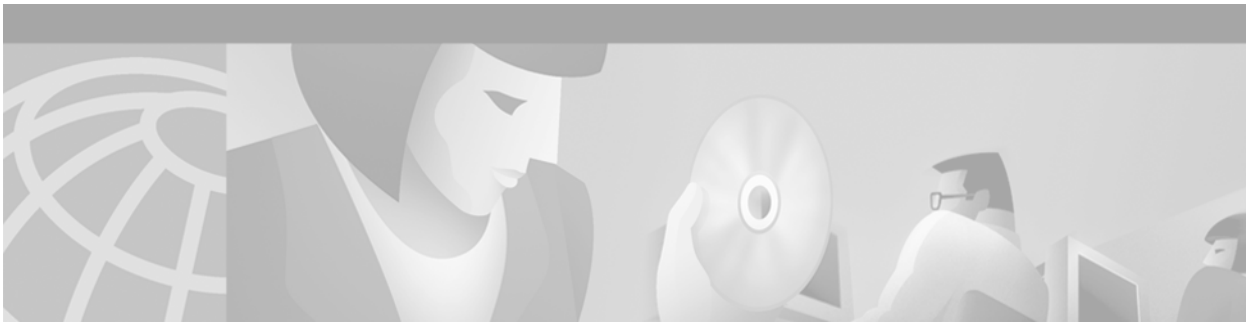

Release Notes for the Cisco uBR10012 Universal Broadband Router for Cisco IOS Release 12.2 XF

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These release notes for the Cisco uBR10012 universal broadband router describe the enhancements and caveats provided in Cisco IOS Release 12.2(4)XF1. For a list of the software caveats that apply to Cisco IOS Release 12.2(4)XF1, see the "Caveats" section on page 19.

Cisco IOS Release 12.2(4)XF1 supports the Cisco uBR10012 universal broadband router.

Note You can find the most current Cisco IOS documentation on Cisco.com. This set of electronic documents may contain updates and modifications made after the hard-copy documents were printed.

Contents

These release notes describe the following topics:

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Introduction

For information on new features and Cisco IOS commands supported by Cisco IOS Release 12.2(4)XF1, see the "New and Changed Information" section on page 12 and the "Related Documentation" section on page 26.

Cisco IOS Release 12.2(4)XF1 supports the Cisco uBR10012 universal broadband router, which provides a high-capacity, high-throughput cable modem termination system (CMTS), optimized for aggregating traffic at the edge of the cable network. Designed for cable operators and service providers, the platform connects residential subscribers via cable modems, digital set-top boxes, or IP telephony cable modems for high-speed data, broadband entertainment, and IP telephony solutions.

The Cisco uBR10012 router has been designed as a high-capacity platform that places a new level of intelligence at the edge of the network, enabling cable service providers to maximize their revenues by delivering more feature-rich services to their customers. The Cisco uBR10012 router uses the industry-proven Parallel eXpress Forwarding (PXF) technology, derived from the Cisco ESR10000 Edge Services Router, to provide consistent, high-performance throughput, even as software features are added and additional services are deployed.

In addition, it supports a variety of broadband access technologies, including Data-over-Cable Service Interface Specification (DOCSIS), gigabit ethernet, and optical. With support for multiple standards, operators can choose the appropriate services and devices to optimize their capital investment with a single CMTS platform. With access to current and future software enhancements, the Cisco uBR10012 also ensures investment protection as standards and customer needs continue to evolve.

Cable companies and Internet service providers (ISPs) can allocate radio frequency (RF) channel capacity for Internet access or high priority services using a hybrid fiber/coax (HFC) or an all-coax cable plant. Cisco currently provides two router-based DOCSIS CMTS solutions that offer a wider feature set and better manageability than bridge-based systems.

Cisco uBR10012 Universal Broadband Router

The Cisco uBR10012 universal broadband router brings the powerful performance and proven reliability of the industry-leading, DOCSIS-qualified Cisco uBR7200 series universal broadband router product line to the next level of performance, capacity, and throughput. The Cisco uBR10012 platform provides a complete, easy-to-use, integrated router and cable modem termination system (CMTS) package, with feature-rich software and unparalleled customer service and support. With access to current and future software enhancements, the Cisco uBR10012 routers also ensure investment protection as standards evolve.

The Cisco uBR10012 router supports up to eight cable interface line cards for connection to subscriber cable modems (CMs) and set-top boxes (STBs). Cisco IOS Release 12.2(4)XF1 supports the Cisco uBR-LCP-MC16C, Cisco uBR-LCP-MC16E, Cisco uBR-LCP-MC28C, and Cisco uBR-LCP-MC28C-BNC cable interface line cards.

For connection to the Internet and other networks, the Cisco uBR10012 router supports up to four network uplink line cards, each of which can support connections as fast as 1Gb/s (Gigabit Ethernet). Cisco IOS Release 12.2(4)XF1 supports OC-12 POS and Gigabit Ethernet connectivity.

Note This guide focuses on Cisco uBR10012 software. For detailed descriptions of the Cisco uBR10012 router chassis and components, see the hardware documents listed in the *"Related Documentation" section on page 26*.

Cisco uBR10012 Router Cable Interface

The cable interface in the Cisco uBR10012 router serves as the RF cable TV interface, supporting downstream and upstream signals. The downstream is output as an IF signal suitable for use with an external upconverter. Your cable plant, combined with your planned and installed subscriber base, service offering, and external network connections, determines what combination of Cisco uBR10012 cable interfaces, network uplink line cards, and other components that you should use.

Cisco IOS Release 12.2(4)XF1 supports the following cable interface line cards, which can be installed in the Cisco uBR10012 chassis in any combination:

- Cisco uBR-LCP-MC16C line card, based on the existing Cisco uBR-MC16C line card, with one downstream and six upstreams.
- Cisco uBR-LCP-MC16E line card, based on the existing Cisco uBR-MC16E line card, with one downstream and six upstreams.
- Cisco uBR-LCP-MC28C line card, based on the existing Cisco uBR-MC28C line card, with two downstreams and eight upstreams divided into two domains. This provides the ability to support a large volume of cable modem subscribers using only one chassis.
- Cisco uBR-LCP-MC28C-BNC line card, based on the existing Cisco uBR-MC28C-BNC line card, with two downstreams and eight upstreams divided into two domains. This line card is identical to the Cisco uBR-LCP-MC28C line card except that it uses BNC connectors instead of F-connectors to connect the downstream and upstream cables.

Note Unless otherwise indicated, all references to the Cisco uBR-LCP-MC28C in this document refer to both the Cisco uBR-LCP-MC28C and Cisco uBR-LCP-MC28C-BNC versions of the card.

All cable interface line cards, except for the Cisco uBR-LCP-MC16E, support the Data-over-Cable Service Interface Specifications (DOCSIS). DOCSIS supports the 6 MHz North American channel plans using the ITU J.83 Annex B RF standard. The downstream uses a 6 MHz channel width in the 85 to 860 MHz frequency range, and the upstream supports the 5 to 42 MHz frequency range.

The Cisco uBR-LCP-MC16E cable interface line card supports the European Data-over-Cable Service Interface Specifications (EuroDOCSIS). EuroDOCSIS supports the 8 MHz Phase Alternating Line (PAL) and Systeme Electronique Couleur Avec Memoire (SECAM) channel plans using the ITU J.112 Annex A RF standard. The downstream uses an 8 MHz channel width in the 85 to 860 MHz frequency range, and the upstream supports multiple channel widths in the 5 to 65 MHz frequency range.

Early Deployment Releases

These release notes describe the Cisco uBR10012 universal broadband router for Cisco IOS Release 12.2(4)XF1. Release 12.2 XF s an early deployment (ED) release based on Release 12.2 T, which serves as the train's starting point. Early deployment releases contain fixes to software caveats as well as support for new Cisco hardware and software features. Feature support is cumulative from release to release, unless otherwise noted.

Table 1 lists the features supported by the Cisco uBR10012 router in Cisco IOS Release 12.2(4)XF1. For complete feature information, see the *Cisco uBR10012 Universal Broadband Router Hardware Installation Guide*, the *Field Replaceable Units (FRUs)* documents, and the *Cisco uBR10012 Universal Broadband Router Software Configuration Guide*.

