

Cisco uBR7225VXR E-28U and E-16U Broadband Processing Engines (Part Numbers UBR-E-28U and UBR-E-16U)

Product Overview

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 Universal Broadband Router. Advanced features and a scalable architecture make these line cards the right choice for cable operators delivering carrier-class IP-based data, voice, and video services to a growing number of subscribers. These BPEs offer greater flexibility and robustness to the Cisco uBR7225VXR communications-grade CMTS.

Figure 1 depicts the Cisco uBR7225VXR E-28U Broadband Processing Engine

Figure 1. Cisco uBR7225VXR E-28U Broadband Processing Engine (Part Number UBR-E-28U)



The new BPEs can coexist in the Cisco uBR7225VXR chassis with earlier Cisco uBR7200 Series MC16U and MC28U line cards should you choose to reuse these line cards in the Cisco uBR7225VXR.

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

Features and Benefits

Primary Features

With their flexible, all-inclusive product design, the Cisco uBR7225VXR E-28U and E-16U BPEs (part numbers UBR-E-28U and UBR-E-16U) offer:

- 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

- Integrated upconverters for Cisco uBR7200 Series uBR-E-28U and uBR-E-16U (part numbers UBR-E-28U and UBR-E-16U) line cards
- Flexible software Media Access Control (MAC) domain configuration or 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
- Patented Cisco technology determines carrier-to-noise ratio (CNR) values for selected upstream channels
- Meet or exceed DOCSIS specifications of 35 dB for downstream CNR and 25 dB for upstream operation

Primary Benefits

The Cisco uBR7225VXR E-28U and E-16U BPEs (part numbers UBR-E-28U and UBR-E-16U) address the expanding service and operational needs of cable operators. They provide the following benefits:

- Low-priced entry-level cable line card makes efficient use of capital expenditures, while maintaining modularity for capacity growth
- Provides up to 16 upstream and 4 downstream ports in a 2-rack-unit 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

About the Cisco uBR7225VXR Universal Broadband Router

The Cisco uBR7225VXR Universal Broadband Router is an inexpensive, mid-level entry CMTS for cable operators that require a higher capacity platform than the Cisco uBR7100 Series, but do not require the larger form factor or capacity of the Cisco uBR7246VXR or uBR10012. The Cisco uBR7225VXR is based on open standards and brings the power and proven reliability of the Cisco uBR7246VXR within reach of all cable operators.

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.

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.

Table 1. Features and Benefits Summary

Feature	Benefit
High port density	<ul style="list-style-type: none"> • Reduces per-port cost • Maximizes plant capacity (frequency reuse)

Advanced RF front end that includes technology patented by Cisco	Optimizes RF performance and robustness
Onboard spectrum analyzer hardware	<ul style="list-style-type: none"> • Reduces return-path monitoring costs • Enhances remote troubleshooting capabilities
Dedicated MAC layer hardware	<ul style="list-style-type: none"> • Provides hardware acceleration of DOCSIS 1.1 features • Enables scalability of data and voice deployment • Optimizes cable modem registration time • Provides hardware-based Layer 2 QoS • Allows use of advanced PHY
DOCSIS, Euro-DOCSIS, and J-DOCSIS support on one line card	<ul style="list-style-type: none"> • Provides operational savings • Lowers capital expenditures
PacketCable 1.1, Euro-DOCSIS 2.0, DOCSIS 1.1 compatible	<p>Raises return on investment to support converged services</p> <p>Provides advanced PHY robustness for DOCSIS 1.x and 2.0 deployments</p>

