



Power and Thermal Monitoring on the Cisco CMTS Routers

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The power and thermal monitoring feature provides monitoring options for the thermal and power consumption of the Cisco UBR-MC20X20V cable interface line card.

Finding Feature Information

Your software release may not support all the features documented in this module. For the latest feature information and caveats, see the release notes for your platform and software release. To find information about the features documented in this module, and to see a list of the releases in which each feature is supported, see the Feature Information Table at the end of this document.

Use Cisco Feature Navigator to find information about platform support and Cisco software image support. To access Cisco Feature Navigator, go to <http://tools.cisco.com/ITDIT/CFN/>. An account on <http://www.cisco.com/> is not required.

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Prerequisites for Power and Thermal Monitoring

The table shows the hardware compatibility prerequisites for this feature.

Table 1: Power and Thermal Monitoring for the Cisco CMTS Routers Hardware Compatibility Matrix

| CMTS Platform | Processor Engine | Cable Interface Cards |
|---|---|---|
| Cisco uBR10012 Universal Broadband Router | Cisco IOS Release 12.2(33)SCD2 and later <ul style="list-style-type: none"> • PRE4 | Cisco IOS Release 12.2(33)SCD2 and later <ul style="list-style-type: none"> • Cisco UBR-MC20X20V¹ |

¹ The Cisco UBR-MC20X20V cable interface line card has three variants: Cisco UBR-MC20X20V-0D, Cisco UBR-MC20X20V-5D, and Cisco UBR-MC20X20V-20D. The Cisco UBR-MC20X20V-0D line card supports 20 upstreams and zero (no) downstreams. The Cisco UBR-MC20X20V-5D line card supports 20 upstreams and 5 downstreams, and the Cisco UBR-MC20X20V-20D line card supports 20 upstreams and 20 downstreams.

**Note**

Any reference to the Cisco UBR-MC20X20V cable interface line card used in this document is also applicable to its three variants—Cisco UBR-MC20X20V-0D, Cisco UBR-MC20X20V-5D, and Cisco UBR-MC20X20V-20D.

- The Cisco UBR10012 universal broadband router must be running Cisco IOS 12.2(33)SCD2 release or later.

Restrictions for Power and Thermal Monitoring

The Power and Thermal Monitoring feature has the following restrictions and limitations:

- The power and thermal monitoring facility is enabled by default and you cannot disable it.
- The thermal thresholds are predefined and you cannot configure or modify them.

Information About Power and Thermal Monitoring

The power and thermal monitoring feature provides monitoring options for the thermal and power consumption of the Cisco UBR-MC20X20V cable interface line card. The power and thermal monitoring facility monitors the line card at several different points (See [Table 2: Thermal Thresholds for the Cisco UBR-MC20X20V Line Card](#)) to see whether it is overheating or drawing too much power.

The monitoring facility triggers an alert when the operational thresholds are exceeded. Alerts are in the form of syslog messages, alarms, and SNMP traps. Syslog messages are generated when the temperature sensors cross their respective thermal threshold levels. Alarms and SNMP traps are generated only when the inlet sensors cross their thresholds. In addition to the alerts, the power consumption of the line card is checked periodically by the monitoring facility.

The following sections describe the Power and Thermal Monitoring feature in more detail:

Thermal Monitoring

The thermal monitoring facility uses temperature sensors, placed at several different points in the line card, to monitor the thermal threshold levels. Each temperature sensor is monitored against the thermal threshold levels that are specific to the sensor.

The table shows the sensors monitored and their corresponding thresholds.


Note

The thermal thresholds shown in the table are predefined and you cannot configure or modify them.

Table 2: Thermal Thresholds for the Cisco UBR-MC20X20V Line Card

| Sensor | Minor Threshold (in Celsius) | Major Threshold (in Celsius) | Critical Threshold (in Celsius) |
|---------------|------------------------------|------------------------------|---------------------------------|
| Nickel 10G | 82 | 87 | 92 |
| CPU | 73 | 78 | 83 |
| Inlet | 68 | 73 | 78 |
| Remora | 82 | 87 | 92 |
| Coldplay | 75 | 80 | 85 |
| Waxbill | 92 | 97 | 102 |
| Fauna | 82 | 87 | 92 |
| Flora | 80 | 85 | 90 |
| Toucan FPGA A | 94 | 97 | 100 |
| Toucan FPGA B | 94 | 97 | 100 |
| Toucan FPGA C | 94 | 97 | 100 |

The Cisco UBR-MC20X20V cable interface line card thermal monitoring has three levels of monitoring thresholds: Minor, Major, and Critical. The table shows the thresholding states and their corresponding descriptions.

