Cisco uBR7225VXR Universal Broadband Router

Product Overview

The Cisco uBR7225VXR Universal Broadband Router is a 2-rack-unit (RU) modular, inexpensive, mid-level entry CMTS suitable for cable operators that require a higher capacity platform than the Cisco uBR7100 Series, but not the larger form factor or capacity of the Cisco uBR7246VXR or Cisco uBR10012. The Cisco uBR7225VXR is based on open standards and brings the power and reliability of the Cisco uBR7246VXR within reach of all cable operators. See Figure 1.

The Cisco uBR7225VXR delivers a feature-rich CMTS for emerging markets and Tier 2 and Tier 3 cable networks evolving to an IP Next-Generation Network infrastructure that supports the deployment of revenue-generating services. This product offers cable operators, multiunit businesses, and ISPs a superior and cost-effective platform for the delivery of high-speed data, voice, and video services. This new CMTS platform requires exceptionally low capital investment and minimal setup time, and it supports up to 5000 subscribers.

Figure 1. Cisco uBR7225VXR Universal Broadband Router

The uBR7225VXR Universal Broadband Router is a service-enabling, communications-grade CMTS that offers carrier-class reliability, modular scalability, and significant investment protection. Because of its support for a broad range of features, cable operators can cost-effectively deploy solutions that address a wide range of density, performance, and service requirements with confidence that the router also will support future networking needs. In addition, unlike a fixed configuration CMTS such as the Cisco uBR7100 Series, the modularity of the processor and line card slots in this platform allows for future upgrades in capacity as technology evolves.

The Cisco uBR7225VXR offers feature-rich software. Cisco IOS® Software provides end-to-end Internet connectivity and includes options to help ensure highly secure communications over the cable and IP network.

Cable Line Cards

Two new cable line cards—the Cisco uBR7225VXR E-28U and E-16U Broadband Processing Engines (BPEs), part numbers UBR-E-28U and UBR-E-16U—bring new choices and capabilities to the Cisco uBR7225VXR. Advanced features and a scalable architecture make the Cisco uBR7225VXR and these BPEs the right choice for cable operators delivering carrier-class IP-based data, voice, and video services to a growing number of subscribers. Should you choose to, you may reuse Cisco uBR7200 Series MC16U and MC28U BPEs in the Cisco uBR7225VXR chassis.

Note: The Cisco uBR7225VXR E-28U and E-16U BPEs (part numbers UBR-E-28U and UBR-E-16U) are compatible with the uBR7225VXR chassis only and are not compatible with the uBR7246VXR. This compatibility function is enabled through both mechanical keying methodology and software locks to prevent insertion of these cards into any other chassis.

Standards Compliance

The product is compatible with DOCSIS® 1.1 and 1.0, Euro-DOCSIS 2.0, 1.1, and 1.0, and PacketCable™ 1.1 standards. It addition, it supports PacketCable Multimedia (PCMM), enabling cable operators to deploy unique, next-generation multimedia services.

The uBR7225VXR further supports the CableLabs OpenCable DOCSIS Set-Top Gateway (DSG) specification. DSG enables cable operators to transport upstream and downstream video traffic directly through the CMTS instead of through a proprietary, standalone video infrastructure. Incorporating out-of-band messaging in DOCSIS digitally modulated carriers, cable operators can consolidate cable modem and set-top box data traffic on a shared DOCSIS channel.

As operators evolve their traditional infrastructures to an IP Next-Generation Network supporting IP data, voice, and video traffic, the CMTS must support advanced routing protocols and offer advanced automated intelligence. The Cisco uBR7225VXR evolves the CMTS into an intelligent broadband edge platform that delivers highly competitive service bundles. The product enables cable operators to capture the full potential of their cable spectrum and DOCSIS hybrid fiber-coaxial (HFC) networks. The product supports up to 5000 subscribers.