Table 2. Product Specifications

Specification	Value
Physical	<ul style="list-style-type: none"> • 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) <p>Weight:</p> <ul style="list-style-type: none"> • 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	<ul style="list-style-type: none"> • Cisco uBR7225VXR E-28U (part number UBR-E-28U): 80W or 273 Btu/h • Cisco uBR7225VXR E-16U (part number UBR-E-16U): 62W or 211.6 Btu/h
Power output	uBR7225VXR E-28U and E-16U (part numbers UBR-E-28U and UBR-E-16U): +50 to 61 dBmV at RF
RF output power range	50 to 61 dBmV
Modulation	<ul style="list-style-type: none"> • Downstream: 64-QAM, 256-QAM • Upstream: QPSK 8-, 16-, 32-, 64-QAM
Downstream frequency range	<ul style="list-style-type: none"> • 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	<ul style="list-style-type: none"> • 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
Environmental	<ul style="list-style-type: none"> • Operating altitude: -197 to 13,123 ft (-60 to 4000 m) • Storage temperature: -4 to 149°F (-20 to 65°C) • Operating temperature, nominal: 41 to 104°F (5 to 40°C) • Storage relative humidity: 5 to 95 percent • Operating relative humidity: 10 to 90 percent
Safety	<ul style="list-style-type: none"> • UL 1950, Third Edition (Safety of Information Technology Equipment, Including Electrical Business Equipment), with No D3 Deviations • CSA 950 \Q95 Third Edition (Safety of Information Equipment Technology, Including Electrical Business Equipment) • EN 60950 (Safety of Information Equipment Technology, Including Electrical Business Equipment) • IEC 60950 • ACA TS001, 1997 Test Report and Statement of Compliance AS/NZS3260

Electromagnetic emissions	<ul style="list-style-type: none"> • EN55022: 1998 Class B • CISPR 22: 1997 Class B • CFR 47 Part 15 Class B • ICES -003, Issue 2, Class B, April 1995 • VCCIIV-3/2000.04 • AS/NZS 3548: 1995 Class B • CNS-13438 Class B-BSMI (BCIQ) in Taiwan
Electromagnetic immunity	<ul style="list-style-type: none"> • EN50082-1: 1992 • EN50082-1: 1997 • EN55024: 1998 • EN61000-3-2: 1995 • EN61000-3-3: 1995 • EN61000-4-2: 1995 [including AMD1 + AMD2] ESD immunity • EN61000-4-3: 1997 Radiated RF field immunity • EN61000-4-4: 1995 Immunity to electrical fast transients • EN61000-4-5: 1995 Surge immunity • EN61000-4-6: 1996 [including AMD1] RF conducted immunity
Network Equipment Building Systems (NEBS) - Level 3	Designed and tested to meet requirements of GR-1089-CORE - Issue 2, December 1997 Revision 1, February 1999
Mechanical	<ul style="list-style-type: none"> • IEC 68-2-1, IEC 68-2-2, IEC 68-2-56: Operational temperature and humidity • IEC 68-2-27: Operating Shock • IEC 68-2-64, IEC 68-2-6, IEC 68-2-47: Operating and nonoperating vibration • IEC 68-2-32: Nonoperating free-fall drop • IEC 68-2-40: Nonoperating altitude • IEC 68-2-27, IEC 68-2-32: Nonoperating mechanical shock • IEC 68-2-3: Nonoperating humidity • IEC 68-2-14, IEC 68-2-33: Nonoperating temperature shock
LEDs	<ul style="list-style-type: none"> • One power LED (green) • One upstream-enabled LED on each upstream port (green): upstream path is configured and able to pass traffic • One downstream-enabled LED on each downstream port (green): downstream path is configured and able to pass traffic through the upconverter at the radio frequencies
Minimum Cisco IOS Software release	Cisco IOS Software Release 12.2SB minimum to support PCMM, admission control, Advanced Mode DSG, and SII Cisco IOS Software
Compatible Cisco Network Processing Engines (NPEs)	The Cisco uBR7225VXR must contain a uBR7200-NPE-G1 processor with at least 256 MB of DRAM. If the Cisco uBR7225VXR 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.
Standard MIBs	<ul style="list-style-type: none"> • IF-MIB (RFC-2233) • ENTITY-MIB (RFC-2737) • MIBII (RFC1213) • EtherLike-MIB (RFC-2665) • IGMP-MIB (RFC-2993) • RMON-MIB (RFC-1757)
Expression MIBs	<ul style="list-style-type: none"> • Simple Network Management Protocol (SNMP)v2-CONF • SNMPv2-SMI • SNMPv2-TC • SNMPv2-MIB • IANAifType-MIB
SNMPv3 MIBs	<ul style="list-style-type: none"> • SNMP-FRAMEWORK-MIB (RFC-2571) • SNMP-MPD-MIB (RFC-2572) • SNMP-NOTIFICATION-MIB (RFC-2573) • SNMP-TARGET-MIB (RFC-2573) • SNMP-USM-MIB (RFC-2574) • SNMP-VACM-MIB (RFC-2575)

