



# GOLD Health Monitoring for the Cisco UBR10012 Universal Broadband Router

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Generic Online Diagnostic (GOLD) is a health monitoring feature implemented on the Cisco UBR10012 Universal Broadband Router in the Cisco IOS Release 12.2(33)SCC. The GOLD functionality is developed to provide online diagnostic capabilities that run at bootup, in the background on a periodic basis, or based on demand from the CLI.

## 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 GOLD

The table shows the hardware and software compatibility prerequisites for this feature.



## Note

The hardware components introduced in a given Cisco IOS Release will be supported in all subsequent releases unless otherwise specified.

**Table 1: GOLD Support for the Cisco CMTS Routers Hardware and Software Compatibility Matrix**

CMTS Platform	Processor Engine	Cable Interface Cards
Cisco uBR10012 Universal Broadband Router	Cisco IOS Release 12.2(33)SCA and later <ul style="list-style-type: none"> <li>• PRE2</li> </ul> Cisco IOS Release 12.2(33)SCB and later <ul style="list-style-type: none"> <li>• PRE4</li> </ul>	Cisco IOS Release 12.2(33)SCB and later <ul style="list-style-type: none"> <li>• Cisco uBR10-MC5X20U/H</li> </ul> Cisco IOS Release 12.2(33)SCC and later <ul style="list-style-type: none"> <li>• Cisco UBR-MC20X20V</li> </ul> Cisco IOS Release 12.2(33)SCE and later <ul style="list-style-type: none"> <li>• Cisco uBR-MC3GX60V <a href="#">1</a></li> </ul>
Cisco uBR7246VXR Universal Broadband Router	Cisco IOS Release 12.2(33)SCA and later <ul style="list-style-type: none"> <li>• NPE-G1</li> <li>• NPE-G2</li> </ul>	Cisco IOS Release 12.2(33)SCA and later <ul style="list-style-type: none"> <li>• Cisco uBR-MC28U/X</li> </ul> Cisco IOS Release 12.2(33)SCD and later <ul style="list-style-type: none"> <li>• Cisco uBR-MC88V <a href="#">2</a></li> </ul>
Cisco uBR7225VXR Universal Broadband Router	Cisco IOS Release 12.2(33)SCA and later <ul style="list-style-type: none"> <li>• NPE-G1</li> </ul> Cisco IOS Release 12.2(33)SCB and later <ul style="list-style-type: none"> <li>• NPE-G2</li> </ul>	Cisco IOS Release 12.2(33)SCA and later <ul style="list-style-type: none"> <li>• Cisco uBR-E-28U</li> <li>• Cisco uBR-E-16U</li> <li>• Cisco uBR-MC28U/X</li> </ul> Cisco IOS Release 12.2(33)SCD and later <ul style="list-style-type: none"> <li>• Cisco uBR-MC88V</li> </ul>

- <sup>1</sup> Cisco uBR3GX60V cable interface line card is not compatible with PRE2. You must use PRE4 with the Cisco uBR3GX60V cable interface line card.
- <sup>2</sup> Cisco uBR-MC88V cable interface line card is not compatible with NPE-G1. You must use NPE-G2 with the Cisco uBR-MC88V cable interface line card.

## Restrictions for GOLD feature

- GOLD test cases are designed on a per chip or per interface level and are not expected to monitor at a per modem or per service flow level.
- GOLD diagnostic test cases supported in the Cisco IOS Release 12.2(33)SCC are as follows:
  - Low Latency Queue (LLQ) Drop Monitor Test: Implemented on 5x20 cable line card (CLC) (Test520LLQDrops), 20x20 CLC (Test2020LLQDrops), and Modena (TestModenaLLQDrops).
  - Guardian Index Leak Test: Implemented only on 5x20 Guardian LC (TestBlazeIndexLeak).
  - CLC Memory Leak Test: Implemented on 5x20 and 20x20 LC (TestMemLeaks).

