Start Up Configuration of the Cisco cBR Router

This document describes the basic start up configuration tasks that must be completed on a Cisco cBR Series Converged Broadband Router.

Prerequisites for Configuring the Cisco CMTS

Complete these prerequisite steps before you power on and configure the Cisco CMTS:

- Ensure that your network supports reliable broadband data transmission. Your plant must be swept, balanced, and certified based on National Television Standards Committee (NTSC) or appropriate international cable plant recommendations. Ensure your plant meets all Data-over-Cable Service Interface Specifications (DOCSIS) downstream and upstream radio frequency (RF) requirements.
- Ensure that your Cisco CMTS is installed according to the instructions in the hardware installation guide available on Cisco.com.
- Ensure that all other required headend or distribution hub routing and network interface equipment is installed, configured, and operational (based on the supported services). This includes:
  - All routers
  - Servers (Dynamic Host Configuration Protocol (DHCP) servers, Trivial File Transfer Protocol (TFTP) servers, and time-of-day (ToD) servers)
  - Network management systems
  - Other configuration or billing systems
- Ensure that DHCP and DOCSIS configuration files have been created and pushed to appropriate servers so that each CM, when initialized, can:
  - Transmit a DHCP request
  - Receive an IP address
  - Obtain TFTP and ToD server addresses
  - Download a DOCSIS configuration file (or updated software image if using Cisco uBR924 cable access routers or Cisco uBR910 cable data service units (DSUs) in your network)
- Ensure that customer premises equipment (CPE)—CMs or set-top boxes (STBs), PCs, telephones, or facsimile machines—meet requirements for your network and service offerings.
- Be familiar with your channel plan to assign appropriate frequencies. Outline your strategies for setting up bundling, if applicable to your headend or distribution hub. As appropriate, obtain:
  - Passwords
  - IP addresses
  - Subnet masks

- Device names

After these prerequisites are met, you are ready to configure the Cisco CMTS. This includes, at a minimum:

- Configuring a host name and password for the Cisco CMTS
- Configuring the CMTS to support IP over the cable plant and network backbone

Note If you plan to use service-class-based provisioning, the service classes must be configured at the CMTS before CMs attempt to make a connection.

Note Do not configure the **logging event link-status** command during system initialization. It may take long time or even stop the standby SUP from booting up.

Booting and Logging onto the Cisco CMTS

The Cisco CMTS is administered using the Cisco command interpreter, called the EXEC. You must boot and log in to the router before you can enter an EXEC command.

Step 1 Connect to the console port on the Supervisor PIC and the Supervisor card.

Step 2 Establish a terminal session. You can open terminal application (Hyper Terminal) on a PC as follows:

a) Connect using: Direct to Com 1
b) Set bits per second:9600
c) Set data bits: 8
d) Set parity: none
e) Set stop bit: 1
f) Set flow control: none

Type **no** when the following message is displayed:

```
Would you like to enter the initial dialog?[yes]: no
Router>
```

First Time Boot Up with ROMMON

The Cisco cBR-8 boots up with ROMMON on the console with 9600 baud default configuration. It boots image either from TFTP or from local device. Local devices supported include the bootflash and USB.

Example of the boot up display:

```
Initializing Hardware ...ˇ
```

```
System Bootstrap, Version 15.5(2r)S, RELEASE SOFTWARE
Copyright (c) 1994-2015  by cisco Systems, Inc.

Current image running: Boot ROM0

Last reset cause: PowerOn

CPUID: 0x000206d7
UCODE: 0x00000710_00000000
Viper version register: 0x14121111
Set Chassis Type to 13RU
Cisco cBR-8  platform with 50331648 Kbytes of main memory

rommon 1 >
```

Configuration Register

The **confreg** ROMMON command displays the configuration and allows modification of the settings.

```
rommon > confreg

           Configuration Summary
   (Virtual Configuration Register: 0x0)
enabled are:
 [ 0 ] break/abort has effect
 [ 1 ] console baud: 9600
 boot: ...... the ROM Monitor

do you wish to change the configuration? y/n  [n]:  y
 enable  "diagnostic mode"? y/n  [n]:
 enable  "use net in IP bcast address"? y/n  [n]:
 enable  "load rom after netboot fails"? y/n  [n]:
 enable  "use all zero broadcast"? y/n  [n]:
 disable "break/abort has effect"? y/n  [n]:
 enable  "ignore system config info"? y/n  [n]:
 change console baud rate? y/n  [n]:
change the boot characteristics? y/n  [n]:

           Configuration Summary
   (Virtual Configuration Register: 0x0)
enabled are:
 [ 0 ] break/abort has effect
 [ 1 ] console baud: 9600
 boot: ...... the ROM Monitor
do you wish to change the configuration? y/n  [n]:
Console baud rate options:
change console baud rate? y/n  [n]:  y
0=9600, 1=4800, 2=1200, 3=2400, 4=19200, 5=38400, 6=57600, 7=115200
enter rate  [0]:
Boot characteristics options:
change the boot characteristics? y/n  [n]:  y

 enter to boot:
 0 = ROM Monitor
 1 = the boot helper image
 2-15 = boot system
 [0]:
```

Setting Environment Variables

No Environment variables are required to boot the Cisco IOS-XE image.

There are variables set by default. The ROMMON command **set** displays the default variables.

```
rommon  > set
PS1=rommon ! >
?=0
rommon  >
```

To set a variable, the format is VARIABLE="value".

The**set** command displays the new variable and the **sync** command saves the variable to NVRAM.

Note If the variable value has a space in between, specify the value within quotes.

```
rommon  > set
PS1=rommon ! >
?=0
rommon  > IP_ADDRESS=1.2.3.4
rommon  > IP_SUBNET_MASK=255.255.255.128
rommon  > DEFAULT_GATEWAY=1.2.9.10
rommon  > TFTP_SERVER=1.2.3.6
rommon  > sync
```

Unsetting Environment Variables

The **unset** ROMMON command removes the Environment variables and the **sync** command saves the variable to NVRAM.

```
rommon 1 > set
PS1=rommon ! >
?=0
BSI=0
BOOT=bootflash:cbrsup-adventerprisek9.SSA.bin,12;
RANDOM_NUM=1357042312
RET_2_RTS=17:45:06 PDT Sat Dec 31 2011
RET_2_RCALTS=1325378706
rommon 2 > unset BOOT
rommon 3 > sync
rommon 4 > set
PS1=rommon ! >
?=0
BSI=0
RANDOM_NUM=1357042312
RET_2_RTS=17:45:06 PDT Sat Dec 31 2011
RET_2_RCALTS=1325378706
rommon 5 >
```

Booting from the TFTP on the Cisco cBR

ROMMON boots up with default environment variables. The BinOS image is booted up from TFTP over the management port. This requires a minimum set of environment variables: IP_ADDRESS, IP_SUBNET_MASK, DEFAULT_GATEWAY, and TFTP_SERVER.

Step 1 Type the **set** command and define the required environment variables.

```
rommon  > set
PS1=rommon ! >
?=0
rommon  > IP_ADDRESS=1.2.3.4
rommon  > IP_SUBNET_MASK=255.255.255.128
rommon  > DEFAULT_GATEWAY=1.2.9.10
rommon  > TFTP_SERVER=1.2.3.6
rommon  > sync
```

Step 2 Type the **sync** command to save the variables to NVRAM.

```
rommon 6 > sync
```

Step 3 Type the **boot** command to load the image.

```
rommon 7 > boot tftp:/tftpboot/username/cbrsup-universalk9.SSA.bin

          IP_ADDRESS: 1.2.3.4
      IP_SUBNET_MASK: 255.255.255.128
     DEFAULT_GATEWAY: 1.2.9.10
         TFTP_SERVER: 1.2.3.6
           TFTP_FILE: /tftpboot/username/cbrsup-universalk9.SSA.bin
        TFTP_MACADDR: c4:14:3c:17:e8:00
        TFTP_VERBOSE: Progress
    TFTP_RETRY_COUNT: 18
        TFTP_TIMEOUT: 7200
       TFTP_CHECKSUM: Yes
          ETHER_PORT: 2

    ETHER_SPEED_MODE: Auto Detect
link up........
Receiving /tftpboot/username/cbrsup-universalk9.SSA.bin from 172.19.211.47
!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!
```

Listing Supported Devices

The **dev** command lists the devices supported on the router.

```
rommon 1 > dev
Devices in device table:
        id  name
 harddisk:  Internal hard disk
bootflash:  Internal flash drive
     usb0:  External USB drive 0
```

```
     usb1:  External USB drive 1
rommon 2 >
```

Booting from the Device on the Cisco cBR

Step 1 Type the **dir bootflash:** command.

```
rommon  > dir bootflash:
File System: EXT2/EXT3

12         691955580 -rw-r--r--     cbrsup-xe315.SSA.bin
45         83475     -rw-r--r--     reload.log.20120103004502
```

Step 2 Type the **boot bootflash:***imagename* command.

```
rommon  > boot bootflash:cbrsup-xe315.bin
File size is 0x293e67bc
Located cbrsup-xe315.bin
Image size 691955644 inode num 145153, bks cnt 168935 blk size 8*512
######################################################################
```

Setting AUTOBOOT image in ROMMON

To set AUTOBOOT of an image from bootflash:, add the Environment Variable BOOT and then change the configuration register boot characteristics to boot and reset the system.

