



Cisco Connected Grid 2010 Router Software Configuration Guide, Cisco IOS Release 15.2(1)T

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This guide provides configuration information about Cisco IOS Release 15.2(1)T software features that support the Cisco Connected Grid 2010 Router. This software release supports the router features listed in the section [Supported Products, page 1](#). Use this document in conjunction with other router software configuration documentation.

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Supported Products

Feature	Hardware	Minimum Software Release	Related Documentation
Temperature and Voltage Monitoring (TVM)	Cisco Connected Grid 2010 Router	IOS Release 15.2(1)T	Cisco 2000 Series Connected Grid Routers Configuration Guides: http://www.cisco.com/en/US/products/ps10977/products_installation_and_configuration_guides_list.html



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Cisco IOS Release 15.2(1)T Feature

The following software feature is documented in this guide:

- [Temperature and Voltage Monitoring \(TVM\), page 2](#)

Temperature and Voltage Monitoring (TVM)

Temperature and Voltage Monitoring (TVM) is a software feature that provides support for monitoring the router operating temperature and the router power supply voltage. This section describes the TVM feature and includes the following topics:

- [TVM Overview, page 2](#)
- [How to Configure TVM, page 4](#)
- [MIB Support for TVM, page 10](#)

TVM Overview

Operating Temperature Monitoring

During normal operation, the router hardware uses sensors to measure the internal temperature of critical router components, including the central processor and any installed interface cards. The router uses the individual component temperatures to calculate its operating temperature.

Using TVM, you can configure the router with maximum and minimum operating temperatures, called thresholds, to define an operating temperature range for the router. You can then configure the router to send a notification when it detects that the operating temperature is out of the defined range. Notifications can be in the form of system log messages or SNMP notifications.

The section [Configure Operating Temperature Monitoring, page 4](#), provides instructions for configuring this functionality.

Power Supply Voltage Monitoring

TVM supports power supply monitoring features that are similar to the operating temperature monitoring features. You can configure voltage ranges for the router power supply and then configure notifications to be sent when the power supply voltage is out of the defined range.

The section [Configure Power Supply Monitoring, page 5](#), provides instructions for configuring this functionality.

Supported Power Supplies

The power supply voltage threshold range supported by TVM is different for each power supply model used with the router. The router power supply models are listed in [Table 1](#), along with the supported voltage thresholds for each model.

For detailed information about these power supplies, refer to the router hardware installation guide.

Table 1 Cisco Connected Grid 2010 Router Power Supplies

Power Supply Model	Description	set threshold Command Option	Threshold Ranges
PWR-RGD-AC-DC	High-voltage AC or DC.	threshold ac-dc	<ul style="list-style-type: none"> High: 275 to 300 volts Low: 75 to 80 volts
PWR-RGD-LOW-DC	Low-voltage DC.	threshold low-dc	<ul style="list-style-type: none"> High: 75 to 80 volts Low: 16 to 20 volts
PWR-RGD-AC-DC-C	High-voltage AC or DC (China)	threshold ac-dc	<ul style="list-style-type: none"> High: 275 to 300 volts Low: 75 to 80 volts

Historical Data Collection

TVM supports historical data collection and storage for temperature and voltage. You can configure the router to save historical data about the router operating temperature and power supply voltage. Related features include:

- A **show** command that displays temperature and voltage data for up to 72 hours in the past.
- An enhanced MIB for historical data retrieval so that network management systems can collect report data from the router.

These sections provide instructions for configuring historical data collection:

- [Configure Operating Temperature Monitoring, page 4](#)
- [Configure Power Supply Monitoring, page 5](#)

Monitoring and Storage Intervals and Periods

This section describes how often the router monitors and stores temperature and voltage data.

Monitoring Interval—The router checks the operating temperature and power supply voltage once per minute. The monitoring interval is not configurable.

Storage Interval—The router stores temperature and voltage data as follows:

- Every 60 seconds, the router stores the actual, measured temperature, and voltage.
- Every 60 minutes, the router stores the average of the 60 measurements taken during the previous hour.

Storage intervals are not configurable.