## Information About GOLD

The following sections provide details of the GOLD feature:

### Limitations of Existing Logging Mechanism

To provide high-availability for a router without any downtime it is imperative to analyze the stability of a system. The primary method of discovering the cause of system failure is system messages. However, there are certain system failures that do not send notifications. It is difficult to understand the cause of these system failures, as the existing logging mechanism fails to notify or maintain a log of these failures.

### Understanding the Importance of GOLD Functionality

As there are certain system failures that do not send any notification or keep a log of failure, it is essential to address these limitations. The GOLD feature has been designed specifically to provide error detection by polling for errors for those system modules that do not have any notification mechanism. GOLD has been implemented on the Cisco UBR10012 router to actively poll for system errors. Online diagnostics is one of the requirements for high availability (HA). HA is a set of quality standards that seeks to limit the impact of equipment failures on the network. A key part of HA is detecting system failures and taking corrective actions while the system is running in a live network.

### Understanding the GOLD Feature

The GOLD feature is primarily used to poll for system errors targeted for those components, which do not send a notification upon failure. Although the infrastructure can be used to poll for both hardware and system errors, the main scope is to poll for status and error registers on physical hardware device. The Cisco UBR10012 Router uses a distributed GOLD implementation. In this model, the core Cisco IOS GOLD subsystem is linked on both the route processor (RP) and the cable line cards.

Diagnostic tests can be registered either as local tests which run on the RP or as proxy tests which run on the line cards. When a proxy test is requested on the RP, a command is sent using Inter-Process Communication (IPC) to the line card to instruct it to run the test locally. The results are then returned to the RP using IPC. Tests are specified by card type on a per slot/subslot basis. Diagnostic tests can be run either on bootup, periodically (triggered by a timer), or on demand from the CLI. GOLD feature is managed through a range of commands which are mainly used to provide on-demand diagnostic tests, schedule tests at particular intervals, monitor the system health on periodic basis and to view the diagnostic test results.

## Configuring Online Diagnostics

The following sections describe how to configure various types of diagnostics and view test reports:

### Configuring the Bootup Diagnostics Level

You can configure the bootup diagnostics level as minimal or complete or you can bypass the bootup diagnostics entirely. Enter the **complete** keyword to run all bootup diagnostic tests and the **minimal** keyword to run minimal tests such as loopback. Enter the **no** form of the command to bypass all diagnostic tests. The default bootup diagnostics level is minimal.



#### Note

None of the currently implemented tests on the Cisco UBR 10012 Router are bootup tests.

#### DETAILED STEPS

	Command or Action	Purpose
<b>Step 1</b>	<b>enable</b>  <b>Example:</b> Router> enable	Enables privileged EXEC mode. Enter your password if prompted.
<b>Step 2</b>	<b>configure terminal</b>  <b>Example:</b> Router# configure terminal	Enters global configuration mode.
<b>Step 3</b>	Router(config)# <b>diagnostic bootup level {minimal   complete}</b>  <b>Example:</b> Router(config) # <b>diagnostic bootup level complete</b>	Configures the bootup diagnostic level.

## Configuring On-Demand Diagnostics

You can run the on-demand diagnostic tests from the CLI. You can set the execution action to either stop or continue the test when a failure is detected or to stop the test after a specific number of failures occur by using the failure count setting. You can configure a test to run multiple times using the iteration setting.

