



Cisco Remote PHY System Overview

Finding Feature Information

Your software release may not support all the features that are documented in this module. For the latest feature information and caveats, see the release notes for your platform and software release. The Feature Information Table at the end of this document provides information about the documented features and lists the releases in which each feature is supported.

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

- [Introduction, on page 1](#)
- [Hardware Compatibility Matrix for Cisco Smart PHY 7200, on page 2](#)
- [Benefits, on page 2](#)
- [Cisco Smart PHY 7200 Network, on page 3](#)
- [Cisco cBR-8 Line Card for Remote PHY, on page 3](#)
- [Cisco Smart PHY 7200, on page 4](#)

Introduction

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.

Data Over Cable Systems Interface Standard (DOCSIS®) is a standardized technology for services over cable and thus has strong interoperability between system providers. It also provides 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. Cisco has bridged the gap by introducing a new access technology called the Remote PHY.

Existing Architecture

In the emerging markets, most triple-play consumers live in multi-tenant buildings (referred to as Multi Dwelling Units or MDU) with the number of residents usually being less than 500 residents per building or cluster. These buildings are typically served by fiber with one of several “final 100 meter” technologies installed in the buildings. These technologies include fiber, twisted pair, Ethernet, and coaxial. Cable operators have access to the cable in the building and use this cable for their services. Several technologies exist for

enabling two-way services over cable. These include a number of proprietary and vendor-specific methods. However, a standards-based approach to using cable is typically preferred by operators, since this ensures vendor interoperability.

Need for the Cisco Remote PHY Solution

DOCSIS and EuroDOCSIS are standards that define two-way operation over a cable network. DOCSIS provides the necessary Quality of Service (QoS) tools for ensuring voice call connectivity during periods of network congestion that are anticipated in triple-play networks. DOCSIS is a robust and mature technology for voice, video, and IP video services.

The Cisco Remote PHY solution leverages existing IP technologies like Ethernet PON (EPON), Gigabit-capable Passive Optical Networks (GPON), and Metro Ethernet (MetroE) equipment; it deploys DOCSIS in MDUs over digital fiber to enable two-way services over cable.

Hardware Compatibility Matrix for Cisco Smart PHY 7200



Note Unless otherwise specified, the hardware components introduced in a given Cisco Smart PHY 7200 Software Release are supported in all subsequent releases.

Table 1: Hardware Compatibility Matrix for the Cisco Smart PHY 7200

Cisco CMTS Platform	Cisco Smart PHY 7200
Cisco cBR-8 Converged Broadband Router with Cisco IOS XE Gibraltar 16.10.1 and Later Releases	<p>Cisco Smart PHY 7200 Software 1.x and Later Releases</p> <p>Cisco Smart PHY 7200</p> <ul style="list-style-type: none"> • PID—HA-RPHY