Table 3: Thresholding States for the Cisco UBR-MC20X20V Line Card

| State | Description |
|----------|--|
| Minor | The temperature sensor moves to minor state when the sensor readings stay constant for 2 minutes between minor and major (\geq minor and $<$ major) thresholds. |
| Major | The temperature sensor moves to major state when the sensor readings stay constant for 2 minutes between major and critical (\geq major and $<$ critical) thresholds. |
| Critical | The temperature sensor moves to critical state when the sensor readings stay above the critical (\geq critical) threshold. |

The temperature sensors are monitored every 2 minutes, with a soaking interval (A soaking interval defines how long a condition must persist before an alarm is declared.) of 2 minutes for minor and major events; there is no soaking interval for critical events.

The following alerts are generated on the Cisco UBR-MC20X20V cable interface line card:

- A syslog error message is generated when a thermal threshold is broken. The syslog error message contains sensor name, reading, threshold state, value, event timestamp, and card power level.
- Alarms and SNMP traps are generated when the inlet sensor crosses its threshold.

**Note**

A high availability (HA) switchover is not initiated for the Cisco UBR-MC20X20V cable interface line card when the temperature sensors cross the critical threshold.

The temperature history of the router is maintained for an hour, with timestamp. It can be viewed using the show environment command. The show environment command displays the PRE temperature, fan status, power supply details, and the thermal and power status of the line card. The slot/subslot option of the show environment command helps to identify the location of the line card.

The thermal monitoring data is exclusive to the Cisco UBR-MC20X20V cable interface line card. When the line card is reset or removed, the outstanding temperature alarm is cleared. However, you can still view the temperature history of the line card that was maintained by the OBFL feature using the show logging onboard slotindex temperature command.

In the event of a line card crash, the temperature history of the line card is viewable from the crashinfo file. The crashinfo file contains the temperature history of the line card for the last one hour before the crash. The data is displayed using the show logging onboard command. See the [Onboard Failure Logging](#) feature guide for more details.

A PRE switchover does not impact the monitoring functionality of the line card. All the outstanding temperature threshold alarms are retained.

Power Monitoring

The following power monitoring options are implemented on the Cisco UBR-MC20X20V cable interface line card:

- The power consumption is monitored every 2 minutes.
- The power consumption history of the line card is maintained for an hour, with timestamp. You can view it using the show environment command.

The power consumption history of the line card is not maintained after an OIR; the history is erased and it cannot be retrieved. However, in case of a line card crash, the power consumption history of the line card is available from the crash log file for the last one hour before the crash. The syslog error message also captures the line card power consumption details at the time of the thermal threshold breach.

Alerts

The thermal and power monitoring feature triggers an alert when the operational thresholds are exceeded.

The Cisco uBR10012 universal broadband router uses the following types of alerts:

- Alarms
- SNMP Traps
- Syslog Messages

Alarms

The monitoring facility triggers an alarm when the inlet sensor of the Cisco UBR-MC20X20V cable interface line card breaches a predefined thermal threshold. The temperature status of the line card is maintained by the RP in Cisco uBR10012 universal broadband router. When the temperature varies, the line card passes the information to the RP to fire an alarm and SNMP trap. The RP clears the current outstanding temperature alarm and generates a new alarm. You can view these alarms using the show facility alarm status command.

SNMP Traps

SNMP traps are generated when the inlet temperature sensor of the Cisco UBR-MC20X20V cable interface line card has a status change among normal, minor, major or critical. You can view the SNMP traps through the SNMP manager. To disable SNMP traps, use the no form of the snmp-server enable traps envmon [temperature] command.

The following MIBs are used to generate SNMP traps when the line card crosses thermal thresholds:

- ciscoEnvMonTempStatusChangeNotif: This SNMP trap is generated when the inlet temperature status changes among normal, minor, major or critical.
- ciscoEnvMonTemperatureNotification: This SNMP trap is generated when the inlet temperature status changes from normal to minor, major or critical.