Features and Benefits

Primary Features

With its flexible, all-inclusive product design, the Cisco uBR7225VXR Series offers:

- An advanced physical layer (PHY) to provide ingress noise cancellation
- Advanced time-division multiple access (A-TDMA) capabilities
- Advanced spectrum management
- An onboard processor for improved performance to support additional subscribers and services
- Flexible software Media Access Control (MAC) domain configuration for virtual interfaces
- Reduced cable wiring through frequency stacking
- DOCSIS®, European DOCSIS (Euro-DOCSIS), and J-DOCSIS compliance on one line card
- Integrated upconverters: depending on the specific model, one or two downstream modulators and eight or six upstream burst receivers on a single line card.

Primary Benefits

The Cisco uBR7225VXR addresses the expanding service and operational needs of cable operators, providing the following benefits:

- Low-cost entry-level CMTS makes efficient use of capital expenditures while maintaining modularity for capacity growth
- Provides up to 16 upstream and 4 downstream ports in a 2-RU form factor
- Support of DOCSIS, Euro-DOCSIS 2.0, and PacketCable 1.1 technology helps return on investment for converged services and speeds deployment of advanced IP services

- Provides DOCSIS, Euro-DOCSIS, and J-DOCSIS support on one line card for operational savings and lower capital expenditure

Features and benefits are summarized in Table 1.

Table 1. Cisco uBR7225VXR Universal Broadband Router Features and Benefits Summary

Feature	Benefit
High port density	Provides up to 16 upstreams and 4 downstreams in a 2-RU form factor.
Standards-based	Supports PacketCable 1.1, DOCSIS 1.1, Euro-DOCSIS 2.0 and PacketCable Multimedia to protect cable operator investment and help ensure compatibility with next-generation multiservice networks. Layer 3 features are designed to support voice and commercial services. Supports DSG, enabling cable operators to migrate from proprietary to open set-top technology and benefit from technical advantages and continued innovation of the DOCSIS standard.
Investment protection	New Cisco uBR7225VXR E-28U and 16U BPEs (part numbers UBR-E-28U and UBR-E-16U) support DOCSIS, Euro-DOCSIS, and J-DOCSIS on one line card for lower capital expenditure.
Superior RF front end	Enables cable operators to capture the full potential of their cable spectrum and DOCSIS HFC networks. Cisco uBR7225VXR E-28U and E-16U BPEs (part numbers UBR-E-28U and UBR-E-16U) use patented Cisco technology to determine carrier-to-noise ratio values for selected upstream channels.
Cisco IOS Software	Includes diverse routing protocols, quality of service (QoS), and policy-routing features to support differentiated services configuration features such as Dynamic Host Configuration Protocol (DHCP) and Trivial File Transfer Protocol (TFTP); DOCSIS Baseline Privacy Interface (BPI) security.

Specifications

Table 2 shows the hardware specifications for the Cisco uBR7225VXR.

Table 2. Hardware Specifications

Specification	Value
Compact design suitable for rack-mount (2-RU) or desktop installation	• Dimensions of 3.5 x 17.32 x 21.8 in. (8.89 x 44.9 x 55.37 cm) (H x W x D) • 45 lb (20.4 kg) • Front, mid, and rear mountable in a 19 in. EIA standard rack • Depth fully loaded from the tip of cable management bracket to the tip of the uBR-NPE-G1 handle is 26.1 in. (66.29 cm)
Line cards with integrated upconverters/modulators (cable plant interfaces)	Modular design Line cards supported: • Cisco uBR7225VXR E-16U (part number UBR-E-16U) • Cisco uBR7225VXR E-28U (part number UBR-E-28U) • Cisco uBR7200 Series MC16U • Cisco uBR7200 Series MC28U Physical: • Occupies a single slot in the Cisco uBR7225VXR chassis • Maximum 2 line cards per uBR7225VXR chassis • Hot-swappable; no slot dependency • Dimensions (H x W x D): 1.35 x 13.5 x 10.56 in. (3.43 x 34.29 x 26.82 cm) Weight: • Cisco uBR7225VXR E-28U (part number UBR-E-28U): 6 lb or 2.72 kg • Cisco uBR7225VXR E-16U (part number UBR-E-16U): 5.25 lb or 2.38 kg Power consumption: • Cisco uBR7225VXR E-28U: 80W (273 Btu/h) • Cisco uBR7225VXR E-16U: 62W (211.6 Btu/h) Integrated upconverter specifications: • High-level output: +61 dBmV, 53 to 857 MHz • Optimized for 64 and 256 quadrature amplitude modulation (QAM) • Software configurable from 45 to 61 dBmV output power in units of dBmV

