Monitoring and Troubleshooting Narrowband and Wideband Components

This chapter provides an introduction to monitoring and troubleshooting the wideband components of the Cisco DOCSIS 3.0 Downstream Solution. The chapter includes the following topics:

Monitoring Narrowband and Wideband Components

The Cisco IOS CLI includes commands that can be issued on the CMTS for the following:

For detailed information on the syntax, usage, and additional examples for each command, see the documents shown in Table 7-1.

Note Many of the commands used to configure the Cisco uBR10012 router and the Cisco Wideband SIP and Wideband SPA *are not* currently part of the command set that can be searched with the Cisco Command Lookup Tool (available on Cisco.com). Use the documents listed in Table 7-1 to find information on these commands.

Table 7-1 Wideband Command Reference Documentation

Document	Command Described
Cisco uBR10012 Universal Broadband Router SIP and SPA Software Configuration Guide	Commands for the Cisco Wideband SIP and Cisco Wideband SPA, including commands for RF and wideband channels.
Configuring the Cisco uBR-MC3GX60V Cable Interface Line Card	Commands for configuring the Cisco uBR-MC3GX60V cable interface line card.
Configuring the Cisco UBR-MC20X20V Cable Interface Line Card	Commands for configuring the Cisco UBR-MC20X20V cable interface line card.
Cisco IOS CMTS Cable Command Reference	Commands for cable modems and cable interfaces (bonded and non-bonded channels).
Cisco IOS Release 12.3 Commands Master Commands List	Commands for Cisco IOS Release 12.3 that are not cable-specific.

Monitoring Wideband Line Cards

The following section provides commands used to monitor Cisco Wideband line cards:

- show diag for Wideband SIPs
- show diag for the Cisco uBR-MC3GX60V Line Card
- show hw-module bay oir
- show diag for Wideband SPA
- show controllers modular-cable for Cisco uBR-MC3GX60V Line Card
- show controllers modular-cable <controller> sfp for Cisco uBR-MC3GX60V Line Card
- show controllers modular-cable for Wideband SPA
- show controllers cable

The **show diag** command is useful for monitoring Cisco Wideband SPA, Wideband SIP, and wideband line cards. It shows basic information such as how long the card or wideband SPA (or SIP) has been up, its voltage status, and the software image version it is running.

In addition, the **show controllers modular-cable and show controllers jacket** commands displays extensive line card information including hardware device register values. The **show controllers** commands are intended for use only by Cisco Systems technical support personnel.

show diag for Wideband SIPs

To verify that the Wideband SIP is powered on, use the **show diag** command. If **show diag** displays any output, the Wideband SIP is powered on. The **show diag** command provides a variety of information on the Wideband SIP. In the following example, the hardware type of the Wideband SIP is 2jacket-1 card.

```
Router# show diag 1/0

Slot/Subslot 1/0:
        2jacket-1 card, 0 ports
        Card is full slot size
        Card is analyzed
        Card detected 16:46:44 ago
```

```
        Card uptime 0 days, 16 hours, 46 minutes, 36 seconds
        Card idle time 0 days, 14 hours, 22 minutes, 34 seconds
        Voltage status: 3.3V Nominal 2.5V Nominal 1.5V Nominal 12V Nominal
EEPROM contents, slot 1/0:
        Hardware Revision        : 1.0
        Top Assy. Part Number    : 800-22843-04
        Board Revision           : 01
        Deviation Number         : 0-0
        Fab Version              : 04
        PCB Serial Number        : CSJ09030613
        RMA Test History         : 00
        RMA Number               : 0-0-0-0
        RMA History              : 00
        CLEI Code                :
...
```

If **show diag** displays no output, the Wideband SIP is not powered on.

```
Router# show diag 1/0     // Displays no output
```

show diag for the Cisco uBR-MC3GX60V Line Card

To verify if the Cisco uBR-MC3GX60V line card is powered on, use the **show diag** command. If **show diag** displays any output, then the Cisco uBR-MC3GX60V line card is powered on.

```
router# show diag 5/0

Slot/Subslot 5/0:
        ubr10k-clc-3g60 card, 15 ports
        Card is half slot size
        Card is analyzed
        Card detected 02:34:34 ago
        Card uptime 0 days, 2 hours, 35 minutes, 0 seconds
        Card idle time N/A
        Voltage status: 3.3V Nominal 2.5V Nominal 1.8V Nominal 1.5V Nominal 1.2V Nominal
1.0V Nominal 1.0V Nominal 1.1V Core Nominal 1.1V Cpu Plat Nominal
EEPROM contents, slot 5/0:
        Controller Type          : 1629
        Hardware Revision        : 1.11
        Top Assy. Part Number    : 800-33189-01
        Top Assy. Revision       : 03
        Product Identifier (PID) : UBR-MC3GX60V
        Version Identifier (VID) : V01
        CLEI Code                : NOCLEICODE
        Deviation Number         : 0
        Fab Version              : 03
        PCB Serial Number        : CSJ13462929
        RMA Test History         : 00
        RMA Number               : 0-0-0-0
        RMA History              : 00
        Asset ID                 : P1D-37
        Asset Alias              : acme corp
        License                  : 72X60
        Licensing Transaction ID : 72 DS, 60 US
        Ordered Software PIDs    :
                SWLIC-MC3GX60V-DS  : 72
                SWLIC-MC3GX60V-US  : 60
LCMON version, slot 5/0
Compiled Thu 17-Jun-10 02:39
        Reset due to: power-on
Operational Image version, slot 5/0
```

```
        Cisco IOS Software, 10000 Software (UBR10KG4CLC-LCK8-M), Experimental Version
12.2(20100928:051040) [release-view 140]
        Compiled Fri 08-Oct-10 20:20 by jsmith
        SW Version 1.0
        Code MD5 BC9C0941705D7B99E2D1FC5C374824FB
        FPGA MD5 00000000000000000000000000000000
        Expected Switchover Action: NO INFORMATION
```

If **show diag** displays no output, then the Cisco uBR-MC3GX60V line card is not powered on.

```
Router# show diag 5/0
Router#
```

show hw-module bay oir

To verify that the Wideband SPA is powered on, use the **show hw-module bay oir** command. If the Operational Status is "ok," the Wideband SPA is powered on and operational.

```
Router# show hw-module bay 1/0/0 oir

Module        Model                Operational Status
------------- -------------------- ------------------------
bay 1/0/0     SPA-24XDS-SFP        ok
```

If the **show hw-module bay oir** command displays "admin down" in the Operational Status field, the Wideband SPA has been administratively disabled.

```
Router# show hw-module bay 1/0/0 oir

Module        Model                Operational Status
------------- -------------------- ------------------------
bay 1/0/0     SPA-24XDS-SFP        admin down
```

show diag for Wideband SPA

To display hardware and diagnostic information for a Wideband SPA, use the **show diag** command for slot, subslot, and bay number.

```
Router# show diag 1/0/0

Slot/Subslot/Port 1/0/0:
        24rfchannel-spa-1 card, 1 port + 1 redundant port
        Card is half slot size
        Card is analyzed
        Card detected 16:47:55 ago
        Card uptime: Not Supported
        Card idle time: Not Supported
        Voltage status: 3.3V (+3.291) NOMINAL  2.5V (+2.495) NOMINAL
                        1.2V (+1.201) NOMINAL  1.8V (+1.811) FIXED
EEPROM contents, slot 1/0/0:
        Hardware Revision        : 1.0
        Boot Timeout             : 500
        PCB Serial Number        : CSJ09379726
        Part Number              : 73-9597-03
        Part Number Revision     : 05
        Fab Version              : 03
        RMA Test History         : 00
        RMA Number               : 0-0-0-0
```

```
RMA History              : 00
Deviation Number         : 0
Product (FRU) Number     : SPA-24XDS-SFP
Version Identifier (VID) : V01
Top Assy. Part Number    : 68-2562-03
Board Revision           : 05
CLEI Code                :
MAC Address              : 0019.06a5.d9b2
MAC Address block size   : 1
Manufacturing Test Data  : 00 00 00 00 00 00 00 00
Field Diagnostics Data   : 00 00 00 00 00 00 00 00
Calibration Data         : Minimum: 0 dBmV, Maximum: 0 dBmV
      Calibration values :
Platform features        : 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
```

show controllers modular-cable for Cisco uBR-MC3GX60V Line Card

The **show controllers modular-cable** command for Cisco uBR-MC3GX60V line card has a number of options:

Table 7-2 show controllers modular-cable Command Options

Options	Description
all	Displays all M-CMTS information.
association	Displays interface association information.
bpi-entry	Displays BPI information
brief	Displays brief M-CMTS information
config	Displays JIB3DS configuration information
counters	Displays channel counters.
crashinfo	Displays CLC crash information
errors	Displays errors encountered.
fpga_version	Displays FPGA version.
ge_phy	Displays Gigabit Ethernet PHY information.
iofpga	Displays IOFPGA information.
mapping	Displays mapping of WB and RF Channels.
registers	Displays JIB3DS registers.
rf-channel	Displays RF channels.
sfp	Displays SFP information.
status	Displays JIB3DS status.
wideband-channel	Displays wideband channels.

