

Cisco uBR7246VXR Universal Broadband Router

The Cisco uBR7246VXR Universal Broadband Router is a service-enabling, communications-grade cable modem termination system (CMTS) that offers the highest modular scalability, carrier-class reliability, and unmatched investment protection. The Cisco uBR7246VXR, a member of the Cisco uBR7200 Series, offers exceptional performance/price and unparalleled features. It is the only platform with a family of field-installable processor upgrades. Customers can deploy scalable solutions today that address a wide range of density, performance, and service requirements, while ensuring future network needs. The Cisco uBR7246VXR is PacketCable 1.0-qualified, as well as Data Over Cable Service Interface Specifications (DOCSIS) and EuroDOCSIS 1.1-qualified.

Delivering Highly Profitable, Tiered, IP Data and Voice Services over an HFC Network

The Cisco uBR7246VXR gives cable operators a cost-effective, scalable, and feature rich interface between subscribers and the backbone network. The Cisco uBR7246VXR offers flexible and cost-effective expansion of DOCSIS, EuroDOCSIS, or PacketCable infrastructures, supporting deployments of 1,000 to 8,000 subscribers. The product offers the widest range of field-installed capacity upgrades, including processors, cable line cards, and network interfaces.

For cable plants not fully upgraded to support two-way transmission, the routers work in conjunction with dialup access products to support upstream traffic from DOCSIS-based cable interfaces connected to the public switched telephone network (PSTN). The Cisco uBR7246VXR supports a broad set of residential and commercial multiservice offerings, including high speed Internet access, IP telephony, and Virtual Private Network (VPN) applications. Cable operators have the ability to offer VPN services via a comprehensive set of Multiprotocol Label Switching (MPLS) capabilities. Cisco Systems has shipped over 275,000 upstream ports, setting a cable industry milestone and affirming its CMTS leadership.

The Cisco uBR7246VXR chassis is fully radio frequency (RF) hardened to ensure virtually noise-free transmission. The Cisco uBR7246VXR supports the complete portfolio of Cisco Universal Broadband Router (uBR) line cards and Cisco Broadband Processing Engines (BPEs) that

Figure 1

Cisco uBR7246VXR Universal Broadband Router is a CMTS that offers the highest modular scalability, carrier-class reliability, and unmatched investment protection.



offer varying upstream-to-downstream interface ratios, differing bandwidth, modulation schemes, and the ability to dynamically perform complex spectrum management. The router supports 6 MHz North American channel plans using ITU-T J.83 Annex B operation and 8 MHz Phase Alternate Line (PAL) or Sequential Colour Avec Memoire (SECAM) channel plans using ITU-T J.83 Annex A operation.

With its combination of modular performance and density, the Cisco uBR7246VXR allows network-layer capabilities to be extended to a wide range of network configurations and environments. One of the key benefits of the Cisco uBR7246VXR is its modularity. The Cisco uBR7246VXR offers a variety of line cards, LAN/WAN interfaces, processors, I/O controllers, and memory options to offer customers customized configurations to meet their network needs. The Cisco uBR7246VXR features:

- Four cable line cards to connect to the cable plant
- Two port adapters (one slot for dual-width port adapter) to connect to the IP backbone and external networks; a range of network interfaces is available, including Cisco Dynamic Packet Transport (DPT) port adapters, which provide direct, high-speed optical connectivity combined with add-drop multiplexer capability
- One Cisco Network Processing Engine (NPE) that includes the choice of the Cisco uBR7200-NPE-G1, NPE-400, or NPE-225
- One I/O controller that includes the choice of a standard I/O controller, controller with one Fast Ethernet port, or controller with two Fast Ethernet or Ethernet ports for a chassis with a Cisco NPE-400 or NPE-225. For chassis that contain the Cisco uBR7200-NPE-G1, customers have the option of operating with or without an I/O controller.
- One cable clock card to lock onto and propagate a T1 clock signal throughout the router midplane