Table 1 Early Deployment (ED) Releases for the Cisco uBR10012 Router

ED Release	Additional Software Features[1] and MIBs[2]	Additional Hardware Features	Hardware Availability
Cisco IOS Release 12.2(4)XF1	• N+1 Redundancy for the Cisco CMTS	• Cisco uBR-RFSW RF switch	Now
Cisco IOS Release 12.2(4)XF	• Route Processor Redundancy (RPR) support • Support for the **cable monitor** command	• Cisco uBR-LCP-MC16C Cable Interface Line Card • Cisco uBR-LCP-MC16E Cable Interface Line Card • PRE1 Performance Routing Engine • DC PEM with power supply monitoring connector	Now
Cisco IOS Release 12.2(2)XF1	None	None	
Cisco IOS Release 12.2(2)XF	None	None	
Cisco IOS Release 12.2(1)XF1	• DOCSIS 1.0 and 1.1 Support • DOCSIS Baseline Privacy Interface (BPI) encryption and authentication	None	

Table 1 Early Deployment (ED) Releases for the Cisco uBR10012 Router (continued)

ED Release	Additional Software Features[1] and MIBs[2]	Additional Hardware Features	Hardware Availability
Cisco IOS Release 12.2(1)XF	• Address Verification • Basic Wiretap Support • Broadband Internet Access • Cable Interface Bundling • Cable Interface Setup Facility • Cable Modem Transmission Burst Size • Cisco IOS Quality of Service Features • Configurable Registration Timeout • Customer Premises Equipment Limitation and Override • DOCSIS 1.0 Support • Downstream Channel ID Configuration • Downstream Frequency Override • Dynamic or Mobile Host Support • Dynamic Modulation Profiles • Dynamic Ranging • Dynamic Upstream Modulation • Flap List Support • Host-to-Host Communication (Proxy Address Resolution Protocol) • Integrated DHCP and Time-of-Day Servers • IP Broadcast and Multicast Echo • Modulation Profile Configuration • MPLS-VPN Network Support • Packet Interception • Simple Network Management Protocol Management Information Base • Simple Network Management Protocol v3 • Spectrum Management • Statistical Counters	• Cisco uBR10012 Router • PRE Performance Routing Engine • Cisco uBR-LCP-MC28C Cable Interface Line Card • Timing, Communication, and Control Plus Card Description • Gigabit Ethernet Line Card • OC-12 POS Line Card • DC Power Entry Modules • 2400-Watt AC-Input Power Shelf • Fan Assembly Module • LCD Display Panel	Now

1. Only major features are listed.
2. MIB = Management Information Base

System Requirements

This section describes the system requirements for Cisco Release 12.2(4)XF1 and includes the following sections:

Memory Recommendations

Table 2 displays the memory recommendations of the Cisco IOS feature sets for the Cisco uBR10012 universal broadband router for Cisco IOS Release 12.2(4)XF1. Cisco uBR10012 universal broadband routers are available with a 48-MB or 120-MB Type II PCMCIA Flash memory card.

Table 2 Memory Recommendations for the Cisco uBR10012 Routers, Cisco Release 12.2(4)XF1 Feature Sets

Feature Set	Software Image	Recommended Flash Memory	Recommended DRAM Memory	Runs From
DOCSIS IP Plus	ubr10k-p6-mz	40 MB Flash	128 MB DRAM	RAM
DOCSIS BPI IP Plus	ubr10k-k8p6-mz	40 MB Flash	128 MB DRAM	RAM

Supported Hardware

For detailed descriptions of the new hardware features, see the "New and Changed Information" section on page 12. Cisco IOS Release 12.2(4)XF1 supports the following hardware on Cisco uBR10012 routers:

Table 3 Cisco uBR10012 Universal Broadband Router Overview

Cable Interface Line cards	Up to eight of the following cable interface line cards can be housed in a chassis in any combination: • Cisco uBR-LCP-MC16C • Cisco uBR-LCP-MC16E • Cisco uBR-LCP-MC28C • Cisco uBR-LCP-MC28C-BNC
Network Uplink Line Cards	Up to four line cards with any combination of the following WAN choices: • UBR10-1GE Gigabit Ethernet (GigE) uplink line card • UBR10-1OC12/P-SMI OC-12 POS uplink line card

Table 3 Cisco uBR10012 Universal Broadband Router Overview (continued)

Timing, Communication and Control Plus (TCC+) card	The TCC+ card can connect to an external reference Stratum 3 clock source that is traceable to a Stratum 1 source. Two such sources can be connected for redundancy. The TCC+ card also monitors the cable line cards and power supply use, as well as control the LCD display screen on the chassis. Two cards can be installed for redundancy.
Performance Routing Engine (PRE or PRE1)	One PRE or PRE1 module performs layer 2 and layer 3 packet processing, as well as routing and system management functions. Two PRE or PRE1 modules can be installed for redundancy. **Note** The PRE1 module is functionally identical to the PRE module except that it adds support for the Error Checking and Correction (ECC) feature, which can automatically correct single-bit memory errors.
DC-input Power Entry Module (PEM)	Two DC PEMs provide power to the chassis. The use of two PEMs provide power balancing and redundancy, as well as the ability to hot-swap a single power supply when needed.
Fan assembly module	The fan assembly module contains four fans that are capable of cooling the chassis even with the failure of a single fan. The fan assembly is dual-speed, providing additional cooling when the chassis temperature exceeds the nominal operating range.

Note The Cisco uBR10012 router is compatible with Cisco Broadband Troubleshooter 2.0 and Cisco Cable Manager 2.0.

Determining Your Software Release

To determine the version of Cisco IOS software running on the Cisco uBR10012 universal broadband router, log in to the router and enter the **show version** EXEC command:

```
Router> show version
Cisco Internetwork Operating System Software
IOS (tm) 12.2 XF Software (uBR10000-is-mz), Version 12.2(4)XF1, RELEASE SOFTWARE
```

Upgrading to a New Software Release

For general information about upgrading to a new software release, see *Cisco IOS Upgrade Ordering Instructions* located at: http://www.cisco.com/warp/public/cc/pd/iosw/prodlit/957_pp.htm.

Feature Set Tables

The Cisco IOS software is packaged in feature sets consisting of software images—depending on the platform. Each feature set contains a specific set of Cisco IOS features.

Table 4 lists the features and feature sets supported by the Cisco uBR10012 routers in Cisco IOS Release 12.2(4)XF1 and uses the following conventions:

- Yes—The feature is supported in the software image.
- No—The feature is not supported in the software image.

Note This table might not be cumulative or list all the features in each image. You can find the most current Cisco IOS documentation on Cisco.com. These electronic documents may contain updates and modifications made after the hard-copy documents were printed. For a list of the 12.1 T-train features in this platform, refer to Feature Navigator. For more information about Feature Navigator, see the "Feature Navigator" section on page 28.

Table 4 Feature List by Feature Sets for Cisco uBR10012 Universal Broadband Routers

Feature	Feature Set	
	DOCSIS IP Plus	DOCSIS IP Plus with BPI
IP Routing		
DOCSIS 1.0 and 1.1 Support	Yes	Yes
DHCP[1] Server	Yes	Yes
DRP[2] Server Agent	Yes	Yes
IP Enhanced IGRP[3] Route Authentication	Yes	Yes
Management		
Cisco Call History MIB Command Line Interface	Yes	Yes
Cisco IOS Internationalization	Yes	Yes
DOCSIS Ethernet MIB Objects Support (RFC 2665)	Yes	Yes
DOCSIS OSSI[4] Objects Support (RFC 2233)	Yes	Yes
Dynamic Ranging Support	Yes	Yes
Entity MIB, Phase 1	Yes	Yes
Interface Command Enhancements	Yes	Yes
Internal Modem Configuration File Editor	Yes	Yes
MIB Enhancements	Yes	Yes
BPI[5] and BPI+ MIB	No	Yes
LinkUp/Down Traps Support (RFC 2233)	Yes	Yes
RF Interface MIB	Yes	Yes
SNMPv2C[6] and SNMPv3[7]	Yes	Yes
Multimedia		
Bidirectional PIM[8]	Yes	Yes
Stub IP Multicast Routing	Yes	Yes
Quality of Service		
Dynamic Upstream Modulation	Yes	Yes
DOCSIS 1.0+[9] QoS Enhancements	Yes	Yes

Table 4 Feature List by Feature Sets for Cisco uBR10012 Universal Broadband Routers (continued)