Step 1 Type the **boot=bootflash:***imagename* command to load the image.

```
rommon  > BOOT=bootflash:cbrsup-xe315-20150131.bin
```

Step 2 Type the **sync** command to copy the variables to NVRAM.

```
rommon  > sync
```

Step 3 Type the **confreg** command to configure and modify the settings.

```
rommon  > confreg

           Configuration Summary
   (Virtual Configuration Register: 0x0)
enabled are:
 [ 0 ] break/abort has effect
 [ 1 ] console baud: 9600
 boot: ...... the ROM Monitor

do you wish to change the configuration? y/n  [n]:  y
 enable  "diagnostic mode"? y/n  [n]:
 enable  "use net in IP bcast address"? y/n  [n]:
 enable  "load rom after netboot fails"? y/n  [n]:
 enable  "use all zero broadcast"? y/n  [n]:
```

```
 disable "break/abort has effect"? y/n  [n]:
 enable  "ignore system config info"? y/n  [n]:
 change console baud rate? y/n  [n]:  n
change the boot characteristics? y/n  [n]:  y

 enter to boot:
 0 = ROM Monitor
 1 = the boot helper image
 2-15 = boot system
 [0]:  2

           Configuration Summary
   (Virtual Configuration Register: 0x2)
enabled are:
 [ 0 ] break/abort has effect
 [ 1 ] console baud: 9600
 boot: ...... image specified by the boot system commands or default to: cisco2-Cisco cBR-8

do you wish to change the configuration? y/n  [n]:

You must reset or power cycle for new config to take effect
```

Step 4 Type the **reset** command for the new configuration to take effect.

```
rommon  > reset
```

What to do next

Verifying the ROMMON Version

Use the **showmon** command to display the version of ROMMON.

```
rommon  > showmon
Current image running (0/1): Boot ROM0
System Bootstrap, Version 15.5(2r)S, RELEASE SOFTWARE
Copyright (c) 1994-2015  by cisco Systems, Inc.

Viper version register: 0x14121111
rommon  >
```

Table 1: Feature History

Feature Name	Release Information	Feature Description
ROMMON Enhancements	Cisco IOS XE Dublin 17.12.1w	With this release, ROMMON autoupgrade takes place when the existing ROMMON version is older than version 16.7(9r)S. Manual ROMMON upgrade continues to be supported. In ROMMON version 16.7(9r)S, we remove DEV key support from cBR-8 routers. You need a challenge key if you need to run an engineer-signed image.

Running Private Cisco IOS XE Images

Use the **devkey** command to get the one-time token. The Cisco support team can use that token to generate the Dev Keys(same as Dev Mode).

```
rommon 1 > devkey
E7B06AE8877E3421
```

Once the Dev Keys are available, configure the Dev Keys in the ROMMON prompt.

```
rommon 2 > DEVKEY0=AE079099BADAEA16C731A667A57BC06D32586C2767631965C607C4842F62F20E
rommon 3 > DEVKEY1=3E926BB3EE3163C805AD908305C5118E3A1F7964BE400240B7850EAFC9773C6F
rommon 4 > DEVKEY2=D9353C68B75EF526957D95E773A8E680AEE81E7C1DFCC2A56F2AF1B257B075CA
rommon 5 > DEVKEY3=07E48CFF98697CEA4129AF04894C7BC160DB552152B4A05210674CA38F08B247
rommon 7 > DEVKEY4=E4D29277DC246F0427D711360E36B193BB9D2969F0B42EF5EE5019E7C80E0535
rommon 8 > DEVKEY5=D45CC1D9B50FED89B17D1674938F9BD7AE1F10F23A46EB95FED5F5593D717F46
rommon 9 > DEVKEY6=2778650684521852B0EFA3B5D95F92A3729F3A99645B802ACA781AA243BFC965
rommon 10> DEVKEY7=F5FA33BC31755EAD97EC376509D52FE89D397B119CE59D26EE310E0DF562003B
```

After setting the Dev Key, you can only boot a private IOS image **once**.

Note Saving tokens in the ROMMON environment does not work. It is necessary to generate the token every time a private image needs to run.

Resetting the Cisco cBR

Use the **reset** command to soft reset the Supervisor.

```
rommon  > reset

Resetting .......


Initializing Hardware ...ˇ

System Bootstrap, Version 15.5(2r)S, RELEASE SOFTWARE
Copyright (c) 1994-2015  by cisco Systems, Inc.

Current image running: Boot ROM0

Last reset cause: LocalSoftware

CPUID: 0x000206d7
UCODE: 0x00000710_00000000
Viper version register: 0x14121111
Set Chassis Type to 13RU
Cisco cBR-8  platform with 50331648 Kbytes of main memory

rommon  >
```

Configuring PTP

The Cisco cBR supports Precision Time Protocol (PTP) boundary or ordinary clock (OC) subordinate mode when connected to the Ethernet ports of the DPIC card or Supervisor PIC card. This topic provides you with a an overview of PTP, configuration options, commands to verify the configuration settings, and configuration examples.

Cisco cBR supports DPIC PTP subordinate configuration with the following restraints:

- Only subordinate mode is supported.
- Only one-step timestamping is supported

Overview of PTP

Precision Time Protocol (PTP) is a packet-based two-way message exchange protocol for synchronizing clocks between nodes in a network, thus providing an accurate time distribution over a network. PTP support is based on the IEEE 1588-2008 standard.

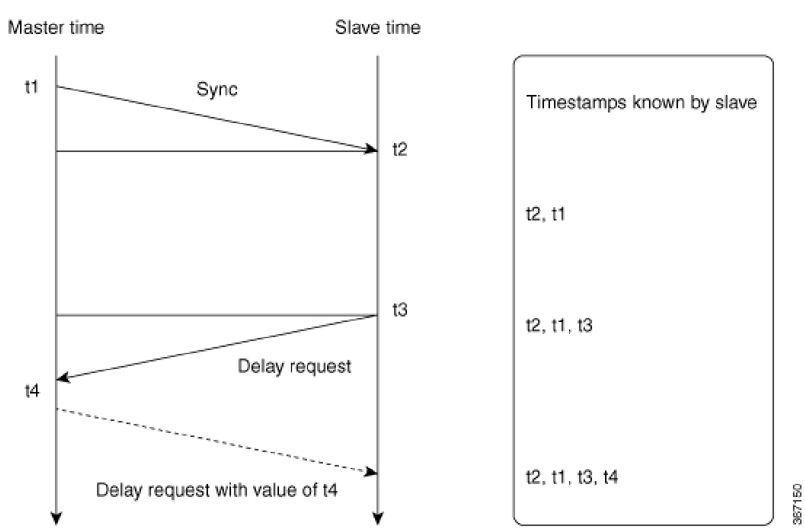
IEEE Standard 1588-2008 defines a method for distributing time around a network using the Precision Time Protocol (PTP) version 2. IEEE 1588-2008 is designed to provide precise timing and synchronization over packet-based Ethernet infrastructures without layer-1 support along the clocking path. PTP ensures that the best available clock is selected as the source of time (the grandmaster clock) for the network and that other clocks in the network are synchronized to the grandmaster.

PTP consists of two parts:

- The port state machine and the best primary clock algorithm: Provides a method to determine which ports in the network run as primary (providing time to other clocks to the network), which runs as subordinate (receiving time from other clocks in the network), and which are passive (neither primary nor subordinate).
- Mechanisms for subordinate ports to calculate the difference between the time of their own clocks and the time of their primary clock. To calculate the differences, PTP uses delay request and response mechanism and a peer delay mechanism.

An overview of clock synchronization is explained.

Figure 1: Clock Synchronization



After the primary-subordinate clock hierarchy is established, the clock synchronization process starts. The message exchange occurs in this sequence:

1. The primary clock sends a `Sync` message. The time at which the `Sync` message leaves the primary is time-stamped as `t1`.
2. The subordinate clock receives the `Sync` message and is time-stamped as `t2`.
3. The subordinate sends the `Delay` request, which is time-stamped as `t3` when it leaves the subordinate, and as `t4` when the primary receives it.
4. The primary responds with a `Delay` request that contains the time stamp `t4`.

PTP employs a hierarchy of clock types to ensure that precise timing and synchronization is maintained between the source and the numerous PTP clients that are distributed throughout the network. The types of clock are the following:

- Grandmaster clock

  This clock is the highest-ranking clock within its PTP domain. PTP grandmasters can be deployed as either standalone devices or as plug-in modules or “blades” that can be integrated into an existing synchronization supply unit (SSU) or building integrated timing supply (BITS) shelf. Grandmasters are the primary reference source (PRS) for all other PTP elements within their PTP domain.

- Primary clock

  The PTP primary has a precise clock, from a PRC or GPS. This clock drives the timestamp engine to derive accurate timestamps. The primary hosts PTP sessions with several subordinates.

- Subordinate clock

  The subordinate is a network element that can recover the (Frequency and phase) clock from the timestamps that are obtained by messages that are exchanged with the PTP primary clock.

- Boundary clock

  The Boundary clock acts as both PTP primary and subordinate. It is a subordinate to a grandmaster and derive the reference from the grandmaster. It then starts its own PTP sessions with several downstream subordinates. The advantage of placing a boundary clock is that it mitigates the number of network hops and resulting delays that occur in the packet network between the grandmaster and subordinates.

- Transparent clock

  They maintain precise internal clocking by measuring the exact time difference between the packet entry and exit and the correction field of PTP packet is updated accordingly. Hence, the delay that is introduced by the node will not affect the PTP subordinate.

PTP on Supervisor 250 Interfaces

Cisco cBR functions as a PTP subordinate when it has Supervisor 250 (CBR-SUP-250G) ports that are combined to form a port channel with an IPv6 address.