Modulation	• Downstream: 64-QAM, 256-QAM • Upstream: QPSK 8-, 16-, 32-, 64-QAM
Downstream frequency range	• DOCSIS: 6 MHz Annex B, 88-860 MHz • Euro-DOCSIS: 8 MHz Annex A, 85-860 MHz • J-DOCSIS: 6 MHz Annex B extension, 70-860 MHz
Upstream frequency range	• DOCSIS: 6 MHz Annex B, 5-42 MHz • Euro-DOCSIS: 8 MHz Annex A, 5-65 MHz • J-DOCSIS: 6 MHz Annex B extension, 5-55 MHz
Compatible Cisco Network Processing Engines (NPEs)	The Cisco uBR7225VXR currently must contain one uBR7200-NPE-G1 processor that must have at least 256 MB of DRAM. If it contains more than one BPE, Cisco recommends installing either 512 MB or 1 GB of DRAM on the uBR7200-NPE-G1 to ensure best performance. FE/GE ports availability: 3 GE ports (UBR-NPE-G1).
Included AC power supply	• Single or dual redundant power supplies • 100 to 240 VAC input, 50/60 Hz frequency • 5.5 A maximum AC input current • 300W (maximum) output DC or 25 @ 11.28V • AC-input cable: 18-QEG4 3-wire cable with 3-lead IEC-320 receptacle on power supply end and country-dependent plug on power source end

Table 3 lists physical and environmental specifications for the Cisco uBR7225VXR.

Table 3. Physical and Environmental Specifications

Specification	Value
Operating temperature	32 to 104°F (0 to 40°C) operating; -4 to 149°F (-20 to 65°C) nonoperating
Airflow	~125 cfm5 (side to side cooling)
Humidity	10% to 90% non-condensing
Safety approvals	UL/CSA/IEC/EN 60950-1 and AS/NZS 60950.1
EMI/EMC regulatory and compliance	**Emissions:** FCC 47CFR 15 Class A, ICES 003 Class A, CISPR22 Class A, EN55022 Class A, VCCI Class A, AS/NZS CISPR22 Class A, EN61000-3-3, EN61000-3-2. **Immunity:** EN61000-4-2, EN61000-4-3, EN61000-4-4, EN61000-4-5, EN61000-4-6, EN61000-4-8, EN61000-4-11, EN55024; EN50082-1/EN61000-6-1, EN 300386.

Software Compatibility

The Cisco uBR7225VXR is supported in Cisco IOS Software Release 12.2SB, which includes PCMM, admission control, Advanced Mode DSG, and SII features. Table 4 describes the software features of the Cisco uBR7225VXR.