In the following example, the **brief** keyword option displays information such as per channel configuration status and hardware registers, which contains configuration and status.

```
router# show controllers modular-Cable 5/0/2 brief

Modular Cable Controller 5/0/2:
--------------------------------
  Channel 49 Annex = B  Modulation = 256 QAM
  Channel 50 Annex = B  Modulation = 256 QAM
  Channel 51 Annex = B  Modulation = 256 QAM
  Channel 52 Annex = B  Modulation = 256 QAM
  Channel 53 Annex = B  Modulation = 256 QAM
  Channel 54 Annex = B  Modulation = 256 QAM
  Channel 55 Annex = B  Modulation = 256 QAM
  Channel 56 Annex = B  Modulation = 256 QAM
  Channel 57 Annex = B  Modulation = 256 QAM
  Channel 58 Annex = B  Modulation = 64 QAM
  Channel 59 Annex = B  Modulation = 256 QAM
  Channel 60 Annex = B  Modulation = 256 QAM
  Channel 61 Annex = B  Modulation = 256 QAM
  Channel 62 Annex = B  Modulation = 256 QAM
  Channel 63 Annex = B  Modulation = 256 QAM
  Channel 64 Annex = B  Modulation = 256 QAM
  Channel 65 Annex = B  Modulation = 256 QAM
  Channel 66 Annex = B  Modulation = 256 QAM
  Channel 67 Annex = B  Modulation = 256 QAM
  Channel 68 Annex = B  Modulation = 256 QAM
  Channel 69 Annex = B  Modulation = 256 QAM
  Channel 70 Annex = B  Modulation = 256 QAM
  Channel 71 Annex = B  Modulation = 256 QAM
  Channel 72 Annex = B  Modulation = 256 QAM

Jib3-DS Device Information:
---------------------------
   Jib3-DS Version = 2.2.1.13
   SW Rev ID = 0x00020002 HW Rev ID = 0x0001000D
   Device Type: Coldplay 3G60
   Driver State: 3
   Device Object Address: 0x1F7CE480
   Ironbus Base Channel: 0xC02

Channel Resources:
------------------
   Total Non-bonded Channels..........= 72
   Per-Controller Non-bonded Channels = 24
   Total Bonded Channels..............= 96
   Per-Controller Bonded Channels.....= 32

Slot-Wide Resources:
--------------------
   Number of PHS Rules...........= 12K (0x3000)
   Number of BPI Table Entries...= 24K (0x6000)
   Number of Service Flows.......= 64K (0x10000)

Santana FPGA brief
---------------------


SANTANA device initialized  : YES
SANTANA device status      : 00000007
SANTANA ERP CLK  DLL LOCKED: YES
SANTANA CORE CLK DLL LOCKED: YES
SANTANA ERP DLL  CLKIN LOST: NO
SANTANA CORE DLL CLKIN LOST: NO

SANTANA Registers
```

```
------------------------
san_fpga_rev_id                          Addr[0xF8900000] Offset[0x0000] = [0x00000001]
san_hw_fpga_rel_id                       Addr[0xF8900004] Offset[0x0004] = [0x00000006]
san_control_reg                          Addr[0xF8900010] Offset[0x0010] = [0x00000000]
san_status_reg                           Addr[0xF8900020] Offset[0x0020] = [0x00000007]
san_fatal_int_first                      Addr[0xF890003C] Offset[0x003C] = [0x00000000]
san_glb_isr_reg                          Addr[0xF8900040] Offset[0x0040] = [0x00000000]
san_fatal_int_src                        Addr[0xF8900050] Offset[0x0050] = [0x00000000]
san_fatal_int_en                         Addr[0xF8900054] Offset[0x0054] = [0x0000007F]
san_testpoint_select_reg                 Addr[0xF8900060] Offset[0x0060] = [0x00000000]
san_testpoint_reg                      Addr[0xF8900064] Offset[0x0064] = [0x00000001]
san_proc_irq_src_reg                   Addr[0xF8900400] Offset[0x0400] = [0x00000000]
san_proc_irq_en_reg                    Addr[0xF8900404] Offset[0x0404] = [0x0000001F]
san_erp_tp_sel                         Addr[0xF8900450] Offset[0x0450] = [0x00000000]
san_erp_tp                             Addr[0xF8900454] Offset[0x0454] = [0x00000000]
san_erp_cfg                            Addr[0xF8900460] Offset[0x0460] = [0x00000000]
san_erp_err_record                     Addr[0xF8900464] Offset[0x0464] = [0x00000000]
san_erp_err_addr                       Addr[0xF8900468] Offset[0x0468] = [0x00000000]
san_erp_err_wd_record                  Addr[0xF890046C] Offset[0x046C] = [0x00000000]
san_proc_err_addr                      Addr[0xF8900490] Offset[0x0490] = [0x00000000]
san_en_traffic                         Addr[0xF89008A8] Offset[0x08A8] = [0x00000021]
san_egres_frm0qam_log_reg              Addr[0xF89008AC] Offset[0x08AC] = [0x00000000]
san_egres_frm1qam_log_reg              Addr[0xF89008B0] Offset[0x08B0] = [0x00000000]
san_egres_frm2qam_log_reg              Addr[0xF89008B4] Offset[0x08B4] = [0x00000000]
san_egres_frm0qam_prio_log_reg         Addr[0xF89008B8] Offset[0x08B8] = [0x00000000]
san_egres_frm1qam_prio_log_reg         Addr[0xF89008BC] Offset[0x08BC] = [0x00000000]
san_egres_frm2qam_prio_log_reg         Addr[0xF89008C0] Offset[0x08C0] = [0x00000000]
san_egres_frm0tun_prio_log_reg         Addr[0xF89008C4] Offset[0x08C4] = [0x00000000]
san_egres_frm1tun_prio_log_reg         Addr[0xF89008C8] Offset[0x08C8] = [0x00000000]
san_egres_frm2tun_prio_log_reg         Addr[0xF89008CC] Offset[0x08CC] = [0x00000000]
san_egres_frm0tun_log_reg              Addr[0xF89008D0] Offset[0x08D0] = [0x00000000]
san_egres_frm1tun_log_reg              Addr[0xF89008D4] Offset[0x08D4] = [0x00000000]
san_egres_frm2tun_log_reg              Addr[0xF89008D8] Offset[0x08D8] = [0x00000000]
san_total_col2san_pkt_cnt              Addr[0xF8901000] Offset[0x1000] = [0x0015A738]
san_frm0_byp_pkt_drp_cnt               Addr[0xF8901024] Offset[0x1024] = [0x00000000]
san_frm1_byp_pkt_drp_cnt               Addr[0xF8901028] Offset[0x1028] = [0x00000000]
san_frm2_byp_pkt_drp_cnt               Addr[0xF890102C] Offset[0x102C] = [0x00000000]
san_frm0_qam_in_pkt_drp_cnt_addr_reg   Addr[0xF8901048] Offset[0x1048] = [0x00000018]
san_frm1_qam_in_pkt_drp_cnt_addr_reg   Addr[0xF890104C] Offset[0x104C] = [0x00000018]
san_frm2_qam_in_pkt_drp_cnt_addr_reg   Addr[0xF8901050] Offset[0x1050] = [0x00000018]
san_frm0_qam_in_pkt_drp_cnt_data_reg   Addr[0xF890106C] Offset[0x106C] = [0x00000000]
san_frm1_qam_in_pkt_drp_cnt_data_reg   Addr[0xF8901070] Offset[0x1070] = [0x00000000]
san_frm2_qam_in_pkt_drp_cnt_data_reg   Addr[0xF8901074] Offset[0x1074] = [0x00000000]
san_frm0_qam_pkt_drp_cnt_addr_reg      Addr[0xF8901078] Offset[0x1078] = [0x00000001]
san_frm1_qam_pkt_drp_cnt_addr_reg      Addr[0xF890107C] Offset[0x107C] = [0x00000001]
san_frm2_qam_pkt_drp_cnt_addr_reg      Addr[0xF8901080] Offset[0x1080] = [0x00000001]
san_frm0_qam_pkt_drp_cnt_data_reg      Addr[0xF8901084] Offset[0x1084] = [0x00000000]
san_frm1_qam_pkt_drp_cnt_data_reg      Addr[0xF8901088] Offset[0x1088] = [0x00000000]
san_frm2_qam_pkt_drp_cnt_data_reg      Addr[0xF890108C] Offset[0x108C] = [0x00000000]
san_gmac0_taildrop_pkt_cnt_reg         Addr[0xF8901300] Offset[0x1300] = [0x00000000]
san_gmac1_taildrop_pkt_cnt_reg         Addr[0xF8901304] Offset[0x1304] = [0x00000000]
san_gmac2_taildrop_pkt_cnt_reg         Addr[0xF8901308] Offset[0x1308] = [0x00000000]
san_gmac3_taildrop_pkt_cnt_reg         Addr[0xF890130C] Offset[0x130C] = [0x00000000]
san_gmac4_taildrop_pkt_cnt_reg         Addr[0xF8901310] Offset[0x1310] = [0x00000000]
san_gmac5_taildrop_pkt_cnt_reg         Addr[0xF8901314] Offset[0x1314] = [0x00000000]
san_ipac_drop_pkt_cnt_reg              Addr[0xF8901318] Offset[0x1318] = [0x00000000]
san_san2col_pkt_cnt_reg                Addr[0xF890131C] Offset[0x131C] = [0x00000006]
san_san2col_loopback_pkt_cnt_reg       Addr[0xF8901320] Offset[0x1320] = [0x00000000]
san_ipac_err_pkt_cnt_reg               Addr[0xF8901324] Offset[0x1324] = [0x00000000]
san_ipac_none_depi_pkt_cnt_reg         Addr[0xF8901328] Offset[0x1328] = [0x00000006]
san_ipac_depi_ctrl_pkt_cnt_reg         Addr[0xF890132C] Offset[0x132C] = [0x00000000]
san_ipac_depi_dlm_pkt_cnt_reg          Addr[0xF8901330] Offset[0x1330] = [0x00000000]
san_egress_bp_thresh0_reg              Addr[0xF8900884] Offset[0x0884] = [0x00008844]
san_egress_irq_src_reg                 Addr[0xF8900888] Offset[0x0888] = [0x00000000]
```

```
san_egress_irq_enb_reg              Addr[0xF890088C] Offset[0x088C] = [0x0003FFFF]
san_egress_fifo_full_reg            Addr[0xF8900894] Offset[0x0894] = [0x00000000]
san_egress_fifo_emp_reg             Addr[0xF8900898] Offset[0x0898] = [0x0007FFFF]
san_egress_fifo_ovfl_reg            Addr[0xF890089C] Offset[0x089C] = [0x00000000]
san_egress_fifo_ufl_reg             Addr[0xF89008A0] Offset[0x08A0] = [0x00000000]
san_egress_fifo_perr_reg            Addr[0xF89008A4] Offset[0x08A4] = [0x00000000]
san_ingress_irq_src_reg             Addr[0xF8900CA0] Offset[0x0CA0] = [0x00000015]
san_ingress_irq_enb_reg             Addr[0xF8900CA4] Offset[0x0CA4] = [0x00000FC0]
san_ingress_fifo_full_reg           Addr[0xF8900CAC] Offset[0x0CAC] = [0x00000000]
san_ingress_fifo_emp_reg            Addr[0xF8900CB0] Offset[0x0CB0] = [0x000FFFFF]
san_ingress_fifo_ovfl_reg           Addr[0xF8900CB4] Offset[0x0CB4] = [0x00000000]
san_ingress_fifo_ufl_reg            Addr[0xF8900CB8] Offset[0x0CB8] = [0x00000000]
san_ingress_fifo_perr_reg              Addr[0xF8900CBC] Offset[0x0CBC] = [0x00000000]
san_gmac_stats_data_reg                Addr[0xF8902000] Offset[0x2000] = [0x000005BF]
san_gmac_stats_addr_reg                Addr[0xF8902004] Offset[0x2004] = [0x00000000]
```

show controllers modular-cable <controller> sfp for Cisco uBR-MC3GX60V Line Card

To monitor the SFPs plugged into the Cisco uBR-MC3GX60V line card, use the **show controller modular-cable <controller> sfp** command. It displays the SFP presence, manufacturer, and most importantly, link status. The Cisco uBR-MC3GX60V line card has six SFP ports, ports 0 to 5.

The example below shows that an SFP is plugged into Port 4, but not 5 and the SFP present has an UP link state.

```
router# show controllers modular-Cable 5/0/2 sfp

SFP in Port4 is Present.  Init status Success <<<——SFP 4 is present
        TX_DISABLE not set, LOS not detected, TX_FAULT not detected
 LOS detection supported: no
 Tx Fault detection supported: no
SFP Interrupt Counts:
        LOS:0, PRES:0, TX_FAULT:0
Link Status of the MV88E1146C DS Gige Phy Port: UP <<<—— link is up

DEV_SHOW_ALL for SFP:4

3G60 SFP:
        ID: SFP
        Extended ID: 4
        Xcvr Type: GE T (1A)
        Connector: unknown
        Encoding: 8B10B
        Bit Rate: 1300 Mbps
        Copper supported length: 100 m
        Upper bit rate limit: not specified
        Lower bit rate limit: not specified
        Date code (yy/mm/dd): 09/04/20
        Vendor name: CISCO-AVAGO
        Vendor OUI: 5994
        Vendor Part Number (PN): ABCU-5710RZ-CS2
        Vendor Rev:
        Vendor SN (SN): AGM131620Y4
        Options implemented:
                TX Disable Signal
        Enhanced options implemented: none
        Diagnostic monitoring implemented: none
        Idprom contents (hex):
        0x00:   03 04 00 00 00 00 08 00 00 00 00 01 0D 00 00 00
        0x10:   00 00 64 00 43 49 53 43 4F 2D 41 56 41 47 4F 20
        0x20:   20 20 20 20 01 00 17 6A 41 42 43 55 2D 35 37 31
```

```
        0x30:   30 52 5A 2D 43 53 32 20 20 20 20 20 41 0C C1 13
        0x40:   00 10 00 00 41 47 4D 31 33 31 36 32 30 59 34 20
        0x50:   20 20 20 20 30 39 30 34 32 30 20 20 00 00 00 AE
        0x60:   00 00 06 90 39 AC E3 A7 43 49 F3 17 7B E1 30 B8
        0x70:   19 04 B3 00 00 00 00 00 00 00 00 00 2A 30 86 F8
        0x80:   FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF
        0x90:   FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF
        0xA0:   FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF
        0xB0:   FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF
        0xC0:   FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF
        0xD0:   FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF
        State: Enabled
        SW TX Fault: unavailable
        SW LOS: unavailable

Phased Initialization
        Phase Reached: 4
        Phase Exit Code: Success 0
        Phase Read Offset: 0

Socket Verification

        SFP PHY Registers
         Register 0x00:   0140  016D  0141  0CC1  0C01  CDE1  000D  2801
         Register 0x08:   45AF  0E00  3800  0000  0000  0000  0000  F000
         Register 0x10:   0078  AC4C  0000  0000  0C68  0000  0000  0000
         Register 0x18:   4100  0000  000A  9088  0000  0000  0000  0000
SFP in Port5 is NOT PRESENT <<<—— SFP 5 is not present
```

show controllers modular-cable for Wideband SPA

The Wideband SPA is a controller and the **show controllers modular-cable** command displays information about the SPA, its Gigabit Ethernet ports, installed SFP modules, wideband channels, and so on.