Feature	Feature Set	
	DOCSIS IP Plus	DOCSIS IP Plus with BPI
Downstream QoS Handling	Yes	Yes
Downstream Traffic Shaping	Yes	Yes
Dynamic Map-Advance	Yes	Yes
Improved Upstream QoS	Yes	Yes
Multiple SID Support (static only)	Yes	Yes
QoS Configuration	Yes	Yes
QoS Profile Enforcement	Yes	Yes
Read/Create Implementation of QoS	Yes	Yes
RTP[10] Header Compression	Yes	Yes
Time of Day (ToD) Server	Yes	Yes
Upstream Address Verification	Yes	Yes
Upstream Traffic Shaping	Yes	Yes
Security		
Automated Double Authentication	Yes	Yes
BPI and BPI+ Encryption	No	Yes
Cisco IOS Firewall Enhancements	Yes	Yes
Dynamic Mobile Hosts	Yes	Yes
HTTP[11] Security	Yes	Yes
Named Method Lists for AAA[12] Authorization & Accounting	Yes	Yes
Per-User Configuration	Yes	Yes
VPN		
MPLS VPN Support for Subinterfaces and Interface Bundles	Yes	Yes
WAN Optimization		
PAD[13] Subaddressing	Yes	Yes

1. DHCP = Dynamic Host Configuration Protocol
2. DRP = Director Response Protocol
3. IGRP = Interior Gateway Routing Protocol
4. OSSI = Operations Support System Interface
5. BPI = Baseline Privacy Interface
6. SNMPv2 = Simple Network Management Protocol version 2
7. SNMPv3 = Simple Network Management Protocol version 3
8. PIM = Protocol Independent Multicast
9. The DOCSIS 1.0+ QoS Enhancements is a set of Cisco's Quality of Service extensions to DOCSIS 1.0 to enable basic VoIP service over the DOCSIS link before DOCSIS 1.1 becomes available. The main enhancements include support for dynamic creation and teardown of flows during voice calls, support for one new unsolicited grant service (UGS) slot scheduling mechanism for voice slots, and per IP-precedence rate shaping on the downstream.
10. RTP = Real-Time Transport Protocol
11. HTTP = Hypertext Transfer Protocol

12. AAA =authentication, authorization, and accounting
13. PAD = packet assembler/disassembler

Important Notes

The following sections contain important notes about Cisco IOS Release 12.2(4)XF1 that apply to the Cisco uBR10012 universal broadband router.

Avoiding the Dropping of SNMP Traps

When the **snmp-server enable traps** command is given without any options, it enables all traps, which can generate a significant number of traps at key events, such as system power-up. If the SNMP queue is not large enough to handle all of the traps, new traps will be dropped without notification until the existing traps are sent and slots become available in the queue.

You can do two things to avoid dropping traps in this situation:

- Increase the SNMP trap queue size. The default queue size is 10, which is insufficient to handle all traps. Use the **snmp-server queue-length** *length* global configuration command to increase the queue size. The *length* parameter can range from 10 to 1000. Increase the queue size until traps are no longer dropped.
- Disable unneeded SNMP traps. For example, if you do not need SYSLOG traps (which are sent for every message displayed on the console), disable those traps as follows:

```
router(config)# snmp-server enable traps
router(config)# no snmp-server enable traps syslog
```

Cable Monitor Support

Cisco IOS Release 12.2(4)XF1 supports the **cable monitor** command, but earlier releases of software for the Cisco uBR10012 router do not support this feature.

Configuring the Routing Protocol Causes a Reset of the Cable Modems

Be aware that when configuring a routing protocol on an interface, the Cisco IOS software must reset the interface to enable the change. This normally does not significantly affect operations on the interface, except that when this is done on a cable interface, it causes all cable modems on that particular downstream to reinitialize, potentially interfering with data transmission on that downstream. Therefore you should use the interface configuration commands, such as **router rip**, on a cable interface only when a minimum of subscribers would be affected.

Limitation on Vendor-Specific Information in the DOCSIS Configuration File

DOCSIS requires that when the cable modem sends its Registration Request (REG-REQ) message to the CMTS, it must include the configuration information found in the DOCSIS configuration file. This configuration information must include all vendor-specific information fields (VSIF). Because MAC-layer management messages, such as REG-REQ, have a maximum data size of 1522 bytes, this limits the amount of VSIF information that can be included in the DOCSIS configuration file.

In particular, the maximum packet size imposes a limit on the number of Cisco IOS CLI commands you can include as VSIF fields in the DOCSIS configuration file. The exact number of commands that will fit depends on the other configuration information included in the file, as well as the length of each command.

If the REG-REQ message is larger than 1522 bytes, the cable modem will likely report errors similar to the following errors that appears on Cisco uBR900 series cable access routers:

```
%LINK-4-TOOBIG: Interface cable-modem0, Output packet size of 1545 bytes too big
%LINEPROTO-5-UPDOWN: Line protocol on Interface cable-modem0, changed state to down
```

In addition, the CMTS will also report that the cable modem timed out during the registration process. If this occurs, you can try the following steps:

- Reduce the length of the commands by using the abbreviated form of the command. For example, you can specify the **int c0** instead of the full command **interface cable-modem 0**.
- SNMP MIB objects are not included in the Registration Request message, so wherever possible, replace the CLI commands with the corresponding SNMP MIB object statements in the DOCSIS configuration file.
- If a large number of CLI commands must be given, use VSIF option 128 to download a Cisco IOS configuration file to the cable modem.

For complete details on what is included in the REG-REQ message, see Chapter 6 of the current DOCSIS 1.1 specification (SP-RFIv1.1-I07-010829 or later).

Minimum Revision for the Cisco uBR-LCP Line Card Processor

The Cisco uBR-LCP line processor card must be at revision 4.4 or greater and be using the boothelper image from Cisco IOS Release 12.2(2)XF1 or later to support the Cisco uBR-MC16C and Cisco uBR-MC16E cable interface line cards.

Redundant PRE Modules Are Not Supported Before Release 12.2(4)XF

Cisco IOS Release 12.2(4)XF1 introduces support for the Route Processor Redundancy (RPR) feature for the Performance Routing Engine (PRE) cards. This allows two PRE modules to be installed in a Cisco uBR10012 chassis for redundant operation.

Earlier releases of software for the Cisco uBR10012 router do not support RPR. In these earlier releases, two PRE modules can be installed in a Cisco uBR10012 chassis, but Cisco does not guarantee that upon a failure of the primary PRE module, the redundant PRE module can automatically bring up all DOCSIS cable interface line cards.

For more information about the RPR feature, see the *Route Processor Redundancy (RPR) on the Cisco uBR10012 Universal Broadband Router* feature module, available on Cisco.com and the Customer Documentation CD-ROM.

Web Cache Communication Protocol Is Not Supported

The Cisco uBR10012 router does not support the Web Cache Communication Protocol (WCCP) feature set in Cisco IOS Release 12.2(4)XF.

New and Changed Information

The following sections list the new hardware and software features supported by the Cisco uBR10012 router for Cisco IOS Release 12.2(4)XF1.

New Hardware Features in Release 12.2(4)XF1

Cisco IOS Release 12.2(4)XF supports the following for new hardware features.

Cisco uBR-RFSW RF Switch

The Cisco uBR-RFSW RF Switch provides the physical cabling support for the N+1 Redundancy for the Cisco CMTS feature, which allows a single cable interface to act as the protect interface for up to 7 cable interfaces in the Cisco uBR10012 router, thereby significantly reducing the cost of providing redundant operation. The cable interface connections are made through the Cisco uBR-RFSW RF Switch, which provides the connections required for both upstream and downstream port redundancy.

Note For complete information about the Cisco uBR-RFSW RF Switch, see the documents in the *Cisco uBR-RFSW RF Switch* documentation directory on Cisco.com.

New Software Feature in Release 12.2(4)XF1

Cisco IOS Release 12.2(4)XF includes support for the following new software features.

N+1 Redundancy for the Cisco CMTS

The N+1 Redundancy for the Cisco CMTS feature extends the existing HCCP 1+1 cable interface redundancy feature, where one cable interface is designated the working interface, and a second cable interface is the protect interface. The protect interface comes online only when the working interface fails.