The following is a sample SNMP trap output from SNMP Manager:

```
Received SNMPv2c Trap:
Community: public
From: 10.11.0.17
mib_2.1.3.0 = 500023
internet.6.3.1.1.4.1.0 = ciscoEnvMonTempStatusChangeNotif
ciscoEnvMonTemperatureStatusDescr.6 = Inlet SubSlot 6/1
ciscoEnvMonTemperatureStatusValue.6 = 70
ciscoEnvMonTemperatureState.6 = warning(2)
Received SNMPv2c Trap:
Community: public
From: 10.11.0.17
mib_2.1.3.0 = 500023
internet.6.3.1.1.4.1.0 = ciscoEnvMonTemperatureNotification
ciscoEnvMonTemperatureStatusDescr.6 = Inlet SubSlot 6/1
ciscoEnvMonTemperatureStatusValue.6 = 70
ciscoEnvMonTemperatureState.6 = warning(2)
```

Syslog Messages

Syslog error messages are generated when the temperature sensor of the Cisco UBR-MC20X20V cable interface line card crosses a thermal threshold. The syslog error message also contains the power consumption level of the line card during the time of thermal threshold crossover event.

The following is a sample syslog error message output:

```
SLOT 6/1: Apr 6 19:08:02.584: %CLCENVM-6-TEMPTHRESHOLDEXCEED: 6/1: CPU temperature MINOR
limit (73 degC) exceeded at temperature 74 degC and power 172.217 watts
SLOT 6/1: Apr 6 19:50:02.652: %CLCENVM-6-TEMPTHRESHOLDEXCEED: 6/1: Nickel 10G temperature
MINOR limit (82 degC) exceeded at temperature 83 degC and power 172.897 watts
SLOT 6/1: Apr 6 19:50:04.152: %CLCENVM-6-TEMPTHRESHOLDEXCEED: 6/1: Waxbill temperature
MINOR limit (92 degC) exceeded at temperature 93 degC and power 172.897 watts
SLOT 6/1: Apr 6 19:58:04.168: %CLCENVM-6-TEMPTHRESHOLDEXCEED: 6/1: Remora temperature MINOR
limit (82 degC) exceeded at temperature 83 degC and power 172.217 watts
SLOT 6/1: Apr 6 19:58:05.668: %CLCENVM-6-TEMPTHRESHOLDEXCEED: 6/1: Coldplay temperature
MINOR limit (75 degC) exceeded at temperature 75 degC and power 172.217 watts
SLOT 6/1: Apr 6 19:58:07.168: %CLCENVM-6-TEMPTHRESHOLDEXCEED: 6/1: Fauna temperature MINOR
limit (82 degC) exceeded at temperature 83 degC and power 172.217 watts
SLOT 6/1: Apr 6 19:58:08.668: %CLCENVM-6-TEMPTHRESHOLDEXCEED: 6/1: Flora temperature MINOR
limit (80 degC) exceeded at temperature 81 degC and power 172.217 watts
```

How to Configure Power and Thermal Monitoring

This section contains the following procedure:

Power and Thermal Monitoring Configuration

The power and thermal monitoring facility for the Cisco UBR-MC20X20V cable interface line card is enabled by default and you cannot disable it. However, you can disable the facility alarms using the no form of the facility-alarm command. Similarly, you can use the no form of the snmp-server enable traps envmon [temperature] command to disable SNMP traps.

Monitoring Power and Thermal Information

To monitor the Power and Thermal Monitoring facility, use the following procedures:

Viewing Thermal and Power Information

To view information about the power and thermal monitoring of the Cisco UBR-MC20X20 cable interface line card, use the **show environment** command in privileged EXEC mode.

For a complete description of the command, see the [Cisco IOS Cable Command Reference Guide](#) on Cisco.com.