DOCSIS and Euro-DOCSIS MIBs	<ul style="list-style-type: none"> • DOCS-IF-MIB (v2 Rev04) • DOCS-CABLE-DEVICE-MIB (RFC2669) • DOCS-BPI-PLUS-MIB (Rev 5) • DOCS-QOS-MIB (Rev 4) • DOCS-CABLE-DEVICE-TRAP-MIB • DOCS-SUBMGT-MIB (Rev 2)
Cisco Generic MIBs	<ul style="list-style-type: none"> • CISCO-SYSLOG-MIB • CISCO-SMI-MIB • CISCO-TC-MIB • CISCO-PRODUCTS-MIB • CISCO-FLASH-MIB • CISCO-CONFIG-MAN-MIB • CISCO-CONFIG-COPY-MIB • CISCO-MEMORY-POOL-MIB • CISCO-BULK-FILE-MIB • CISCO-SONET-MIB • CISCO-TCP-MIB • CISCO-RTTMON-MIB • CISCO-FTP-CLENT-MIB • CISCO-IPMROUTE-MIB • CISCO-QUEUE-MIB • CISCO-IMAGE-MIB • CISCO-ENVMON-MIB • CISCO-ENTITY-VENDORTYPE-OID-MIB • CISCO-PRODUCTS-MIB

Table 3. 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	2.56 M	10.24
	QPSK		5.12
1.6 MHz	16-QAM	1.28 M	5.12
	QPSK		2.56
800 kHz	16-QAM	640 K	2.56
	QPSK		1.28
400 kHz	16-QAM	320 K	1.28
	QPSK		0.64
200 kHz	16-QAM	160 K	0.64
	QPSK		0.32

Table 4. 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	5.12 M	30.72
	32-QAM		25.60
	16-QAM		20.48
	8-QAM		15.36
	QPSK		10.24
3.2 MHz	64-QAM	2.56 M	15.36
	32-QAM		12.80
	16-QAM		10.24
	8-QAM		7.68
	QPSK		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

Table 5. Ordering

Part Number	Description
UBR-E-16U	Cisco uBR7225VXR E-16U BPE, 1 downstream with upconverter, 6 upstreams, A-TDMA, Adv PHY, CPU
UBR-E-16U=	Cisco uBR7225VXR E-16U BPE, 1 downstream with upconverter, 6 upstreams, A-TDMA, Adv PHY, CPU, spare
UBR-E-28U	Cisco uBR7225VXR E-28U BPE, 2 downstreams with upconverter, 8 upstreams, A-TDMA, Adv PHY, CPU
UBR-E-28U=	Cisco uBR7225VXR E-28U BPE, 2 downstreams with upconverter, 8 upstreams, A-TDMA, Adv PHY, CPU, spare

Cisco Services

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

For more information about the Cisco uBR7225VXR E-16U and E-28U BPEs (part numbers UBR-E-28U and UBR-E-16U), please contact your local Cisco account representative.

**Americas Headquarters**

Cisco Systems, Inc.
170 West Tasman Drive
San Jose, CA 95134-1706
USA
www.cisco.com
Tel: 408 526-4000
800 553-NETS (6387)
Fax: 408 527-0883

Asia Pacific Headquarters

Cisco Systems, Inc.
168 Robinson Road
#28-01 Capital Tower
Singapore 068912
www.cisco.com
Tel: +65 6317 7777
Fax: +65 6317 7799

Europe Headquarters

Cisco Systems International BV
Haarlerbergpark
Haarlerbergweg 13-19
1101 CH Amsterdam
The Netherlands
www-europe.cisco.com
Tel: +31 0 800 020 0791
Fax: +31 0 20 357 1100

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