The N+1 Redundancy feature allows a single cable interface to act as the protect interface for up to 7 cable interfaces in the Cisco uBR10012 router, thereby significantly reducing the cost of providing redundant operation. The cable interface connections are made through the Cisco uBR-RFSW RF Switch.

Note For complete information about the N+1 Redundancy feature, see *the N+1 Redundancy for the Cisco CMTS* chapter in the *Cisco CMTS Feature Guide*.

New Hardware Features in Release 12.2(4)XF

Cisco IOS Release 12.2(4)XF includes support for the following new hardware features.

Cisco uBR-LCP-MC16C Cable Interface Line Card

Cisco IOS Release 12.2(4)XF adds support for the Cisco uBR-LCP-MC16C cable interface line card, which is a combination of the Cisco uBR-LCP and Cisco uBR-MC16C line cards. The Cisco uBR-LCP card adapts the Cisco uBR-MC16C to the electrical requirements and form factor of the Cisco uBR10012 chassis.

The Cisco uBR-LCP-MC16C line card provides one downstream and six upstreams that support the DOCSIS (Annex B) 6 MHz North American channel plans using the ITU J.83 Annex B RF standard. The downstream uses a 6 MHz channel width in the 85 to 860 MHz frequency range, and the upstream supports the 5 to 42 MHz frequency range.

The Cisco uBR10012 chassis supports a maximum of eight Cisco uBR-LCP-MC16C line cards. The Cisco uBR10012 chassis also supports the Cisco uBR-LCP-MC16C card along with any combination of the other supported cable interface line cards, up to a maximum of eight cards.

Note The Cisco uBR-LCP line processor card must be at revision 4.4 or greater and be using the boothelper image from Cisco IOS Release 12.2(2)XF1 or later to support the Cisco uBR-MC16C cable interface line card.

Cisco uBR-LCP-MC16E Cable Interface Line Card

Cisco IOS Release 12.2(4)XF adds support for the Cisco uBR-LCP-MC16E cable interface line card, which is a combination of the Cisco uBR-LCP and Cisco uBR-MC16E line cards. The Cisco uBR-LCP card adapts the Cisco uBR-MC16E to the electrical requirements and form factor of the Cisco uBR10012 chassis.

The Cisco uBR-LCP-MC16E cable interface line card provides one downstream and six upstreams that support the EuroDOCSIS (Annex A) standard. EuroDOCSIS supports the 8 MHz Phase Alternating Line (PAL) and Systeme Electronique Couleur Avec Memoire (SECAM) channel plans using the ITU J.112 Annex A RF standard. The downstream uses an 8 MHz channel width in the 85 to 860 MHz frequency range, and the upstream supports multiple channel widths in the 5 to 65 MHz frequency range.

The Cisco uBR10012 chassis supports a maximum of eight Cisco uBR-LCP-MC16E line cards. The Cisco uBR10012 chassis also supports the Cisco uBR-LCP-MC16E card along with any combination of the other supported cable interface line cards, up to a maximum of eight cards.

Note The Cisco uBR-LCP line processor card must be at revision 4.4 or greater and be using the boothelper image from Cisco IOS Release 12.2(2)XF1 or later to support the Cisco uBR-MC16E cable interface line card.

PRE 1 Performance Routing Engine

Cisco IOS Release 12.2(4)XF adds support for the PRE1 Performance Routing Engine processor card on the Cisco uBR10012 router. The PRE1 module enhances the existing PRE module functionality by adding support for Error Checking and Correction (ECC) for all onboard memory, replacing the simpler parity error algorithm.

Where parity error detection can only detect errors, the ECC feature helps protect against processor downtime by correcting errors as well as detecting them. The PRE1 module can automatically correct single-bit errors as small as 1 bit per nibble, protecting the PRE1 module from memory corruption due to transient memory problems.

The ECC feature is also more sensitive and precise in detecting errors. The PRE1 module can detect an error in only 1 bit out of each 64-bit block. It can also detect errors in two, three, or four bits in each 64-bit block.

Cisco IOS Release 12.2(4)XF automatically enables the ECC feature on PRE1 modules. Two CLI commands are also enhanced to provide information about ECC operation:

- **show hardware pxf xcm**—Adds a display for the ECC counters for each PRE1 module. For the older PRE modules, this command shows the message "ECC is not supported for this revision."
- **clear pxf xcm counters**—Adds support for clearing the ECC counters.

The **show version** command also indicates whether a PRE or PRE1 module is the active processor module.

Note The order number for the PRE1 module is UBR10-PRE1. The order number for a spare PRE1 module is UBR10-PRE1=.

DC PEM with Alarm Status Connector

Cisco IOS Release 12.2(4)XF supports the new model of the DC Power Entry Module (PEM), which is identical in form and function to the original DC PEM, except that the new model includes an RJ-45 connector on the front panel to connect to the power supply monitoring connector on the optional 2400-watt AC-input power shelf.

Note If you are not using the optional 2400-watt AC-input power shelf, both models of DC PEM are functionally identical.

New Software Feature in Release 12.2(4)XF

Cisco IOS Release 12.2(4)XF include supports for the following new software features.

Route Processor Redundancy Support

Cisco IOS Release 12.2(4)XF introduces support for Route Processor Redundancy (RPR) on the Cisco uBR10012 universal broadband router. The RPR feature enables the Cisco uBR10012 to use two PRE or PRE1 modules in a redundant configuration, so that if the primary PRE or PRE1 module fails or becomes inactive, the system automatically performs a *failover*, where the secondary PRE or PRE1 module takes over and assumes full responsibility for systems operations.

The RPR feature does not require a full reboot of the system to perform a failover. When the system is originally initialized, the secondary PRE or PRE1 module performs an abbreviated initialization routine—the module performs all self-checks and loads the Cisco IOS software, but instead of performing normal systems operations it begins monitoring the primary PRE module. If the secondary PRE or PRE1 module detects a failure in the primary module, it can quickly assume the primary responsibility for systems operations.

Support for the cable monitor Command

Cisco IOS Release 12.2(4)XF supports the **cable monitor** command, which allows an external LAN packet analyzer or other server to monitor inbound and outbound data packets for specific types of traffic sent between the Cisco CMTS and the cable modems on a cable interface. This feature enables the CMTS administrator to analyze traffic problems with customer data exchanges. For complete information on configuring and using this feature, see the *Cable Monitor for the Cisco CMTS* chapter in the *Cisco CMTS Feature Guide*, available on Cisco.com and the Customer Documentation CD-ROM.

No New Hardware Features in Release 12.2(2)XF1

Cisco IOS Release 12.2(2)XF1 does not include support for any new hardware features.

No New Software Feature in Release 12.2(2)XF1

Cisco IOS Release 12.2(2)XF1 does not include support for any new software features.

No New Hardware Features in Release 12.2(2)XF

Cisco IOS Release 12.2(2)XF does not include support for any new hardware features.

New Software Feature in Release 12.2(2)XF

Cisco IOS Release 12.2(2)XF does not include support for any new software features.

No New Hardware Features in Release 12.2(1)XF1

Cisco IOS Release 12.2(1)XF1 does not include support for any new hardware features.

New Software Feature in Release 12.2(1)XF1

Cisco IOS Release 12.2(1)XF1 adds software support for DOCSIS Baseline Privacy Interface (BPI) encryption and authentication.

New Hardware Features in Release 12.2(1)XF

Cisco IOS Release 12.2(1)XF introduces the Cisco uBR10012 router chassis and the FRU components described in *Cisco uBR10000 Series Universal Broadband Router Hardware Installation Guide* and the *Field Replaceable Units (FRUs)* documents.

New Software Feature in Release 12.2(1)XF

Cisco IOS Release 12.2(1)XF introduces software support for the Cisco uBR10012 router, as described in the *Cisco uBR10000 Series Universal Broadband Router Software Configuration Guide*.

MIBs

Current MIBs

To obtain lists of supported MIBs by platform and Cisco IOS release, and to download MIB modules, go to the Cisco MIB web site on Cisco.com at http://www.cisco.com/public/sw-center/netmgmt/cmtk/mibs.shtml.