The following example provides sample **show controllers modular-cable** output for the Wideband SPA located in slot 1, subslot 0, bay 0 of a Cisco uBR10012 router. In the output, the Gigabit Ethernet Port Selected field indicates that Port 1 is the active Gigabit Ethernet port on the Wideband SPA.

```
Router# show controllers modular-cable 1/0/0 brief

SPA 0 is present
status LED: [green]
Host 12V is enabled and is okay.
Power has been enabled to the SPA.
SPA reports power enabled and okay.
SPA reports it is okay and is NOT held in reset.

Gigabit Ethernet Port Selected : Port 1
Receive Interface              : In Reset
Receive Interface              : Disabled
Transmit Interface             : Out of Reset
Transmit Interface             : Enabled
Primary Receive Clock          : Disabled
Backup Receive Clock           : Disabled
SFP [Port 0] : 1000BASE-SX Present
 Tx Enabled , LOS Detected , TxFault Not Detected
 Link Status [Port 0] : DOWN

SFP [Port 1] : 1000BASE-T Present
 Tx Enabled , LOS Not Detected , TxFault Not Detected
```

```
 Link Status [Port 1] : UP


Wideband Channel information
Channel    RF bitmap   Police Info: Bytes      Interval
0          0x3                      0            0 ms
1          0xC                      0            0 ms
2          0x30                     0            0 ms
3          0xC0                     0            0 ms
4          0x300                    0            0 ms
5          0xC00                    0            0 ms
6          0x3000                   0            0 ms
7          0xC000                   0            0 ms
8          0x30000                  0            0 ms
9          0x0                      0            0 ms
10         0x0                      0            0 ms
11         0x0                      0            0 ms

RF Channel information
Modulation corresponds to : QAM 256
Annex corresponds to : Annex B
Modulation Data :GE Interframe Gap = 12 , MPEG-TS Frames per pkt = 4
SPA IP address = 0.0.0.0           SPA MAC Addr = 0012.001A.888B
QAM       Channel Rate     Rate adjust   State
0         0                1             Enabled
1         0                1             Enabled
2         0                1             Enabled
3         0                1             Enabled
4         0                1             Enabled
5         0                1             Enabled
6         0                1             Enabled
7         0                1             Enabled
8         0                1             Enabled
9         0                1             Enabled
10        0                1             Enabled
11        0                1             Enabled
12        0                1             Enabled
13        0                1             Enabled
14        0                1             Enabled
15        0                1             Enabled
16        0                1             Enabled
17        0                1             Enabled
18        0                1             Enabled
19        0                1             Enabled
20        0                1             Enabled
21        0                1             Enabled
22        0                1             Enabled
23        0                1             Enabled

Interrupt Counts
Idx  Interrupt Register       Interrupt Bit            Total Count  Masked:
69   blz_sp_int_stat_reg_0    spi_train_vld            24           YES
84   spa_brd_int_stat_reg     sp_int_0                 24           NO
85   spa_brd_int_stat_reg     scc_int                  2            NO
86   spa_brd_int_stat_reg     phy1_int                 1            NO
87   spa_brd_int_stat_reg     phy0_int                 1            NO
92   spa_brd_int_stat_reg     temp1_int                2            NO
93   spa_brd_int_stat_reg     temp0_int                2            NO
97   bm_int_stat_reg          bm_spa_brd               26           NO
```

To display information about the SFP module in a Wideband SPA port, use the **show controllers modular-cable** with the **sfp** keyword. In the following example, the information is for the SFP module in Port 1 is displayed.

```
Router# show controllers modular-cable 1/0/0 sfp port 1

SFP in port 1
SFP is present
SFP LOS is not detected
SFP TX FAULT is not detected
SFP TX is enabled

ID: SFP
        Extended ID: 4
        Connector: LC
        SONET compliance:  not specified
        Gigabit Ethernet compliance: 1000BASE-SX
        Fibre Channel link length:  not specified
        Fibre Channel transmitter technology:  not specified
        Fibre Channel transmission media:  not specified
        Fibre Channel speed:  not specified
        Encoding: 8B10B
        Bit Rate: 1300 Mbps
        50 micron-multimode fiber supported length: 550 m
        62.5 micron-multimode fiber supported length: 270 m
        Upper bit rate limit: not specified
        Lower bit rate limit: not specified
        Date code (yy/mm/dd): 05/02/23
        Vendor name: CISCO-AGILENT
        Vendor OUI: 12499
        Vendor Part Number (PN): QFBR-5766LP            Vendor Rev:
        Vendor SN (SN): AGS090855CE
        Options implemented:
                LOS Signal
                TX Fault Signal
                TX Disable Signal
        Enhanced options implemented: none
        Diagnostic monitoring implemented: none
        Idprom contents (hex):
        0x00:   03 04 07 00 00 00 01 00 00 00 00 01 0D 00 00 00
        0x10:   37 1B 00 00 43 49 53 43 4F 2D 41 47 49 4C 45 4E
        0x20:   54 20 20 20 00 00 30 D3 51 46 42 52 2D 35 37 36
        0x30:   36 4C 50 20 20 20 20 20 20 20 20 20 03 52 00 B5
        0x40:   00 1A 00 00 41 47 53 30 39 30 38 35 35 43 45 20
        0x50:   20 20 20 20 30 35 30 32 32 33 20 20 00 00 00 C4
        0x60:   00 00 06 C9 F0 FA 7C 01 B3 C8 41 6B 39 04 FC 85
        0x70:   BB 20 9E 00 00 00 00 00 00 00 00 00 B4 94 52 CC
        0x80:   FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF
        0x90:   FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF
        State: Initalized
Phased Initialization
        Phase Reached: 4
        Phase Exit Code: 0
        Phase Read Offset: 0
...
```

show controllers cable

To display information about RF channels and their attributes that are added to the cable MAC domain, use the **show controllers cable** *slot/subslot/port* **downstream** command. This applies to all MAC domain card types, Cisco uBR-MC5X20, Cisco UBR-MC20X20V, Cisco uBR-MC8X8V, and Cisco uBR-MC3GX60V line cards.

The following configuration shows the modular-cable interface channels of a SPA in bay 1/1/0 added to the MAC domain c8/0/0:

```
Router# show run interface c8/0/0 | inc Modular-Cable

 downstream Modular-Cable 1/1/0 rf-channel 1 upstream 1
 downstream Modular-Cable 1/1/0 rf-channel 4 upstream 0
 downstream Modular-Cable 1/1/0 rf-channel 7 upstream 0
```

The MAC domain configuration shown in the preceding configuration provides the following SPA RF downstream channel information in the **show controllers cable** *slot/subslot/port* **downstream** command output (in this example, the output is for cable 8/0/0 where a uBR-MC5X20 line card is in subslot 8/0):

```
Router# show controllers cable 8/0/0 downstream

 Cable8/0/0 Downstream is up <<<—— local MC5X20 downstream
  Frequency 459.0000 MHz, Channel Width 6 MHz, 64-QAM, Symbol Rate 5.056941 Msps
  FEC ITU-T J.83 Annex B, R/S Interleave I=32, J=4
  Downstream channel ID: 119
  Dynamic Services Stats:
  DSA: 0  REQs  0 RSPs  0 ACKs
  0 Successful DSAs  0 DSA Failures
  DSC: 0  REQs  0 RSPs  0 ACKs
  0 Successful DSCs  0 DSC Failures
  DSD:  0 REQs  0 RSPs
  0 Successful DSDs  0 DSD Failures
  DCC: 0  REQs  0 RSPs  0 ACKs
  0 Successful DCCs  0 DCC Failures
  DCC end of transaction counts:
  DCC unknown cause(0) offline(0) if down(0) no cm(0)
  DCC no resource(0) no retries(0) reject(0) unknown state (0)
  DCC rebuild err (0) T15 timeout(0) wrong channel(0) reinit MAC (0)
  DCC dcc succeeds(0)
  DCC wcm(0)
 Local total modems 0, modems active 0, total DS flows 1
  NB DS Mo 1/1/0:1, STATE: UP
   Frequency 561.0000 MHz 64-QAM,  ANNEX B, R/S Interleave I=32, J=4
   Network Delay 550 (usec)
   Bandwidth (Kbps): 1078,  Load Percent: 0
   Channel ID: 49, US MAP: 0x0002
   Total modems: 2, modems active : 2, total DS flows: 3
  NB DS Mo 1/1/0:4, STATE: UP
   Frequency 717.0000 MHz 64-QAM,  ANNEX B, R/S Interleave I=32, J=4
   Network Delay 550 (usec)
   Bandwidth (Kbps): 2697,  Load Percent: 0
   Channel ID: 52, US MAP: 0x0001
   Total modems: 6, modems active : 6, total DS flows: 7
  NB DS Mo 1/1/0:7, STATE: UP
   Frequency 735.0000 MHz 64-QAM,  ANNEX B, R/S Interleave I=32, J=4
   Network Delay 550 (usec)
   Bandwidth (Kbps): 1078,  Load Percent: 0
   Channel ID: 55, US MAP: 0x0001
   Total modems: 0, modems active : 0, total DS flows: 1

  DS_chan_id  RFID  Interface
  ---------------------------------------
    49        25   Mo 1/1/0:1
    52        28   Mo 1/1/0:4
    55        31   Mo 1/1/0:7
  ---------------------------------------
MDDs            Primary          Non-Primary
  -----------------------------------------------
  1/1/0:1         6300             0
  1/1/0:4         6299             0
  1/1/0:7         6298             0
  -----------------------------------------------
```

Upstream Controller Monitoring

To display information about the number of MAP and UCD MAC management messages sent on a DS channel (that has been added to primary-capable channels that are part of a MAC domain), use the **show controllers cable** *slot/subslot/port* **upstream** command.

The following configuration shows the modular-cable interface channels added to the MAC domain c8/0/0:

```
Router# show run interface c8/0/0 | inc Modular-Cable

 downstream Modular-Cable 1/1/0 rf-channel 1 upstream 1
 downstream Modular-Cable 1/1/0 rf-channel 4 upstream 0
 downstream Modular-Cable 1/1/0 rf-channel 7 upstream 0
```

The MAC domain configuration shown in the preceding configuration provides the following information for US channels associated with SPA DS channels that are added to the MAC domain in the **show controllers cable** *slot/subslot/port* **upstream** command output (in this example, the output is for cable8/0/0):

```
Router# show controllers cable 8/0/0 upstream 0

Cable8/0/0 Upstream 0 is up
  Frequency 11.400 MHz, Channel Width 3.200 MHz, Symbol Rate 2.560 Msps
  Modulations (64-QAM) - A-short 64-QAM, A-long 64-QAM, A-ugs 64-QAM
  Mapped to non-shared connector 2 and receiver 2
  Spectrum Group is overridden
  MER(SNR) - Unknown - no modems online.
  Nominal Input Power Level 0 dBmV, Tx Timing Offset 0
  Ranging Backoff Start 3, Ranging Backoff End 6
  US timing offset adjustment type 0, value 0
  Ranging Insertion Interval automatic (60 ms)
  US throttling off
  Tx Backoff Start 3, Tx Backoff End 5
  Modulation Profile Group 221
  Concatenation is enabled
  Fragmentation is enabled
  part_id=0x3140, rev_id=0x03, rev2_id=0x00
  nb_agc_thr=0x0000, nb_agc_nom=0x0000
  Range Load Reg Size=0x58
  Request Load Reg Size=0x0E
  Minislot Size in number of Timebase Ticks is = 2
  Minislot Size in Symbols = 32
  Bandwidth Requests = 0x0
  Piggyback Requests = 0x0
  Invalid BW Requests= 0x0
  Minislots Requested= 0x0
  Minislots Granted  = 0x0
  Minislot Size in Bytes = 24
  Map Advance (Dynamic) : 2830 usecs
  Map Count Local = 6540889
  No MAP buffer= 0x0   No Remote MAP buffer= 0x0
  Map Counts Remote: Controller 1/1/0 = 26148778
  UCD Count = 6651
  Remote UCD Counts:
    Controller 1/1/0:4 = 6646
    Controller 1/1/0:7 = 6646
  ATDMA mode enabled
  PHY: us errors 0  us recoveries 0 (enp 0)
  MAC PHY TSS: tss error start 0  tss error end 0
  MAC PHY Status: bcm3140 status 0  lookout status 0
```

```
PHY: TSS late 0  discontinuous 0
PHY: TSS mis-match 0  not-aligned 0
PHY: TSS missed snapshots from phy 0
MAP/UCD Replication Instructions:
  Controller 1/1/0 index = 121, bitmap = 0x0090
Dynamic Services Stats: <<<——Useful for voice services monitoring
DSA: 0  REQs  0 RSPs  0 ACKs
0 Successful DSAs  0 DSA Failures
DSC: 0  REQs  0 RSPs  0 ACKs
0 Successful DSCs  0 DSC Failures
DSD:  0 REQs  0 RSPs
0 Successful DSDs  0 DSD Failures
Dropped MAC messages: (none)
```

The Dynamic Services Stats section is useful in voice services monitoring. If an upstream is too congested, DOCSIS dynamic services messages may be dropped in the upstream and those drops will be counted and reflected in the command output.

Monitoring Wideband Channels

The following commands are useful for monitoring wideband channels:

- **show interface wideband-cable**
- **show hw-module bay and show controller**

show interface wideband-cable

To display information about a wideband-cable interface (wideband channel), use the **show interface wideband-cable** command. Wideband channels are similar to cable interfaces and information about them is also displayed with the **show ip interfaces** and **show interfaces** commands.