### DETAILED STEPS

	Command or Action	Purpose
<b>Step 1</b>	<b>enable</b>  <b>Example:</b> Router> enable	Enables privileged EXEC mode. Enter your password if prompted.
<b>Step 2</b>	<b>diagnostic ondemand {iteration <i>iteration_count</i> }   {action-on-error {continue   stop}[<i>error_count</i> ]}</b>  <b>Example:</b> Router# <b>diagnostic ondemand iteration 3</b>	Configures on-demand diagnostic tests to run, how many times to run (iterations), and what action to take when errors are found.
<b>Step 3</b>	<b>diagnostic start {bay <i>slot/bay</i>   slot <i>slot-no</i>} test {<i>test-id</i>   <i>test-id-range</i>   all   complete   minimal   non-disruptive}</b>  <ul style="list-style-type: none"> <li>• <b>diagnostic start {subslot <i>slot/sub-slot</i>} test {<i>test-id</i>   <i>test-id-range</i>   all   complete   minimal   non-disruptive   per-port [port {num   <i>port#-range</i>   all}]}</b></li> </ul> <b>Example:</b> Router# diagnostic start bay 1/0 test 5	Starts the on-demand diagnostic test on the specified bay, slot, or subslot.
<b>Step 4</b>	<b>diagnostic stop {bay <i>slot/bay</i>   slot <i>slot-no</i>   subslot <i>slot/sub-slot</i>}</b>  <b>Example:</b> Router# diagnostic stop bay 1/0	Stops the diagnostic test running on the specified bay, slot, or subslot.

## Scheduling Diagnostics

You can schedule online diagnostics to run at a designated time of day or on a daily, weekly, or monthly basis. You can schedule tests to run only once or to repeat at an interval. Use the **no** form of this command to remove the scheduling.

To schedule online diagnostics, perform this task:

## DETAILED STEPS

	Command or Action	Purpose
<b>Step 1</b>	<b>enable</b>  <b>Example:</b> <pre>Router&gt; enable</pre>	Enables privileged EXEC mode. Enter your password if prompted.
<b>Step 2</b>	<b>configure terminal</b>  <b>Example:</b> <pre>Router# configure terminal</pre>	Enters global configuration mode.
<b>Step 3</b>	<b>diagnostic schedule</b> {bay slot/bay   slot slot-no } test {test-id   test-id-range   all   complete   minimal   non-disruptive} {daily hh:mm   on mm dd year hh:mm   weekly day-of-week hh:mm }  <b>Example:</b> <b>diagnostic schedule</b> {subslot slot/sub-slot} test {test-id   test-id-range   all   complete   minimal   non-disruptive   per-port {daily hh:mm   on mm dd year hh:mm   weekly day-of-week hh:mm   port {{num   port#range   all} {daily hh:mm   on mm dd year hh:mm   weekly day-of-week hh:mm}}}}  <b>Example:</b> <pre>Router(config)# diagnostic schedule bay 1/0 test 1 on september 2 2009 12:00</pre> <b>Example:</b> <pre>Router(config)# diagnostic schedule slot 1 test complete daily 08:00</pre>	<p>This example shows how to schedule the diagnostic testing on a specific date and time for a specific bay:</p> <p>This example shows how to schedule the diagnostic testing to occur daily at a certain time for a specific slot:</p> <p>Schedules on-demand diagnostic tests for a specific date and time, how many times to run (iterations), and what action to take when errors are found.</p>

## Configuring Health-Monitoring Diagnostics

You can configure health-monitoring diagnostic testing while the system is connected to a live network. You can configure the execution interval for each health monitoring test, whether or not to generate a system message upon test failure, or to enable or disable an individual test. Use the **no** form of this command to disable testing.

**Note**

Before enabling the diagnostic monitor test, you first need to set the interval to run the diagnostic test. An error message is displayed if the interval is not configured before enabling the monitoring.