Table 4. Software Features

Feature	Description
Software compatibility	Cisco IOS Software Release 12.2SB minimum to support PCMM, admission control, Advanced Mode DSG, and Service Independent Intercept (SII)
IPv6	• CM Provisioning & Management using IPv6 • IPv6 Multicast for control plane • ACLs • Virtual interface bundle • DMIC • Cable monitor • Cable source verify • BPI+ • DOCSIS state machine with MDD • MDD config. per interface • DHCPv6/4 relay agent and VIVSO options • Cable CLIs impacted by IPv6 • FQDN display in CLIs • Select MIBs • IPv6 MIB retrieval over IPv4 transport • Cable filters • SNMP over IPv6 transport • Syslog over IPv6 • Domain name for IPv6 CM • Telnet access over IPv6 • TFTP file download for IPv6 • Ping for IPv6 • Traceroute for IPv6 • SSH over an IPv6 transport • HTTP access over IPv6 • CPE IPv6 services • IPv6 Multicast for data plane • DOCSIS QoS • DOCSIS Set-top Gateway • eRouter spec. compliance • DHCP leased query • Cable Intercept • Lawful Intercept • IPv6 supports over PXF path • Additional MIBs • DOCSIS 3.0 CMs Interoperability
L2VPN	• DOCSIS CM config file based L2VPN provisioning (vs CLI provisioned) • Multiple L2VPNs (up to 4) per CM • QoS support using service flows (US and DS) • DUT Filtering • eSAFE Host Exclusion using CMIM (for compliant CMs) • BPI+ encryption using primary SAID • 802.1q based PseudoWire • L2 Classifier for L2VPN traffic (CMIM mask, Priority) • SNMP MIB (DOCS-L2VPN-MIB) and CLI support • Dynamic Service requests (DSX) support • BPI+ encryption with L2VPN SAIDs • eSAFE DHCP snooping support • Radar items: support for Ether-channel as NSI; support for vendor specific encoding in CM configuration file (to specify WAN interface) • AToM and L2TPv3 PW • Point-to-Multipoint L2VPN

Multicast enhancements	DOCSIS 3.0 Multicast QoS addresses various limitations in the current Multicast QoS implementation (for instance, QoS can now be applied to sub-interfaces and VPNs), allowing a single QoS template to be applied to multiple multicast streams Intelligent Multicast Admission Control (AC): • Integrates Multicast QoS with Unicast QoS under unified control model, simplifying operation • Multicast service flows are deleted once all multicast streams stop and all members go away, helping operators reclaim bandwidth Option to disable IP Multicast echo per cable bundle allows operators to hide subscriber-generated multicast traffic from other subscribers on the same cable subnet
Multicast in MPLS VPN / L3 VPN (mVPN) service (with BPI+)	IP multicast support for MPLS/L3 VPN VRF Ability to track and isolate streams and membership within a VPN by encrypting the multicast stream with unique BPI SAIDs and keys across VPNs
CMTS Service Independent Intercept (SII)	• Transparency for data intercept (unlike cable-intercept) • Common architecture for voice and data • Controlled by Mediation Device, not call control equipment • Separates lawful intercept control from call control • Open interface for Mediation Device and Call Control partners • Documented in IETF Informational RFCs Support for TAP2-MIB extensions requested by LEAs • Addresses PCMM scenarios for CPE behind CMs • Support for MPLS networks that segregate voice and data

Table 5 describes the maximum DOCSIS and Euro-DOCSIS 1.1 data rates supported on the Cisco uBR7225VXR.

Table 5. Maximum DOCSIS and Euro-DOCSIS 1.1 Data Rates

Upstream Channel Width	Modulation Scheme	Baud Rate Sym/sec	Maximum Raw Bit Rate Mbit/sec
3.2 MHz	16-QAM QPSK	2.56 M	10.24 5.12
1.6 MHz	16-QAM QPSK	1.28 M	5.12 2.56
800 kHz	16-QAM QPSK	640 K	2.56 1.28
400 kHz	16-QAM QPSK	320 K	1.28 0.64
200 kHz	16-QAM QPSK	160 K	0.64 0.32

Table 6 describes the maximum DOCSIS and Euro-DOCSIS 2.0 (A-TDMA mode) data rates supported on the Cisco uBR7225VXR.

