63
*Mar  7 20:12:08: 595323.110: Max map to map time is 41
*Mar  7 20:12:08: 595323.262: Min MAP to sync=59
*Mar  7 20:12:08: 595323.440: Max map to map time is 46
*Mar  7 20:12:09: 595323.872: Min MAP to sync=58
```

Related Commands

Command	Description
debug cable-modem bpkm	Displays Baseline Privacy Interface (BPI) information.
debug cable-modem bridge	Displays bridge filter processing information.
debug cable-modem error	Displays debugging messages for the cable interface driver.

Command	Description
debug cable-modem interrupts	Displays information about cable modem interrupts.
debug cable-modem mac	Displays information about the cable modem MAC layer.

debug usb

The **debug usb** privileged EXEC command displays debugging messages about the USB interface. To disable the debugging output, use the **no** form of this command.

debug usb { rx | tx }

no debug usb { rx | tx }

Syntax Description

rx	Displays receive packet events.
tx	Displays transmit packet events.

Defaults

The default is not to display any debugging messages.

Command History

Release	Modification
12.1(5)XU2	This command was introduced for the Cisco CVA120 Series Cable Voice Adapter.

Usage Guidelines

This command should be used only while debugging cable modem operation. Displaying debugging messages consumes system resources. Turning on too many messages could negatively affect system performance.

Examples

The following shows display output for the **debug usb** command.

```
cva120# debug usb rx
USB Rx debugging is on

cva120# debug usb tx
USB Tx debugging is on
```

Related Commands

Command	Description
debug cable-modem bpkm	Displays Baseline Privacy Interface (BPI) information.
debug cable-modem bridge	Displays bridge filter processing information.
debug cable-modem error	Displays debugging messages for the cable interface driver.
debug cable-modem interrupts	Displays information about cable modem interrupts.
debug cable-modem mac	Displays information about the cable modem MAC layer.

Glossary

To fully understand the content of this guide, you should be familiar with the acronyms and terms listed in this section. These terms are specific to the operation of a data cable network; more general networking acronyms and terms can be found in *Internetworking Terms and Acronyms*, available on CCO and the Documentation CD-ROM.

3DES—Triple Data Encryption Standard.

ASIC—Application Specific Integrated Circuit.

BPI—Baseline Privacy Interface.

BPI+ —Extension to the initial BPI standard with improved authentication and encryption.

CM—Cable modem.

CMTS—Cable Modem Termination System (headend).

CoS—Class of service.

CPE—Customer Premises Equipment.

DES—Data Encryption Standard.

DOCSIS 1.0—Data Over Cable Service Interface Specification.

DOCSIS 1.0+ —Extension of the DOCSIS 1.0 standard with features that support quality of service (QoS) options to offer better than best effort, low latency, and low jitter services.

downstream—Transmission of traffic from the CMTS (headend) to the CM (cable modem).

IPSec—IP network security.

Kbps—Kilobits per second.

MAC—Media Access Control.

Mbps—Megabits per second.

modem—modulator/demodulator.

MSO—Multiple Systems Operator.

NIU/STB—Network Interface Unit/Set-Top Box.

PPS—Packets per second.

QAM—Quadrature Amplitude Modulation.

QoS—Quality of service.

QPSK—Quadrature Phase Shift Keying.

RF—Radio frequency.

SID—Service Identifier (DOCSIS MAC-level service flow identifier)

SM—Subscriber Modem or Spectrum Manager.

uBR—Universal broadband router.

upstream—Transmission of traffic from CM (cable modem) to the CMTS (headend).

VoIP—Voice over IP.