**DETAILED STEPS**

	Command or Action	Purpose
<b>Step 1</b>	<b>enable</b>  <b>Example:</b> Router> enable	Enables privileged EXEC mode. Enter your password if prompted.
<b>Step 2</b>	<b>configure terminal</b>  <b>Example:</b> Router# configure terminal	Enters global configuration mode.
<b>Step 3</b>	<b>diagnostic monitor interval</b> {bay slot/bay   slot slot-no   subslot slot/sub-slot} <b>test</b> {test-id   test-id-range   all} {hh:mm:ss} {milliseconds} {number-of-days}  <b>Example:</b> Router(config)# <b>diagnostic monitor interval bay 1/0 test 2 06:00:00 100 10</b>	Configures the health-monitoring interval of the specified tests. The <b>no</b> form of this command will change the interval to the default interval, or zero.
<b>Step 4</b>	<b>diagnostic monitor</b> {bay slot/bay   slot slot-no   subslot slot/sub-slot} <b>test</b> {test-id   test-id-range   all}  <b>Example:</b> <p>The following example shows a sample output of an error message displayed when monitoring is enabled before configuring the test interval:</p> <b>Example:</b> Router(config)# <b>diagnostic monitor bay 1/0 test 2</b> Aug 12 18:04:56.280: %DIAG-3-MONITOR_INTERVAL_ZERO: Bay 1/0: Monitoring interval is 0. Cannot enable monitoring for Test #2	Enables or disables health-monitoring diagnostic tests.
<b>Step 5</b>	<b>diagnostic monitor syslog</b>  <b>Example:</b> Router(config)# <b>diagnostic monitor syslog</b>	Enables the generation of a system logging messages when a health-monitoring test fails.
<b>Step 6</b>	<b>diagnostic monitor threshold</b> {bay slot/bay   slot slot-no   subslot slot/sub-slot} <b>test</b> {test-id   test-id-range   all} {failure count no-of-allowed-failures}	Configures the failure threshold value for the bay, slot, or subslot.

	Command or Action	Purpose
	<b>Example:</b> <pre>Router(config)# diagnostic monitor threshold bay 1/0 test 2 failure count 10</pre>	

## Displaying Online Diagnostic Tests and Test Results

You can display the online diagnostic tests that are configured and check the results of the tests using the **show** commands.

### DETAILED STEPS

	Command or Action	Purpose
<b>Step 1</b>	<b>enable</b>  <b>Example:</b> <pre>Router&gt; enable</pre>	Enables privileged EXEC mode. Enter your password if prompted.
<b>Step 2</b>	<b>show diagnostic content all</b>   bay <i>slot/bay</i>   slot <i>slot-no</i>   subslot <i>slot/subslot</i>  <b>Example:</b> <pre>Router# show diagnostic content bay 1/0</pre>	Displays the online diagnostics tests and test attributes that are configured.
<b>Step 3</b>	<b>show diagnostic result</b> [[bay <i>slot/bay</i>   slot <i>slot-no</i>   subslot <i>slot/subslot</i> ] { <b>detail</b>   <b>test</b> { <i>test-id</i>   <i>test-id-range</i>   <b>all</b> }}   <b>all</b>  <b>Example:</b> <pre>Router# show diagnostic result all</pre>	Displays the diagnostic test results (pass, fail, or untested) for a bay, slot, or subslot.
<b>Step 4</b>	<b>show diagnostic schedule all</b>   bay <i>slot/bay</i>   slot <i>slot-no</i>   subslot <i>slot/subslot</i>  <b>Example:</b> <pre>Router# show diagnostic schedule slot 1</pre>	Displays the current scheduled diagnostic tasks.
<b>Step 5</b>	<b>show diagnostic events</b> [bay <i>slot/bay</i>   slot <i>slot-no</i>   subslot <i>slot/sub-slot</i>   <b>event-type</b> { <i>error</i>   <i>info</i>   <i>warning</i> }]  <b>Example:</b> <pre>Router# show diagnostic events subslot 5/0</pre>	Displays the diagnostic event log details for the specified bay, slot, or subslot.



## Supported GOLD Tests on Cisco UBR10012 Router

This section discusses the GOLD test cases that have been implemented on Cisco UBR10012 Router in the Cisco IOS Release 12.2(33)SCC. This section contains the following topics:

### Low Latency Queue (LLQ) Drop Test

To support the low latency requirements of voice calls the UBR10012 Router uses per interface absolute priority queues. Verifying the drops in the queue is a cumbersome manual process. Because of this, the periodic LLQ Drop test has been implemented to monitor all low latency queues on the box for drops. The test is a non-proxy test case that runs on the RP.

For the specified slot/subslot or slot/bay pair, the test will walk all associated forwarding interfaces legacy, modular, integrated, and wideband and look for drops on the interface low latency queue (if one exists). If drops are found, the test case reports a failure to the GOLD infrastructure and log a system log message with pertinent information.