The following example displays the **show interface wideband-cable** command output for wideband channel 0 on the Wideband SPA in slot/subslot/bay 1/0/0.

```
Router# show interface wideband-cable 1/0/0:0

Wideband-Cable1/0/0:0 is up, line protocol is up
  Hardware is Wideband CMTS Cable interface, address is 0012.001a.8896 (bia
0012.001a.8896)
  MTU 1500 bytes, BW 74730 Kbit, def 74730 Kbit DLY 1000 usec,
     reliability 255/255, txload 1/255, rxload 1/255
  Encapsulation MCNS, loopback not set
  Keepalive set (10 sec)
  ARP type: ARPA, ARP Timeout 04:00:00
  Last input never, output 00:00:16, output hang never
  Last clearing of "show interface" counters never
  Input queue: 0/75/0/0 (size/max/drops/flushes); Total output drops: 0
  Queueing strategy: fifo
  Output queue: 0/40 (size/max)
  30 second input rate 0 bits/sec, 0 packets/sec
  30 second 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
     17470 packets output, 1810488 bytes, 0 underruns
     0 output errors, 0 collisions, 0 interface resets
     0 output buffer failures, 0 output buffers swapped out
```

Hardware Status and Line Protocol Status for a Wideband-Channel and Modular-Cable Interface

When a wideband-channel cable interface is specified in the **show interface wideband-cable** command or another Cisco IOS command that displays hardware status (initializing, down, up, or administratively down) and line protocol status (down or up) for a cable interface, the following applies:

- In the case of a Wideband SIP and SPA, the hardware status for a wideband cable interface will be up if the Wideband SPA is installed in the Wideband SIP, and both are powered on, and config mode has been entered for the interface.
- In the case of a Cisco uBR-MC3GX60V or Cisco UBR-MC20X20V line card, the hardware status for a wideband-cable interface will be up if the line card is installed, powered on, and config mode has been entered for the interface at least once.
- The line protocol for a wideband-channel cable interface will be up if the wideband channel is associated with at least one RF channel by configuration and the following parameters have been set for the RF channel:
  - Frequency
  - IP-address
  - MAC-address
  - DEPI-remote-id

If the line protocol for a wideband cable interface is up, all wideband cable configuration information needed to successfully send data is present. However, additional configuration information may be needed to complete the Wideband SPA configuration process. For more information on Wideband SPA configuration procedures, see the *Cisco uBR10012 Universal Broadband Router SIP and SPA Software Configuration guide.*

For more information about the Cisco UBR-MC20X20V line card based wideband-cable interface, see Configuring the Cisco UBR-MC20X20V Cable Interface Line Card guide.

For more information about the Cisco uBR-MC3GX60V line card based wideband-cable interface, see Configuring the Cisco uBR-MC3GX60V Cable Interface Line Card guide.

When a modular-cable interface is specified in the **show interface modular-cable** command or another Cisco IOS command that displays hardware status and line protocol status for a cable interface, such as the **show ip interfaces brief** command, the following applies:

- In the case of a Wideband SIP and SPA, the hardware status for a modular-cable interface will be up if the Wideband SPA is installed in the Wideband SIP and both are powered on.
- In the case of a Cisco UBR-MC20X20V line card, the hardware status for a integrated-cable interface will be up if the line card is installed, powered on, and config mode has been entered for the interface at least once.
- In the case of a Cisco uBR-MC3GX60V line card, the hardware status for an modular-channel cable interface will be up if the line card is installed, powered on, and config mode has been entered for the interface at least once.
- The line protocol for a modular-cable interface will be up if the following settings have been applied to the RF channel:
  - The upstream channels from the MAC domain cable interface line card must be associated with the modular-cable interface or integrated-cable downstream channels in a given cable MAC domain.
  - The total bandwidth allocated for the interface must be greater than or equal to 1 percent.

- In the case of a Wideband SPA, the modular host must be configured on the modular-cable controller for the corresponding SPA. The modular-host is the line card responsible for managing per-modem BPI, PHS, and DSID indexes.
- In the case of an M-CMTS modular-cable interface, a DEPI remote ID must be configured for this channel. The UDP port number must not be configured in this case.
- RF channel frequency parameter must be set for the RF channel.

show hw-module bay and show controller

To display additional information about a wideband channel of a Wideband SPA, use the **show hw-module bay** commands. Use the **show controller modular-cable** commands for a Cisco uBR-MC3GX60V line card, and the **show controller integrated-cable** commands for a Cisco UBR-MC20X20V line card. You can then specify one of the following keywords indicating the particular type of information you want to display:

- **association**—Displays wideband-to-narrowband MAC domain association information. The association of a wideband channel to a MAC domain is made when a primary downstream channel for the fiber node is configured with the **downstream** command and the wideband interface channels are also in the fiber node.
- **config**—Displays wideband channel configuration information.
- **counters wideband-channel**—Displays wideband channel statistics.
- **mapping**—Displays the mapping of RF channels to wideband channels.

To display wideband-to-narrowband channel association (the MAC domains using the wideband channel) information, use the **show hw-module bay command** with the **association** and **wideband-channel** keywords. If you specify a wideband channel number after the **wideband-channel** keyword, the output is shown only for that channel:

```
Router# show hw-module bay 1/0/0 association wideband-channel 0

WB                      BG   Bundle  NB          NB chan  Reserved  Total
channel                 ID   num     channel     ID       CIR       CIR
Wideband-Cable1/0/0:0   24   1       Cable5/0/1  120      0         0
```

In the preceding example, the following information is displayed for each wideband channel:

Table 7-3 show hw-module bay association wideband-channel Command Output Field Descriptions

Field	Description
WB channel	Wideband-cable interface (wideband channel).
BG ID	Bonding-group ID for the wideband channel.
Bundle num	Number of the virtual bundle interface where the wideband channel is a member.
NB channel	Slot/subslot/port of the for MAC domains using for the wideband channel.
NB channel ID	DOCSIS channel ID for the primary downstream channel. Because the Cisco UBR-MC20X20V and Cisco uBR-MC3GX60V line cards do not natively have a local downstream channel, the ID will show as 0 in these cases.

Table 7-3 show hw-module bay association wideband-channel Command Output Field Descriptions

Field	Description
Reserved CIR	Reserved committed information rate (CIR). Because CIR is not currently supported for wideband traffic, reserved CIR is always 0.
Total CIR	CIR that is currently available.

To display the configuration information for a wideband channel, use the **show hw-module bay command** with the **config** and **wideband-channel** keywords. If you do not specify a wideband channel number after the **wideband-channel keyword, the output is shown for all wideband channels:**

```
Router# show hw-module bay 1/0/0 config wideband-channel

WB                      BG    Bundle  WB Host       Primary
channel                 ID    num     Slot/Subslot  BG
Wideband-Cable1/0/0:0    1    123     5/0           Yes
Wideband-Cable1/0/0:1    2    123     5/0           Yes
Wideband-Cable1/0/0:2    3    123     5/0           Yes
Wideband-Cable1/0/0:3    4    123     5/0           Yes
Wideband-Cable1/0/0:4    5    123     5/0           Yes
Wideband-Cable1/0/0:5    6    123     5/0           Yes
Wideband-Cable1/0/0:6   7     123     5/0           Yes
Wideband-Cable1/0/0:7   8     123     5/0           Yes
Wideband-Cable1/0/0:8   9     123     5/0           Yes
Wideband-Cable1/0/0:9   10    123     5/0           Yes
Wideband-Cable1/0/0:10  11    123     5/0           Yes
Wideband-Cable1/0/0:11  12    123     5/0           Yes
```

In the preceding example, the following information is displayed for each wideband channel:

Table 7-4 show hw-module bay config wideband-channel Output Field Description

Field	Description
Wideband Channel	Wideband channel.
BG ID	Bonding-group ID.
Bundle num	Number of the virtual bundle interface where the wideband channel is a member.
WB Host Slot/Subslot	Cable interface line card that has been configured for Wideband protocol operations. For information, see the **modular-host subslot** command in the *Cisco uBR10012 Universal Broadband Router SIP and SPA Software Configuration Guide*.
Primary BG	Primary bonding group (primary wideband channel). "Yes" indicates that the wideband channel is a primary bonding group.

To display wideband-channel statistics, use the **show hw-module bay command** with the **counters** and **wideband-channel** keywords.

```
Router# show hw-module bay 1/0/0 counters wideband-channel 0

SPA      WB channel   Tx packets             Tx octets
```

```
1/0/0    0            29069                    4032392
```

To display RF channels that have been configured for a wideband channel, use the **show hw-module bay command** with the **mapping** and **wideband-channel** keywords. The BW% column displays the percentage of the RF channel bandwidth that is assigned to the wideband channel with the **cable rf-channel** command.

```
Router# show hw-module bay 1/0/0 mapping wideband-channel

SPA      WB       RF         BW %
         channel  channel
1/0/0    0        0          100
                  1          100
1/0/0    1        2          100
                  3          100
1/0/0    2        4          100
                  5          100
1/0/0    3        6          100
                  7          100
1/0/0    4        8          100
                  9          100
1/0/0    5        10         100
                  11         100
1/0/0    6        12         100
                  13         100
1/0/0    7        14         100
                  15         100
1/0/0    8        16         100
                  17         100
1/0/0    9        18         100
                  19         100
1/0/0    10       20         100
                  21         100
1/0/0    11       22         100
                  23         100
```

Monitoring Narrowband RF Channels

The following commands are useful for monitoring narrowband RF channels:

- **show interface modular-cable and show interface integrated-cable**
- **show hw-module bay**
- show controller modular-cable and show controller integrated-cable

show interface modular-cable and show interface integrated-cable

To display information about narrowband interfaces, use the **show interface modular-cable** or **show interface integrated-cable** command. Narrowband interfaces information is also displayed with the **show ip interface** and **show interfaces** command.

The following is sample output of the **show interface modular-cable** command:

```
Router# show interface modular-cable 1/0/0:0

Modular-Cable3/0/0:0 is up, line protocol is up
 Hardware is CMTS MC interface, address is 0011.9221.84be (bia 0011.9221.84be)
  MTU 1500 bytes, BW 539 Kbit, DLY 1000 usec,
     reliability 255/255, txload 1/255, rxload 1/255
```

```
Encapsulation MCNS, loopback not set
Keepalive set (10 sec)
ARP type: ARPA, ARP Timeout 04:00:00
Last input never, output 00:09:57, output hang never
Last clearing of "show interface" counters never
Input queue: 0/75/0/0 (size/max/drops/flushes); Total output drops: 0
Queueing strategy: PXF First-In-First-Out
Output queue 0/64, 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
   107 packets output, 16302 bytes, 0 underruns
   0 output errors, 0 collisions, 0 interface resets
   0 output buffer failures, 0 output buffers swapped out
```

You can also specify the following keywords to display more specific information you would like to display:

Table 7-5 show interface modular-cable Output Field Description

Field	Description
accounting	Displays interface accounting information
controller	Displays interface status, configuration, and controller status.
counters	Displays interface counters.
crb	Displays interface routing and bridging information.
description	Displays interface description.
dlm	Displays DLM statistics.
downstream	Displays downstream information.
fair-queue	Displays interface Weighted Fair Queueing (WFQ) information.
irb	Displays interface routing and bridging information.
mac-accounting	Displays interface MAC accounting information.
monitor	Displays the interface information continuously.
mpls-exp	Displays interface MPLS experimental accounting information.
multicast-gcr	Displays multicast QoS GCR Details.
multicast-sessions	Displays multicast sessions information.
precedence	Displays interface precedence accounting information.
random-detect	Displays interface weighted random early detection (WRED) information.
stats	Displays interface packets & octets, in & out, by switching path.
summary	Displays interface summary.

show hw-module bay

To display information about RF channels on a Wideband SPA, use the **show hw-module bay** command with the **rf-channel** keyword. You also have to specify one of the following keywords indicating the particular type of information you want to display:

- **config—**Displays RF channel configuration information.
- **counters—**Displays RF channel statistics.
- **mapping—**Displays the mapping of RF channels to wideband channels.

To display configuration information for an RF channel, use the **show hw-module bay command** with the **config** and **rf-channel** keywords. If you specify an RF channel number after the **rf-channel keyword**, output is for that channel only. For example, the following output is for RF channel 0 on the Wideband SPA located in slot/subslot/bay 1/0/0.

```
Router# show hw-module bay 1/0/0 config rf-channel 0

Freq       Mod     Anx  IP Address     MAC Address     UDP Port/    If
       chnl                                                        DEPI        Idx
                                                                   Remote Id
1/1/0  0    555000000  256qam  B    10.30.4.100    0090.f001.53eb  37721      1209
```

In the preceding output, these fields provide information on the edge QAM device that is associated with the RF channel:

- IP address—IP address of the edge QAM device.
- MAC address—MAC address of the next-hop or edge QAM device.
- DEPI ID or UDP port—DEPI ID or UDP port number for the edge QAM device that will be used for this RF channel.

