



Introduction

This release notes contain information about downloading and installing Cisco IOS Release 12.2(33)CX. It also provides new and changed information, hardware support, limitations and restrictions, and caveats for Cisco IOS Release 12.2(33)CX.

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Cisco Remote-PHY Solution

Driven by market evolution towards triple-play services, cable operators in emerging markets are seeking standardized and digital fiber-based solutions for economical and future proof access technologies. Much of the demand is driven by the need to provide higher bandwidth packet transport for Internet connectivity, video and voice services. DOCSIS® is known as a standardized technology for services over cable and thus has strong interoperability between system providers and robust Quality of Service (QoS) methods, ensuring packet delivery during periods of network congestion. Traditionally, DOCSIS runs on linear fiber (or HFC) to provide service and is not naturally applicable for digital fiber. However, Cisco has bridged the gap by inventing a new access technology called Cisco Remote-PHY.

Cisco Remote-PHY (a.k.a REMOTE-PHY) enables cable operators to deploy DOCSIS-based networks over digital fiber while obtaining all of the benefits of using standards-based equipments. These benefits include the utilization of scalable, cheap and easy to operate digital fiber, standardized and proven QoS for various services, lower cost, and wide availability of both cable modem and set-top box systems. Furthermore, with deep fiber, the optical noise contribution to SNR is eliminated. As a result, the remote QAM modulator runs at higher orders of modulation as compared to a centralized QAM modulator. Cisco Remote-PHY is apt where digital deep fiber is preferred.

This document presents an overview of using Cisco Remote-PHY as a solution for digital fiber and DOCSIS pursued cable operators. It provides a cost-effective digital fiber-based DOCSIS solution that uses Ethernet PON (EPON), Gigabit-capable Passive Optical Networks (GPON), or Metro Ethernet (MetroE) as transmission

network between the CMTS and CM, which gives customers an optimal option to utilize the Passive Optical Network (PON) technology and DOCSIS in the same network.



Note Cisco IOS Release 12.2(33)CX is generally available for field deployment. However, we recommend that you validate and qualify Cisco IOS Release 12.2(33)CX in a limited field trial with your specific network configuration requirements in order to ensure a smoother, faster, and successful field deployment.

This chapter includes the following sections:

System Requirements

These sections describe the system requirements for Cisco IOS Release 12.2(33)CX:

Memory Requirements

This section describes the memory requirements for Cisco IOS Release 12.2(33)CX.

[Table 1: Memory Recommendations for the Cisco Remote-PHY solution, on page 2](#) displays the memory recommendations for the Cisco Remote-PHY solution with Cisco IOS Release 12.2(33)CX.

Table 1: Memory Recommendations for the Cisco Remote-PHY solution

Feature Set	Route Processor	Software Image	RecommendedFlash Memory ¹	RecommendedDRAM Memory ²	RunsFrom
DOCSIS Base 3 DES image and Lawful Intercept for Cisco PRE4 ³	PRE4	ubr10k4-k9p6u2-mz	128 MB	2 GB	RAM
DOCSIS BPI and Lawful Intercept for Cisco PRE4	PRE4	ubr10k4-k8p6u2-mz	128 MB	2 GB	RAM
DOCSIS Base 3DES image and Lawful Intercept for Cisco PRE5	PRE5	urb10k5-k9p6u2-mz	256 MB	4 GB	RAM
DOCSIS BPI and Lawful Intercept for Cisco PRE5	PRE5	urb10k5-k8p6u2-mz	256 MB	4 GB	RAM
Coaxial Media Converter	None	cmc-16x4-os-1.0.bin cmc-16x4-os-1.1.bin	96 MB	256 MB	RAM

¹ Recommended FLASH Memory refers to bootflash memory.

² DRAM memory is not configurable on the Cisco uBR10012 router.

³ PRE = Processor Routing Engine

Hardware Supported

The following sections list the hardware supported on various Cisco IOS Releases:

Cable Interface Line Cards Supported

[Table 2: Supported Cable Interface Line Cards and Processor Engines](#), on page 3 provides information about the supported cable interface line cards and processor engines in Cisco IOS Release 12.2(33)CX.

Table 2: Supported Cable Interface Line Cards and Processor Engines

Supported Line Card	Supported Processor Engine
Cisco uBR-MC3GX60V-RPHY—maximum 8	PRE4, PRE5
Cisco uBR-MC3GX60V—maximum 8	PRE4, PRE5
Cisco UBR-MC20X20—maximum 8	PRE4, PRE5

Other Hardware Supported

The table provides information about the other hardware components supported in Cisco IOS Release 12.2(33)CX.