#### Note

The LLQ Drop test runs on demand with a default period of one (1) hour. It can be configured to run as often as every one minute.

The table provides details regarding the supported hardware, test names, and criteria for displaying the test results.

**Table 2: Hardware Support Matrix for LLQ Drop Test**

Supported Line Card and SPA	Test Name	Criteria To Display Result
5x20 line card	Test520LLQDrops	For 5x20 line cards, the test returns per port results with a port corresponding to a downstream interface.
20x20 line card	Test2020LLQDrops	For 20x20 line cards, the test returns per port results with a port corresponding to a controller.
Modena SPA	TestModenaLLQDrops	On Modena SPA, the test returns global results.

### Guardian Index Leak Test

For remote downstreams using SPAs, the Guardian maintains stat indices for remote service flows, PHS indices for voice flows on NB modems and BPI indices for encrypted modems. The index associations are maintained on the host mac-domain. There could be cases where the service flow has been destroyed or the

cable modem has been kicked offline and the corresponding indices have not been de-allocated on the guardian. Any index leaks arising out of corner cases or race conditions would cause the index table to run out of indices which would then prevent any new modems to come online or new service flows to be created.

Periodic GOLD test (TestBlazeIndexLeak) has been introduced for 5x20 line cards to catch these index leaks early. TestBlazeIndexLeak test is a proxy test which runs on the linecard per slot or subslot. The number of Blaze indices are compared on each mac-domain host with the indices allocated by the guardian. If inconsistencies are found, error message is reported on the line card, with the mac-domain host inconsistencies. The error message displays the allocating guardian, the host line card on which the test fails and the margin observed.

**Note**

The TestBlazeIndexLeak test runs on demand with a default period of eight (8) hours.

The table provides details regarding the supported hardware, test names, and criteria for displaying the test results.

**Table 3: Hardware Support Matrix for Guardian Index Leak Test**

Supported Line Card and SPA	Test Name	Criteria To Display Result
5x20 line card	TestBlazeIndexLeak	For 5x20 line cards, the test returns per port results with a port corresponding to a downstream interface.

## Memory Leak Test

As part of health monitoring tests, GOLD test case for detecting memory leaks in IOS have been added. The programmed approach covers potential leaks in IO Buffers and Processor Heap Memory. Most of the approaches to detect memory leak, require human analysis or tool based post-processing of outputs from various show commands. The Memory Leak Test adds a programmatic implementation inside IOS code itself to detect and signal any 'sizeable levels of IOS memory leaks' occurring over-time. The TestMemLeaks test case is automatically kick-started by GOLD on both PRE and CLC. One hour after card bootup, the test starts sampling free-memory data every 2 minutes in the background and then after every two hours it generates Leak test results for GOLD.

**Test Result Behavior:** The GOLD TestMemLeak failures are persistent failures, i.e. if the test fails due to a leak detected during a two hour window, the test fails from here on till card reboot, even if no new leaks were detected during ongoing two-hour sampling window.

**Memory:** The TestMemLeaks test adds some fixed-size static data-structures that take less than 10KB of fixed memory. To run per-RU-IO-buffer leak test, dynamic List is also allocated to get per-RU-stats, and these list elements are all freed before the test is over.

The Memory Resource Monitoring test case added as TestMemLeaks currently covers the following two approaches:

- [Free Memory Trending](#), on page 11
- [I/O Memory Buffer Hold Accounting](#), on page 11

## Free Memory Trending

Aggregate level memory leaks can be detected using Free Memory Trending. Free memory trending requires system to get baseline usage numbers after one hour of system boot-up, and collect free memory samples every few minutes. Apply the free memory trending approach after you have enough samples. Periodically keep a watch on trend of free, lowest and largest block levels, by performing:

- Leak Trending check: Size of the Lowest Free Memory, Current Free Memory. Compare these samples to previous values and if all these parameters indicate a gradually leaking memory, and signal it as a test failure. If the following conditions are significantly found to be true, the logic alarms leaking memory.
  - FreeBytes of next sample are lower than FreeBytes of previous sample, AND
  - Lowest free in this sample is within 10KB bytes of freeBytes; AND
  - If lowest free in this sample is lesser than lowest block of previous sample
  - If such conditions are found to be true for more than 25% of periodically collected samples, LeakTrend is assumed.
- Lower Threshold Check: Compare the free memory threshold to total memory on the card.