To display MPEG packets transmitted for an RF channel, use the **show hw-module bay command** with the **counters** and **rf-channel** keywords.

```
Router# show hw-module bay 1/0/0 counters rf-channel 0

MPEG       MPEG    Sync          MAP Queue
       Chan  Packets Tx            bps        Mbps    Packets Tx    Packets Tx
1/1/0  0     826196333             13722746   13.722  870613        521229533
```

show controller modular-cable and show controller integrated-cable

For the Cisco uBR-MC3GX60V and Cisco UBR-MC20X20V line card, the **config**, **counters**, and the **mapping** commands shown in the preceding configuration are displayed with the **show controller** command.

The **config** command displays all aspects of the configuration for the controller and its channels.

To display configuration information for an RF channel, use the **show controller modular-cable rf-channel** command.

The following example shows how to display the configuration information for the rf-channel 0 on the modular interface 5/0/0:

```
router# show controllers modular-Cable 5/0/0 rf-channel 0

Ctrl Chan Frequency  Mod Annex IP Address      MAC Address    DEPI Remote ID
0    0    453000000  256 B     10.31.136.100   0022.9084.4e3f 101111
```

To display the per RF channel packet counts, bandwidth usage, SYNC, MAP, and non-SYNC and MAP packet counts use the **counters rf** command. This command is used to monitor channel saturation and the distribution of bandwidth in the cable plant.

For the Cisco Wideband SPA and Cisco UBR-MC20X20V line card, the channel bandwidth usage is computed based on the MPEG frames, each of which is 188 bytes.

For the Cisco uBR-MC3GX60V line card, the channel bandwidth is computed based on the DMPT (DOCSIS MPEG Transport) frames, which are a composite of MPEG frames.

The following example displays the output of the **show controller modular cable counter rf** command for the Cisco uBR-MC3GX60V line card:

```
router# show controller modular-Cable 5/0/1 counter rf

Contr  RF Pkts          Bytes           Pkts       DMPT       DMPT* Sync        MAP/UCD
Med Pri
oller     Chan Tx       Tx              Dropped    Mbps       pps   Pkts        Pkts
Pkts
                                                                   Tx          Tx
Tx
5/0/1  0  359422902      175839786632     0          16.084494 3278  17695916
348630355      131188
5/0/1  1  297919977      144703086948     0          12.776285 2464  17695915
348630335      100908
5/0/1  2  411173896      205063220844     0          19.152506 3965  17695915
348630323      121152
5/0/1  3  533449227      289471796988     0          28.142993 5570  17695914
348630315      170136
5/0/1  4  416414672      208106842144     0          19.457173 4016  17695913
349494926      122964
5/0/1  5  359411966      177779675348     0          16.280459 3274  17695913
349494918      105723
5/0/1  6  358961974      177630830860     0          16.316326 3277  17695912
349494906      105728
5/0/1  7  493909136      263091994564     0          22.212102 4431  17695910
349494858      157423
5/0/1  8  359861407      176357816120     0          16.148563 3277  17695905
349424219      106805
5/0/1  9  298273856      145360324608     0          12.855633 2467  17695904
349424215      88482
5/0/1  10 460787085      235328615916     0          22.350009 4596  17695904
349424199      143407
5/0/1  11 393417481      387085290468     0          38.185439 3677  17695903
349424191      161748
5/0/1  12 404324991      393733309244     0          38.130136 3775  17695903
327307195      109146
5/0/1  13 404351002      393679365464     0          38.128834 3772  17695902
327307183      171286
5/0/1  14 404379728      393645455340     0          38.130587 3770  17695901
327307175      129867
5/0/1  15 297584535      142519536884     0          12.589738 2460  17695901
327307163      88480
5/0/1  16 293331958      141265632720     0          12.439508 2410  17695899
292640661      88483
5/0/1  17 327924662      160476865612     0          12.441312 2409  17695898
292640655      125175
5/0/1  18 386874510      191388404840     0          15.774166 3245  17695898
292640643      143530
5/0/1  19 436449376      225386019716     0          21.717130 4352  17695897
292640629      143562
5/0/1  20 442427         83204476         0          0.003756 2     0           0
442395
5/0/1  21 442463         83199588         0          0.003756 2     0           0
442395
5/0/1  22 442462         83198836         0          0.003756 2     0           0
442395
5/0/1  23 442455         83197144         0          0.003756 2     0           0
442395
```

```
Total:    7699994148     4628246671304    0          429.328417 70493 353918123
6669989064     4284773
*Does not include DEPI control plane or DLM packets.
```

The following example displays the **show controllers integrated-Cable counter rf** command output for the Cisco UBR-MC20X20V line card:

```
router# show controllers integrated-Cable 7/0/0 counter rf 0

Controller  RF    MPEG       MPEG       MPEG       Sync       MAP/UCD
            Chan  Packets    bps        Mbps       Packets    Packets
                  Tx                               Tx         Tx
7/0/0       0     0          0          0.000000   0          0
```

The **mapping** command shows the relationship between RF channels and wideband channels. A wideband channel is always built from one or more RF channels.

The following example shows that the rf-channel 0 is used in both a 4-channel and a 8-channel wideband channel, specifically wideband channel 5/0/0:1 and 5/0/0:2:

```
router# show controllers modular-Cable 5/0/0 mapping rf-channel 0

Ctrlr    RF       MC         MC Rem.    WB         WB         WB Rem.
         channel  BW %       Ratio      channel    BW %       Ratio
5/0/0    0        5          1          5/0/0:1     50        1
                                       5/0/0:2     20        1


router# show controllers modular-Cable 5/0/0 mapping wb 1

Ctrlr    WB       RF         BW %       Remaining
         channel  channel               Ratio
5/0/0    1        5/0/0:0     50        1
                  5/0/0:1     50        1
                  5/0/0:2     50        1
                  5/0/0:3     50        1


router # show controllers modular-Cable 5/0/0 mapping wb 2

Ctrlr    WB       RF         BW %       Remaining
         channel  channel               Ratio
5/0/0    2        5/0/0:0     20        1
                  5/0/0:1     20        1
                  5/0/0:2     20        1
                  5/0/0:3     20        1
                  5/0/0:4     20        1
                  5/0/0:5     20        1
                  5/0/0:6     20        1
                  5/0/0:7     20        1
```

Monitoring Voice Services

The **show cable service-voice downstream-type** command is useful for monitoring voice services:

```
Router# show cable service-voice downstream-type

Slot 5/1 :    HA-capable-DS              MDC-DS
Slot 6/0 :    HA-capable-DS              MDC-DS
```

The output shown above indicates that both, HA-capable-DS and MDC-DS are enabled for voice services for slot/subslots *5/1* and *6/0*.

Monitoring Narrowband and Wideband Cable Modems

The following commands are useful for monitoring wideband cable modems:

- **show cable modem wideband**
- **show cable modem summary**
- **show cable modem primary**
- **show cable modem primary-channel**
- **show cable modem voice**

Many other **show cable** commands display information on wideband cable modems if a wideband cable modem or a cable interface used for a wideband cable modem is specified in the command's arguments. Some examples of these commands are:

- **show cable modem vendor**
- **show cable modem cnr**
- **show cable modem errors**
- **show cable modulation profile**
- **show interface cable privacy**

show cable modem wideband

To display information for registered and unregistered wideband cable modems, use the **show cable modem wideband** command:

```
Router# show cable modem wideband

MAC Address    IP Address      I/F           MAC           Prim  RCC  MD-DS-SG/
                                             State         Sid   ID   MD-US-SG
0019.474a.c2a6 50.3.81.31      C5/0/5/U0     w-online(pt)  6     3    1 / N/A
0018.6852.82fe 50.3.81.64      C5/0/8/U0     w-online(pt)  1     3    1 / N/A
0019.474a.d4e0 50.3.81.57      C5/0/8/U0     w-online(pt)  2     3    1 / N/A
0019.474a.d310 50.3.81.56      C5/0/8/U0     w-online(pt)  3     3    1 / N/A
```

With the **show cable modem wideband** command, you can specify a particular wideband cable modem by IP address or MAC address. You can also specify a set of wideband cable modems that are on a particular cable interface.

Table 7-6 describes the fields that are shown in the **show cable modem wideband** display.

Table 7-6 show cable modem wideband Field Description

Field	Description
MAC Address	MAC address of the cable modem.
IP Address	IP address that the DHCP server has assigned to the cable modem.
I/F	Cable interface providing the upstream for this cable modem.

Table 7-6 show cable modem wideband Field Description (continued)

Field	Description
MAC State	Current state of the MAC layer. For information on MAC states, see the **show cable modem wideband** command in the *Cisco Broadband Cable Command Reference Guide*.
Prim SID	Primary SID assigned to this cable modem.
RCC ID	Receive Channel Configuration identifier of the modem. Further information on the RCC can be shown with the **show cable mac-domain <interface> rcc** command.
MD-DS-SG	MAC domain downstream service group. The downstream channels of a single MAC domain that reach the cable modem.
MD-US-SG	MAC domain upstream service group. The upstream channels of a single MAC domain that reach the cable modem.

Further information about a particular modem may be obtained using the **show cable modem verbose** command.

Registered-traditional Subcommand

To monitor wideband-capable modems that are registered as DOCSIS 1.x or DOCSIS 2.0 modems and are not showing up with status w-online, use the **show cable modem wideband registered-traditional-docsis** command.

show cable modem summary

To display the summary information of the cable modems, including modems registered as wideband cable modems, use the **show cable modem summary** command:

```
Router# show cable modem summary

Interface                      Cable Modem                    Description
           Total Reg   Oper  Unreg Offline Wideband initRC initD initIO initO
C5/0/1/U0  11    11    11    0     0       0        0      0     0      0
C6/0/1/U0  11       11    11    0     0       0        0      0     0      0
```

The following example displays summary information and totals for the set of cable modems on a range of cable interfaces (in this example, cable 5/1/1 to cable 5/1/2).

```
Router# show cable modem summary c5/1/1 c5/1/2 total

Interface                      Cable Modem                    Description
           Total Reg   Unreg Offline Wideband initRC initD initIO initO
C5/1/1/U0  84    84    0     0       84       0      0     0      0
C5/1/1/U1  84    84    0     0       83       0      0     0      0
C5/1/1/U2  83    83    0     0       83       0      0     0      0
C5/1/1/U3  83    83    0     0       83       0      0     0      0
C5/1/2/U0  84    84    0     0       84       0      0     0      0
C5/1/2/U1  84    84    0     0       84       0      0     0      0
C5/1/2/U2  83    83    0     0       83       0      0     0      0
C5/1/2/U3  83    83    0     0       83       0      0     0      0

Total:     668   668   0     0       667      0      0     0      0
```

show cable modem primary

To display which primary channel the modem is using, use the **show cable modem primary** command:

```
Router# show cable modem primary

MAC Address    IP Address      Host      MAC          Prim  Num  Primary    DS
                               Interface State        Sid   CPE  Downstream RfId
0018.6852.7f02 80.27.0.10      C8/0/0/U0 w-online     1     0    Mo1/1/0:4  28
0018.6852.7ee2 80.27.0.2       C8/0/0/U1 online       2     0    C8/0/0     255
0018.6852.7ef8 80.27.0.6       C8/0/0/U0 w-online     6     0    Mo1/1/0:4  28
0018.6852.7ef2 80.27.0.7       C8/0/0/U1 w-online     7     0    Mo1/1/0:1  25
0018.6852.7ef6 80.27.0.8       C8/0/0/U1 w-online     8     0    Mo1/1/0:1  25
```

show cable modem primary-channel

To display the primary-channel and host interface for all modems or for modems on a MAC domain host interface, use the **show cable modem primary-channel** command:

```
Router# show cable modem primary-channel non-bonding-capable

MAC Address    IP Address      Host      MAC          Prim  Num  Primary    DS
                               Interface State        Sid   CPE  Downstream RfId
000f.66f9.aa73 80.17.1.3       C6/0/0/U0 online(pt)   1     0    C6/0/0     255
0007.0e02.d7e9 80.17.1.7       C6/0/0/U0 online(pt)   5     0    Mo3/0/0:1  1
0013.10bb.22f9 80.17.1.2       C6/0/0/U0 online(pt)   2     0    Mo3/0/0:1  1
000f.66f9.b193 80.17.1.6       C6/0/0/U0 online(pt)   22    0    C6/0/0     255
0012.17ea.f3fb 80.17.1.4       C6/0/0/U0 online(pt)   23    0    C6/0/0     255
0013.10bb.23d1 80.17.1.5       C6/0/1/U1 online(pt)   5     0    C6/0/1     255
```

show cable modem voice

To show the detected voice-enabled modems, use the **show cable modem voice** command:

```
Router# show cable modem voice

MAC Address    IP Address      Host      MAC          Prim  Num  Primary    DS
                               Interface State        Sid   CPE  Downstream RfId
0013.10bb.22f9 80.17.1.2       C6/0/0/U0 online(pt)   2     0    Mo3/0/0:1  1
0013.10bb.23d1 80.17.1.5       C6/0/1/U1 online(pt)   5     0    C6/0/1     255
```

Monitoring Cable MAC Domains

The following commands are useful for monitoring the cable MAC domains:

- show cable mac-domain downstream-service-group
- show cable mac-domain cgd-associations

show cable mac-domain downstream-service-group

To display MAC domain downstream service group information for a primary downstream channel, use the **show cable mac-domain downstream-service-group** command. The service-group is determined from the channels placed in the fiber nodes; therefore, if fiber nodes are being reconfigured, use this command to check if the downstream service-group is updated.