In this scenario, the Cisco cBR router locks with the remote PTP server which is also configured with an IPv6 address, through the port channel.

Note You can configure a maximum of two clock sources for PTP. If you confiigure three or more clock sources, the *ptpd_mcp_rp* process crashes when the PTP reaches the *PHASE ALIGNED* state.

Configure PTP Subordinate Through DPIC

Before you begin

You can configure PTP ports on Cisco cBR through the DPIC.

Configure the PTP subordinate using one of the following options:

- Subordinate mode with single source

```
config terminal
 ptp clock ordinary domain <domain id>
 servo tracking-type R-DTI
 clock-port <name> slave
  delay-req interval < Interval>
  sync interval < Interval>
  sync one-step
  transport <ipv4/ipv6> unicast interface <loopback name> negotiation
 clock source <clock ip>
```

- Subordinate mode with single source with profile G8275.2

```
config terminal
   ptp clock ordinary domain <domain id>
   servo tracking-type R-DTI
   clock-port <name> slave profile g8275.2
   delay-req interval < Interval>
   sync interval < Interval>
   sync one-step
   transport <ipv4/ipv6> unicast interface <loopback name> negotiation
   clock source <clock ip>
```

- Subordinate mode with multiple clock source

```
config t
 ptp clock ordinary domain <domain id>
  servo tracking-type R-DTI
  clock-port <name> slave
  delay-req interval < Interval>
   sync interval < Interval>
   sync one-step
   transport <ipv4/ipv6> unicast interface <loopback name> negotiation
   clock source <clock ip>
   clock source <clock ip>  <local priority>
```

- Subordinate mode with multiple clock source with profile G8275.2

```
config t
 ptp clock boundary domain <domain id>
  servo tracking-type R-DTI
  clock-port <name> profile g8275.2
   delay-req interval < Interval>
   sync interval < Interval>
   sync one-step
   transport ipv6 unicast interface <loopback name> negotiation
```

```
 clock source <clock ip>
clock-port <name> profile g8275.2
 delay-req interval < Interval>
 sync interval < Interval>
 sync one-step
 transport ipv6 unicast interface <loopback name> negotiation
 clock source <clock ip>
```

Configure Cisco cBR as PTP Subordinate

You can configure the Cisco cBR router to function as a PTP subordinate. The cBR router must have Supervisor 250 cards with an IPv6 port channel. Use the following sample commands to configure the router.

Step 1 Configure a port-channel on the Cisco cBR router using the following sample command:

```
router#config port-channel 16
        cmts.config('''
            interface port-channel 16
            ip address %s 255.255.255.0
            ipv6 address %s/64
            no shut
        ''' % (ipaddr_portchannel,ipaddr_portchannel_ipv6))
```

Step 2 Configure the two ports that belong to this port-channel using the following sample command:

For example, you can configure one port on SUP-A and another port on SUP-B:

```
router#config port
        cmts.config('''
            interface %s
            channel-group 16
            no shut
        ''' % cbr1588_mainint)
```

Configure the port-channel on the peer switch using the commands in Step 1.

Step 3 Configure PTP on Cisco cBR using the following sample command:

```
router#sh run | sec ptp
ptp clock ordinary domain 55
 servo tracking-type R-DTI
clock-port dp-ptp slave
  delay-req interval -4
  sync interval -5
  sync one-step
  transport ipv6 unicast interface Lo1588 negotiation
  clock source ipv6 2001:10:90:3::93
```

Step 4 Verify the configuration by pinging the PTP server IPv6 address.

The `source` is `Lo1588` interface.

Verifying PTP Subordinate Configuration

You can verify the PTP subordinate configuration by going through the following steps.

Step 1 Verify the PTP configuration by running the **show run | se ptp** command.

Example:

```
router# show run | se ptp
ptp clock ordinary domain 55
 servo tracking-type R-DTI
 clock-port slave-from-903 slave
  delay-req interval -5
  sync interval -5
  sync one-step
  transport ipv4 unicast interface Lo1588 negotiation
  clock source 10.90.3.93
```

Step 2 To verify the PTP clock working state, use the **show ptp clock running** command.

The state `PHASE_ALIGNED` confirms a successful locking.

Example:

```
router# show ptp clock running
PTP Ordinary Clock [Domain 55]
State          Ports          Pkts sent      Pkts rcvd      Redundancy Mode
PHASE_ALIGNED  1              68938          138822         Hot standby
PORT SUMMARY
PTP Master
Name           Tx Mode      Role         Transport    State        Sessions     Port Addr
slave-from-903 unicast      slave        Lo1588       Slave        1            10.90.3.93
L06#
```

PTP Subordinate Configuration Examples

The PTP subordinate example configurations are as follows:

- PTP subordinate mode with ipv4

```
config t
ptp clock ordinary domain 0
 servo tracking-type R-DTI
 clock-port slave-from-903 slave
  delay-req interval -5
  sync interval -5
  sync one-step
  transport ipv4 unicast interface Lo1588 negotiation
  clock source 10.90.3.93
```

- PTP subordinate mode with ipv6

```
config t
ptp clock ordinary domain 0
  servo tracking-type R-DTI
 clock-port slave-from-903 slave
  delay-req interval -4
```

```
  sync interval -5
  sync one-step
  transport ipv6 unicast interface Lo1588 negotiation
  clock source ipv6 2001:10:90:3::93
```

- PTP subordinate mode with ipv4 with profile G8275.2

```
config t
    ptp clock ordinary domain 55
    servo tracking-type R-DTI
    clock-port slave-from-903 slave profile g8275.2
    delay-req interval -4
    sync interval -5
    sync one-step
    transport ipv4 unicast interface Lo1588 negotiation
    clock source 10.90.3.93
```

- PTP subordinate mode with ipv6 with profile G8275.2

```
config t
ptp clock ordinary domain 55
servo tracking-type R-DTI
clock-port slave-from-903 slave profile g8275.2
delay-req interval -4
sync interval -5
sync one-step
transport ipv6 unicast interface Lo1588 negotiation
clock source ipv6 2001:10:90:3::93
```

- PTP subordinate mode with ipv4 with 2 clock sources

```
config t
ptp clock ordinary domain 0
 servo tracking-type R-DTI
 clock-port slave-from-903 slave
  delay-req interval -5
  sync interval -5
  sync one-step
  transport ipv4 unicast interface Lo1588 negotiation
  clock source 10.90.3.93
  clock source 10.1.1.1 2
```

- PTP subordinate mode with ipv6 with 2 clock sources and with profile G8275.2

```
config t
ptp clock boundary domain 55
 servo tracking-type R-DTI
 clock-port 22 profile g8275.2
  delay-req interval -4
  sync interval -5
  sync one-step
  transport ipv6 unicast interface Lo1588 negotiation
  clock source ipv6 2001:10:90:3::93
 clock-port 33 profile g8275.2
  delay-req interval -4
  sync interval -5
  sync one-step
  transport ipv6 unicast interface Lo1588 negotiation
  clock source ipv6 2001:158:158:158::7
```

Feature Information for PTP Subordinate

Use Cisco Feature Navigator to find information about the platform support and software image support. Cisco Feature Navigator enables you to determine which software images support a specific software release, feature set, or platform. To access Cisco Feature Navigator, go to the https://cfnng.cisco.com/ link. An account on the Cisco.com page is not required.

Note The following table lists the software release in which a given feature is introduced. Unless noted otherwise, subsequent releases of that software release train also support that feature.

Table 2: Feature Information for PTP Subordinate

Feature Name	Releases	Feature Information
PTP Subordinate Through DPIC	Cisco IOS-XE Release 16.8.1	This feature was introduced in Cisco IOS-XE Release 16.8.1 on Cisco cBR Series Converged Broadband Router.
PTP on Supervisor 250 Interfaces	Cisco IOS-XE Amsterdam 17.3.1	This feature was introduced in Cisco IOS-XE Release 17.3.1 on Cisco cBR Series Converged Broadband Router.

File Systems

The Cisco cBR-8 router runs on the Cisco IOS-XE image. Supported file systems include:

1. IOS File System (IFS) in IOS
2. ext2, vfs, jffs2, tmpfs, autofs, and such common file systems in Linux

Features of the File Systems:

1. Both the Harddisk and USB are hot pluggable.
2. Harddisk is not accessible under Rommon.
3. Bootflash and USB disk are accessible under Rommon.
4. The **dir**, **show**, **copy**, **delete**, **mkdir**, **rmdir**, and **fsck** commands are supported for bootflash, harddisk and USB.

File System Table in the Supervisor

Name	Device	Size	Type	Visible	Usage	Physical Description
bootflash	/dev/bootflash1	7800705024	ext2	IOS/Binos	image,IOScrasinfo,etc	Partition1 of bootflash (eUSB flash).
flash	/dev/bootflash1	7800705024	ext2	IOS	image	A copy of bootflash.
nvram	/dev/bootflash2	32M	N/A	IOS	configuretion, etc	Partition2 of bootflash (eUSB flash).

Name	Device	Size	Type	Visible	Usage	Physical Description
harddisk	/dev/harddisk1	98394218496	ext2	IOS/Binos	tracelog,corefile,etc	Partition1 of the 100G harddisk.
usb0	/dev/usb11	8G	vfat	IOS/Binos	image	Two USBs can be inserted into one SUP.