Like all other Cisco routers, the Cisco uBR7246VXR runs Cisco IOS[®] Software—the industry’s most feature-rich software platform. The Cisco uBR7246VXR delivers high-performance routing capability at the edge, supporting Border Gateway Protocol (BGP4), Internal Border Gateway Protocol (IBGP), Multicast, Open Shortest Path First (OSPF), and many other routing and switching protocols. The Cisco uBR7246VXR supports NetFlow switching and quality of service (QoS) features including Weighted Fair Queuing (WFQ), Weighted Random Early Discard (WRED), and Resource Reservation Protocol (RSVP). The product enables tiered service provisioning based on DOCSIS 1.1 QoS for true traffic shaping and management. The product enables differentiated billing by providing detailed traffic statistics by IP address, protocol, QoS, and application. Advanced plant troubleshooting and diagnostics enable advanced proactive network management. Advanced spectrum management capabilities maintain reliable service to end users even in the presence of cable plant upstream noise.

High Availability, Serviceability, and Manageability

The Cisco uBR7246VXR offers exceptional availability, serviceability, and manageability. The Cisco uBR7246VXR supports dual current-sharing power supplies (AC or DC) and online insertion and removal (OIR) so that interfaces can be added, removed, or replaced without service interruption. A PC Flash memory card enhances reliability by storing backup software images and configuration files. Environmental monitors have levels of escalation so operators may take corrective action prior to any system shutdown. To enhance serviceability, each component of the Cisco uBR7246VXR is replaceable in the field.

For maximum uptime, the Cisco uBR7246VXR offers N+1 redundancy solutions with 99.999 percent high availability. The router works with both Cisco RF Switch models—the Cisco uBR 3x10 RF Switch or the Cisco uBR 2x12 RF Switch. The router supports fast failover of connected cable modems from an active CMTS to a standby

CMTS. This ensures no single point of failure in the CMTS and offers fast switchover of 3-5 seconds in the event of a system or link failure. The solution exceeds PacketCable high-availability requirements and optimizes switchover to:

- Prioritize voice flows over best-effort data flows
- Maintain advanced spectrum management states
- Support switchover of a single domain, line card, bundle, or chassis
- Offer quick command line interface (CLI)-based switchover for plant maintenance

Up to seven active CMTSs can be protected by one protect CMTS with the Cisco uBR 2x12 RF Switch. This enhances customer satisfaction through highly available services.

For additional flexibility, the Cisco uBR7246VXR also supports 1+1 inter chassis redundancy which does not require an external Cisco RF Switch.

Key Features

- Modular scalability
 - Highest density per seven-foot rack with forward-compatible cable line cards and a wide variety of network interfaces
 - Only platform with family of field-installable processor upgrades; additional subscribers with a 2x performance upgrade to the Cisco uBR7200-NPE-G1
- Highest reliability
 - Demonstrated mean time between failure (MTBF) beyond PacketCable requirements
 - 99.999 percent availability with N+1 Redundancy—cable industry's first inter-chassis, fully redundant N+1 system configuration
 - Highest field-proven reliability with more than 275,000 upstream ports deployed worldwide
- Proven investment protection
 - PacketCable 1.0, DOCSIS 1.1 and 1.0 qualified
 - Most versatile standards support—IETF, ITU, EuroDOCSIS, PacketCable, MPLS, DPT/RPR
 - Greatest flexibility with investment protection and lowest total cost of ownership

Key Benefits

- Additional revenues with advanced IP services
- Increased customer satisfaction with field-proven high availability
- Reduced operational expenses with DPT backhaul resiliency
- Enhanced revenues with Layer 3 features designed specifically to support voice and commercial services
- Reduced operational expenses with industry-leading network management tools

Network Interfaces

The Cisco uBR7246VXR shares the same port adapters with the Cisco 7400, 7500, and 7600 Series routers. The Cisco uBR7246VXR offers scalable density with the widest range of connectivity options including:

- Ethernet 10BASE-TX and 10BASE-FX
- Fast Ethernet 100BASE-TX and 100BASE-FX
- Gigabit Ethernet with transceiver options
- Serial V.35; multiport T1, E1, T3, E3
- HSSI
- Multichannel T1, E1, T3, E3
- Packet Over SONET (POS)
- Dynamic Packet Transport (DPT)
- ATM

Software Features

Key features supported by the Cisco uBR7246VXR include:

- QoS
 - Low-Latency Queuing (LLQ)
 - Class-Based Weighted Fair Queuing (CBWFQ)
 - Class-Based Weighted Random Early Detection (CBWRED)
 - Policing
 - Marking
 - Shaping
 - Committed Access Rate (CAR)
 - Generic Traffic Shaping (GTS)
 - DOCSIS 1.1 and PacketCable QoS
- MPLS
 - MPLS VPN
 - MPLS QoS
 - MPLS traffic engineering
- Tunneling
 - GRE
 - L2TP
 - UTI

- Other
 - ACLs
 - NAT
 - NetFlow
 - Firewall
 - Multicast
- N+1 Redundancy—Cisco uBR7246VXR interoperates with both Cisco RF Switches
- 1+1 inter chassis redundancy option which does not require an external Cisco RF Switch; this gives cable operators maximum flexibility and accommodates different service needs

Specifications

Description	Specification
Midplane	Two PCI buses with an aggregate bandwidth of 3.2 Gbps ¹
Dimensions (H x W x D)	10.5 x 17.00 x 21.25 in. (26.67 x 43.18 x 53.98 cm)
Weight	Chassis fully configured with a network processing engine, I/O controller, 2 port adapters, 4 cable line cards, a clock card, 2 power supplies, and a fan tray: ~ 100 lb (45.4 kg)
Heat dissipation	800W ² (2730 Btu ³)
AC-input power	800W maximum (with either a single or dual power supply configuration)
Maximum AC-input voltage	100 to 240 VAC ⁴ wide input with power factor correction
AC-input current rating	7A ⁵ maximum at 110 VAC and 3.5A maximum at 240 VAC with the chassis fully configured
AC-input cable	18 AWG ⁶ three-wire cable, with a three-lead IEC-320 receptacle on the power supply end, and a country-dependent plug on the power source end
DC-input voltage rating	-48 VDC ⁷ nominal in North America -60 VDC nominal in the European Community
DC-input current rating	Not to exceed 13A maximum at -48 VDC (370W/-48 VDC = 7.7A typical draw) Not to exceed 8A maximum at -60 VDC (370W/-60 VDC = 6.2A typical draw)
DC-input cable	14 AWG (2.08 mm ²) recommended minimum, with at least three conductors rated for at least 140°F (60°C)
DC-output power	550W maximum (with either a single or dual power supply configuration)
DC voltages supplied	+3.5V, +5.2V, +12.2V, -12.2V, +16V, -16V
Operating Frequency	50/60 Hz
Airflow	~120 cfm ⁸
Temperature	32 to 104°F (0 to 70°C) -4 to 149°F (-20 to 65°C)
Humidity	10 to 90% noncondensing
Agency approval	Safety: UL 1950, CSA 22.2 No. 950, EN60950 EMI: FCC Class A, CSA Class A, EN60555-2, EN55022 Class B, VCCI Class 2, AS/NRZ 3548 Class A Immunity: IEC-1000-4-2, IEC-1000-4-3, IEC-1000-4-4, IEC-1000-4-5, IEC-1000-4-6, IEC-1000-4-11, IEC 1000-3-2

1. Some de-rating applies due to a) multiplexing address and data on a PCI bus, b) mix of read (slow) versus write (fast) operations, and c) burst transfer sizes.
2. W = watts
3. Btu = British thermal units
4. VAC = volts alternating current
5. A = ampere
6. AWG = American Wire Gauge
7. VDC = volts direct current
8. cfm = cubic feet per minute

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