The following example displays **show cable mac-domain downstream-service-group** output for the primary downstream channel on the cable interface at slot/subslot/port 5/0/0:

```
Router# show cable mac-domain cable5/0/0 downstream-service-group

Primary  MD-DS-SG         RF
IF       Id        SPA    Chan
C5/0/0   1         1/0/0  0 - 1
```

In the preceding example, the MD-DS-SG with ID 1 is used for RF channels 0 and 1 on the Wideband SPA located in slot/subslot/bay 1/0/0.

The following example displays the **show cable mac-domain downstream-service-group** output of two 8-channel downstream service groups for a Cisco uBR-MC3GX60V MAC domain.

```
router# show cable mac-domain ca6/0/0 downstream-service-group
Cable    MD-DS-SG              RF
IF       Id        Resource    Chan     Primary Chan
C6/0/0   1         6/0/0       00-03    0 1 2 3
                               20-23

         2         6/0/0       00-03    0 1 2 3
                               20-22
```

show cable mac-domain cgd-associations

To display a summary of the channel grouping domain (CGD) associations for a MAC domain, use the **show cable mac-domain <interface> cgd-associations** command.

The following is sample output of the **show cable mac-domain cgd-associations** command for the cable interface at slot 5, subslot 0, and port 0:

```
Router# show cable mac-domain c5/0/0 cgd-associations

CGD Host  SPA   DS Channels             Upstreams (All)   Active Remote DS
Ca5/0/0         Local                  1            Y
          1/0/0 0-1                    0
```

The preceding example shows the following information for the cable MAC domain host, which is the cable interface at slot 5, subslot 0, and port 0:

- The SPA downstream channels 0 and 1 from the SPA slot 1, subslot 0, and bay 0 have been added to this MAC domain.

  Upstream 1 is associated with the Cisco uBR10-MC5X20 downstream channel. If the **All** column in the command output indicates **Y**, then this indicates that all upstream channels are associated with the Cisco uBR10-MC5x20 line card downstream channels (in this case, one or more SPA downstream channels are configured using the **upstream cable connector** command). If all upstream channels are not configured, then this column will not display.

Troubleshooting Wideband Components

This section provides an introduction to troubleshooting the wideband components of the Cisco DOCSIS 3.0 Downstream Solution:

The following Cisco cable documents provide useful information on troubleshooting the non-wideband components of the Cisco uBR10012 router:

- *Cisco uBR10012 Universal Broadband Router Troubleshooting Guide*
- "Troubleshooting the System" chapter in the *Cisco uBR10012 Universal Broadband Router Software Configuration Guide*
- *Online Offline Diagnostics—Field Diagnostics on Cisco uBR10012 Router User's Guide*

For information on troubleshooting non-Cisco components (such as edge QAM devices) used in the Cisco DOCSIS 3.0 Downstream Solution, see the vendor documentation for the device.

Note Complex troubleshooting procedures are beyond the scope of this document and may involved Cisco TAC or Advanced Services support, or both.

The following are basic the troubleshooting steps to get wideband modems w-online and their CPEs pingable:

1. Line card is powered on.
2. For M-CMTS, DTI timing is functioning.
3. For M-CMTS, Gigabit Ethernet ports are up.
4. For M-CMTS, EQAM ping.
5. Controller configuration is complete.
6. Primary-capable state of the MC or IC interfaces.
7. Fiber-node configuration is complete, fiber-node status valid.
8. MAC domain configuration is complete.
9. MC interface or IC interface status is up.
10. RF channel bandwidth usage for the primary channels.
11. No RF impairment on non-primary channels.

All these troubleshooting procedures are discussed in detail in the rest of the chapter.

Troubleshooting Power Up Issues

This section describes troubleshooting techniques for a Wideband SIP or Wideband SPA. It includes the following sections:

- Verifying That a Wideband SPA Is Able to Communicate with the Edge QAM Device, page 7-36

Performing Basic Power Troubleshooting on a Wideband SIP and Wideband SPA

To perform basic troubleshooting on a Wideband SIP and Wideband SPA, complete the following steps:

	Action	More Information or Example

Step 1	Use the **show diag** command to check that a Wideband SIP is powered on.	`Router# show diag 1/0`
		
		`Slot/Subslot 1/0:`
		`  2jacket-1 card, 0 ports`
		`  Card is full slot size`
		`  Card is analyzed`
		`  Card detected 0:3:16 ago`
		`Card uptime 0 days, 0 hours, 3 minutes, 17 seconds`
		`...`
		
		If **show diag** displays output, the Wideband SIP is powered on. If **show diag** displays no output, the Wideband SIP is not powered on.

Step 2	Check that the Wideband SIP FAIL LED is not on.	`The FAIL LED is turned on by default and turned off by software after basic board functionality has been verified. If the SIP FAIL LED remains on, the SIP has failed to initialize or has encountered an error.`

Step 3	Use the **show hw-module bay oir** command to check that a Wideband SPA is powered on.	`Router# show hw-module bay 1/0/0 oir`
		
		`Module  Model  Operational Status`
		`------------- ------------------- ------------------------`
		`bay 1/0/0  SPA-24XDS-SFP  ok`
		
		• If the Operational Status is “ok,” the Wideband SPA is powered on and operational.
		• If the Operational Status is “admin down,” the Wideband SPA is not powered on.

Step 4	Check that the Wideband SPA STATUS LED is lit green.	• If the STATUS LED is green, the SPA is ready and operational. • If the STATUS LED is amber, SPA power is on and good, and the SPA is being configured. • If the STATUS LED is off, SPA power is off.
Step 5	If cables are connected to one or both of the SPA Gigabit Ethernet port SFP modules and the links for these should be up, check that the Wideband SPA A/L (Active Loopback) LEDs are lit green.	• If the A/L LED is green, the port is enabled and the link is up. • If the A/L LED is amber, the port is enabled and the link is down. • If the A/L LED is off, the port is not enabled.

Performing Basic Power Troubleshooting on the Cisco uBR-MC3GX60V Line Card

To perform the basic power troubleshooting on a Cisco uBR-MC3GX60V line card, execute the **show diag** command on the subslot, the card is plugged into. If no output is displayed, then the card is not powered on.

Check for the following, in case the card is not powered on:

- Card has been inserted correctly and is screwed in.

- There are no extraneous subslot **shutdown** commands in the configuration preventing the card from booting up. To perform this, execute the **show running | include hw-mod.*shutdown** command.

If the **show diag** command does not display any output and the card is not powered off by configuration, physically examine the card faceplate and check the Fail LED status. If it is on, then the line card is not booting correctly.

Note When using a Cisco uBR-MC3GX60V line card, the empty slots in the Cisco uBR10012 router chassis must be filled with blank filler cards to maximize the air flow and keep the line cards functioning within proper thermal boundaries.

Troubleshooting DOCSIS Timing and Control Card

This section describes troubleshooting techniques for the DOCSIS Timing and Control Card (DTCC). It includes the following sections:

Verifying Active DTCC and Status

For the M-CMTS network architecture, DTI-based timing must be enabled using the **cable clock dti** command in global config mode. If DTI timing does not functioning correctly, cable modems do not reach the init() state.

To determine the active DTCC and its current status, use the **show cable clock** command:

```
Router# show cable clock

Number of TCC Cards in the Chassis: 1
Active TCC Card is in slot: 1 subslot: 1,(DTCC Eightbells card) Clock reference used by
the active card is DTI

Active TCC card in slot 1/1
TCC Card 1/1 DTI status:
-----------------------------------------
   Active Client port: 2
   Active Client status: normal
   Active Client Server status: freerun
   Active Client frame error rate : < 2%
   Active Client CRC error count : 0xFC
   Standby Client Signal detected : no

No card in slot 2/1
```

If the Cisco uBR10012 chassis has two DTCCs, this command can be used to determine which DTCC is active. If the DTI client has established communications with a DTI server, the **show cable clock** command displays the current status. If the active DTCC is connected to a DTI server that is delivering a DOCSIS time stamp and frequency, the Active Client status displays as normal. However, if the connection to the DTI server is lost, the Active Client status displays as freerun (see previous example).

Note When a DTI server is first powered on, it may stay in the warmup state until its internal oscillator has stabilized. This may take more than 15 minutes.

Verifying DTI Counters

To display the DTI counters for the clock card, use the **show cable clock dti counters slot/subslot** command.

The following example displays the **show cable clock dti counters slot/subslot** command output for slot 1 and subslot 1:

```
Router> show cable clock dti counters 1/1

TCC Card 1/1 DTI counters:
---------------------------------------- Client Normal time: 0xFFFF Client Holdover
time: 0x0000
Client Phase Correction: 0x0000
Client Freq Correction: 0xFBD7
Client EFC Correction: 0xF7AD Client transition count t3: 0x00
Client transition count t4: 0x01
Client transition count t6: 0x00
Client transition count t7: 0x00
```

Verifying DTI Clock Synchronization

Three main components in the M-CMTS system need to have a synchronized DOCSIS clock:

1. CMTS DTCC card
2. CMTS cable line card, and
3. EQAM

To verify the CMTS timing at the DTCC and MAC domain card, enter the following three commands in rapid succession:

- show cable clock dti client 1/1 | i Timestamp
- **show controller Cable5/0/0 | i Timestamp**
- On the CISCO RFGW10 EQAM, execute the **show cable clock | i timestamp** command.

Note The Harmonic NSG EQAM has a GUI screen that can display the clock.

The timestamps shown will not match exactly due to the 10 MHz rate of the clock, but the three timestamps should be close. If the timestamps are not close, verify the following:

- DTI wiring from the DTI server to the CMTS DTCC card
- DTI wiring from the DTI server to the EQAM
- Proper configuration of the three devices. The CMTS must be configured with the **cable clock dti** command.

The following example verifies the CMTS timing at the DTCC and MAC domain card:

```
Router> show cable clock dti client 1/1 | i stamp
```

```
    Client timestamp               : 0x38683C64
Router> show contr ca5/0/0 | i stamp
  Timestamp is from TCC card
 Master Clock Timestamp = 0x3B0E1F89

RFGW-10# show cable clock | i stamp
Client timestamp               : 0x3C4F02FA
```

Troubleshooting EQAM Connectivity Issues of the M-CMTS

This section describes troubleshooting techniques for EQAM connectivity to the M-CMTS. It includes the following sections:

Verifying the Up State of an Active Gigabit Ethernet Port of a Wideband SPA

The Gigabit Ethernet ports on a Wideband SPA are not considered standard user-configurable interfaces; However, they appear in the configuration (since Cisco IOS Release 12.2[33]SCC) because the DEPI protocol transmits and receives control packets by using this interface. The Wideband SPA is a controller with one active and one redundant Gigabit Ethernet port. The **show controller modular-cable** command displays information about the SPA, its Gigabit Ethernet active port, installed small form-factor pluggable (SFP) modules, and so on.

The following example provides sample **show controller modular-cable** output for the Wideband SPA located in slot 1, subslot 0, bay 0 of a Cisco uBR10012 router.

```
Router#  show controller modular-cable 1/0/0 brief

SPA 0 is present
status LED: [green]
Host 12V is enabled and is okay.
Power has been enabled to the SPA.
SPA reports power enabled and okay.
SPA reports it is okay and is NOT held in reset.

Gigabit Ethernet Port Selected : Port 1
Receive Interface              : In Reset
Receive Interface              : Disabled
Transmit Interface             : Out of Reset
Transmit Interface             : Enabled
Primary Receive Clock          : Disabled
Backup Receive Clock           : Disabled
SFP [Port 0] : 1000BASE-SX Present
 Tx Enabled , LOS Detected , TxFault Not Detected
 Link Status [Port 0] : DOWN

SFP [Port 1] : 1000BASE-T Present
 Tx Enabled , LOS Not Detected , TxFault Not Detected
 Link Status [Port 1] : UP
...
```

In the preceding output, notice the following:

- The Gigabit Ethernet Port Selected field indicates the active Gigabit Ethernet port.
- For the active Gigabit Ethernet port, the SFP [Port 1] field indicates the type of SFP module that is present.
- For the active Gigabit Ethernet port, the Link Status [Port 1] field indicates whether the link is up.