Verification of Hardware Bring Up

Monitoring the Cisco cBR Chassis Using CLI

- **show platform**—Verify if the installed cards are in **Ok** or **Inserted** state.

```
Router# show platform

Chassis type: CBR-8-CCAP-CHASS

Slot      Type                State                 Insert time (ago)
--------- ------------------- --------------------- -----------------
1         CBR-CCAP-LC-40G     ok                    03:22:58
1/1       CBR-RF-PIC          ok                    03:19:40
SUP0      CBR-CCAP-SUP-160G   inserted              03:22:58
 R0                           ok, active
 F0                           ok, active
 4                            ok, active
 4/1      CBR-SUP-8X10G-PIC   ok                    03:20:30
P0        PWR-2KW-DC-V2       ok                    03:21:20
P1        PWR-2KW-DC-V2       ok                    03:21:20
P2        PWR-2KW-DC-V2       ok                    03:21:20
P3        PWR-2KW-DC-V2       ok                    03:21:20
P4        PWR-2KW-DC-V2       ok                    03:21:20
P5        PWR-2KW-DC-V2       ok                    03:21:20
P10       CBR-FAN-ASSEMBLY    ok                    03:21:10
P11       CBR-FAN-ASSEMBLY    ok                    03:21:10
P12       CBR-FAN-ASSEMBLY    ok                    03:21:10
P13       CBR-FAN-ASSEMBLY    ok                    03:21:10
P14       CBR-FAN-ASSEMBLY    ok                    03:21:10
```

- **show platform hardware slot** *slot* **serdes status**—Verify if all the links are in **locked** state.

```
Router# show platform hardware slot F1 serdes status

Slot R1-Link A
  RX link locked
  58-bit scrambler, 20 Gbps
  0 Overruns, 0 Underruns
  0 Reframe, 0 Disparity
  0 Out of band, 0 Illegal control codes

Slot 3-Link A
  RX link locked
  58-bit scrambler, 20 Gbps
  0 Overruns, 0 Underruns
  0 Reframe, 0 Disparity
  0 Out of band, 0 Illegal control codes

Slot 5-Link A
```

```
  RX link locked
  58-bit scrambler, 20 Gbps
  0 Overruns, 0 Underruns
  0 Reframe, 0 Disparity
  0 Out of band, 0 Illegal control codes

Slot 5-Link B
  RX link locked
  58-bit scrambler, 20 Gbps
  0 Overruns, 0 Underruns
  0 Reframe, 0 Disparity
  0 Out of band, 0 Illegal control codes

Slot 5-Link C
  RX link locked
  58-bit scrambler, 20 Gbps
  0 Overruns, 0 Underruns
  0 Reframe, 0 Disparity
  0 Out of band, 0 Illegal control codes

Slot 5-Link D
  RX link locked
  58-bit scrambler, 20 Gbps
  0 Overruns, 0 Underruns
  0 Reframe, 0 Disparity
  0 Out of band, 0 Illegal control codes

Slot 5-Link E
  RX link Init
  58-bit scrambler, 20 Gbps
  0 Overruns, 0 Underruns
  0 Reframe, 0 Disparity
  0 Out of band, 0 Illegal control codes

Slot 5-Link F
  RX link Init
  58-bit scrambler, 20 Gbps
  0 Overruns, 0 Underruns
  0 Reframe, 0 Disparity
  0 Out of band, 0 Illegal control codes

Slot 5-Link G
  RX link Init
  58-bit scrambler, 20 Gbps
  0 Overruns, 0 Underruns
  0 Reframe, 0 Disparity
  0 Out of band, 0 Illegal control codes

Slot 5-Link H
  RX link Init
  58-bit scrambler, 20 Gbps
  0 Overruns, 0 Underruns
  0 Reframe, 0 Disparity
  0 Out of band, 0 Illegal control codes
```

- **show environment all**—Verify the environmental status of each FRU after installation.