You must enable the router to store the data that it collects at the monitoring intervals using the **monitor environment temperature** and the **monitor power-supply voltage** commands. These sections provide instructions for enabling data collection and storage:

- [Configure Operating Temperature Monitoring, page 4.](#)
- [Configure Power Supply Monitoring, page 5.](#)

Maximum Date Storage Period—The router stores temperature and voltage data for a maximum of 72 hours. After 72 hours, the oldest data is purged when the router adds the most recent data. The storage period is not configurable.

Alarms—At each monitoring interval, the router checks the operating temperature and power supply voltage. If the router detects that either is out of range of the defined thresholds, it generates an event notification (SYSLOG or SNMP). These sections provide instructions for configuring notifications:

- [Configure Operating Temperature Monitoring, page 4.](#)
- [Configure Power Supply Monitoring, page 5.](#)

Show Commands

The TVM feature includes **show** commands to view the history configuration and stored data for both operating temperature and power supply voltage.

The section [Using TVM Show Commands, page 7](#), provides instructions for using this command.

How to Configure TVM

This section describes the TVM configuration commands supported in Cisco IOS Release 15.2(1)T and later.

Configure Operating Temperature Monitoring

Use the **monitor environment temperature** global configuration command to configure router operating temperature thresholds. These thresholds define an operating temperature range so the router can be configured to send notifications when the temperature is out of the desired range.

You can also use this command to:

- Enable historical data collection for router operating temperature.
- Disable the specified setting, using the **no** form of the command.
- Reset operating temperature thresholds to the default value, using the **no** form of the command with the **low** and **high** options.

This table describes the command options for the **monitor environment temperature** command.

Command Syntax	Description
monitor environment temperature { history low celsius high celsius notifies syslog }	<p>The monitor environment temperature global command configures the thresholds, alarm settings, and historical data settings for the router operating temperature.</p> <ul style="list-style-type: none"> • history—Enables data collection of the router operating temperature. The default setting is disabled. • high celsius—Maximum temperature in degrees celsius that, when exceeded, triggers the router to send a notification. The range is -150 to 300. The default value is 110. • low celsius—Minimum temperature in degrees celsius that, when not met, triggers the router to send a notification. The range is -200 to 250. The default value is -25. • notifies—Generates an SNMP trap when the router operating temperature is out of range of the configured threshold values. The default setting is disabled. • syslog—Generates a SYSLOG message when the router operating temperature is out of range of the configured threshold values. The default setting is enabled.

Configure Power Supply Monitoring

Use the **monitor power-supply voltage** global configuration command to configure router power supply voltage thresholds. These thresholds define a voltage range so that the router can be configured to send an notification when the power supply voltage is outside the desired range. You can also use this command to:

- Enable historical data collection of power supply voltage.
- Disable the specified setting, using the **no** form of the command.
- Reset power supply voltage thresholds to the default value, using the **no** form of the command with the **low** and **high** options.

This table describes the command options for the **monitor power-supply voltage** command.

Command Syntax	Description
<p>monitor power-supply voltage { disable history notifies syslog threshold ac-dc { high volts low volts } threshold low-dc { high volts low volts } }</p>	<p>The monitor power-supply voltage global configuration command configures the power supply thresholds, alarm settings, and historical data settings for the router power supplies.</p> <ul style="list-style-type: none"> • disable—Disables threshold notifications for the power supply. • history—Enables historical data collection for the power supplies. The default setting is disabled. • notifies—Generates an SNMP trap when the power supply voltage is out of range of the configured threshold values. The default setting is disabled. • syslog—Generates an SNMP trap when the power supply voltage is out of range of the configured threshold values. The default setting is enabled. • threshold ac-dc—Configures the maximum and minimum threshold values for the power supply. Use this option for power supply models PWR-RGD-AC-DC and PWR-RGD-AC-DC-C. • threshold low-dc—Configures the maximum and minimum threshold values for the power supply. Use this option for power supply model PWR-RGD-LOW-DC. • high volts—Maximum power supply voltage that, when exceeded, triggers the router to send a notification. The ranges are: <ul style="list-style-type: none"> – ac-dc high: 275 to 300 – low-dc high: 75 to 80 The default values are: <ul style="list-style-type: none"> – ac-dc high: 275 – low-dc high: 80 • low volts—Minimum power supply voltage that, when not met, triggers the router to send a notification. The ranges are: <ul style="list-style-type: none"> – ac-dc low: 75 to 85 – low-dc low: 16 to 20 The default values are: <ul style="list-style-type: none"> – ac-dc low: 80 – low-dc low: 17

Using TVM Show Commands

This section describes TVM **show environment** commands supported in Cisco IOS Release 15.2(1)T and later.