If the above two checks fail, a red flag is raised as an error message that memory on the box has been gradually leaking.

- If Largest Free is less than 1 MB (min. buffer size level for safe allocation) i.e. even if Largest free memory is above risk thresholds but if 'Lowest Sized buffer' reaches dangerous levels (like 1MB), then the logic signals memory leak error.

## I/O Memory Buffer Hold Accounting

This section discusses, how I/O memory buffer leak scan algorithm works. To detect I/O memory leaks, besides the free-memory trending approach, the buffer life span analysis approach is also considered, where old buffers stored for more than a specified threshold of time are considered leaking. The command **show buffers leak resource** user displays a detailed summary of buffers that are older than a minute in the system, on a per Resource-User basis.



### Note

The TestMemLeaks test runs on demand with a default period of two (2) hours.

The table provides details regarding the supported hardware, test names, and criteria for displaying the test results.

**Table 4: Hardware Support Matrix for Memory Leak Detection**

Supported Line Card and SPA	Test Name	Criteria To Display Result
5x20 line card	TestMemLeaks	Poll, collect, and compare samples of Processor Memory Leak and I/O Memory Buffer leak.

Supported Line Card and SPA	Test Name	Criteria To Display Result
20x20 line card	TestMemLeaks	Poll, collect, and compare samples of Processor Memory Leak and I/O Memory Buffer leak.

## How to Manage Diagnostic Tests

This section describes how to manage the diagnostic tests. The following GOLD commands are used to manage the ondemand and periodic diagnostic tests:

### DETAILED STEPS

	Command or Action	Purpose
<b>Step 1</b>	<b>diagnostic ondemand</b>  <b>Example:</b> Router# diagnostic ondemand iteration 50	Configures the ondemand diagnostic parameters such as iteration-count and action-on-error. These parameters signify the number of times the test is run and the execution action when a failure is detected. These parameters are used when the command <b>diagnostic start</b> is executed. In the given example, the iteration count to the same ondemand diagnostic test again is configured as 50.  <b>Note</b> By default, iteration-count is 1, action-on-error is continue, and error count is 0.
<b>Step 2</b>	<b>show diagnostic ondemand settings</b>  <b>Example:</b> Router# show diagnostic ondemand settings	Displays the ondemand diagnostic settings configured using the command <b>diagnostic ondemand</b> .
<b>Step 3</b>	<b>diagnostic start {bay slot/bay   slot slot-no} test {test-id   test-id-range   all   complete   minimal   non-disruptive}</b>  <b>Example:</b> Router# diagnostic start bay 1/0 test 1 all	Starts an ondemand diagnostic test. <ul style="list-style-type: none"> <li>• <b>bay slot/bay</b>—Indicates the card slot and bay number where the diagnostic test is executed. The bay keyword is used to refer a SPA on the router. The valid range for the slot number is from 1 to 8 and 0 to 3 for the bay number.</li> <li>• <b>slot slot-no</b>—Indicates the slot number of the full-height line card where the diagnostic test is executed. The slot keyword is used to refer a full-height line card on the router. The valid range for slot is from 1 to 8.</li> <li>• <b>subslot slot/sub-slot</b>—Indicates the slot and subslot number of half-height line card where the diagnostic test is executed. The subslot keyword is used to refer a half-height line card on the router. The valid range for the slot number is from 1 to 8 and 0 to 1 for the subslot number.</li> <li>• <b>test</b>— Specifies a test to run.</li> <li>• <b>test-id</b>—Identification number for the test to run.</li> </ul>