  This command displays the system temperature, voltage, fan, and power supply conditions.

```
Router# show environment all

Sensor List:  Environmental Monitoring
 Sensor           Location          State             Reading
 AVCC&1P2: Sens   4/1               Normal            81 mV
```

```
AVCC&1P2: Vin     4/1               Normal            12600 mV
AVCC&1P2: ADin    4/1               Normal            0 mV
VP1P35: Sens      4/1               Normal            8 mV
VP1P35: Vin       4/1               Normal            12650 mV
VP1P35: ADin      4/1               Normal            112 mV
VP1P0: Sens       4/1               Normal            15 mV
VP1P0: Vin        4/1               Normal            12625 mV
VP1P0: ADin       4/1               Normal            0 mV
MGTAVTT: Sens     4/1               Normal            21 mV
MGTAVTT: Vin      4/1               Normal            12625 mV
MGTAVTT: ADin     4/1               Normal            0 mV
VP1P8: Sens       4/1               Normal            41 mV
VP1P8: Vin        4/1               Normal            12600 mV
VP1P8: ADin       4/1               Normal            0 mV
VP3P3: Sens       4/1               Normal            39 mV
VP3P3: Vin        4/1               Normal            12625 mV
VP3P3: ADin       4/1               Normal            0 mV
Temp: RTMAC       4/1               Normal            34 Celsius
Temp: INLET       4/1               Normal            29 Celsius
Temp: OUTLET      4/1               Normal            27 Celsius
Temp: MAX6697     4/1               Normal            50 Celsius
Temp: TCXO        4/1               Normal            37 Celsius
Temp: SUP_OUT     4/1               Normal            49 Celsius
Temp: 3882_1 P    4/1               Normal            44 Celsius
Temp: 3882_2 P    4/1               Normal            39 Celsius
Temp: 3882_3 P    4/1               Normal            39 Celsius
VP5P0: Sens       4/1               Normal            6 mV
VP5P0: Vin        4/1               Normal            12650 mV
VP5P0: ADin       4/1               Normal            0 mV
VP1P8: Sens       4/1               Normal            33 mV
VP1P8: Vin        4/1               Normal            12625 mV
VP1P8: ADin       4/1               Normal            0 mV
3P3&1P0: Sens     4/1               Normal            24 mV
3P3&1P0: Vin      4/1               Normal            12625 mV
3P3&1P0: ADin     4/1               Normal            0 mV
Temp: INLET PD    4/1               Normal            27 Celsius
Temp: OUTLETPD    4/1               Normal            36 Celsius
Temp: 6697-DC     4/1               Normal            38 Celsius
Temp: PHYOUT      4/1               Normal            49 Celsius
Temp: PHYIN       4/1               Normal            38 Celsius
Temp: SSD         4/1               Normal            40 Celsius
Temp: SFP+        4/1               Normal            36 Celsius
Temp: 3882_1PD    4/1               Normal            42 Celsius
3882_PC1_0: VO    4/1               Normal            1198 mV
3882_PC1_1: VO    4/1               Normal            999 mV
3882_PC2_0: VO    4/1               Normal            998 mV
3882_PC3_0: VO    4/1               Normal            1349 mV
PSOC-PC1_0: VO    4/1               Normal            3300 mV
PSOC-PC1_1: VO    4/1               Normal            12590 mV
PSOC-PC1_2: VO    4/1               Normal            6997 mV
PSOC-PC1_3: VO    4/1               Normal            5000 mV
PSOC-PC1_4: VO    4/1               Normal            3299 mV
PSOC-PC1_5: VO    4/1               Normal            1000 mV
PSOC-PC1_6: VO    4/1               Normal            1010 mV
PSOC-PC1_7: VO    4/1               Normal            1801 mV
PSOC-PC1_8: VO    4/1               Normal            2000 mV
PSOC-PC1_9: VO    4/1               Normal            1198 mV
PSOC-PC1_10: V    4/1               Normal            1798 mV
PSOC-PC1_11: V    4/1               Normal            2500 mV
PSOC-PC1_12: V    4/1               Normal            1353 mV
PSOC-PC1_13: V    4/1               Normal            1223 mV
PSOC-PC1_14: V    4/1               Normal            592 mV
PSOC-PC1_15: V    4/1               Normal            596 mV
3882_PDC_0: VO    4/1               Normal            1000 mV
```

```
3882_PDC_1: VO   4/1              Normal            3300 mV
PSOC-DC1_0: VO   4/1              Normal            4998 mV
PSOC-DC1_1: VO   4/1              Normal            3280 mV
PSOC-DC1_2: VO   4/1              Normal            1005 mV
PSOC-DC1_3: VO   4/1              Normal            1801 mV
PSOC-DC1_4: VO   4/1              Normal            2500 mV
12_CUR: Sens     9                Normal            14 mV
12_CUR: Vin      9                Normal            12650 mV
12_CUR: ADin     9                Normal            267 mV
G0_CUR: Sens     9                Normal            69 mV
G0_CUR: Vin      9                Normal            12550 mV
G0_CUR: ADin     9                Normal            0 mV
G1_CUR: Sens     9                Normal            69 mV
G1_CUR: Vin      9                Normal            12575 mV
G1_CUR: ADin     9                Normal            0 mV
LB_CUR: Sens     9                Normal            11 mV
LB_CUR: Vin      9                Normal            12525 mV
LB_CUR: ADin     9                Normal            0 mV
Temp: CAPRICA    9                Normal            40 Celsius
Temp: BASESTAR   9                Normal            47 Celsius
Temp: RAIDER     9                Normal            45 Celsius
Temp: CPU        9                Normal            31 Celsius
Temp: INLET      9                Normal            25 Celsius
Temp: OUTLET     9                Normal            35 Celsius
Temp: DIGITAL    9                Normal            31 Celsius
Temp: UPX        9                Normal            29 Celsius
Temp: LEOBEN1    9                Normal            31 Celsius
Temp: LEOBEN2    9                Normal            35 Celsius
Temp: 3.3-18     9                Normal            43 Celsius
Temp: BS_1V      9                Normal            45 Celsius
Freq: 5338-49    9                Normal            0 MHz
Freq: 5338-52    9                Normal            0 MHz
Freq: 5338-89    9                Normal            0 MHz
3882_1_0: VOUT   9                Normal            3299 mV
3882_1_1: VOUT   9                Normal            1800 mV
3882_2_0: VOUT   9                Normal            2500 mV
3882_2_1: VOUT   9                Normal            1199 mV
3882_3_0: VOUT   9                Normal            1419 mV
3882_4_0: VOUT   9                Normal            1350 mV
3882_5_0: VOUT   9                Normal            1000 mV
3882_6_0: VOUT   9                Normal            1021 mV
3882_7_0: VOUT   9                Normal            1199 mV
3882_7_1: VOUT   9                Normal            1000 mV
3882_8_0: VOUT   9                Normal            1000 mV
3882_9_0: VOUT   9                Normal            999 mV
V2978: VSENSE0   9                Normal            0 mV
V2978: VSENSE1   9                Normal            0 mV
V2978: VSENSE2   9                Normal            0 mV
V2978: VSENSE3   9                Normal            6000 mV
V2978: VSENSE4   9                Normal            2400 mV
V2978: VSENSE5   9                Normal            0 mV
V2978: VSENSE6   9                Normal            6598 mV
V2978: VSENSE7   9                Normal            4998 mV
V2978: VIN       9                Normal            25218 mV
PSOC_2_0: VOUT   9                Normal            12582 mV
PSOC_2_1: VOUT   9                Normal            4985 mV
PSOC_2_2: VOUT   9                Normal            3256 mV
PSOC_2_3: VOUT   9                Normal            1982 mV
PSOC_2_4: VOUT   9                Normal            1990 mV
PSOC_2_5: VOUT   9                Normal            1782 mV
PSOC_2_6: VOUT   9                Normal            1793 mV
PSOC_2_7: VOUT   9                Normal            1786 mV
PSOC_2_8: VOUT   9                Normal            1483 mV
PSOC_2_9: VOUT   9                Normal            1193 mV
```

```
PSOC_2_10: VOU   9                  Normal           995 mV
PSOC_2_11: VOU   9                  Normal           987 mV
PSOC_2_12: VOU   9                  Normal           994 mV
PSOC_2_13: VOU   9                  Normal           707 mV
PSOC_2_14: VOU   9                  Normal           592 mV
PSOC_2_15: VOU   9                  Normal           593 mV
LTC4261: Power   9                  Normal           340 Watts
PEM Iout         P0                 Normal           5 A
PEM Vout         P0                 Normal           55 V DC
PEM Vin          P0                 Normal           202 V AC
Temp: INLET      P0                 Normal           26 Celsius
Temp: OUTLET     P0                 Normal           48 Celsius
PEM Iout         P1                 Normal           6 A
PEM Vout         P1                 Normal           55 V DC
PEM Vin          P1                 Normal           204 V AC
Temp: INLET      P1                 Normal           30 Celsius
Temp: OUTLET     P1                 Normal           53 Celsius
PEM Iout         P2                 Normal           3 A
PEM Vout         P2                 Normal           55 V DC
PEM Vin          P2                 Normal           204 V AC
Temp: INLET      P2                 Normal           25 Celsius
Temp: OUTLET     P2                 Normal           51 Celsius
PSOC-MB2_0: VO   R0                 Normal           12758 mV
PSOC-MB2_1: VO   R0                 Normal           4998 mV
PSOC-MB2_2: VO   R0                 Normal           7082 mV
PSOC-MB2_3: VO   R0                 Normal           3287 mV
PSOC-MB2_4: VO   R0                 Normal           989 mV
PSOC-MB2_5: VO   R0                 Normal           1047 mV
PSOC-MB2_6: VO   R0                 Normal           1500 mV
PSOC-MB2_7: VO   R0                 Normal           1800 mV
PSOC-MB2_8: VO   R0                 Normal           914 mV
PSOC-MB2_9: VO   R0                 Normal           885 mV
PSOC-MB2_10: V   R0                 Normal           994 mV
PSOC-MB2_11: V   R0                 Normal           989 mV
PSOC-MB2_12: V   R0                 Normal           1479 mV
PSOC-MB2_13: V   R0                 Normal           989 mV
PSOC-MB2_14: V   R0                 Normal           984 mV
PSOC-MB2_15: V   R0                 Normal           890 mV
PSOC-MB2_16: V   R0                 Normal           2485 mV
PSOC-MB2_17: V   R0                 Normal           1346 mV
PSOC-MB2_18: V   R0                 Normal           1458 mV
PSOC-MB2_19: V   R0                 Normal           1208 mV
PSOC-MB2_20: V   R0                 Normal           1791 mV
PSOC-MB2_21: V   R0                 Normal           3293 mV
PSOC-MB2_22: V   R0                 Normal           3250 mV
PSOC-MB2_23: V   R0                 Normal           3284 mV
PSOC-MB2_24: V   R0                 Normal           4970 mV
PSOC-MB2_25: V   R0                 Normal           4451 mV
PSOC-MB3_0: VO   R0                 Normal           4983 mV
PSOC-MB3_1: VO   R0                 Normal           4979 mV
PSOC-MB3_2: VO   R0                 Normal           1500 mV
PSOC-MB3_3: VO   R0                 Normal           1192 mV
PSOC-MB3_4: VO   R0                 Normal           705 mV
PSOC-MB3_5: VO   R0                 Normal           752 mV
PSOC-MB3_6: VO   R0                 Normal           579 mV
PSOC-MB3_7: VO   R0                 Normal           1500 mV
PSOC-MB3_8: VO   R0                 Normal           1501 mV
PSOC-MB3_9: VO   R0                 Normal           1250 mV
PSOC-MB3_10: V   R0                 Normal           1247 mV
PSOC-MB3_11: V   R0                 Normal           1260 mV
PSOC-MB3_12: V   R0                 Normal           1038 mV
PSOC-MB3_13: V   R0                 Normal           1343 mV
PSOC-MB3_14: V   R0                 Normal           670 mV
PSOC-MB3_15: V   R0                 Normal           1800 mV
```

```
PSOC-MB3_16: V   R0                 Normal              908 mV
PSOC-MB3_17: V   R0                 Normal              823 mV
PSOC-MB3_18: V   R0                 Normal              992 mV
PSOC-MB3_19: V   R0                 Normal              984 mV
PSOC-MB3_20: V   R0                 Normal              1046 mV
PSOC-MB3_21: V   R0                 Normal              1192 mV
PSOC-MB3_22: V   R0                 Normal              1169 mV
PSOC-MB3_23: V   R0                 Normal              1187 mV
PSOC-MB3_24: V   R0                 Normal              1796 mV
PSOC-MB3_25: V   R0                 Normal              1792 mV
PSOC-MB3_26: V   R0                 Normal              1787 mV
PSOC-MB3_27: V   R0                 Normal              1034 mV
3882_MB1_0: VO   R0                 Normal              1001 mV
3882_MB1_1: VO   R0                 Normal              1022 mV
3882_MB2_0: VO   R0                 Normal              1197 mV
3882_MB3_0: VO   R0                 Normal              1045 mV
3882_MB3_1: VO   R0                 Normal              996 mV
3882_MB4_0: VO   R0                 Normal              898 mV
3882_MB5_0: VO   R0                 Normal              1348 mV
3882_MB6_0: VO   R0                 Normal              1350 mV
3882_MB6_1: VO   R0                 Normal              3297 mV
3882_MB7_0: VO   R0                 Normal              998 mV
3882_MB8_0: VO   R0                 Normal              1501 mV
3882_MB8_1: VO   R0                 Normal              1551 mV
3882_MB9_0: VO   R0                 Normal              999 mV
3882_MB9_1: VO   R0                 Normal              3296 mV
15301_1: VOUT    R0                 Normal              2500 mV
15301_2: VOUT    R0                 Normal              1200 mV
15301_3: VOUT    R0                 Normal              1200 mV
AS_VRM: Sens     R0                 Normal              40 mV
AS_VRM: Vin      R0                 Normal              12725 mV
AS_VRM: ADin     R0                 Normal              0 mV
Y0_VRM: Sens     R0                 Normal              23 mV
Y0_VRM: Vin      R0                 Normal              12675 mV
Y0_VRM: ADin     R0                 Normal              380 mV
CPU_VCC: Sens    R0                 Normal              6 mV
CPU_VCC: Vin     R0                 Normal              12725 mV
CPU_VCC: ADin    R0                 Normal              0 mV
5P0_BIAS: Sens   R0                 Normal              19 mV
5P0_BIAS: Vin    R0                 Normal              12700 mV
5P0_BIAS: ADin   R0                 Normal              0 mV
7P0_BIAS: Sens   R0                 Normal              45 mV
7P0_BIAS: Vin    R0                 Normal              12725 mV
7P0_BIAS: ADin   R0                 Normal              0 mV
1P0_AA: Sens     R0                 Normal              37 mV
1P0_AA: Vin      R0                 Normal              12700 mV
1P0_AA: ADin     R0                 Normal              0 mV
1P0_RT: Sens     R0                 Normal              16 mV
1P0_RT: Vin      R0                 Normal              12725 mV
1P0_RT: ADin     R0                 Normal              0 mV
1P2: Sens        R0                 Normal              37 mV
1P2: Vin         R0                 Normal              12675 mV
1P2: ADin        R0                 Normal              0 mV
0P9_T0: Sens     R0                 Normal              7 mV
0P9_T0: Vin      R0                 Normal              12750 mV
0P9_T0: ADin     R0                 Normal              0 mV
1P05_CPU: Sens   R0                 Normal              11 mV
1P05_CPU: Vin    R0                 Normal              12700 mV
1P05_CPU: ADin   R0                 Normal              0 mV
1P0_CC: Sens     R0                 Normal              16 mV
1P0_CC: Vin      R0                 Normal              12700 mV
1P0_CC: ADin     R0                 Normal              0 mV
1P35_DDR: Sens   R0                 Normal              6 mV
1P35_DDR: Vin    R0                 Normal              12725 mV
```

```
1P35_DDR: ADin   R0                 Normal            0 mV
1P35_RLD: Sens   R0                 Normal            0 mV
1P35_RLD: Vin    R0                 Normal            12675 mV
1P35_RLD: ADin   R0                 Normal            2047 mV
3P3_CCC: Sens    R0                 Normal            16 mV
3P3_CCC: Vin     R0                 Normal            12700 mV
3P3_CCC: ADin    R0                 Normal            1375 mV
1P0_R: Sens      R0                 Normal            29 mV
1P0_R: Vin       R0                 Normal            12700 mV
1P0_R: ADin      R0                 Normal            0 mV
1P5_A0: Sens     R0                 Normal            41 mV
1P5_A0: Vin      R0                 Normal            12700 mV
1P5_A0: ADin     R0                 Normal            0 mV
1P5: Sens        R0                 Normal            34 mV
1P5: Vin         R0                 Normal            12675 mV
1P5: ADin        R0                 Normal            0 mV
2P5: Sens        R0                 Normal            5 mV
2P5: Vin         R0                 Normal            12700 mV
2P5: ADin        R0                 Normal            0 mV
1P8_A: Sens      R0                 Normal            10 mV
1P8_A: Vin       R0                 Normal            12675 mV
1P8_A: ADin      R0                 Normal            947 mV
1P0_BV: Sens     R0                 Normal            24 mV
1P0_BV: Vin      R0                 Normal            12700 mV
1P0_BV: ADin     R0                 Normal            0 mV
3P3: Sens        R0                 Normal            16 mV
3P3: Vin         R0                 Normal            12725 mV
3P3: ADin        R0                 Normal            0 mV
1P2_B: Sens      R0                 Normal            41 mV
1P2_B: Vin       R0                 Normal            12725 mV
1P2_B: ADin      R0                 Normal            0 mV
ADM1075: Power   R0                 Normal            329 Watts
Temp: Y0_DIE     R0                 Normal            33 Celsius
Temp: BB_DIE     R0                 Normal            29 Celsius
Temp: VP_DIE     R0                 Normal            26 Celsius
Temp: RT-E_DIE   R0                 Normal            31 Celsius
Temp: INLET_1    R0                 Normal            23 Celsius
Temp: INLET_2    R0                 Normal            22 Celsius
Temp: OUTLET_1   R0                 Normal            25 Celsius
Temp: 3882_1     R0                 Normal            46 Celsius
Temp: 3882_1A    R0                 Normal            43 Celsius
Temp: 3882_1B    R0                 Normal            43 Celsius
Temp: 3882_2     R0                 Normal            41 Celsius
Temp: 3882_2A    R0                 Normal            40 Celsius
Temp: 3882_2B    R0                 Normal            41 Celsius
Temp: 3882_3     R0                 Normal            37 Celsius
Temp: 3882_3A    R0                 Normal            34 Celsius
Temp: 3882_3B    R0                 Normal            33 Celsius
Temp: 3882_4     R0                 Normal            46 Celsius
Temp: 3882_4A    R0                 Normal            38 Celsius
Temp: 3882_4B    R0                 Normal            35 Celsius
Temp: 3882_5     R0                 Normal            32 Celsius
Temp: 3882_5A    R0                 Normal            23 Celsius
Temp: 3882_5B    R0                 Normal            23 Celsius
Temp: 3882_6     R0                 Normal            37 Celsius
Temp: 3882_6A    R0                 Normal            30 Celsius
Temp: 3882_6B    R0                 Normal            32 Celsius
Temp: 3882_7     R0                 Normal            38 Celsius
Temp: 3882_7A    R0                 Normal            35 Celsius
Temp: 3882_7B    R0                 Normal            35 Celsius
Temp: 3882_8     R0                 Normal            47 Celsius
Temp: 3882_8A    R0                 Normal            45 Celsius
Temp: 3882_8B    R0                 Normal            41 Celsius
Temp: 3882_9     R0                 Normal            37 Celsius
```

```
Temp: 3882_9A    R0                 Normal            33 Celsius
Temp: 3882_9B    R0                 Normal            32 Celsius
Temp: 8314_1     R0                 Normal            40 Celsius
Temp: 8314_2     R0                 Normal            36 Celsius
Temp: 3536_1A    R0                 Normal            26 Celsius
Temp: 3536_1B    R0                 Normal            26 Celsius
Temp: 15301_1A   R0                 Normal            31 Celsius
Temp: 15301_1B   R0                 Normal            32 Celsius
Temp: 15301_2A   R0                 Normal            28 Celsius
Temp: 15301_2B   R0                 Normal            34 Celsius
Temp: 15301_3A   R0                 Normal            38 Celsius
Temp: 15301_3B   R0                 Normal            45 Celsius
Temp: AS_DIE     R0                 Normal            70 Celsius
Temp: XPT1_DTL   R0                 Normal            42 Celsius
Temp: XPT1_DTR   R0                 Normal            42 Celsius
Temp: XPT1_DBL   R0                 Normal            42 Celsius
Temp: XPT1_DBR   R0                 Normal            42 Celsius
Temp: XPT2_DTL   R0                 Normal            42 Celsius
Temp: XPT2_DTR   R0                 Normal            42 Celsius
Temp: XPT2_DBL   R0                 Normal            42 Celsius
Temp: XPT2_DBR   R0                 Normal            42 Celsius
Temp: XPT3_DTL   R0                 Normal            42 Celsius
Temp: XPT3_DTR   R0                 Normal            42 Celsius
Temp: XPT3_DBL   R0                 Normal            42 Celsius
Temp: XPT3_DBR   R0                 Normal            42 Celsius
Freq: MAX3674    R0                 Normal            500 MHz
Freq: SQ420D     R0                 Normal            24 MHz
```