Example

The following example shows a typical display for the **show environment** command.

```
Router# show environment subslot 7/0
-----
TEMPERATURE/POWER INFORMATION
-----
Number of Temperature Sensors : 11
Sampling frequency           : 2 minutes
-----
Sensor           | ID | Current      | Minor | Major | Critical | Alarm   |
                  |    | Temperature  |       | Threshold |         | Condition |
                  |    |      0C     |       |      0C |         |         |
-----
Nickel 10G       | 1  | 48           | 82    | 87    | 92      | Normal  |
Inlet #1         | 2  | 36           | 68    | 73    | 78      | Normal  |
CPU              | 3  | 44           | 73    | 78    | 83      | Normal  |
Remora          | 4  | 48           | 82    | 87    | 92      | Normal  |
Coldplay        | 5  | 40           | 75    | 80    | 85      | Normal  |
Waxbill         | 6  | 53           | 92    | 97    | 102     | Normal  |
Fauna           | 7  | 46           | 82    | 87    | 92      | Normal  |
Flora           | 8  | 47           | 80    | 85    | 90      | Normal  |
Toucan FPGA A   | 9  | 45           | 94    | 97    | 100     | Normal  |
Toucan FPGA B   | 10 | 36           | 94    | 97    | 100     | Normal  |
Toucan FPGA C   | 11 | 47           | 94    | 97    | 100     | Normal  |
-----
Power: 168.813 watts
-----
-----
Time Stamp      | Power | Sensor Temperature 0C
MM/DD/YYYY HH:MM:SS | watts | 1  2  3  4  5  6  7  8  9  10  11
-----
09/30/2009 10:24:26 | 168.813 | 48 36 44 48 40 53 46 47 45 36 47
09/30/2009 10:22:26 | 168.813 | 48 36 44 48 40 53 46 47 45 36 47
09/30/2009 10:20:26 | 168.813 | 48 36 44 47 40 53 46 47 45 36 47
09/30/2009 10:18:26 | 168.813 | 48 36 44 47 40 53 46 47 45 36 47
09/30/2009 10:16:26 | 168.813 | 47 36 44 47 40 53 46 47 45 36 47
09/30/2009 10:14:26 | 168.813 | 47 36 44 47 40 53 46 47 45 36 47
09/30/2009 10:12:26 | 168.813 | 47 36 44 46 40 52 45 47 45 36 47
09/30/2009 10:10:26 | 168.813 | 47 35 44 45 39 51 45 47 45 36 47
09/30/2009 10:08:26 | 168.132 | 46 35 44 43 38 50 43 47 45 36 47
-----
```

Viewing Thermal and Power Monitoring Alarms

To view the power and thermal monitoring alarms of the Cisco UBR-MC20X20 cable interface line card, use the **show facility-alarm status** command in privileged EXEC mode.

For a complete description of the command, see the [Cisco IOS Cable Command Reference Guide](#) on Cisco.com.

Example

The following example shows a typical display for the **show facility-alarm status** command.

```
Router# show facility-alarm status
Thresholds:
Intake minor 45 major 54 critical 67
Outlet minor 48 major 58 critical 85
System Totals Critical: 1 Major: 1 Minor: 1
Source          Severity      ACO          Description [Index]
-----
chassis         MINOR        NORMAL      Subslot 7/0 Inlet temperature limit
chassis         MAJOR        NORMAL      Subslot 7/1 Inlet temperature limit
chassis         CRITICAL     NORMAL      Subslot 8/0 Inlet temperature limit
```

Additional References

The following sections provide references related to the Power and Thermal Monitoring feature.

Related Documents

| Related Topic | Document Title |
|--|--|
| CMTS commands | Cisco IOS CMTS Cable Command Reference |
| Onboard Failure Logging | Onboard Failure Logging |
| Cisco Cisco UBR-MC20X20V Cable Interface Line Card Hardware Installation Guide | Cisco UBR-MC20X20V Cable Interface Line Card Hardware Installation Guide |

Standards

| Standards | Title |
|-----------|-------|
| None | — |

MIBs

| MIBs ² | MIBs Link |
|--|---|
| <ul style="list-style-type: none"> CISCO-ENVMON-MIB | To locate and download MIBs for selected platforms, Cisco software releases, and feature sets, use Cisco MIB Locator found at the following URL: http://www.cisco.com/go/mibs |

² Not all supported MIBs are listed.

RFCs

| RFCs | Title |
|------|-------|
| None | — |

Technical Assistance

| Description | Link |
|---|---|
| The Cisco Support and Documentation website provides online resources to download documentation, software, and tools. Use these resources to install and configure the software and to troubleshoot and resolve technical issues with Cisco products and technologies. Access to most tools on the Cisco Support and Documentation website requires a Cisco.com user ID and password. | http://www.cisco.com/cisco/web/support/index.html |

Feature Information for Power and Thermal Monitoring on the Cisco CMTS Routers

Use Cisco Feature Navigator to find information about platform support and software image support. Cisco Feature Navigator enables you to determine which software images support a specific software release, feature set, or platform. To access Cisco Feature Navigator, go to <http://tools.cisco.com/ITDIT/CFN/>. An account on <http://www.cisco.com/> is not required.

**Note**

The below table lists only the software release that introduced support for a given feature in a given software release train. Unless noted otherwise, subsequent releases of that software release train also support that feature.

Table 4: Feature Information for Power and Thermal Monitoring on the Cisco CMTS Routers

| Feature Name | Releases | Feature Information |
|------------------------------|--------------|---|
| Power and Thermal Monitoring | 12.2(33)SCD2 | <p>The Power and Thermal Monitoring feature was introduced for the Cisco UBR-MC20X20V line card.</p> <p>The following section provides information about this feature:</p> <p>The following command was modified:</p> <ul style="list-style-type: none">• show environment |