	Command or Action	Purpose
		<ul style="list-style-type: none"> <li>• <i>test-id-range</i>—Range of identification numbers for tests to run.</li> <li>• <b>minimal</b>—Runs minimal bootup diagnostic tests.</li> <li>• <b>complete</b>—Runs complete bootup diagnostic tests.</li> <li>• <b>non-disruptive</b>—Runs the non disruptive health-monitoring tests.</li> <li>• <b>all</b>—Runs all diagnostic tests.</li> </ul>
<b>Step 4</b>	<b>show diagnostic content</b>  <b>Example:</b> Router# show diagnostic content	Displays the registered tests, attributes, and the configured interval at which the test runs.  <b>Note</b> To view the registered test details for a specific SPA, full-height line card, or half-height line-card, use the keywords <i>bay</i> , <i>slot</i> , or <i>subslot</i> .
<b>Step 5</b>	<b>show diagnostic result</b>  <b>Example:</b> Router# show diagnostic result	Displays the diagnostic test results for a SPA, full-height line card, or half-height line card.
<b>Step 6</b>	<b>show diagnostic events</b>  <b>Example:</b> Router# show diagnostic events	Displays the diagnostic event log details for all the SPAs, full-height line card, and half-height line cards installed on the Cisco UBR10012 Router.
<b>Step 7</b>	<b>diagnostic stop {bay slot/bay   slot slot-no} test {test-id   test-id-range   all   complete   minimal   non-disruptive}</b>  <b>Example:</b> Router# diagnostic stop bay 1/0 all	Stops the ondemand diagnostic test.
<b>Step 8</b>	<b>configure terminal</b>  <b>Example:</b> Router# configure terminal	Enters global configuration mode.
<b>Step 9</b>	<b>diagnostic bootup level {minimal   complete}</b>  <b>Example:</b> Router(config)# diagnostic bootup level complete	Configures the bootup diagnostic level.  <ul style="list-style-type: none"> <li>• <b>minimal</b>—Specifies minimal diagnostics.</li> <li>• <b>complete</b>—Specifies complete diagnostics.</li> </ul>
<b>Step 10</b>	<b>show diagnostic bootup level</b>  <b>Example:</b> Router# show diagnostic bootup	Displays the configured bootup diagnostic level.
<b>Step 11</b>	<b>diagnostic event-log size size</b>	Modifies the diagnostic event log size dynamically.

	Command or Action	Purpose
	<b>Example:</b> <pre>Router(config)# diagnostic event log size 10000</pre>	<ul style="list-style-type: none"> <li><i>size</i>—Diagnostic event-log sizes. The valid values range from 1 to 10000 entries.</li> </ul>
<b>Step 12</b>	<b>diagnostic monitor interval</b> {bay slot/bay   slot slot-no}   subslot slot/subslot} test {test-id   test-id-range   all} hh:mm:ss milliseconds days  <b>Example:</b> <pre>Router(config)# diagnostic monitor interval bay 1/0 test 2 06:00:00 100 20</pre>	Configures the health monitoring diagnostic test interval to rerun the tests. <ul style="list-style-type: none"> <li><i>hh:mm:ss</i>—Hours, minutes, and seconds interval configured to run the test again.</li> <li><i>milliseconds</i>—Number of milliseconds between tests.</li> <li><i>days</i>—Number of days between tests. The valid range is from 0 to 20.</li> </ul>
<b>Step 13</b>	<b>diagnostic schedule module</b> {module-number   slot/subslot} test {test-id   all   complete   minimal   non-disruptive   per-port}  <b>Example:</b> <pre>Router(config)# diagnostic schedule slot 1 test complete daily 08:00</pre>	Schedules the online diagnostic test to run at a designated time, or on daily, weekly or monthly basis. <ul style="list-style-type: none"> <li><i>module-number</i>—Specifies the module number.</li> <li><i>per-port</i>—Selects the per-port test suite.</li> </ul>
<b>Step 14</b>	<b>show diagnostic schedule</b>  <b>Example:</b> <pre>Router# show diagnostic schedule</pre>	Displays the current scheduled diagnostic tests.