Table 6. Maximum DOCSIS and Euro-DOCSIS 2.0 (A-TDMA mode) Data Rates

Upstream Channel Width	Modulation Scheme	Baud Rate Sym/sec	Maximum Raw Bit Rate Mbit/sec
6.4 MHz	64-QAM 32-QAM 16-QAM 8-QAM QPSK	5.12 M	30.72 25.60 20.48 15.36 10.24
3.2 MHz	64-QAM 32-QAM 16-QAM 8-QAM QPSK	2.56 M	15.36 12.80 10.24 7.68 5.12

1.6 MHz	64-QAM 32-QAM 16-QAM 8-QAM QPSK	1.28 M	7.68 6.40 5.12 3.84 2.56
800 kHz	64-QAM 32-QAM 16-QAM 8-QAM QPSK	640 K	3.84 3.20 2.56 1.92 1.28
400 kHz	64-QAM 32-QAM 16-QAM 8-QAM QPSK	320 K	1.92 1.60 1.28 0.96 0.64
200 kHz	64-QAM 32-QAM 16-QAM 8-QAM QPSK	160 K	0.96 0.80 0.64 0.48 0.32

Ordering Information

To place an order, visit the Cisco Ordering Home Page. Table 7 provides part numbers.

Table 7. Ordering Information

Part Number	Description
UBR7225VXR	uBR7225VXR, 2MC + 1PA Slot, Fan Tray
U7225VXR-M16EUG1	uBR7225VXR with NPE-G1, IOS and 1 uBR7725VXR E-16U
U7225VXR-M28EUG1	uBR7225VXR with NPE-G1, IOS and 1 uBR7225VXRE-28U
UBR-E-16U	uBR7225VXR E-16U BPE, 1 DS with Upconverter, 6 US, ATDMA, Adv PHY, CPU
UBR-E-16U=	uBR7225VXR E-16U BPE, 1 DS with Upconverter, 6 US, ATDMA, Adv PHY, CPU, Spare
UBR-E-28U	uBR7225VXR E-28U BPE, 2 DS with Upconverter, 8 US, ATDMA, Adv PHY, CPU
UBR-E-28U=	uBR7225VXR E-28U BPE, 2 DS with Upconverter, 8 US, ATDMA, Adv PHY, CPU, Spare
UBR-MC16U	uBR7200 Series MC16U BPE, 1 DS with Upconverter, 6 US, ATDMA, Adv PHY, CPU
UBR-MC16U=	uBR7200 Series MC16U BPE, 1 DS with Upconverter, 6 US, ATDMA, Adv PHY, CPU, Spare
UBR-MC28U	uBR7200 Series MC28U BPE, 2 DS with Upconverter, 8 US, ATDMA, Adv PHY, CPU
UBR-MC28U=	uBR7200 Series MC18U BPE, 2 DS with Upconverter, 8 US, ATDMA, Adv PHY, CPU, Spare
PWR-UBR7225VXR-AC	uBR7225 AC Power Supply, Option
PWR-UBR7225VXR-AC=	uBR7225 AC Power Supply, Spare
PWR-UBR7225/2-AC	uBR7225 Dual AC Power Supply, Option
CAB-7KAC	Cisco 7500 Series AC Power Cord, US
CAB-7KACA	Cisco 7500 Series AC Power Cord, Australia
CAB-7KACE	Cisco 7500 Series AC Power Cord, Europe
CAB-7KACI	Cisco 7500 Series AC Power Cord CD12, Italy
CAB-7KACR	AC Power Cord (Argentina)
CAB-7KAC=	Cisco 7500 Series AC Power Cord, US
CAB-7KACA=	Cisco 7500 Series AC Power Cord, Australia
CAB-7KACE=	Cisco 7500 Series AC Power Cord, Europe
CAB-7KACR=	AC Power Cord (Argentina), Spare