Supported MIBs

The Cisco uBR10012 universal broadband router supports the following categories of MIBs:

- SNMP standard MIBs—These MIBs are required by any agent supporting SNMPv1 or SNMPv2 network management.
- Cisco's platform and network-layer enterprise MIBs—Common across most of Cisco's router platforms. If your network management applications are already configured to support other Cisco routers, such as the 2600 series router, no further configuration is needed unless the version of Cisco IOS software being used has updated these MIBs.
- Cable-specific MIBs—Provide information about the cable interfaces and related information on the Cisco uBR10012 router. They include both DOCSIS-specific MIBs and Cisco-specific enterprise MIBs. If your network management applications have not already been configured for the Cisco uBR10012 routers, these MIBs must be loaded.
- Deprecated MIBs—Supported in earlier releases of Cisco IOS software but have been replaced by more standardized, scalable MIBs. Network Management applications and scripts should convert to the replacement MIBs as soon as possible.
- CISCO-ENTITY-VENDORTYPE-OID-MIB

The cable-specific MIBs are described in the following section. For information on the SNMP standard MIBs and Cisco's platform and network-layer enterprise MIBs, see Cisco's MIB web site at http://www.cisco.com/public/sw-center/netmgmt/cmtk/mibs.shtml.

Cable-Specific MIBs

Table 5 shows the cable-specific MIBs that are supported on the Cisco uBR10012 universal broadband router. The table also provides a brief description of each MIB's contents and the Cisco IOS Software Release in which the MIB was initially functional—earlier releases might have had unsupported prototype versions of the MIB; later releases might have added new attributes and functionality. Because of interdependencies, the MIBs must be loaded in the order given in the table.

Note The names given in Table 5 are the filenames for the MIBs as they exist on Cisco's FTP site (ftp://ftp.cisco.com/pub/mibs/ or http://www.cisco.com/public/sw-center/netmgmt/cmtk/mibs.shtml). Most MIBs are available in both SNMPv1 and SNMPv2 versions; the SNMPv1 versions have *V1SMI* as part of their filenames.

Table 5 Cable-Specific MIBs Supported on Cisco uBR10012 Routers

MIB Filename	Description	Introduced in Release
SNMPv2-SMI.my SNMPv2-SMI-V1SMI.my	This module specifies the Structure of Management Information (SMI) for SNMPv2, as defined in RFC1902.	12.2(1)XF1
SNMPv2-TC.my SNMPv2-TC-V1SMI.my	This module defines the textual conventions as specified in RFC1903.	12.2(1)XF1
SNMPv2-MIB.my SNMPv2-MIB-V1SMI.my	The management protocol, SNMPv2, provides for the exchange of messages that convey management information between the agents and the management stations, as defined in RFC1907.	12.2(1)XF1
CISCO-SMI.my CISCO-SMI-V1SMI.my	This module specifies the SMI for Cisco's enterprise MIBs.	12.2(1)XF1
CISCO-TC.my CISCO-TC-V1SMI.my	This module defines the textual conventions used in Cisco's enterprise MIBs.	12.2(1)XF1
IF-MIB.my IF-MIB-V1SMI.my	This module describes generic objects for the Layer 3 network interface sublayers. This MIB is an updated version of MIB-II's *if* table and incorporates the extensions defined in RFC2233.	12.2(1)XF1
DOCS-IF-MIB.my DOCS-IF-MIB-V1SMI.my	This module describes the DOCSIS-compliant Radio Frequency (RF) interfaces in CMs and the CMTS. This MIB has been released as an RFC2670.	12.2(1)XF1
DOCS-BPI-MIB.my DOCS-BPI-MIB-V1SMI.my	This module describes the attributes for the DOCSIS 1.0-specified Baseline Privacy Interface (BPI) on cable modems and the CMTS.	12.2(1)XF1
DOCS-BPI-PLUS-MIB.my[1] DOCS-BPI-PLUS-MIB-V1SMI.my	This module describes the attributes for the DOCSIS 1.1-specified Baseline Privacy Interface Plus (BPI+) on CMs and the CMTS. This is revision 05 of the MIB. **Note** In DOCSIS 1.1 operation, this MIB replaces the DOCSIS 1.0 version, DOCS-BPI-MIB.	12.2(1)XF1
CISCO-DOCS-EXT-MIB.my CISCO-DOCS-EXT-MIB-V1SMI.my	This module extends the DOCSIS standard RFI MIB (DOCS-IF-MIB) with Cisco-specific extensions, such as QoS attributes and connection status and other information regarding the cable modems and CPE devices supported by the CMTS.	12.2(1)XF1

Table 5 Cable-Specific MIBs Supported on Cisco uBR10012 Routers (continued)

MIB Filename	Description	Introduced in Release
CISCO-CABLE-SPECTRUM-MIB.my CISCO-CABLE-SPECTRUM-MIB-V1SMI.my	This module describes the spectrum management and flap list attributes. **Note** The Cisco uBR10012 router supports only the flap list attributes in this MIB.	12.2(2)XF1
DOCS-QOS-MIB.my[1] DOCS-QOS-MIB-V1SMI.my	This module describes the quality of service (QoS) attributes. This is revision 04 of the MIB.	12.2(2)XF1
IGMP-MIB (RFC2933)[1]	This module describes the IGMP protocol attributes, as defined in RFC2933.	12.2(2)XF1
DOCS-IF-EXT-MIB.my[1]	This is the extension of module of the RFC2670 (DOCS-IF-MIB).	12.2(2)XF1

1. These MIBs are in draft form. They have not yet been finalized by the DOCSIS committee and are subject to change with future releases.

Deprecated MIBs

Old Cisco MIBs will be replaced in a future release. Currently, OLD-CISCO-* MIBs are being converted into more scalable MIBs without affecting existing Cisco IOS products or network management system (NMS) applications. You can update from deprecated MIBs to the replacement MIBs as shown in Table 6.

Table 6 Replacements for Deprecated MIBs

Deprecated MIB	Replacement
OLD-CISCO-APPLETALK-MIB	RFC1243-MIB
OLD-CISCO-CHASSIS-MIB	ENTITY-MIB
OLD-CISCO-CPUK-MIB	To be determined
OLD-CISCO-DECNET-MIB	To be determined
OLD-CISCO-ENV-MIB	CISCO-ENVMON-MIB
OLD-CISCO-FLASH-MIB	CISCO-FLASH-MIB
OLD-CISCO-INTERFACES-MIB	IF-MIB CISCO-QUEUE-MIB
OLD-CISCO-IP-MIB	To be determined
OLD-CISCO-MEMORY-MIB	CISCO-MEMORY-POOL-MIB
OLD-CISCO-NOVELL-MIB	NOVELL-IPX-MIB
OLD-CISCO-SYS-MIB	(Compilation of other OLD* MIBs)
OLD-CISCO-SYSTEM-MIB	CISCO-CONFIG-COPY-MIB
OLD-CISCO-TCP-MIB	CISCO-TCP-MIB
OLD-CISCO-TS-MIB	To be determined
OLD-CISCO-VINES-MIB	CISCO-VINES-MIB
OLD-CISCO-XNS-MIB	To be determined

Note Some of the MIBs listed in Table 6 represent feature sets that are not supported on Cisco uBR10012 universal broadband routers.

Note *Cisco Management Information Base (MIB) User Quick Reference* is no longer published. If you have an account with Cisco.com, you can find the current list of MIBs supported by Cisco. To reach the *Cisco Network Management Toolkit*, go to Cisco.com, press **Login**, and then go to **Software Center: Network Mgmt Products: Cisco Network Management Toolkit: Cisco MIB**.

Caveats

Caveats describe unexpected behavior in Cisco IOS software releases. Severity 1 caveats are the most serious caveats; severity 2 caveats are less serious. Severity 3 caveats are moderate caveats, and only selected severity 3 caveats are included in the caveats document.

All caveats in Cisco IOS Release 12.2 are also in Cisco IOS Release 12.2(4)XF1.

For information on caveats in Cisco IOS Release 12.2, see *Caveats for Cisco IOS Release 12.2*. This document lists severity 1 and severity 2 caveats and only selected severity 3 caveats, and is located on Cisco.com and the Documentation CD-ROM.

Caveat numbers and brief descriptions are listed in Table 13 and Table 15. For details about a particular caveat, go to Bug Toolkit at:

http://www.cisco.com/kobayashi/bugs/bugs.html

To access this location, you must have an account on Cisco.com. For information about how to obtain an account, go to the "Feature Navigator" section on page 28.

Note If you have an account with Cisco.com, you can use Bug Navigator II to find caveats of any severity for any release. To reach Bug Navigator II, log in to Cisco.com and click **Software Center: Cisco IOS Software: Cisco Bugtool Navigator II**. Another option is to go to http://www.cisco.com/support/bugtools/.