- **show facility-alarm status** —Verify the chassis status.

```
Router# show facility-alarm status

System Totals  Critical: 4  Major: 1  Minor: 8

Source                    Time                    Severity      Description [Index]
------                    ------                  --------      -------------------
slot 3/0                  Apr 13 2015 16:25:58    CRITICAL      Active Card Removed
OIR Alarm [0]
Power Supply Bay 3        Apr 13 2015 13:41:56    CRITICAL      Power Supply/FAN
Module Missing [0]
Power Supply Bay 4        Apr 13 2015 13:41:56    CRITICAL      Power Supply/FAN
Module Missing [0]
Power Supply Bay 5        Apr 13 2015 13:41:56    CRITICAL      Power Supply/FAN
Module Missing [0]
Cable3/0/15-US0           Apr 13 2015 17:32:53    MINOR         Physical Port Link
Down [0]
Cable3/0/15-US1           Apr 13 2015 17:32:53    MINOR         Physical Port Link
Down [0]
Cable3/0/15-US2           Apr 13 2015 17:32:53    MINOR         Physical Port Link
Down [0]
Cable3/0/15-US3           Apr 13 2015 17:32:53    MINOR         Physical Port Link
Down [0]
Cable3/0/15-US4           Apr 13 2015 17:32:53    MINOR         Physical Port Link
Down [0]
```

Gigabit Ethernet Management Interface Overview

The purpose of this interface is to allow users to perform management tasks on the router; it is basically an interface that should not and often cannot forward network traffic but can otherwise access the router, often via Telnet and SSH, and perform most management tasks on the router.

The following aspects of the Management Ethernet interface should be noted:

- Each SUP has a Management Ethernet interface, but only the active SUP has an accessible Management Ethernet interface (the standby SUP can be accessed using the console port, however).
- IPv4, IPv6, and ARP are the only routed protocols supported for the interface.
- The interface provides a method of access to the router even when some software processes are down.
- The Ethernet Management Interface cannot be used as a Lawful Intercept MD source interface.
- The Management Ethernet interface is part of its own VRF.

Gigabit Ethernet Port Numbering

The Gigabit Ethernet Management port is always GigabitEthernet0.

In a dual SUP configuration, the Management Ethernet interface on the active SUP will always be Gigabit Ethernet 0, while the Management Ethernet interface on the standby SUP will not be accessible using the Cisco IOS-XE CLI in the same telnet session. The standby SUP can be telnetted to through the console port, however.

The port can be accessed in configuration mode like any other port on the Cisco cBR Series Routers:

```
Router#configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#interface gigabitethernet0
Router(config-if)#
```

IP Address Handling in ROMMON and the Management Ethernet Port

Assuming the IOS-XE process has not begun running on the Cisco cBR Series Router, the IP address that was set in ROMMON acts as the IP address of the Management Ethernet interface. In cases where the IOS-XE process is running and has taken control of the Management Ethernet interface, the IP address specified when configuring the Gigabit Ethernet 0 interface in the IOS-XE CLI becomes the IP address of the Management Ethernet interface. The ROMMON-defined IP address is only used as the interface address when the IOS-XE process is inactive.