CAB-7KACU=	Cisco 7500 Series AC Power Cord, UK
CHAS-UBR7225VXR=	uBR7225VXR Chassis, Spare
ACS-UBR7225-RMK=	uBR7225/VXR Rack Mount Kit And Cable Management Bracket
MAS-UBR-PSBLANK=	uBR7225 Power Supply Blank
MAS-UBR-MCBLANK=	uBR7200 Series Modem Card Blank
PKG-UBR7225=	uBR7225VXR Spare System Packaging Material
MAS-7200-LCCBLMGMT	Cisco chassis cable management bracket kit line card (front) of chassis
MAS-7200-CBLMGMT	Cisco NPE-G1/NPE-G2 Cable Management Bracket
UBR7200-NPE-G1	uBR7200 NPE-G1 w/ 256MB mem;64MB Flash;3 GE/FE/E and I/O ports
UBR7200-NPE-G1=	uBR7200 NPE-G1 w/ 256MB mem;64MB Flash;3 GE/FE/E and I/O ports, Spare
MEM-NPE-G1-FLD128	Cisco 7200 Compact Flash Disk for NPE-G1, 128 MB Option
MEM-NPE-G1-FLD256	Cisco 7200 Compact Flash Disk for NPE-G1, 256 MB Option
MEM-NPE-G1-FLD64=	Cisco 7200 Compact Flash Disk for NPE-G1, 64 MB Option
MEM-NPE-G1-FLD128=	Cisco 7200 Compact Flash Disk for NPE-G1, 128 MB Option
MEM-NPE-G1-FLD256=	Cisco 7200 Compact Flash Disk for NPE-G1, 256 MB Option
MEM-NPE-G1-512MB	Two 256MB memory modules (512MB total) for NPE-G1 in 7200
MEM-NPE-G1-1GB	Two 512MB memory modules (1GB total) for NPE-G1 in 7200
MEM-NPE-G1-256MB=	Two 128MB memory modules (256MB total) for NPE-G1 in 7200
MEM-NPE-G1-512MB=	Two 256MB memory modules (512MB total) for NPE-G1 in 7200
MEM-NPE-G1-1GB=	Two 512MB memory modules (1GB total) for NPE-G1 in 7200
CBT-3.3-LIC100=	Cable Broadband Troubleshooter v3.3 for managing 1-100 CMTS
CBT-3.3-LIC10=	Cable Broadband Troubleshooter v3.3 for managing 1-10 CMTS
CBT-3.3-LIC50=	Cable Broadband Troubleshooter v3.3 for managing 1-50 CMTS
CBT-3.3-LIC500=	Cable Broadband Troubleshooter v3.3 for managing 1-500 CMTS
CBT-3.3-UPGLIC10=	Cable Broadband Trblestr v3.3 Upgd 1-10 CMTS license
CBT-3.3-UPGLIC50=	Cable Broadband Trblestr v3.3 Upgd 1-50 CMTS license
CBT-3.3-UPGLIC100=	Cable Broadband Trblestr v3.3 Upgd 1-100 CMTS licens
CBC-4.0	Cisco Broadband Configurator 4.0 for a single CPU system
WS-G5484	1000BASE-SX Short Wavelength GBIC (Multimode only)
WS-G5484=	1000BASE-SX Short Wavelength GBIC (Multimode only)
WS-G5486	1000BASE-LX/LH long haul GBIC (singlemode or multimode)
WS-G5486=	1000BASE-LX/LH long haul GBIC (singlemode or multimode)
WS-G5487	1000Base-ZX extended reach GBIC(singlemode)
WS-G5487=	1000Base-ZX extended reach GBIC(singlemode)

Service and Support

Using the Cisco Lifecycle Services approach, Cisco and its partners provide a broad portfolio of end-to-end services and support that can help increase your network's business value and return on investment. This approach defines the minimum set of activities needed, by technology and by network complexity, to help you successfully deploy and operate Cisco technologies and optimize their performance throughout the lifecycle of your network.

For More Information

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