Open Caveats for Release 12.2(4)XF1

All the caveats listed in Table 7 are open in Cisco IOS Release 12.2(4)XF1. This table lists only severity 1 and 2 caveats and select severity 3 caveats.

Table 7 Open Caveats for Release 12.2(4)XF1

Caveat ID Number	Description
CSCdt25186	The PRE module's FastEthernet interface will always autonegotiate its link speed and duplex settings, even if you have manually set those parameters. This does not impact operations, however, because the interface will automatically negotiate the correct settings and come online.
CSCdu81936	An ARP packet received by the router that has the router's own interface address but with a different MAC address can overwrite the router's own MAC address in the ARP table, causing that interface to stop sending and receiving traffic. This attack is successful only against interfaces on the Ethernet segment that is local to the attacking host. The workaround for this vulnerability is to hard-code the interface's ARP table entry by using the **arp** *ip-address hardware-address type* [*alias*] command. This entry will remain in the ARP table until the **clear arp** command is issued.

CSCdu87551	Console messages similar to the following can appear on the PRE module console, indicating that the active TCC+ card has gone down and immediately come back up.
	
	`02:24:17: %IPCOIR-2-CARD_UP_DOWN: Card in slot 1/1 is down.`
	`02:24:17: %UBR10KTCC-1-NOTCC: No working TCCplus card available in the system`
	`02:24:18: %IPCOIR-5-CARD_DETECTED: Card type 2cable-tccplus (0x2AF) in slot 1/1`
	`02:24:18: %IPCOIR-2-CARD_UP_DOWN: Card in slot 1/1 is up.`
	
	These messages are generated when the PRE module misses a keepalive message from the TCC+ card, but there is no system impact because the TCC+ card is still active and running. There is no workaround.

CSCdv02247	The Cisco uBR10012 router does not support the **cable modem change-frequency**, **cable modem max-hosts**, and **cable modem qos** commands.
CSCdv17163	Under rare circumstances, a GigE line card link can go down after a PRE reload. Possible workarounds are to reenable the interface using the **shutdown** and **no shutdown** commands, or to not use autonegotiation on the link.
CSCdv17552	The cable interface line card can crash at bootup with the following message: `%CRYPTO-0-SELF_TEST_FAILURE: Encryption self-test failed.` The workaround is to reload the cable interface line card.
CSCdv36206	When a cable interface line card is under severe load, the card might generate the following error message and reload: "ipc_send_message_blocked timed_out (Cause: timeout)". The workaround is to reduce the number of cable modems on the line card.

Table 7 Open Caveats for Release 12.2(4)XF1 (continued)

Caveat ID Number	Description

CSCdv69668	A faulty external T1 reference signal can generate the following errors and reset the TCC+ card:
	`01:39:12: %UBR10KTCC-4-CHG_CLK_REF: Clock reference source changed`
	`01:39:43: %UBR10KTCC-2-LOS: Loss of signal with clock reference Primary T1`
	`01:39:43: %UBR10KTCC-4-CHG_CLK_REF: Clock reference source changed to Local oscillator`
	`01:39:56: %IPCOIR-2-CARD_UP_DOWN: Card in slot 2/1 is down.`
	`01:39:56: %IPCGRP-3-CMDOP: IPC command 19 (slot2/1): line card ipc is disabled - dropping non-blocking ipc command`

CSCdv77670	In rare circumstances, the router can crash when giving the **show cable modem** command. This can occur when a cable modem is deleted from an internal data structure at the same time the show command is accessing the data structure. There is no workaround.
CSCdv86324	Multicast packets are not forwarded to the correct slave interface in bundled interfaces. There is no workaround.
CSCdw07630	When the EIGRP or RIP routing protocols are configured on a WAN interface, and the shutdown and no shutdown commands are given on a working WAN interface to force a switchover, the routing tables are not updated to reflect the switchover to the protect interface. This does not occur during an unscheduled switchover of the interface. Possible workarounds are to use the **hccp switch** command to force a switchover instead of the **shutdown** command, or to reset the interface card.
CSCdw19230	When logging in using AAA authentication, users can enter the proper enable password but authentication can fail. The workaround is to reattempt the login, and the authentication usually then succeeds.
CSCdw25801	If the operator uses **hccp** commands to configure a live N+1 cable interface (with working and protect routers), the working interface might crash while trying to send a registration response to a modem. A workaround is to add the HCCP configuration commands at initial system provisioning, or if that is not possible, to use the **hccp lockout** command to remove the working interface from its group while configuring the interface.
CSCdw30013	When HCCP redundancy is configured, and 2000 or more cable modems are connected to a single working Cisco uBR-MC28 cable interface line card, false switch-overs can occur during moderate to high traffic conditions. The protect and working line cards will “flap” back and forth in these conditions. The workaround is to distribute the cable modems more evenly across the cable interface cards.

Closed and Resolved Caveats for Release 12.2(4)XF1

All the caveats listed in Table 8 are resolved in Cisco IOS Release 12.2(4)XF1. This table lists only severity 1 and 2 caveats and select severity 3 caveats.

Table 8 Closed and Resolved Caveats for Release 12.2(4)XF1

Caveat ID Number	Description
CSCdv13224	In rare situations, the upstream on a slave interface in a bundle might stop passing traffic when the downstream traffic on the interface exceeds 70 kpps on a continuous basis for approximately 4 hours. The workaround is to reduce the downstream traffic below 60 kpps or so for a few moments to clear the upstream.
CSCdv86213	The router can crash at boot when adding an entry for the clock card in the SNMP MIB. There is no workaround.
CSCdw13008	Dynamic routes that are learned through routing protocols such as RIP and OSPF are not correctly populated in the processor's routing tables, which causes those routes to be unusable during packet processing. Possible workarounds are to use static routes on the router, or to turn on tag-switching on any one interface.

Open Caveats for Release 12.2(4)XF

All the caveats listed in Table 9 are open in Cisco IOS Release 12.2(4)XF. This table lists only severity 1 and 2 caveats and select severity 3 caveats.

Table 9 Open Caveats for Release 12.2(4)XF

Caveat ID Number	Description
CSCdt25186	The PRE module's FastEthernet interface will always autonegotiate its link speed and duplex settings, even if you have manually set those parameters. This does not impact operations, however, because the interface will automatically negotiate the correct settings and come online.
CSCdu81936	An ARP packet received by the router that has the router's own interface address but with a different MAC address can overwrite the router's own MAC address in the ARP table, causing that interface to stop sending and receiving traffic. This attack is successful only against interfaces on the Ethernet segment that is local to the attacking host. The workaround for this vulnerability is to hard-code the interface's ARP table entry by using the **arp** *ip-address hardware-address type* [*alias*] command. This entry will remain in the ARP table until the **clear arp** command is issued.

Table 9 Open Caveats for Release 12.2(4)XF (continued)

Caveat ID Number	Description

CSCdu87551	Console messages similar to the following can appear on the PRE module console, indicating that the active TCC+ card has gone down and immediately come back up.
	`02:24:17: %IPCOIR-2-CARD_UP_DOWN: Card in slot 1/1 is down.`
	`02:24:17: %UBR10KTCC-1-NOTCC: No working TCCplus card available in the system`
	`02:24:18: %IPCOIR-5-CARD_DETECTED: Card type 2cable-tccplus (0x2AF) in slot 1/1`
	`02:24:18: %IPCOIR-2-CARD_UP_DOWN: Card in slot 1/1 is up.`
	These messages are generated when the PRE module misses a keepalive message from the TCC+ card, but there is no system impact because the TCC+ card is still active and running. There is no workaround.

CSCdv02247	The Cisco uBR10012 router does not support the **cable modem change-frequency**, **cable modem max-hosts**, and **cable modem qos** commands.
CSCdv13224	In rare situations, the upstream on a slave interface in a bundle might stop passing traffic when the downstream traffic on the interface exceeds 70 kpps on a continuous basis for approximately 4 hours. The workaround is to reduce the downstream traffic below 60 kpps or so for a few moments to clear the upstream.
CSCdv17163	Under rare circumstances, a GigE line card link can go down after a PRE reload. Possible workarounds are to reenable the interface using the **shutdown** and **no shutdown** commands, or to not use autonegotiation on the link.
CSCdv17552	The cable interface line card can crash at bootup with the following message: `%CRYPTO-0-SELF_TEST_FAILURE: Encryption self-test failed.` The workaround is to reload the cable interface line card.
CSCdv36206	When a cable interface line card is under severe load, the card might generate the following error message and reload: “ipc_send_message_blocked timed_out (Cause: timeout)”. The workaround is to reduce the number of cable modems on the line card.

