Cisco uBR-MC28C and Cisco uBR-MC28C-BNC Line Cards, Offering the highest port density of Cisco uBR7200 Series line cards

THE CISCO UBR-MC28C AND CISCO UBR-MC28C-BNC LINE CARDS OFFER A TOTAL OF TWO DOWNSTREAM AND EIGHT UPSTREAM PORTS. THE CARDS DELIVER THE CAPACITY AND PERFORMANCE NEEDED TO MEET INCREASED SUBSCRIBER DEMANDS, WITHOUT REQUIRING PURCHASE OF A NEW SYSTEM. THE CARDS OFFER THE CHOICE OF CONNECTORS IN A DUAL 1X4 DOWNSTREAM-TO-UPSTREAM PORT RATIO. THE CARDS CAN BE HOUSED IN A CISCO UBR7246VXR OR CISCO UBR7223.

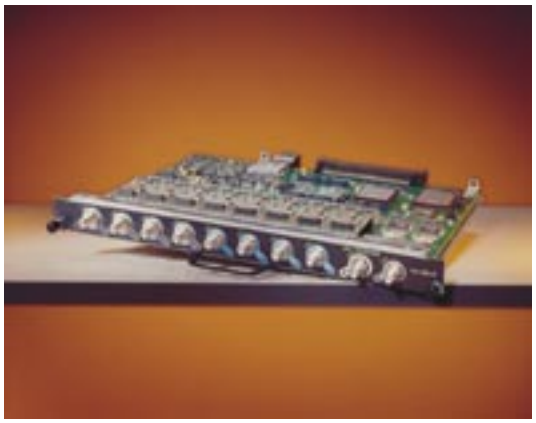
Deploying cable Internet Protocol (IP) data and voice services means cable operators must be able to scale network bandwidth and support large numbers of subscribers efficiently and cost-effectively. The Cisco uBR-MC28C and Cisco uBR-MC28C-BNC Data-over-Cable Service Interface Specifications (DOCSIS) line cards meet these requirements. The products offer the highest port density available for Cisco uBR7200 Series line cards and give service providers the choice of coaxial BNC or F-type connectors.

Offering a total of two downstream and eight upstream ports, the cards significantly increase the number of subscribers a Cisco uBR7246VXR or Cisco uBR7223 support. This postpones or eliminates the need to purchase additional chassis to meet increased demands and saves rack space at the headend or distribution hub. Both the Cisco uBR-MC28C and the Cisco uBR-MC28C-BNC cards support 6 MHz National Television Systems Committee (NTSC) channel operation using standard (STD), Harmonic Related Carrier (HRC), or Incremental Related Carrier (IRC) frequency plans. The cards can be used in 8 MHz international cable plants, but in these instances, ignore 2 MHz of available downstream channel width and handle upstream ranges up to 42 MHz.

The Cisco uBR-MC28C and Cisco uBR-MC28C-BNC line cards are divided into two radio frequency (RF) domains; each with one downstream and four upstream ports. Upstream ports are fixed to a specific downstream. Both domains operate independently of each other.

The cards belong to the Cisco uBR7200 Series family, providing alternatives for cost-effective market entry and network scaling. All cards support an unprecedented array of capabilities to enable delivery of differentiated services with guaranteed service levels. Other cards in the family include the Cisco uBR-MC16S, Cisco uBR-MC16C, Cisco uBR-MC14C, Cisco uBR-MC12C, Cisco uBR-MC11C, and the EuroDOCSIS Cisco uBR-MC16E. Figure 1 shows the Cisco uBR-MC28C line card.

Figure 1 Cisco uBR-MC28C Line Card



Supported Applications

- High-penetration and flexible partitioning of the network to better support IP data and Voice over IP (VoIP) services
- Intelligent IP routing and RF interfaces between the cable headend or distribution hub and DOCSIS-compliant cable modems

CISCO SYSTEMS

Features and Benefits

Key Feature	Benefit
Two Downstream Ports	Extends capacity of a Cisco uBR7246VXR or Cisco uBR7223; doubles downstream capacity from other Cisco uBR7200 Series line cards
Eight Upstream Ports	Meets bandwidth requirements and improves partitioning of interactive subscriber services
Dual 1x4 Port Configuration	Decouples downstream-to-upstream port ratios to provide a highly scalable, modular architecture within one Cisco uBR7200 Series chassis
Choice of Coaxial F-Connector or BNC Connector Options	Gives operators choice of preferred connectors
Greater Port Density than other Cisco uBR7200 Series Line Cards	Reduces number of chassis needed Minimizes capital equipment investment Saves rack space at headend or distribution hub
Clock Card Support	Offers seamless integration with Cisco legacy VoIP deployments
Supports DOCSIS-1.0, DOCSIS 1.0 extensions, and Cisco's early deployment of DOCSIS 1.1	Enables operability with a wide variety of cable modems or CPE/enterprise devices Gives operators choices to support differing types of services
Hot-Swappable via Online Insertion and Removal (OIR); Rapid Initialization during OIR	Offers ease of maintenance and minimizes impact to the system when adding or replacing line cards