Command Syntax	Description
<pre>show environment { all last table temperature { configuration history } power-supply { configuration history } }</pre>	<p>The show command displays configuration information and historical data for the router operating temperature and power supply voltage:</p> <ul style="list-style-type: none"> • all—Displays all available temperature and voltage historical data. • last—Displays the most recent temperature and voltage data. • table—Displays the current, configured temperature, and voltage ranges (table format). • temperature history—Displays operating temperature historical data. • temperature configuration—Displays the current TVM configuration for operating temperature. • power-supply history—Displays power supply voltage historical data. • power-supply configuration—Displays the current TVM configuration for power supply voltage.

Example Output for TVM Show Commands

The following examples show sample output of the **show environment** command. In these examples, the power supplies are external.

Show Environment All

```
Router# show environment all
SYSTEM POWER SUPPLY STATUS
=====
Internal Power Supply 1 Type: AC-POE
Internal Power Supply 1 POE Output Status: Normal

Internal Power Supply 2 Type: Absent

SYSTEM TEMPERATURE STATUS
=====
CPU temperature: 46 Celsius, Normal
Riser Card temperature: 49 Celsius, Normal
DRAM temperature: 35 Celsius, Normal
SFP temperature: 34 Celsius, Normal
GRWIC slot 0 temperature: 49 Celsius, Normal
GRWIC slot 2 temperature: 51 Celsius, Normal
Power Supply Unit 1 temperature: 47 Celsius, Normal

REAL TIME CLOCK BATTERY STATUS
=====
Battery OK (checked at power up)
```

```

SYSTEM WATTAGE
=====
Motherboard Components Power consumption = 31.208 W
Total System Power consumption is: 31.208 W

Environmental information last updated 00:00:21

SYSTEM CPU TEMPERATURE HISTORY
=====
CPU temperature history: Disabled

SYSTEM POWER SUPPLY INPUT VOLTAGE HISTORY
=====
Power Supply input voltage history: Disabled

Router#

```

Show Environment Last

The following example shows a sample output of the **show environment last** command. In the following example, the power supplies are external:

```

Router# show environment last
SYSTEM POWER SUPPLY STATUS
=====
Internal Power Supply 1 Type: AC-POE
Internal Power Supply 1 POE Output Status: Normal

Internal Power Supply 2 Type: Absent

SYSTEM TEMPERATURE STATUS
=====
CPU temperature: 46 Celsius, Normal
Riser Card temperature: 49 Celsius, Normal
DRAM temperature: 35 Celsius, Normal
SFP temperature: 34 Celsius, Normal
GRWIC slot 0 temperature: 49 Celsius, Normal
GRWIC slot 2 temperature: 51 Celsius, Normal
Power Supply Unit 1 temperature: 47 Celsius, Normal

REAL TIME CLOCK BATTERY STATUS
=====
Battery OK (checked at power up)
Router#

```

Show Environment Table

The following example shows a sample output of the **show environment table** command. In the following example, the power supplies are external:

```

Router# show environment table
SYSTEM POWER SUPPLY STATUS
=====
Internal Power Supply 1 Type: AC-POE
Internal Power Supply 1 POE Output Status: Normal

Internal Power Supply 2 Type: Absent

SYSTEM TEMPERATURE STATUS
=====
CPU temperature: 45 Celsius, Normal
Riser Card temperature: 48 Celsius, Normal

```



```

DRAM temperature: 35 Celsius, Normal
SFP temperature: 33 Celsius, Normal
GRWIC slot 0 temperature: 49 Celsius, Normal
GRWIC slot 2 temperature: 51 Celsius, Normal
Power Supply Unit 1 temperature: 47 Celsius, Normal