CSCdv69668	A faulty external T1 reference signal can generate the following errors and reset the TCC+ card:
	`01:39:12: %UBR10KTCC-4-CHG_CLK_REF: Clock reference source changed`
	`01:39:43: %UBR10KTCC-2-LOS: Loss of signal with clock reference Primary T1`
	`01:39:43: %UBR10KTCC-4-CHG_CLK_REF: Clock reference source changed to Local oscillator`
	`01:39:56: %IPCOIR-2-CARD_UP_DOWN: Card in slot 2/1 is down.`
	`01:39:56: %IPCGRP-3-CMDOP: IPC command 19 (slot2/1): line card ipc is disabled - dropping non-blocking ipc command`

CSCdv86324	Multicast packets are not forwarded to the correct slave interface in bundled interfaces. There is no workaround.

Closed and Resolved Caveats for Release 12.2(4)XF

All the caveats listed in Table 10 are resolved in Cisco IOS Release 12.2(4)XF. This table lists only severity 1 and 2 caveats and select severity 3 caveats.

Table 10 Closed and Resolved Caveats for Release 12.2(4)XF

Caveat ID Number	Description
CSCdt93976	The router could reload when doing a DNS query to resolve an IP address to its respective DNS hostname. Only certain hostnames generate the problem, and the problem could appear whenever the router needs to display an IP address and hostname, as occurs with the **show users** and other CLI commands. Possible workarounds are to turn DNS domain lookup off with the **no ip domain-lookup** command, or to create a host entry for the problem hostname using the **ip host** command.
CSCdv54518	Fast-switching on the cable interface does not work. Possible workarounds are to enable CEF on the incoming (backhaul) interface or to disable fast-switching on the outgoing cable interface. This caveat is considered closed because it does not apply to the Cisco uBR10012 router and Cisco IOS Release 12.2(4)XF.

Open Caveats for Release 12.2(2)XF1

All the caveats listed in Table 11 are open in Cisco IOS Release 12.2(2)XF1. This table lists only severity 1 and 2 caveats and select severity 3 caveats.

Table 11 Open Caveats for Release 12.2(2)XF1

Caveat ID Number	Description
CSCdu15467	PRE Redundancy: Modems go offline during failover.
CSCdv02247	The Cisco uBR10012 router does not support the **cable modem change-frequency**, **cable modem max-hosts**, and **cable modem qos** commands.
CSCdv17163	Under rare circumstances, a GigE line card link can go down after a PRE reload. Possible workarounds are to reenable the interface using the **shutdown** and **no shutdown** commands, or to not use autonegotiation on the link.
CSCdv17552	The cable interface line card can crash at bootup with the following message: `%CRYPTO-0-SELF_TEST_FAILURE: Encryption self-test failed.` The workaround is to reload the cable interface line card.
CSCdv36206	When a cable interface line card is under severe load, the card might generate the following error message and reload: “ipc_send_message_blocked timed_out (Cause: timeout)”. The workaround is to reduce the number of cable modems on the line card.
CSCdv54518	Fast-switching on the cable interface does not work. Possible workarounds are to enable CEF on the incoming (backhaul) interface or to disable fast-switching on the outgoing cable interface.

Closed and Resolved Caveats for Release 12.2(2)XF1

All the caveats listed in Table 12 are resolved in Cisco IOS Release 12.2(2)XF1. This table lists only severity 1 and 2 caveats and select severity 3 caveats.

Table 12 Closed and Resolved Caveats for Release 12.2(2)XF1

Caveat ID Number	Description
CSCdu83820	In rare situations during the bootup sequence, SYS-2-BADSGARE error messages could appear on the console.
CSCdv14807	Packets can be dropped when the OC-12 POS line card is pinged. The problem occurs when one end of the POS connection has keepalive messages enabled and the other end does not. The workaround is to configure both ends of the OC-12 POS connection with the same keepalive configuration.
CSCdv46210	The Line Card Processor could crash in certain situations when HCCP is enabled and the cable interface is shutdown for a switchover.
CSCdv54522	The Cisco uBR10012 software could encounter memory leaks when SNMP is enabled. There is no workaround.

Open Caveats for Release 12.2(2)XF

All the caveats listed in Table 13 are open in Cisco IOS Release 12.2(2)XF. This table lists only severity 1 and 2 caveats and select severity 3 caveats.

Table 13 Open Caveats for Release 12.2(2)XF

Caveat ID Number	Description
CSCdu15467	PRE Redundancy: Modems go offline during failover.
CSCdu83820	In rare situations during the bootup sequence, SYS-2-BADSGARE error messages could appear on the console.
CSCdv02247	The Cisco uBR10012 router does not support the **cable modem change-frequency**, **cable modem max-hosts**, and **cable modem qos** commands.
CSCdv14807	Packets can be dropped when the OC-12 POS line card is pinged. The problem occurs when one end of the POS connection has keepalive messages enabled and the other end does not. The workaround is to configure both ends of the OC-12 POS connection with the same keepalive configuration.
CSCdv17552	The cable interface line card can crash at bootup with the following message: `%CRYPTO-0-SELF_TEST_FAILURE: Encryption self-test failed.` The workaround is to reload the cable interface line card.

Closed and Resolved Caveats for Release 12.2(2)XF

All the caveats listed in Table 14 are resolved in Cisco IOS Release 12.2(2)XF. This table lists only severity 1 and 2 caveats and select severity 3 caveats.

Table 14 Closed and Resolved Caveats for Release 12.2(2)XF

Caveat ID Number	Description
CSCdt81563	Pkt corruption on MCAST/BCAST echo
CSCdu25108	RP stops communicating with LC, after enabling debug on LC

Closed and Resolved Caveats for Release 12.2(1)XF1

All the caveats listed in Table 15 are resolved in Cisco IOS Release 12.2(1)XF1. This table lists only severity 1 and 2 caveats and select severity 3 caveats.

Table 15 Closed and Resolved Caveats for Release 12.2(1)XF1

Caveat ID Number	Description
CSCdu24213	Malloc failure and interface goes down
CSCdu18867	Interface rest after all modems go offline by RF switch
CSCdt93974	CdxCmtsOnOffNotification

Related Documentation

The following sections describe the documentation available for the Cisco uBR10012. These documents consist of hardware and software installation guides, Cisco IOS configuration guides and command references, system error messages, and other documents.

Documentation is available as printed manuals or electronic documents. Use these release notes with these documents:

- Release-Specific Documents, page 26
- Platform-Specific Documents, page 27
- Cisco IOS Software Documentation Set, page 28

Release-Specific Documents

The following documents are specific to Release 12.2 and are located on Cisco.com and the Documentation CD-ROM:

- Product bulletins, field notices, and other release-specific documents on Cisco.com, beginning under the **Service & Support** heading:

  Technical Documents

- *Caveats for Cisco IOS Release 12.2*

  On Cisco.com, beginning under the **Service & Support** heading:

  Technical Documents: Cisco IOS Software Configuration: Cisco IOS Release 12.1: Release Notes: Caveats: Caveats for Release 12.2

  On the Documentation CD-ROM:

Cisco Product Documentation: Cisco IOS Software Configuration: **Cisco IOS Release 12.2**: **Caveats**

Note If you have an account with Cisco.com, you can use Bug Navigator II to find caveats of any severity for any release. To reach Bug Navigator II, log in to Cisco.com and click **Software Center: Cisco IOS Software: Cisco Bugtool Navigator II**. Another option is to go to http://www.cisco.com/support/bugtools/.

Platform-Specific Documents

The following related documents are available on Cisco.com and the Documentation CD-ROM:

- *Cisco uBR10012 Series Hardware Installation Guide*
- *Cisco uBR10012 Series Software Configuration Guide*
- *Field Replaceable Units (FRUs)*
- *Cisco Broadband Cable Command Reference Guide*

The following documents describe the Cisco uBR-RFSW RF Switch:

- *Cisco uBR-RFSW RF Switch Installation and Configuration Guide*
- *Cisco uBR-FRSW RF Switch Cabling Instructions*
- *Cisco uBR-RFSW RF Switch Regulatory Compliance and Safety Information*

Note Some of the above documentation will not be available on Cisco.com until the official release of the Cisco uBR10012 router and its public software release.