Technical Specifications

Product Support

- Cisco uBR7246VXR requires NPE-300 minimum; NPE-400 is recommended
- Cisco uBR7223 requires NPE-225 minimum
- Cisco uBR-MC28C requires Cisco IOS Release 12.1(3a)EC1 or higher if using an NPE-300
  If using NPE-400, Cisco IOS Release 12.1(6)EC1 or higher is required
- Cisco uBR-MC28C-BNC requires Cisco IOS Release 12.1(6)EC1 or higher
- Both line cards require 128 Megabytes dynamic random-access memory (DRAM)

Downstream Physical Layer

- Downstream physical layer enhanced ITU J.83 Annex B, with convolutional and Reed-Solomon forward error correction
- Variable depth interleaving, (I, J) = (8, 16), (16, 8), (32, 4), (64, 2), (128, 1)
- DOCSIS physical-layer parameters, in a 6-MHz downstream channel
- Output impedance: 75 ohms nominal
- Connectors:
  F-connector per [IPS-SP-406] on Cisco uBR-MC28C
  BNC connector on Cisco uBR-MC28C-BNC (50 ohm connectors with center plastic insulation removed (pseudo 75 ohm); provides 66 - 68 ohms

Downstream Channel Width	Modulation	Baud Rate in Mbps	Nyquist Filter (square root raised cosine)	Line Bit Rate in Mbps	Actual Throughput (Bit Rate Minus Overhead in Mbps)[1]
6 MHz	64 QAM	5.056941	12%	30.34	27
6 MHz	256 QAM	5.360537	18%	42.88	38

1. Actual throughput varies based on your headend setup; e.g., modulation profiles and other physical layer parameters affect system throughput

Upstream Physical Layer

- The Cisco uBR-MC28C and Cisco uBR-MC28C-BNC line cards meet all DOCSIS specifications. The cards support:
  - Symbol rates of 160, 320, 640, 1280, 2560 ksym/sec]
  - Modulation: 16 Quadrature Amplitude Modulation (QAM) and Quadrature Phase Shift (QPSK)
  - Upstream frequency range: 5 to 42 MHz edge-to-edge
  - FEC length (T = 0 to 10)
- Calibrated and widely adjustable upstream voltage level
- Total input power: less than 35 dBmV
- Operating power range: bursts within 6 dB of commanded level
- RF performance stable to 1.5 dB across -5 to +50 C
- RF spurs <5 V on all inputs and outputs

Range of upstream symbol rates and data rates supported (typical overhead of 10 percent):

Upstream Channel Width in MHz	Modulation	Baud Rate in MSym/sec	Line Bit Rate in Mbps	Actual Throughput (Bit rate Minus Overhead in Mbps)[1]
3.2	16 QAM QPSK	2.56	10.24 5.12	9.0 4.6
1.6	16 QAM QPSK	1.28	5.12 2.56	4.5 2.3
0.8	16 QAM QPSK	0.64	2.56 1.28	2.3 1.2
0.4	16 QAM QPSK	0.32	1.28 0.64	1.2 0.6
0.2	16 QAM QPSK	0.16	0.64 0.32	0.6 0.3

1. Actual throughput varies based on your headend setup; e.g., modulation profiles and other physical layer parameters affect system throughput

Power Requirements

- Heat dissipation: 40W
- 120 to 240 VAC

Physical Configuration

- 1.35 x 13.5 x 10.56 in (3.43 x 34.29 x 26.82 cm) (H x W x D)

Universal Chassis Environmental Specifications

- Operating temperature: 32 to 104 F (0 to 40 C)
- Nonoperating temperature: -4 to 149 F (-20 to 65 C)
- Relative humidity: 10 to 90%, noncondensing (-120 cfm)

Corporate 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: 408 526-4100

European Headquarters
Cisco Systems Europe
11, Rue Camille Desmoulins
92782 Issy Les Moulineaux
Cedex 9
France
www-europe.cisco.com
Tel: 33 1 58 04 60 00
Fax: 33 1 58 04 61 00

Americas
Headquarters
Cisco Systems, Inc.
170 West Tasman Drive
San Jose, CA 95134-1706
USA
www.cisco.com
Tel: 408 526-7660
Fax: 408 527-0883

Asia Pacific Headquarters
Cisco Systems Australia, Pty., Ltd
Level 17, 99 Walker Street
North Sydney
NSW 2059 Australia
www.cisco.com
Tel: +61 2 8448 7100
Fax: +61 2 9957 4350

Cisco Systems has more than 190 offices in the following countries. Addresses, phone numbers, and fax numbers are listed on the

Cisco.com Web site at www.cisco.com/go/offices.

Argentina • Australia • Austria • Belgium • Brazil • Canada • Chile • China • Colombia • Costa Rica • Croatia • Czech Republic • Denmark • Dubai, UAE
Finland • France • Germany • Greece • Hong Kong • Hungary • India • Indonesia • Ireland • Israel • Italy • Japan • Korea • Luxembourg • Malaysia
Mexico • The Netherlands • New Zealand • Norway • Peru • Philippines • Poland • Portugal • Puerto Rico • Romania • Russia • Saudi Arabia • Singapore
Slovakia • Slovenia • South Africa • Spain • Sweden • Switzerland • Taiwan • Thailand • Turkey • Ukraine • United Kingdom • United States • Venezuela

4/01 A0