```

REAL TIME CLOCK BATTERY STATUS

```

=====
Battery OK (checked at power up)

```

SYSTEM ALARMS SETTINGS

```

=====
CPU Over Temperature Alarm = 110C
CPU Under Temperature Alarm = -25C
Riser Card Over Temperature Alarm = 100C
DRAM Over Temperature Alarm = 85C
SFP Over Temperature Alarm = 85C
GRWIC slot 0 Over Temperature Alarm = 94C
GRWIC slot 1 Over Temperature Alarm = 90C
GRWIC slot 2 Over Temperature Alarm = 94C
GRWIC slot 3 Over Temperature Alarm = 90C
Power-Supply AC-DC Low Voltage Alarm = 80V
Power-Supply AC-DC High Voltage Alarm = 275V
Power-Supply LOW-DC Low Voltage Alarm = 17V
Power-Supply LOW-DC High Voltage Alarm = 80V

```

SYSTEM VOLTAGES

```

=====
12V voltage = 12.481 V, Normal
5V voltage = 5.049 V, Normal
3.3V voltage = 3.288 V, Normal
2.5V voltage = 2.512 V, Normal
1.8V voltage = 1.801 V, Normal
1.2V voltage = 1.202 V, Normal
ASIC voltage = 1.052 V, Normal
PSU1 Voltage = 118 V, Normal

```

SYSTEM WATTAGE

```

=====
Motherboard Components Power consumption = 31.208 W
Total System Power consumption is: 31.208 W
Environmental information last updated 00:00:02

```

ENVIRONMENTAL STRESS EVENTS

```

=====
Critical Temperature: Maximum = 65526
                      Total Duration = 20110

```

----- CPU TEMPERATURE SENSOR REGISTERS -----

```

REG: 0x0 : 0x24
REG: 0x1 : 0x2D
REG: 0x2 : 0x0
REG: 0x3 : 0x0
REG: 0x4 : 0x4
REG: 0x5 : 0x73
REG: 0x6 : 0xE7
REG: 0x7 : 0x6E
REG: 0x8 : 0xD8

```

----- POWER SEQUENCER REGS -----

```

REG: 0x0 : 0x305
REG: 0x1 : 0x1
REG: 0x2 : 0x1

```

```

.
.
.

```

MIB Support for TVM

This section describes the MIBs that are supported by the TVM feature:

- CISCO-ENTITY-SENSOR-MIB—Collects history information about temperature and power-supply monitoring on the router.
- CISCO-ENTITY-SENSOR-HISTORY-MIB—Provides five objects that support read-write operations:
 - entSensorThresholdSeverity
 - entSensorThresholdRelation
 - entSensorThresholdValue
 - entSensorThresholdNotificationEnable
 - entSensorThreshNotifGlobalEnable

**Note**

TVM supports read operations (get operations) only, including for objects that support read and write operations.

Enable Entity Sensor Threshold Notifications

To enable entity sensor threshold notifications, enter the **snmp-server enable traps entity-sensor threshold** global configuration command. To disable entity sensor threshold notifications, enter the **no** form of this command.

Specify SNMP Notification Recipients

To specify the recipient of an SNMP notification operation for entity sensor threshold, enter the **snmp-server host** global configuration command. To remove the specified host, enter the **no** form of this command.

Related Documents

These documents contains additional software configuration information for the Cisco Connected Grid 2010 Router:

- Cisco Connected Grid 2010 Router Software Configuration Guides:
http://www.cisco.com/en/US/products/ps10977/products_installation_and_configuration_guides_list.html
- Cisco Connected Grid 2010 Router Release Notes:
http://www.cisco.com/en/US/products/ps10977/prod_release_notes_list.html

Technical Assistance

Finding Support Information for Platforms and Cisco IOS Software Images

Use Cisco Feature Navigator to find information about platform support and Cisco IOS software image support. Access Cisco Feature Navigator at <http://www.cisco.com/go/fn>. You must have an account on Cisco.com. If you do not have an account or have forgotten your username or password, click **Cancel** at the login dialog box and follow the instructions that appear.

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