## Configuration Examples for GOLD Feature

The following example shows a sample output of the test configuration, test attributes, and the supported coverage test levels for each test and for each bay/slot/subslot:

```
Slot 1: 2jacket-1
Diagnostics test suite attributes:
  M/C/* - Minimal bootup level test / Complete bootup level test / NA
  B/* - Basic ondemand test / NA
  P/V/* - Per port test / Per device test / NA
  D/N/* - Disruptive test / Non-disruptive test / NA
  S/* - Only applicable to standby unit / NA
  X/* - Not a health monitoring test / NA
  F/* - Fixed monitoring interval test / NA
  E/* - Always enabled monitoring test / NA
  A/I - Monitoring is active / Monitoring is inactive

ID   Test Name                               Attributes                               Test Interval
====  =====                               =====                               =====
1) TestJacketSample -----> ***N***I    not configured n/a
    Bay 1/0: 2jacket-1
```

## Diagnostics test suite attributes:

M/C/\* - Minimal bootup level test / Complete bootup level test / NA  
 B/\* - Basic ondemand test / NA  
 P/V/\* - Per port test / Per device test / NA  
 D/N/\* - Disruptive test / Non-disruptive test / NA  
 S/\* - Only applicable to standby unit / NA  
 X/\* - Not a health monitoring test / NA  
 F/\* - Fixed monitoring interval test / NA  
 E/\* - Always enabled monitoring test / NA  
 A/I - Monitoring is active / Monitoring is inactive

Interval	ID	Test Name	Attributes	Test day
hh:mm:ss.	====	=====	=====	=====
=====		1) TestModenaSample ----->	***N***I	not configured
n/a		2) TestModenaLLQDrops ----->	***N***A	000 01:00:00.00
1				

## Additional References

For additional information related to health monitoring, see the following references:

### Related Documents

Related Topic	Document Title
CMTS commands	<a href="#">Cisco IOS CMTS Cable Command Reference</a>
System Event Archive (SEA)	SEA feature for the Cisco UBR10012 Router

### Standards

Standards	Title
No new or modified standards are supported by this feature, and support for existing standards has not been modified by this feature.	—

### MIBs

MIBs	MIBs Link
No new or modified MIBs are supported by this feature, and support for existing MIBs has not been modified by this feature.	To locate and download MIBs for selected platforms, Cisco IOS releases, and feature sets, use Cisco MIB Locator found at the following URL: <a href="http://www.cisco.com/go/mibs">http://www.cisco.com/go/mibs</a>

**RFCs**

RFCs	Title
No new or modified RFCs are supported by this feature, and support for existing RFCs has not been modified by this feature.	—

**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.	<a href="http://www.cisco.com/cisco/web/support/index.html">http://www.cisco.com/cisco/web/support/index.html</a>

## Feature Information for GOLD for 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/TTDIT/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 5: Feature Information for GOLD for the Cisco CMTS Routers**

Feature Name	Releases	Feature Information
Generic Online Diagnostic (GOLD) subsystem support for the Cisco CMTS Routers	12.2(33)SCC	<p>GOLD is a health monitoring feature implemented to run diagnostic tests and poll for system components, which do not generated errors. This feature was introduced for the MC5x20, MC20x20 cable line cards, Modena SPA, Jacket cards, PRE2, and PRE4 route processors.</p> <p>The following commands are new or modified:</p> <ul style="list-style-type: none"> <li>• <b>diagnostic start</b></li> <li>• <b>diagnostic stop</b></li> <li>• <b>diagnostic ondemand</b></li> <li>• <b>show diagnostic bootup</b></li> <li>• <b>show diagnostic content</b></li> <li>• <b>show diagnostic description</b></li> <li>• <b>show diagnostic events</b></li> <li>• <b>show diagnostic ondemand</b></li> <li>• <b>show diagnostic result</b></li> <li>• <b>show diagnostic schedule</b></li> <li>• <b>diagnostic bootup</b></li> <li>• <b>diagnostic event-log</b></li> <li>• <b>diagnostic monitor</b></li> <li>• <b>diagnostic schedule</b></li> </ul>