The Cisco Wideband SPA transmits data in a unidirectional manner only and does not receive data from devices connected to its active Gigabit Ethernet port.

If the link for the active Gigabit Ethernet port is not up, check the following:

- The SFP module is correctly installed and matches the SFP module in the connected device.
- The cables to the Wideband SPA ports are correctly connected to a powered-on device.
- The cables to the Wideband SPA ports are not bent or damaged.
- A hardware failure has not occurred. For information, see the "Performing Basic Power Troubleshooting on a Wideband SIP and Wideband SPA" section on page 7-28.

Use the **show controller modular-cable** command with the **sfp** keyword to get more detailed information on the SFP modules installed in the Wideband SPA Gigabit Ethernet ports.

Verifying the Up State of an Active Gigabit Ethernet Port of a Cisco uBR-MC3GX60V Line Card

The Cisco uBR-MC3GX60V line card can have up to six SFPs for its three controllers. To check the presence and link status of the SFPs, use the **show controller modular-cable <slot/subslot/controller> sfp** command.

If the SFP is not present, the **show controller modular-cable <slot/subslot/controller> sfp** command output displays:

```
Router# show controller modular-cable 6/0/0 sfp

SFP in Port1 is NOT PRESENT
```

If the SFP is present, confirm if the physical port status is **Up** in the **show controller modular-cable <slot/subslot/controller> sfp** command output:

```
Router# show controller modular-cable 6/0/0 sfp

SFP in Port0 is Present.  Init status Success
        TX_DISABLE not set, LOS not detected, TX_FAULT not detected
 LOS detection supported: no
 Tx Fault detection supported: no
SFP Interrupt Counts:
        LOS:0, PRES:0, TX_FAULT:0
Link Status of the MV88E1146C DS Gige Phy Port: UP <<<—— Physical port status is up
```

Verifying Layer 3 Connectivity to the EQAM

As of Cisco IOS Release 12.2(33)SCC, DEPI control plane functionality requiring bidirectional communication between the CMTS and the EQAM has been supported. This communication requires a Gigabit Ethernet interface visible to the IOS and hence visible with the **show ip interfaces brief** command.

Note Only a very small fraction of the Gigabit Ethernet interface bandwidth is actually used by the DEPI protocol.

Both the Wideband SPA and the Cisco uBR-MC3GX60V line card have one Gigabit Ethernet interface per controller, therefore a Wideband SPA has one such interface and a Cisco uBR-MC3GX60V line card has three interfaces.

With an IP address is configured on the interface in a subnet, that includes the EQAM, the IP address of the EQAM is pingable. This provides a basic verification method of the bidirectional communication between the CMTS and the EQAM.

The following example shows the ping command output of an EQAM from the CMTS through the Gigabit Ethernet port of controller 0 of a Cisco uBR-MC3GX60V line card:

```
!
interface GigabitEthernet5/0/0
 ip address 10.31.136.215 255.255.255.0
 negotiation auto
 output-rate 100
end

router# show running-config | begin ontroll.*5/0/0

controller Modular-Cable 5/0/0
 rf-channel 0 cable downstream channel-id 1
 rf-channel 0 frequency 453000000 annex B modulation 256qam interleave 32
 rf-channel 0 ip-address 10.31.136.100 mac-address 0022.9084.4e3f depi-remote-id 101111

router# ping 10.31.136.100

Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 10.31.136.100, timeout is 2 seconds:
!!!!!
Success rate is 100 percent (5/5), round-trip min/avg/max = 1/9/12 ms
```

Troubleshooting Primary-Capable Channel DOCSIS Signalling

This section describes troubleshooting techniques for the Primary-capable Channel DOCSIS Signalling. It includes the following sections:

Verifying MAP, UCD, SYNCs for Primary-Capable Channels

All primary-capable channels of a MAC domain transmit MAPs, UCDs, SYNCs packets downstream. In the case of DOCSIS 3.0 deployments, MDD is also transmitted.

For the MAC domain to transmit the packets, the associated modular-cable or integrated-cable interface must have UP status as shown in the **show ip interfaces** command output. If the interface is not up, verify the following:

1. The interface has been configured with the **cable rf-bandwidth-percent** command to have at least 1 percent of bandwidth.
2. The interface has been unshut.
3. The controller parameters are configured. This includes frequency, annex, modulation type, and interleaver.

4. The CGD configuration has been done in the MAC domain interface using the **downstream Modular-cable** or **downstream integrated-cable** command. Multiple configuration lines for primary channels may be used.
5. For modular-cable interfaces, the Gigabit Ethernet SFP is in the UP state (see Verifying the Up State of an Active Gigabit Ethernet Port of a Cisco uBR-MC3GX60V Line Card, page 7-32)

When the modular-cable or integrated cable interface is up, verify that at least one upstream in the MAC domain is up with the **show interface <mac domain interface> upstream** command.

After the upstream is UP, verify if the MAPs, SYNCs, and UCDs are being transmitted. This can be done at 2 layers:

1. At the MAC domain layer, use the **show controller** command. Execute the **show controllers <MAC domain> upstream <upst ream number> | begin Map Counts** command and verify the output to determine if the Map Counts counter is incrementing.
2. At the hardware layer, use the **show controller <modular-cable | integrated-cable> <slot/subslot/controller> counters rf** command. Verify the output to determine if the MAP Pkts counter is incrementing. Verify if the SYNC Pkts counter is incrementing. Without any Layer 3 traffic, the Mbps rate for one upstream channel is approximately 0.9 to 1.0 Mbps. The Mbps rate for four upstreams is approximately 1.7 to 1.9 Mbps.

Verifying MDD Packet Transmit for DOCSIS 3.0 Operations

To support downstream and upstream bonding, the fiber node or fiber nodes in use by a MAC domain must be properly configured. The fiber node is used to calculate the correct downstream service groups and upstream service group IDs placed in the MDD packets. The fiber node configuration includes specifying the downstream channels and the upstream connector in use. The downstream channels must not have frequency or downstream channel ID conflicts.

The following example shows an invalid fiber node:

```
router# show running | begin fiber.*224

cable fiber-node 224
  downstream Modular-Cable 5/0/2 rf-channel 8-11 20-23
!
router# show cable fiber 224

-------------------------------------------------------------------------------
Fiber-Node 224
  Channel(s)    :  downstream Modular-Cable    5/0/2:   8-11 20-23
  Channel ID(s):  57, 58, 59, 60, 69, 70, 71, 72
    FN Config Status: Configured (status flags = 0x41)
    MDD Status: Invalid
                No US Connector Configured
```

Use the **show controller <MAC domain> | begin MDD** command to check the number of MDD packets being transmitted. The following example shows that no MDD packets are transmitted:

```
router# show contr ca5/0/12 | beg MDD
  MDDs            Primary          Non-Primary
  ------------------------------------------------
  ------------------------------------------------
```

Use the **show cable mac-domain <MAC domain> downstream-service-group** command to examine the downstream service groups for the MAC domain. The following example shows that there is no service group configured since the fiber node is invalid.

```
router# show cable mac-domain ca5/0/12 downstream-service-group

Cable    MD-DS-SG              RF
IF       Id        Resource    Chan     Primary Chan
C5/0/12
```

Completing the fiber node configuration with an upstream connector resolves the service group, which in turn allows the MAC domain to transmit MDD packets. The following example shows the above debug commands after a connector is configured in the fiber node causing it to be valid which in turn causes the service groups to be calculated and MDD packets to be transmitted and counted in the controller.

```
router# conf t
Enter configuration commands, one per line.  End with CNTL/Z.
router(config)#cable fiber 224
router(config-fiber-node)# upstream cable 5/0 connector 12
router(config-fiber-node)# end
Fiber node 224 is valid.

router# show run | begin fiber.*224

cable fiber-node 224
  downstream Modular-Cable 5/0/2 rf-channel 8-11 20-23
 upstream Cable 5/0 connector 12

router# show cable fiber 224
 ------------------------------------------------------------------------------
Fiber-Node 224
  Channel(s)   :  downstream Modular-Cable    5/0/2:   8-11 20-23
  Channel ID(s):  57, 58, 59, 60, 69, 70, 71, 72
  upstream Cable 5/0:  12
    FN Config Status: Configured (status flags = 0x01)
    MDD Status: Valid

router# show cable mac-domain ca5/0/12 downstream-service-group

Cable    MD-DS-SG              RF
IF       Id        Resource    Chan     Primary Chan
C5/0/12  1         5/0/2       08-11    8 9 10 11
                               20-23

router# show controllers ca5/0/12 | begin MDD

  MDDs           Primary          Non-Primary
  ---------------------------------------------
  5/0/2:8        36               0
  5/0/2:9        36               0
  5/0/2:10       36               0
  5/0/2:11       36               0
  5/0/2:20       0                35
  5/0/2:21       0                35
  5/0/2:22       0                35
  5/0/2:23       0                35
  ---------------------------------------------
```

Troubleshooting Wideband SIP and Wideband SPAs

Verifying That a Wideband SPA Is Correctly Configured for SPA-to-EQAM Communications

If a Wideband SPA is unable to communicate with an edge QAM device, check that the RF channels configured with the **rf-channel** command match the values required by the edge QAM device. You can use the **show hw-module bay** command to see the values that have been configured for an RF channel:

```
Router# show hw-module bay 1/0/0 config rf-channel 0 verbose

SPA                                 : Wideband-Cable 1/0/0
RF channel number                   : 0
Frequency                           : 699000000 Hz
Modulation                          : 64qam
Annex                               : B
IP address of next hop              : 192.168.200.30
MAC address of EQAM                 : 000c.3033.2cbf
UDP port number                     : 49152
EQAM headroom                       : 0
```

Check that the following values are correct and match what is configured on the edge QAM device:

- Frequency—Center frequency used for this RF channel.
- IP address of next hop—IP address of the edge QAM device for this RF channel.
- MAC address—MAC address of the next-hop or edge QAM device for this RF channel.
- DEPI Remote ID—DEPI ID of the RF channel on the EQAM. The DEPI ID is seen with the non-verbose form of this command.
- UDP port—UDP port number for the QAM output port for this RF channel.

If any of the above values do not match what is present on the edge QAM device, the Wideband SPA will not be able to successfully communicate with that device.

On the Cisco uBR10012 router, RF channels are configured with the **rf-channel** command. The values on the edge QAM are device-specific and are typically configured when setting up the edge QAM device.

Verifying That a Wideband SPA Is Able to Communicate with the Edge QAM Device

To verify that a Wideband SPA that has been correctly configured for wideband operations is communicating with the edge QAM device, use the **show hw-module bay** command with the **counters** and **rf-channel** keywords. In the following example, only RF channels 0 to 3 on the Wideband SPA are transmitting MPEG packets.

```
Router# show hw-module bay 1/0/0 counters rf-channel

SPA      RF channel   MPEG packets tx        Sync Tx          MP Pkts Tx
1/0/0    0            109382989               18858822        90121503
1/0/0    1            109314434               18858822        90121203
1/0/0    2            0                       0               0
1/0/0    3            0                       0               0
1/0/0    4            0                       0               0
1/0/0    5            0                       0               0
1/0/0    6            0                       0               0
1/0/0    7            0                       0               0
1/0/0    8            0                       0               0
1/0/0    9            0                       0               0
1/0/0    10           0                       0               0
1/0/0    11           0                       0               0
```

```
1/0/0     12          0                    0              0
1/0/0     13          0                    0              0
1/0/0     14          0                    0              0
1/0/0     15          0                    0              0
1/0/0     16          0                    0              0
1/0/0     17          0                    0              0
1/0/0     18          0                    0              0
1/0/0     19          0                    0              0
1/0/0     20          0                    0              0
1/0/0     21          0                    0              0
```

Troubleshooting Wideband Channels

This section describes troubleshooting techniques for wideband channels. It includes the following sections:

- Verifying That a Wideband Channel Is Up and Is Transmitting Packets, page 7-37
- Verifying That a Wideband Channel Is Configured Correctly, page 7-38

For information about configuring wideband channels, see the *Cisco uBR10012 Universal Broadband Router SIP and SPA Software Configuration Guide*.