For this reason, the IP addresses specified in ROMMON and in the IOS-XE CLI can be identical and the Management Ethernet interface will function properly in single SUP configurations.

In dual SUP configurations, however, users should never configure the IP address in the ROMMON on either SUP0 or SUP1 to match each other or the IP address as defined by the IOS-XE CLI. Configuring matching

IP addresses introduces the possibility for an active and standby Management Ethernet interface having the same IP address with different MAC addresses, which will lead to unpredictable traffic treatment.

Gigabit Ethernet Management Interface VRF

Placing the management Ethernet interface in its own VRF has the following effects on the Management Ethernet interface:

- Many features must be configured or used inside the VRF, so the CLI may be different for certain Management Ethernet functions on the Cisco cBR Series Routers than on Management Ethernet interfaces on other routers.
- The VRF prevents route leakage and avoids unnecessary traffic through the management port.

The Management Ethernet interface VRF supports both IPv4 and IPv6 address families.

Common Ethernet Management Tasks

Because users can perform most tasks on a router through the Management Ethernet interface, many tasks can be done by accessing the router through the Management Ethernet interface.

This section documents tasks that might be common or slightly tricky on the Cisco cBR Series Routers. It is not intended as a comprehensive list of all tasks that can be done using the Management Ethernet interface.

Viewing the VRF Configuration

The VRF configuration for the Management Ethernet interface is viewable using the **show running-config vrf** command.

This example shows the default VRF configuration:

```
Router# show running-config vrf
Building configuration...

Current configuration : 351 bytes
vrf definition Mgmt-intf
!
address-family ipv4
exit-address-family
!
address-family ipv6
exit-address-family
!
(some output removed for brevity)
```

Setting a Default Route in the Management Ethernet Interface VRF

To set a default route in the Management Ethernet Interface VRF, use the **ip route vrf Mgmt-intf 0.0.0.0 0.0.0.0** *next-hop-IP-address* command.

Setting the Management Ethernet IP Address

The IP address of the Management Ethernet port is set like the IP address on any other interface.

Below are two simple examples of configuring an IPv4 address and an IPv6 address on the Management Ethernet interface.

IPv4 Example

```
Router(config)# interface GigabitEthernet 0
Router(config-if)# ip address A.B.C.D A.B.C.D
```

IPv6 Example

```
Router(config)# interface GigabitEthernet 0
Router(config-if)# ipv6 address X:X:X:X::X /prefix-length
```

Telnetting over the Management Ethernet Interface

Telnetting can be done through the VRF using the Management Ethernet interface.

In the following example, the router telnets to 172.17.1.1 through the Management Ethernet interface VRF:

```
Router# telnet 172.17.1.1 /vrf Mgmt-intf
```

Pinging over the Management Ethernet Interface

Pinging other interfaces using the Management Ethernet interface is done through the VRF.

In the following example, the router pings the interface with the IP address of 172.17.1.1 through the Management Ethernet interface:

```
Router# ping vrf Mgmt-intf 172.17.1.1
Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 172.17.1.1, timeout is 2 seconds:
.!!!!
Success rate is 80 percent (4/5), round-trip min/avg/max = 1/1/1 ms
```

Copy Using TFTP or FTP

To copy a file using TFTP through the Management Ethernet interface, the **ip tftp source-interface GigabitEthernet 0** command must be entered before entering the **copy tftp** command because the **copy tftp** command has no option of specifying a VRF name.

Similarly, to copy a file using FTP through the Management Ethernet interface, the **ip ftp source-interface GigabitEthernet 0** command must be entered before entering the **copy ftp** command because the **copy ftp** command has no option of specifying a VRF name.

TFTP Example

```
Router(config)# ip tftp source-interface gigabitethernet 0
```

FTP Example

```
Router(config)# ip ftp source-interface gigabitethernet 0
```

NTP Server

To allow the software clock to be synchronized by a Network Time Protocol (NTP) time server over the Management Ethernet interface, enter the **ntp server vrf Mgmt-intf** command and specify the IP address of the device providing the update.

The following CLI provides an example of this procedure.

```
Router(config)# ntp server vrf Mgmt-intf 172.17.1.1
```

SYSLOG Server

To specify the Management Ethernet interface as the source IP or IPv6 address for logging purposes, enter the **logging host** *ip-address* **vrf Mgmt-intf** command.

The following CLI provides an example of this procedure.

```
Router(config)# logging host ip-address vrf Mgmt-intf
```

SNMP-Related Services

To specify the Management Ethernet interface as the source of all SNMP trap messages, enter the **snmp-server source-interface traps gigabitEthernet 0** command.

The following CLI provides an example of this procedure:

```
Router(config)# snmp-server source-interface traps gigabitEthernet 0
```

Domain Name Assignment

The IP domain name assignment for the Management Ethernet interface is done through the VRF.

To define the default domain name as the Management Ethernet VRF interface, enter the i**p domain-name vrf Mgmt-intf** *domain* command.

```
Router(config)# ip domain-name vrf Mgmt-intf cisco.com
```

DNS service

To specify the Management Ethernet interface VRF as a name server, enter the **ip name-server vrf Mgmt-intf** *IPv4/IPv6 address* command.

RADIUS or TACACS+ Server

To group the Management VRF as part of a AAA server group, enter the **ip vrf forward Mgmt-intf** command when configuring the AAA server group.

The same concept is true for configuring a TACACS+ server group. To group the Management VRF as part of a TACACS+ server group, enter the **ip vrf forwarding Mgmt-intf** command when configuring the TACACS+ server group.

RADIUS Server Group Configuration

```
Router(config)# aaa group server radius hello
Router(config-sg-radius)# ip vrf forwarding Mgmt-intf
```

TACACS+ Server Group Configuration

```
Router(config)# aaa group server tacacs+ hello
Router(config-sg-tacacs+)# ip vrf forwarding Mgmt-intf
```

VTY lines with ACL

To ensure an access control list (ACL) is attached to vty lines that are and are not using VRF, use the **vrf-also** option when attaching the ACL to the vty lines.

```
Router(config)# line vty 0 4
Router(config-line)#access-class 90 in vrf-also
```

Configuring the AUX Port for Network Management

Step 1 AUX port is used for IOSd command prompt. Type the **set** command at the rommon prompt.

Step 2 Verify if BOOT_PARAM is defined. It must not be defined.

Step 3 If the BOOT_PARAM is defined, do the following:

a) Type **unset BOOT_PARAM**.
b) Type **sync**.
c) Type **reset**.

Step 4 Boot with the latest image. The AUX port will show IOS command prompt.

Preprovisioning the Supervisor in the Cisco cBR Chassis

Preprovisioning on the Cisco cBR allows you to configure the Supervisors without their physical presence in the chassis.

Procedure

	Command or Action	Purpose
Step 1	**enable** **Example:** `Router> enable`	Enables privileged EXEC mode. Enter your password if prompted.
Step 2	**configure terminal** **Example:** `Router# configure terminal`	Enters global configuration mode.
Step 3	**card** *slot*/**1** **sup-pic-8x10g** **Example:** `Router(config)# card 4/1 sup-pic-8x10g`	Preprovisions the Supervisor in the Cisco cBR chassis. • *slot*—Identifies the chassis slot number for the Supervisor PIC. The valid values are 4 and 5.

Configuring the Gigabit Ethernet Interface for Network Management

You must configure the GigabitEthernet0 interface and enable it to use the NME port.

Procedure

	Command or Action	Purpose
Step 1	**enable** **Example:** `Router> enable`	Enables privileged EXEC mode. Enter your password if prompted.
Step 2	**configure terminal** **Example:** `Router# configure terminal`	Enters global configuration mode.
Step 3	**interface GigabitEthernet0** **Example:** `Router(config)# interface GigabitEthernet0`	Enters the Gigabit Ethernet interface configuration mode.

	Command or Action	Purpose
Step 4	**vrf forwarding** *vrf-name* **Example:** `Router(config-if)# vrf forwarding Mgmt-intf`	Associates a Virtual Routing and Forwarding (VRF) instance with the interface. • *vrf-name*—The interface name to be associated with the specified VRF.
Step 5	**ip address** *ip-address subnet-mask* **Example:** `Router(config-if)# ip address 192.71.0.1 255.255.255.0`	Sets the IP address of the Gigabit Ethernet interface. • *ip-address*—IP address of the Gigabit Ethernet interface. • *subnet -mask*—Subnet mask for the network.
Step 6	**no shutdown** **Example:** `Router(config-if)# no shutdown`	Enables the Gigabit Ethernet interface.
Step 7	**speed 1000** [**negotiate**] **Example:** `Router(config-if)# speed 1000`	Configures the speed for the Gigabit Ethernet interface.
Step 8	**duplex full** **Example:** `Router(config-if)# duplex full`	Configures full duplex operation on the Gigabit Ethernet interface.
Step 9	**negotiation auto** **Example:** `Router(config-if)# negotiation auto`	Selects the auto-negotiation mode.
Step 10	**end** **Example:** `Router(config-if)# end`	Exits Gigabit Ethernet interface configuration mode. Returns to privileged EXEC mode.

Configuring the DTI Port on the Supervisor PIC

The Cisco cBR router can run in standalone mode, which uses internal clock and does not require any external reference clock source. The Cisco cBR router also supports DTI server as an external clocking source. To use a DTI server as a reference clock source, you must enable the DTI port on the Supervisor PIC.

Procedure

	Command or Action	Purpose
Step 1	**enable** **Example:**	Enables privileged EXEC mode. Enter your password if prompted.