On Cisco.com, beginning under the **Service & Support** heading:

Technical Documents: Broadband/Cable Solutions: **Cisco uBR10000 Series Universal Broadband Routers**

Note **The** *Broadband Command Consolidation* is available on Cisco.com through the following path: **Technical Documents: Broadband/Cable Solutions**

On the Documentation CD-ROM:

Cisco Product Documentation: Broadband/Cable Solutions: **Cisco uBR10000 Series Universal Broadband Routers**

Note **The** *Broadband Command Consolidation* is available on the Documentation CD-ROM through the following path: **Cisco Product Documentation: Broadband/Cable Solutions**

Tip Information about features of the Cisco *uBR10012* universal broadband router, as well as software release notes, are available on Cisco.com at: http://www.cisco.com/univercd/cc/td/doc/product/cable/ubr10k/index.htm.

Feature Navigator

Feature Navigator is a web-based tool that enables you to quickly determine which Cisco IOS software images support a particular set of features and which features are supported in a particular Cisco IOS image.

Feature Navigator is available 24 hours a day, 7 days a week. To access Feature Navigator, you must have an account on Cisco.com. If you have forgotten or lost your account information, e-mail the Contact Database Administration group at cdbadmin@cisco.com. If you do not have an account on Cisco.com, go to http://www.cisco.com/register and follow the directions to establish an account.

To use Feature Navigator, you must have a JavaScript-enabled web browser such as Netscape 3.0 or later, or Internet Explorer 4.0 or later. Internet Explorer 4.0 always has JavaScript enabled. To enable JavaScript for Netscape 3.x or Netscape 4.x, follow the instructions provided with the web browser. For JavaScript support and enabling instructions for other browsers, check with the browser vendor.

Feature Navigator is updated when major Cisco IOS software releases and technology releases occur. It contains feature information about mainline-, T-, S-, and P-trains. You can access Feature Navigator at the following URL:

http://www.cisco.com/go/fn

Cisco IOS Software Documentation Set

The Cisco IOS software documentation set consists of the Cisco IOS configuration guides, Cisco IOS command references, and several other supporting documents. The Cisco IOS software documentation set is shipped with your order in electronic form on the Documentation CD-ROM, unless you specifically ordered the printed versions.

Documentation Modules

Each module in the Cisco IOS documentation set consists of one or more configuration guides and one or more corresponding command references. Chapters in a configuration guide describe protocols, configuration tasks, and Cisco IOS software functionality, and contain comprehensive configuration examples. Chapters in a command reference provide complete command syntax information. Use each configuration guide with its corresponding command reference.

On Cisco.com and the Documentation CD-ROM, two master hot-linked documents provide information for the Cisco IOS software documentation set.

On Cisco.com, beginning under the **Service & Support** heading:

Technical Documents: Cisco IOS Software Configuration: Cisco IOS Release 12.2: Configuration Guides and Command References

On the Documentation CD-ROM:

Cisco IOS Software Configuration: Cisco IOS Release 12.2: Configuration Guides and Command References

Release 12.2 Documentation Set

Note You can find the most current Cisco IOS documentation on Cisco.com and the Documentation CD-ROM. These electronic documents may contain updates and modifications made after the paper documents were printed.

On Cisco.com, beginning under the **Service & Support** heading:

Technical Documents: Cisco IOS Software Configuration: Cisco IOS Release 12.2: Configuration Guides and Command References

On the Documentation CD-ROM:

Cisco Product Documentation: Cisco IOS Software Configuration: **Cisco IOS Release 12.2**: **Configuration Guides and Command References**

Note The *Cisco Management Information Base (MIB) User Quick Reference* publication is no longer published. For the latest list of MIBs supported by Cisco, see *Cisco Network Management Toolkit* on Cisco.com. From Cisco.com, click on the following path: **Service & Support: Software Center: Network Mgmt Products: Cisco Network Management Toolkit: Cisco MIB**.

Obtaining Documentation

The following sections provide sources for obtaining documentation from Cisco Systems.

World Wide Web

You can access the most current Cisco documentation on the World Wide Web at http://www.cisco.com. Translated documentation can be accessed at http://www.cisco.com/public/countries_languages.shtml.

Documentation CD-ROM

Cisco documentation and additional literature are available in a CD-ROM package, which ships with your product. The Documentation CD-ROM is updated monthly and may be more current than printed documentation. The CD-ROM package is available as a single unit or as an annual subscription.

Ordering Documentation

Cisco documentation is available in the following ways:

- Registered Cisco Direct Customers can order Cisco product documentation from the Networking Products MarketPlace:

  http://www.cisco.com/cgi-bin/order/order_root.pl

- Registered Cisco.com users can order the Documentation CD-ROM through the online Subscription Store:

  http://www.cisco.com/go/subscription

- Nonregistered Cisco.com users can order documentation through a local account representative by calling Cisco corporate headquarters (California, USA) at 408 526-7208 or, in North America, by calling 800 553-NETS(6387).

Documentation Feedback

If you are reading Cisco product documentation on the World Wide Web, you can submit technical comments electronically. Click **Feedback** in the toolbar and select **Documentation**. After you complete the form, click **Submit** to send it to Cisco.

You can e-mail your comments to bug-doc@cisco.com.

To submit your comments by mail, for your convenience many documents contain a response card behind the front cover. Otherwise, you can mail your comments to the following address:

Cisco Systems, Inc.
Document Resource Connection
170 West Tasman Drive
San Jose, CA 95134-9883

We appreciate your comments.

Obtaining Technical Assistance

Cisco provides Cisco.com as a starting point for all technical assistance. Customers and partners can obtain documentation, troubleshooting tips, and sample configurations from online tools. For Cisco.com registered users, additional troubleshooting tools are available from the TAC web site.

Cisco.com

Cisco.com is the foundation of a suite of interactive, networked services that provides immediate, open access to Cisco information and resources at anytime, from anywhere in the world. This highly integrated Internet application is a powerful, easy-to-use tool for doing business with Cisco.

Cisco.com provides a broad range of features and services to help customers and partners streamline business processes and improve productivity. Through Cisco.com, you can find information about Cisco and our networking solutions, services, and programs. In addition, you can resolve technical issues with online technical support, download and test software packages, and order Cisco learning materials and merchandise. Valuable online skill assessment, training, and certification programs are also available.

Customers and partners can self-register on Cisco.com to obtain additional personalized information and services. Registered users can order products, check on the status of an order, access technical support, and view benefits specific to their relationships with Cisco.

To access Cisco.com, go to the following web site:

http://www.cisco.com

Technical Assistance Center

The Cisco TAC web site is available to all customers who need technical assistance with a Cisco product or technology that is under warranty or covered by a maintenance contract.

Contacting TAC by Using the Cisco TAC Web Site

If you have a priority level 3 (P3) or priority level 4 (P4) problem, contact TAC by going to the TAC web site:

http://www.cisco.com/tac

P3 and P4 level problems are defined as follows:

- P3—Your network performance is degraded. Network functionality is noticeably impaired, but most business operations continue.
- P4—You need information or assistance on Cisco product capabilities, product installation, or basic product configuration.

In each of the above cases, use the Cisco TAC web site to quickly find answers to your questions.

To register for Cisco.com, go to the following web site:

http://www.cisco.com/register/

If you cannot resolve your technical issue by using the TAC online resources, Cisco.com registered users can open a case online by using the TAC Case Open tool at the following web site:

http://www.cisco.com/tac/caseopen

Contacting TAC by Telephone

If you have a priority level 1(P1) or priority level 2 (P2) problem, contact TAC by telephone and immediately open a case. To obtain a directory of toll-free numbers for your country, go to the following web site:

http://www.cisco.com/warp/public/687/Directory/DirTAC.shtml

P1 and P2 level problems are defined as follows:

- P1—Your production network is down, causing a critical impact to business operations if service is not restored quickly. No workaround is available.
- P2—Your production network is severely degraded, affecting significant aspects of your business operations. No workaround is available.

This document is to be used in conjunction with the documents listed in the "Related Documentation" section on page 26