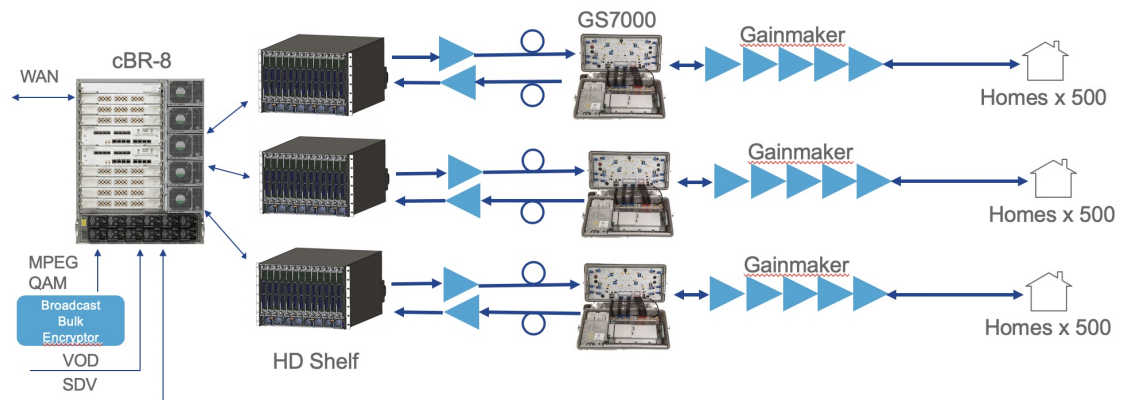
Benefits

- Cost effectively addresses bandwidth requirements for today's Service Groups with low to medium bandwidth requirement
- Dramatically reduces cost of addressing high bandwidth requirements in conjunction with future cloud CMTS solution
- Lower hub space and power requirements
- Enables independent scaling of CMTS Core and PHY
- Migration path to Cloud CMTS

Cisco Smart PHY 7200 Network

Cisco Smart PHY 7200 solution supports the following network architecture, its benefits include:

- Share cBR-8 capacity across multiple hubs
- Fewer RPHY cores required
- Increased cBR-8 scale (ports/SG)
- Higher core license utilization



Cisco cBR-8 Line Card for Remote PHY

Cisco cBR-8 router supports following line card for the Remote PHY system.

Cisco CCAP RF Line Card for Remote PHY

The Cisco CCAP RF line card for remote PHY architecture is available in two flavours:

- CBR-LC-8D31-16U30—This RF line card with the downstream and upstream PHY modules can be connected with the Cisco GS7000 node by configuring it using the **card cBR-CCAP-LC-40G r-phy** command.
- CBR-CCAP-LC-40G-R—This RF line card with no downstream and upstream PHY modules can be connected with the Cisco GS7000 node and Remote PHY Shelf 7200. For more information, see [Cisco cBR Series Converged Cable Access Platform 40G Remote PHY Line Card Data Sheet](#)

Cisco Digital Physical Interface Card

The Cisco Digital Physical Interface Card (DPIC) transmits and receives RF signals between the subscriber and headend over the hybrid fiber-coaxial (HFC) system and is DOCSIS-compliant. This interface card is

designed specifically for the Cisco cBR router. The PID is cBR-DPIC-8X10G. For more information, see [Cisco cBR Series 8x10G Remote PHY Digital Physical Interface Card Data Sheet](#).

The DPIC is installed in the CMTS and connected to the Cisco GS7000 node via the EPON, GPON, or Metro Ethernet. It supports both downstream and upstream traffic. Both the downstream and upstream traffic share the same ports.

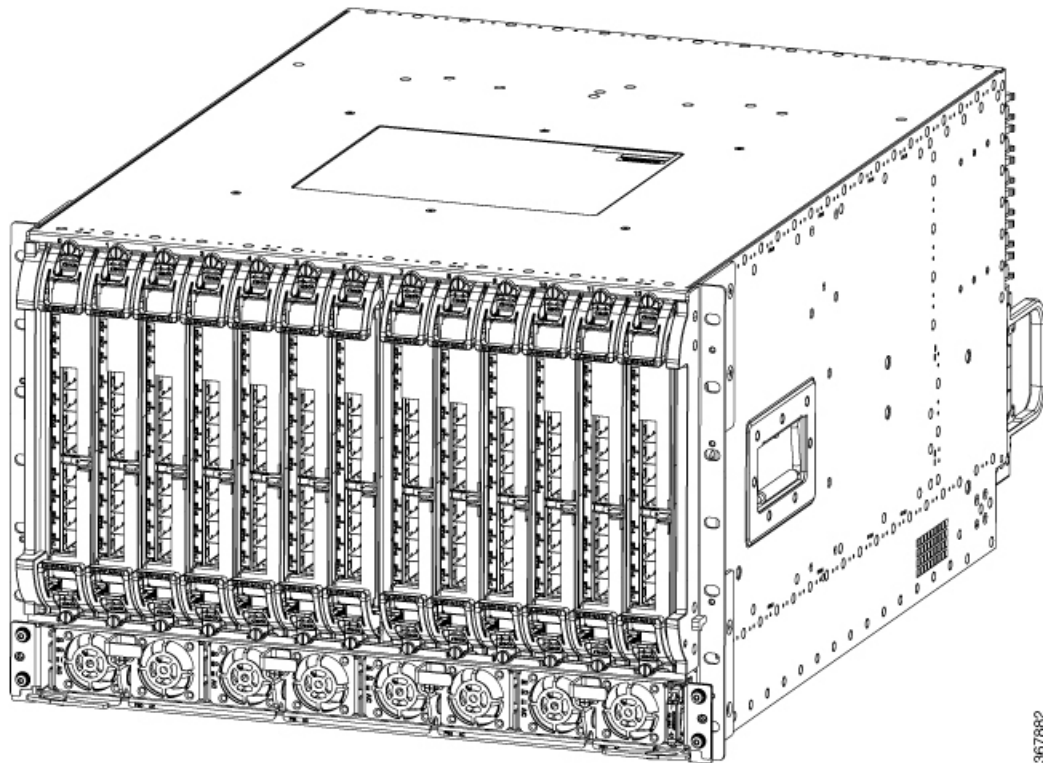
The DPIC supports:

- Eight ten gigabit ethernet SFP+ interfaces
- 80 gigabit non-blocking switching architecture with 40+40 protection scheme
- 40 gigabit DOCSIS traffic bandwidth when connected with the Cisco CBR-CCAP-LC-40G-R line card
- Cisco SFP-10G-SR-S/Cisco SFP-10G-LR-S/Cisco SFP-10G-ZR-S/Cisco SFP-10G-ER-S optic modules
- MACSec and 1588 TC

Cisco Smart PHY 7200

The Cisco Smart PHY 7200 is a 7 rack unit (RU) chassis. It supports 13 RPD modules and 6 RF PICs. Below are some of its features:

- 13 slots high availability chassis
- Full spectrum DOCSIS 3.0 support
- CCAP support
- Support of optical overlay architectures
- US/DS RF switching function between dedicated-protect and active RPD modules
- Hitless Line Card high availability (12+1)
- N+N Power Supply Redundancy
- Support for up to 72 SG with high availability

Figure 1: Cisco Smart PHY 7200

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RPD Line Card

The Cisco Smart PHY 7200 RPD Line Card has the following features:

- Compliance to DOCSIS 3.1 specification
- 12 US RF ports
 - US Frequency Range 5 MHz – 204 MHz
 - Support up to 12 ATDMA /8 ATDMA+4 SCDMA per port
 - Support up to 2 OFDMA (96 MHz) Receivers per port
 - Spectrum management (FFT)
- 6 DS RF ports
 - DS Frequency Range: 54 MHz - 1.218 GHz
 - 160 QAM per port
 - 6 OFDM min 24 MHz and max 192 MHz channel width per port
 - RF Monitoring: D3.0 Tuner/demod with RF power, MER, BER report
 - DOCSIS/Video de-jitter buffer (20 ms (+/-10 ms) at 60 Gbps)

PIC

The PIC card uses solid-state switch to create a switching path between the dedicated protect RPD in slot 6 and the 12 other RPDs in the Cisco Smart PHY 7200 chassis. The features of the Cisco Smart PHY 7200 PIC are:

- Surge protector
- Demodulator
- Power meter
- US test signal
- Solid-state switches 2:1, 6:1
- DS RF amp for better return loss matching
- MES in control of all PIC functions through I2C control
- Simplified power design and power sequencer
- DS at MCX connector meets the DOCSIS 3.1 RF specification
- ACT2 PID
- FLASH holding calibration data
- No firmware upgradeable images
- US and DS ports accept 75 Ohm compression type MCX connectors