Table 3: Other hardware components supported in Cisco IOS Release 12.2(33)CX

Other Supported Hardware	Cisco IOS Release 12.2(33)CX	Minimal Cisco IOS Release
Cisco uBR10012 universal broadband router DTCC card	Yes	Cisco IOS Release 12.2(33) SCB
Cisco 10000 Series SIP-600 and WAN SPAs (5-Port Gigabit Ethernet and the 1-Port 10 Gigabit Ethernet SPAs)	Yes	Cisco IOS Release 12.2(33) SCB
Cisco 10000 Series SIP-600 with the Cisco Wideband SPA	Yes	Cisco IOS Release 12.2(33) SCB

Other Hardware not Supported

For a list of unsupported hardware, see the End-of-Life and End-of-Sale products at:

http://www.cisco.com/en/US/products/hw/cable/ps2209/prod_eol_notices_list.html

Verifying the Software Version

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

```
Router# show version
Cisco IOS Software, 10000 Software (UBR10K4-K9P6U2-M), Version 12.2(33)CX
EXPERIMENTAL IMAGE ENGINEERING C10K_WEEKLY_BUILD, synced to 122_33_CX_THROTTLE_P
Copyright (c) 1986-2014 by Cisco Systems, Inc.
ROM: System Bootstrap, Version 12.2(20071113:194412), RELEASE SOFTWARE (fc1)
```

Upgrading to a New Software Release

For information about upgrading the Cisco universal broadband routers, see the *Software Installation and Upgrade Procedures* document at the following location:

<http://www.cisco.com/c/en/us/support/docs/routers/10000-series-routers/23233-sw-upgrade-highendrouters-23233.html>

<http://www.cisco.com/c/en/us/support/docs/routers/10000-series-routers/23233-sw-upgrade-highendrouters-23233.html>

Cisco Feature Navigator

The Cisco Feature Navigator is a web-based tool that enables you to determine which Cisco IOS software images support a specific set of features and which features are supported in a specific Cisco IOS image. You can search by feature or by feature set (software image). Under the release section, you can compare Cisco IOS software releases side-by-side to display both the features unique to each software release and the features that the releases have in common.

To access the Cisco Feature Navigator, you must have an account on Cisco.com. If you have forgotten or lost your account information, send a blank e-mail to cco-locksmith@cisco.com. An automatic check verifies that your e-mail address is registered with Cisco.com. If the check is successful, account details with a new random password is e-mailed to you. Qualified users can establish an account on Cisco.com by following the directions found at this URL:

<https://tools.cisco.com/RPF/register/register.do>

The Cisco Feature Navigator is updated regularly when major Cisco IOS software releases and technology releases occur. For the most current information, go to the Cisco Feature Navigator home page at the following URL:

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

For frequently asked questions about the Cisco Feature Navigator, see the FAQs at the following URL:

<http://www.cisco.com/support/FeatureNav/FNFAQ.html>

New and Changed Information

The following sections list the new and modified hardware and software features supported on the Cisco Remote-PHY solution in Cisco IOS Release 12.2(33)CX:

New Hardware Features in Cisco IOS Release 12.2(33)CX

This section describes the new hardware features in the Cisco IOS Release 12.2(33)CX.

Cisco uBR-MC3GX60V-RPHY Line Card

Effective with Cisco IOS Release 12.2(33)CX, the Cisco uBR-MC3GX60V-RPHY Line Card is introduced for the Cisco Remote-PHY solution.

The Cisco uBR-MC3GX60V-RPHY line card is DOCSIS 3.0 compliant and is designed for the Cisco uBR10012 universal broadband router. This line card conforms to the Modular CMTS (M-CMTS) architecture and has the capacity to support up to 72 downstream (DS) and 60 upstream (US) channels.

The Cisco uBR-MC3GX60V-RPHY line card has six Gigabit Ethernet (GE) interface ports organized into three pairs, which connect to the Cisco CMC device via EPON, GPON, or Metro. Each pair supports 1+1 redundancy for the Metro Ethernet ports. The Cisco uBR-MC3GX60V-RPHY line card supports 24 downstream RF channels and 20 upstream RF channels per Gigabit Ethernet port. The Cisco uBR-MC3GX60V-RPHY line card has a front panel display (FPD) to show the licensing status information of the US and DS channels.