	Command or Action	Purpose
	Router> **enable**	
Step 2	**configure terminal** **Example:** Router# **configure terminal**	Enters global configuration mode.
Step 3	**cable clock dti** **Example:** Router(config)# **cable clock dti**	Configures the DTI clock reference mode for the Supervisor PIC.

Configuring the TenGigabit Ethernet Interface for Network Management

You must configure the TenGigabitEthernet interface and enable it to use the NME port.

Procedure

	Command or Action	Purpose
Step 1	**enable** **Example:** Router> **enable**	Enables privileged EXEC mode. Enter your password if prompted.
Step 2	**configure terminal** **Example:** Router# **configure terminal**	Enters global configuration mode.
Step 3	**interface TenGigabitEthernet** **Example:** Router(config)# **interface TenGigabitEthernet4/1/0**	Enters the TenGigabit Ethernet interface configuration mode.
Step 4	**ip address** *ip-address subnet-mask* **Example:** Router(config-if)# **ip address 1.2.3.4 255.255.255.0**	Sets the IP address of the TenGigabit Ethernet interface.
Step 5	**load-interval** *seconds* **Example:** Router(config-if)# **load-interval 30**	Changes the length of time for which data is used to compute load statistics.
Step 6	**no shutdown** **Example:** Router(config-if)# **no shutdown**	Enables the TenGigabit Ethernet interface.

	Command or Action	Purpose
Step 7	**end** **Example:** `Router(config-if)# end`	Exits TenGigabit Ethernet interface configuration mode. Returns to privileged EXEC mode.

Connecting the New Router to the Network

Connect the new router to the network using a n Ethernet interface. After the router successfully resolves its host name, new router sends a TFTP broadcast requesting the file name-confg or name.cfg. The router name must be in all lowercase, even if the true host name is not. The file is downloaded to the new router, where the configuration commands take effect immediately. If the configuration file is complete, the new router should be fully operational.

To save the complete configuration to NVRAM, use the following commands in privileged EXEC mode:

Procedure

	Command or Action	Purpose
Step 1	**enable password**	Enters privileged mode on the new router.
Step 2	**copy running-config startup-config**	Saves the information from the name-config file into your startup configuration. On most platforms, this step saves the configuration to NVRAM. **Note** Verify that the existing and new routers (or access servers) are connected before entering the **copy running-config startup-config** EXEC command to save configuration changes. Use the **ping** EXEC command to verify connectivity. If an incorrect configuration file is downloaded, the new router will load NVRAM configuration information before it can enter AutoInstall mode. If the configuration file is a minimal configuration file, the new router comes up, but with only one interface operational. Use the following commands to connect to the new router and configure it.
Step 3	**telnet existing**	Establishes a Telnet connection to the existing router.
Step 4	**telnet newrouter**	From the existing router, establishes a Telnet connection to the new router.
Step 5	**enable password**	Enters privileged EXEC mode.
Step 6	**setup**	Enters setup mode to configure the new router.

Setting Password Protection on the Cisco CMTS

Note For security purposes, the EXEC has two levels of access to commands: user EXEC mode and privileged EXEC mode. The commands available at the user level are a subset of those available at the privileged level.

Tip Because many privileged-level EXEC commands are used to set operating parameters, password-protect these commands to prevent unauthorized use.

Note An enable secret password can contain from 1 to 25 uppercase and lowercase alphanumeric characters. An enable password can contain any number of uppercase and lowercase alphanumeric characters. A number cannot be the first character. Spaces are valid password characters; for example, "two words" is a valid password. Leading spaces are ignored. Trailing spaces are recognized. Alphanumeric characters are recognized as uppercase or lowercase.

Passwords should be different for maximum security. If you enter the same password for both during the setup script, the system accepts it, but you receive a warning message indicating that you should enter a different password.

At the EXEC prompt, enter one of the following two commands to set password protection:

- **enable secret password**—a very secure encrypted password.
- **enable**—is a less secure and nonencrypted password.

To gain access to privileged-level commands, enter the desired password.

Recovering Lost Password on the Cisco CMTS

Complete the following steps to recover or replace a lost enable, enable secret, or console login password:

Step 1 Attach an ASCII terminal to the console port on your Cisco CMTS.

Step 2 Configure the terminal to operate at 9600 baud, 8 data bits, no parity, and 1 stop bits.

Step 3 If you can log in to the router as a nonprivileged user, enter the **show version** command to display the existing configuration register value. Note the value for later use. If you cannot log in to the router at all, continue with the next step.

Step 4 Press the `Break` key or send a `Break` from the console terminal.

- If Break is enabled, the router enters the ROM monitor, indicated by the ROM monitor prompt (rommon n>), where n is the number of the command line. Proceed to configuring the register.
- If Break is disabled, power cycle the router (turn the router off or unplug the power cord, and then restore power). Within 60 seconds of restoring the power to the router, press the `Break` key or send a `Break`. This action causes the router to enter the ROM monitor and display the ROM monitor prompt (rommon 1>).

Step 5 To set the configuration register on a Cisco CMTS, use the configuration register utility by entering the **confreg** command at the ROM monitor prompt as follows:

```
rommon 1> confreg
```

Answer **yes** to the *enable ignore system config info?* prompt and note the current configuration register settings.

Step 6 Initialize the router by entering the **reset** command as follows:

```
rommon 2> reset
```

The router initializes, the configuration register is set to 0x142, the router boots the system image from Flash memory and enters the System Configuration dialog (setup), as follows:

```
--- System Configuration Dialog --
```

Step 7 Enter **no** in response to the System Configuration dialog prompts until the following message appears:

```
Press RETURN to get started!
```

Step 8 Press **Return**. The user EXEC prompt appears as follows:

```
Router>
```

Step 9 Enter the **enable** command to enter privileged EXEC mode.

Step 10 Enter the **show startup-config** command to display the passwords in the configuration file as follows:

```
Router# show startup-config
```

Step 11 Scan the configuration file display looking for the passwords; the enable passwords are usually near the beginning of the file, and the console login or user EXEC password is near the end. The passwords displayed will look something like this:

```
enable secret 5 $1$ORPP$s9syZt4uKn3SnpuLDrhuei
enable password 23skiddoo
.
.
line con 0
 password onramp
```

Note The enable secret password is encrypted and cannot be recovered; it must be replaced. The enable and console passwords can be encrypted text or clear text.

Proceed to the next step to replace an enable secret, console login, or enable password. If there is no enable secret password, note the enable and console login passwords if they are not encrypted and proceed to set the configuration register to the original value.

Caution Do not perform the next step unless you have determined that you must change or replace the enable, enable secret, or console login passwords. Failure to follow the steps as presented here could cause your router configuration to be erased.

Step 12 (Optional) Enter the configure memory command to load the startup configuration file into running memory. This action allows you to modify or replace passwords in the configuration.

```
Router# configure memory
```

Step 13 Enter the **configure terminal** command for configuration mode:

```
Router# configure terminal
```

Step 14 To change all three passwords, enter the following commands:

```
Router(config)# enable secret newpassword1

Router(config)# enable password newpassword2
Router(config)# line con 0

Router(config)# password newpassword3
```

Change only the passwords necessary for your configuration. You can remove individual passwords by using the **no** form of the previous commands. For example, entering the **no enable secret** command removes the enable secret password.

Step 15 You must configure all interfaces to not be administratively shut down as follows:

```
Router(config)# interface gigabitethernet 0

Router(config)# no shutdown
```

Enter the equivalent commands for all interfaces that were originally configured. If you omit this step, all interfaces are administratively shut down and unavailable when the router is restarted.

Step 16 Use the **config-register** command to set the configuration register to the original value noted earlier.

Step 17 Press **`Ctrl-Z`** or type **end** to exit configuration mode:

```
Router(config)# end
```

Caution Do not perform the next step unless you have changed or replaced a password. If you skipped changing or replacing the enable, enable secret, or console login passwords previously, then proceed now to reload. Failure to observe this sequence causes the system to erase your router configuration file.

Step 18 Enter the **copy running-config startup-config** command to save the new configuration to nonvolatile memory:

```
Router# copy running-config startup-config
```

Step 19 Enter the **reload** command to reboot the router:

```
Router# reload
```

Step 20 Log in to the router with the new or recovered passwords.

Saving Your Configuration Settings

To store the configuration or changes to your startup configuration in NVRAM, enter the **copy running-config startup-config** command at the *Router#* prompt.

This command saves the configuration settings you set using configuration mode, the Setup facility, or AutoInstall.

Note If you do not save your settings, your configuration will be lost the next time you reload the router.

Example

```
Router# copy running-config startup-config
```

Reviewing Your Settings and Configurations

- To view the current configuration of a Cisco CMTS, run the **show running-config** command at the command-line interface (CLI) prompt in EXEC mode or privileged EXEC mode.
- To review changes you make to the configuration, use the EXEC **show startup-config** command to display the information stored in NVRAM.

Recovering Unresponsive Modems

If the cable modem does not respond to pings from the Cisco Converged Broadband Router, the modem DSBG, DSID, and the BPI index values on the Cisco Converged Broadband Router may be incorrect. To recover the unresponsive modem, run the **cable reconciliation enable** command to generate the correct DSBG, DSID, and the BPI index values. The following CLI provides an example of this procedure:

```
Router# configure terminal
Router# cable reconciliation enable
Router# end
```

To set the time when the **cable reconciliation enable** command should run, run the **cable reconcilation time** *hours* command, where *hours* is the time in the 24 hour format. The following CLI provides an example of this procedure:

```
Router# configure terminal
Router# cable reconciliation time 23
Router# end
```