Verifying That a Wideband Channel Is Up and Is Transmitting Packets

To verify that a wideband channel is up and transmitting packets, use the **show interface wideband-cable** command and examine the first line of the output and the packets output field:

```
Router# show interface wideband-cable 1/0/0:1

Wideband-Cable1/0/0:1 is up, line protocol is up
  Hardware is Wideband CMTS Cable interface, address is 0012.001a.8897 (bia
0012.001a.8897)
  MTU 1500 bytes, BW 74730 Kbit, DLY 1000 usec,
     reliability 255/255, txload 1/255, rxload 1/255
  Encapsulation MCNS, loopback not set
  Keepalive set (10 sec)
  ARP type: ARPA, ARP Timeout 04:00:00
  Last input never, output 00:00:09, output hang never
  Last clearing of "show interface" counters never
  Input queue: 0/75/0/0 (size/max/drops/flushes); Total output drops: 0
  Queueing strategy: fifo
  Output queue: 0/40 (size/max)
  30 second input rate 0 bits/sec, 0 packets/sec
  30 second 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
     24224 packets output, 1222002 bytes, 0 underruns
     0 output errors, 0 collisions, 0 interface resets
     0 output buffer failures, 0 output buffers swapped out
```

For information on what criteria are used to determine whether a wideband channel and its associated line protocol are up, see the "show interface wideband-cable" section on page 7-14.

Verifying That a Wideband Channel Is Configured Correctly

To verify whether a wideband channel is configured correctly, use the **show hw-module bay** command with the **wideband-channel** keyword and the **association**, **config**, or **mapping** keywords. The following examples show the output for the **association** keyword:

```
Router# show hw-module bay 1/0/0 association wideband-channel 0

WB                      BG   Bundle  NB          NB chan  Reserved  Avail
channel                 ID   num     channel     ID       CIR       CIR
Wideband-Cable1/0/0:0   24   123     Cable5/0/1  120      0         0
```

In the preceding output, the Bundle num field indicates the virtual bundle interface to which the wideband channel belongs. For a description of each field in the preceding output, see the "show hw-module bay and show controller" section on page 7-16.

The wideband channel and the primary downstream channel (NB channel) must be members of the same virtual bundle interface. The CMTS running configuration file shows the virtual bundle (cable bundle) for the primary downstream channel (Cable5/0/1):

```
interface Cable5/0/1
 no ip address
 load-interval 30
 no cable packet-cache
 cable bundle 123
 cable downstream channel-id 120
...
```

The **downstream modular-cable rf-channel** command specifies the RF channels that are available for wideband channels on a fiber node. If a wideband channel attempts to use an RF channel that has not been made available for use on the fiber node, a misconfiguration error occurs. In this case, the **show hw-module bay** command displays the following error message:

```
Router# show hw-module bay 1/0/0 association wideband-channel

WB                      BG   Bundle  NB          NB chan  Reserved  Avail
channel                 ID   num     channel     ID       CIR       CIR
Wideband-Cable1/0/0:0   RF channel mismatch with Fiber Node 1
```

The following example shows the **show hw-module bay** command output for the **config** keyword:

```
Router# show hw-module bay 1/0/0 config wideband-channel

WB                      BG    Bundle  WB Host       Primary
channel                 ID    num     Slot/Subslot  BG
Wideband-Cable1/0/0:0   24    123     5/0           Yes
Wideband-Cable1/0/0:1   25    123     5/0           Yes
Wideband-Cable1/0/0:2   26    123     5/0           Yes
Wideband-Cable1/0/0:3   27    123     5/0           Yes
Wideband-Cable1/0/0:4   28    123     5/0           Yes
Wideband-Cable1/0/0:5   29    123     5/0           Yes
Wideband-Cable1/0/0:6   30    123     5/0           Yes
Wideband-Cable1/0/0:7   31    123     5/0           Yes
Wideband-Cable1/0/0:8   32    0       5/0           Yes
Wideband-Cable1/0/0:9   33    0       5/0           Yes
Wideband-Cable1/0/0:10  34    0       5/0           Yes
Wideband-Cable1/0/0:11  35    0       5/0           Yes
```

In the preceding output, each wideband channel that is used should be configured as a member of a virtual bundle interface. Channels 8 through 11 are not members of a virtual bundle interface.

The following example shows the **show hw-module bay** command output for the **mapping** keyword:

```
Router# show hw-module bay 1/0/0 mapping wideband-channel

SPA      WB       RF         BW %
         channel  channel
1/0/0    0        0          100
                  1          100
1/0/0    1        2          100
                  3          100
1/0/0    2        4          100
                  5          100
1/0/0    3        6          100
                  7          100
1/0/0    4        8          100
                  9          100
1/0/0    5        10         100
                  11         100
1/0/0    6        12         100
                  13         100
1/0/0    7        14         100
                  15         100
1/0/0    8        16         100
                  17         100
1/0/0    9        18         100
                  19         100
1/0/0    10       20         100
                  21         100
1/0/0    11       22         100
                  23         100
```

A channel-bonded wideband channel is associated with at least two RF channels depending on the wideband channel configuration. The **cable rf-channel** command associates an RF channel with a wideband channel. The bandwidth percent (BW %) of each RF channel used for the wideband channel is 100 percent by default, but is configurable with the **cable rf-channel** command.

Troubleshooting Wideband Cable Modems

This section describes troubleshooting techniques for wideband cable modems. It includes the following sections:

Pinging a Wideband Cable Modem

To determine whether a wideband cable modem or any DOCSIS cable CPE device is reachable from the CMTS at the DOCSIS MAC layer, use the **ping docsis** command with either a MAC address or IP address:

```
Router# ping docsis 1.11.0.5

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

The **ping docsis** command uses 1/64—the bandwidth of IP ping—and works with cable modems that have not yet acquired an IP address. This allows you to ping cable modems that are unable to complete registration, that have internal bugs, or that are unresponsive due to a crash.

The **ping docsis** command with the **verbose** keyword includes a real-time view and plot of requested power adjustments, frequency, timing offset adjustments, and a measure of optimal headend reception power.

```
Router# ping docsis 1.11.0.5 verbose

Queueing 5 MAC-layer station maintenance intervals, timeout is 25 msec:
Reply from 0014.bfbe.3e3c: 46 ms, tadj=1, padj=0, fadj=34
Reply from 0014.bfbe.3e3c: 46 ms, tadj=0, padj=0, fadj=26
Reply from 0014.bfbe.3e3c: 50 ms, tadj=0, padj=0, fadj=29
Reply from 0014.bfbe.3e3c: 50 ms, tadj=1, padj=0, fadj=29
Reply from 0014.bfbe.3e3c: 50 ms, tadj=-1, padj=0, fadj=39

Success rate is 100 percent (5/5)
```

For more information on the **ping docsis** command, see the *Cisco Broadband Cable Command Reference Guide*.

Verifying That a Wideband-Capable Cable Modem Is Registered as a Wideband Modem

To verify that a wideband-capable cable modem is registered as a wideband modem, use the **show cable modem** command. In the following example, the MAC address of the wideband cable modem is specified:

```
Router# show cable modem 0014.bfbe.3e70

MAC Address    IP Address      I/F       MAC          Prim RxPwr  Timing Num BPI
                                         State        Sid  (dBmv) Offset CPE Enb
0014.bfbe.3e70 1.11.0.3        C5/0/1/U0 w-online(pt) 1     0.00  1231    0   Y
```

If a wideband-capable cable modem is registered as a wideband modem, the MAC State field will have one of the w-online values (wideband-online), such as w-online(pt) in the preceding example. For descriptions of the complete set of MAC state values, see the **show cable modem** command in the *Cisco Broadband Cable Command Reference Guide*.

A wideband-capable modem may also register as a DOCSIS 2.0 modem (for example, if a wideband channel is not available). In this case, the MAC State field displayed by the **show cable modem** command will not have one of the w-online values.

To determine the set of wideband-capable cable modems that have registered as wideband modems on the CMTS, use the **show cable modem wideband** command:

```
Router# show cable modem wideband

MAC Address    IP Address      I/F       MAC            Prim  BG  DSID  MD-DS-SG
                                         State          Sid   ID
0014.bfbe.3e70 1.11.0.3        C5/0/1/U0 w-online(pt)   1     24  24    N/A
0014.bfbe.3e3c 1.11.0.4        C5/0/1/U0 w-online(pt)   2     24  24    N/A
0016.92fb.5742 1.11.0.6        C5/0/1/U0 w-online(pt)   3     24  256   1
0016.92fb.580e 1.11.0.7        C5/0/1/U0 w-online(pt)   4     24  264   1
0014.bfbe.3eaa 1.11.0.2        C6/0/1/U0 w-online(pt)   7     36  36    N/A
0016.92fb.57f8 1.11.0.5        C6/0/1/U0 w-online(pt)   8     36  298   1
0016.92fb.57f4 1.11.0.8        C6/0/1/U0 w-online(pt)   9     36  306   1
```

To determine the set of wideband-capable cable modems that have registered as DOCSIS 2.0 modems on the CMTS, use the **show cable modem wideband** command with the **registered-traditional-docsis** keyword.

Examining Wideband-Capable Modems That are Partial Online

A fault in one or more channels in the CMTS or cable plant may result in a wideband modem being partial online. DOCSIS 3.0 includes signaling based on the CM-STATUS message that enables modems to inform the CMTS about downstream failures. The CMTS will track and react upon these messages. The CMTS may disable an RF channel in a wideband channel, causing the modems to go into partial online mode, **p-online**. The **show cable modem partial** command can used to view all modems in the p-online state.

To determine the cause of the partial online status, use the **show cable modem <address> wideband rcs-status** command for a modem in p-online mode. Failures reported by the modem will be counted categorically. For example:

```
Router # show cable modem 50.3.81.80 wideband rcs-status

CM  : 0025.2e2d.74b8
RF  : 5/0/2 8
  Status                  : UP
  FEC/QAM Failure         : 0
  Dup FEC/QAM Failure     : 0
  FEC/QAM Recovery        : 0
  Dup FEC/QAM Recovery    : 0
  MDD Failure             : 0
  Dup MDD Failure         : 0
  MDD Recovery            : 0
  Dup MDD Recovery        : 4
  Flaps                   : 0
  Flap Duration           : 00:00
RF  : 5/0/2 10
  Status                  : UP
  FEC/QAM Failure         : 0
  Dup FEC/QAM Failure     : 0
  FEC/QAM Recovery        : 0
  Dup FEC/QAM Recovery    : 0
  MDD Failure             : 0
  Dup MDD Failure         : 0
  MDD Recovery            : 0
  Dup MDD Recovery        : 0
  Flaps                   : 0
  Flap Duration           : 00:00
```

The type of error reported can then be used to further troubleshoot the problem on the CMTS, the EQAM or the cable plant.

Verifying Other Information for Wideband Cable Modems

To verify other information related to wideband cable modems, use the **show** commands that display information relevant to all cable modems:

- **show cable modem access-group**—Displays information about the access group for each cable modem.
- **show cable modem classifiers**—Displays information about the classifiers used for each cable modem.
- **show cable modem cnr**—Displays carrier-to-noise ratio (CNR) information for cable modems that are using cable interface line cards with hardware spectrum-management capabilities.

- **show cable modem connectivity**—Displays connectivity information for each cable modem.
- **show cable modem counters**—Displays traffic counters for each cable modem.
- **show cable modem cpe**—Displays information about the CPE devices using each cable modem.
- **show cable modem errors**—Displays packet error information for each cable modem.
- **show cable modem flap**—Displays flap-list information for each cable modem.
- **show cable modem mac**—Displays MAC-layer information for each cable modem.
- **show cable modem maintenance**—Displays information about the Station Maintenance errors for each cable modem.
- **show cable modem offline**—Lists the offline cable modems.
- **show cable modem phy**—Displays the PHY layer information for each cable modem.
- **show cable modem qos**—Displays the quality of service (QoS) information for each cable modem.
- **show cable modem registered**—Lists the registered cable modems.
- **show cable modem remote-query**—Displays information collected by the remote-query feature.
- **show cable modem rogue**—Displays a list of cable modems that have been marked, locked, or rejected because they failed the dynamic shared-secret authentication checks.
- **show cable modem summary**—Displays summary information about the cable modems on each cable interface.
- **show cable modem unregistered**—Lists the unregistered cable modems.
- **show cable modem vendor**—Displays vendor names and identifies each cable modem.

For information on these commands, see the *Cisco Broadband Cable Command Reference Guide.*

Troubleshooting Gigabit Ethernet Components

This section provides basic information for troubleshooting the Gigabit Ethernet components of the Cisco DOCSIS 3.0 Downstream Solution:

- Troubleshooting the Cisco SIP-600, page 7-42
- Troubleshooting the Gigabit Ethernet SPAs, page 7-42

Troubleshooting the Cisco SIP-600

The troubleshooting techniques adopted for the Cisco SIP-600 is similar to what is used for a Cisco Wideband SIP. For more information, see the chapter “Troubleshooting the SIPs” in the *Cisco uBR10012 Universal Broadband Router SIP and SPA Software Configuration Guide*.

Troubleshooting the Gigabit Ethernet SPAs

For detailed troubleshooting information on Gigabit Ethernet SPAs, see the chapter “Troubleshooting Gigabit Ethernet SPAs” in the *Cisco uBR10012 Universal Broadband Router SIP and SPA Software Configuration Guide*.