For more information, see the [Cisco Remote-PHY Solution Guide](#) document.

Cisco Coaxial Media Converter

Effective with Cisco IOS Release 12.2(33)CX, the Cisco Coaxial Media Converter (CMC) is introduced for the Cisco Remote-PHY solution. Cisco CMC acts as the edge QAM (EQAM) in the Cisco Remote-PHY architecture. It is located between the Cisco CMTS and the cable modem, and controlled by the Cisco CMTS router. Cisco CMC has network interfaces on one side connecting to the fiber (digital and linear) portion of the Hybrid Fiber Coaxial (HFC) plant, and RF interfaces on the other side connecting to the coaxial portion of the HFC plant. The RF output of the Cisco CMC can be combined with other services, such as, analog or digital video services. It uses the linux operating system Cisco CMC OS 1.0. Most of the Cisco CMC configurations are performed on the Cisco CMTS router.

For more information, see the following documents:

- [Cisco Remote-PHY Solution Guide](#)
- [Cisco Coaxial Media Converter Command Reference](#)

Modified Hardware Features in Cisco IOS Release 12.2(33)CX

There are no modified hardware features in Cisco IOS Release 12.2(33)CX.

New Software Features in Cisco IOS Release 12.2(33)CX

This section describes new software features in Cisco IOS Release 12.2(33)CX.

GCP Client

GCP (generic control protocol) is a control protocol between the Cisco CMTS and the Cisco CMC. The Cisco CMTS uses GCP to get status information from and configure the Cisco CMC.

CMC Management

The Cisco CMTS uses the CMC Management module to manage and control the Cisco CMC.

Modified Software Features in Cisco IOS Release 12.2(33)CX

There are no modified software features in Cisco IOS Release 12.2(33)CX.

Features Integrated in Cisco IOS Release 12.2(33)CX

There are no integrated features in Cisco IOS Release 12.2(33)CX

MIBs

To locate and download MIBs for selected platforms, Cisco IOS releases, and feature sets, use Cisco MIB Locator found at the following URL:

<http://tools.cisco.com/ITDIT/MIBS/servlet/index>

If Cisco MIB Locator does not support the MIB information that you need, you can also obtain a list of supported MIBs and download MIBs from the Cisco MIBs page at the following URL:

<http://www.cisco.com/public/sw-center/netmgmt/cmtk/mibs.shtml>

To access Cisco MIB Locator, you must have an account on Cisco.com. If you have forgotten or lost your account information, send a blank e-mail to cco-locksmith@cisco.com. An automatic check verifies that your e-mail address is registered with Cisco.com. If the check is successful, account details with a new random password is e-mailed to you. Qualified users can establish an account on Cisco.com by following the directions found at this URL:

<http://tools.cisco.com/RPF/register/register.do>

For information about the MIBs supported by the Cisco universal broadband routers, see the [Cisco CMTS Universal Broadband Series Router MIB Specifications Guide](#).

New and Changed MIB Information in Cisco IOS Release 12.2(33)CX

The following new MIBs are introduced in Cisco IOS Release 12.2(33)CX:

- CISCO-CDOC-CHGRP-MIB
- CISCO-CMC-MGR-MIB

Limitations and Restrictions

There are no restrictions for the Cisco universal broadband routers in Cisco IOS Release 12.2(33)CX.

Unsupported Hardware

For a list of unsupported hardware, see the End-of-Life and End-of-Sale Notices at:

http://www.cisco.com/en/US/products/hw/cable/ps2209/prod_eol_notices_list.html

Important Notes

Cisco IOS Release 12.2(33)CX

- While upgrading the software images for the Cisco Remote-PHY solution, upgrade the Cisco CMC first, and then upgrade the Cisco CMTS.



Note

Note: If the Cisco CMTS is upgraded before the Cisco CMC, the Cisco CMC may not come online.

- The Spectrum Management feature is not supported on the Cisco uBR-MC3GX60V-RPHY line card.

Obtaining Documentation and Submitting a Service Request

For information on obtaining documentation, submitting a service request, and gathering additional information, see the monthly *What's New in Cisco Product Documentation*, which also lists all new and revised Cisco technical documentation, at:

<http://www.cisco.com/en/US/docs/general/whatsnew/whatsnew.html>

Subscribe to the *What's New in Cisco Product Documentation* as a Really Simple Syndication (RSS) feed and set content to be delivered directly to your desktop using a reader application. The RSS feeds are a free service and Cisco currently supports RSS version 2.0.

