Data Sheet

Cisco uBR10012 Universal Broadband Router

The Cisco® uBR10012 Universal Broadband Router is a communications-grade cable modem termination system (CMTS) that helps cable operators evolve their traditional cable infrastructures to an IP next-generation network with superior reliability, performance, scale, and density. The Cisco uBR10012 (Figure 1) supports large-scale delivery of advanced, revenue-generating IP services—at line rate—for business and residential customers. The unique architecture of the Cisco uBR10012 brings unparalleled flexibility and intelligence to the cable network with consistent high performance and sophisticated routing capabilities.

Figure 1. Cisco uBR10012 Universal Broadband Router

NEXT-GENERATION TECHNOLOGY TODAY

The Cisco uBR10012, which is qualified for PacketCable™ 1.0, DOCSIS® 1.1, and Euro-DOCSIS 1.1, is built to meet the current and future needs of cable operators. Based on Cisco IOS® Software and featuring full Layer 3 routing capabilities, the Cisco uBR10012 offers advanced networking and routing options. Beginning in Cisco IOS Software Release 12.3(13)BC, the product supports PacketCable Multimedia (PCMM), enabling cable operators to deploy unique, next-generation multimedia services such as voice over IP (VoIP), video telephony, and broadband online gaming. With Cisco IOS Software Release 12.3(13)BC or greater, operators can optimize network utilization in real time for prioritized and aggregated resource demands from all PCMM applications and enhance the broadband subscriber experience by prioritizing or reserving bandwidth for latency-sensitive and feature-rich services. The CMTS fulfills service flow requests and now supports admission control—real-time decision making on a service-by-service request prior to committing CMTS or CMTS-controlled resources. Operators can establish policies for how resources are allocated among multiple services and can set thresholds for dealing with demand spikes.

The product also 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 (OOB) messaging in DOCSIS digitally modulated carriers, cable operators can consolidate cable modem and set-top box (STB) data traffic on a shared DOCSIS channel. Features such as admission control and advanced traffic

engineering, as well as advanced-mode DSG on their cable IP networks, help cable operators converge voice, video, and data traffic on their cable IP networks. Furthermore, Cisco Systems® is a leader in CMTS lawful intercept enablement. Cisco IOS Software Release 12.3(13)BC introduces Service-Independent Intercept (SII) support on the Cisco uBR10012. SII support assists operators in meeting the needs of law enforcement.

Wideband Enables New IP Services

Wideband uses advanced channel-bonding technology to deliver very high-speed broadband services—and enable a new generation of bandwidth-hungry IP services. As cable operators deploy more and more IP-based services, including video over DOCSIS, wideband technology allows them to offer up to 240 Mbps on a single bonded downstream.

In addition to increasing bandwidth available on the downstream, Cisco wideband also reduces cost. It does this using inexpensive, field-proven edge quadrature amplitude modulation (QAM) modulators such as the Scientific Atlanta XDQA in order to double the downstream capacity of the Cisco uBR10012 and reduce RF downstream costs. This enables cable operators to use the lower edge QAM port prices and to add new downstreams without adding additional upstreams at the same time.

Each Cisco uBR10012 chassis can support up to two Cisco 1-Gbps wideband shared port adapters (SPAs) by utilizing a carrier card that occupies slots 1 and 2 in the I/O portion of the chassis. Equally important, these SPAs work in conjunction with the existing MC5X20U Broadband Processing Engines to more than double the available downstream bandwidth of the Cisco uBR10012 system.

COMMUNICATIONS-GRADE RELIABILITY

The Cisco uBR10012 delivers extremely high availability with fully redundant components, redundant backplane connections, N+1 RF line-card redundancy, and stateful switchover support, which help ensure uninterrupted service (Figure 2). All platforms are compliant with Network Equipment Building Standards (NEBS), ETSI, and ANSI. The Cisco uBR10012 can be managed remotely and features field-upgradable software and hot-swappable components.

Figure 2. Fully Redundant Components and Connections in Cisco uBR10012

The Cisco uBR10012 features these components:

- Eight RF line cards connect to the cable plant
- Two SPAs for wideband channel bonding, which provides bonded downstream data rates up to 240 Mbps
- One SPA interface processor (SIP), the carrier card for wideband SPAs

- Four high-performance WAN interfaces to connect to the IP backbone and external networks
- Two Cisco Timing, Communication, and Control Plus (TCC+) cards to monitor the line cards and power supply
- Two Cisco performance routing engine (PRE) modules with Parallel Express Forwarding (PXF) processors for consistent, high-performance throughput, even with multiple services enabled
- Two power entry modules (PEMs) for uninterrupted power supply

MODULAR DESIGN FOR INVESTMENT PROTECTION

The Cisco uBR10012 enables cable operators to deliver feature-rich, high-speed data, voice, and video services to very high subscriber penetrations, typically 1000 to 64,000 subscribers per chassis. With a standards-based, modular design and upgrade flexibility, the Cisco uBR10012 provides cable operators with a quick return on investment and an easy migration path for future growth.

The Cisco uBR10012 supports Cisco broadband processing engines (BPEs), including the Cisco 5x20U Broadband Processing Engine, which offers five downstreams and 20 upstreams. This BPE supports DOCSIS and Euro-DOCSIS channel plans, as well as DOCSIS operations in Japan that extend the supported upstream frequency range. With the Cisco 5x20U and the Cisco uBR10012 Performance Routing Engine 2 (PRE-2), cable operators can now offer a broad range of reliable, value-added IP services to as many as 64,000 subscribers per chassis, with guaranteed performance at line rate with leading RF capabilities.

The Cisco uBR10012 supports high-performance WAN interfaces. The Cisco Gigabit Ethernet Half-Height Line Card for the Cisco uBR10012 helps address increasing needs for Gigabit Ethernet modularity and density. Two of these half-height line cards can be housed in a single Cisco uBR10012 chassis slot (slots 3 and 4) with the use of a Cisco Half-Height Line Card Carrier. This doubles the Gigabit Ethernet density of the Cisco uBR10012 to maximize slot utilization and decrease system cost per port.

All cable line cards and WAN interfaces are optimized for terminating large numbers of subscriber circuits and for handling physical-layer conversions unique to each kind of interface.

CONSISTENT HIGH PERFORMANCE WITH VALUE-ADDED IP SERVICES

Supporting multiple services can strain existing cable networks. Operators must often make significant trade-offs concerning throughput, capacity, or service mix that can lower operating margins and create inconsistent service characteristics. With the Cisco uBR10012, multiple revenue-generating cable IP services can be deployed reliably and with consistent performance.

The Cisco uBR10012's PXF-based architecture helps ensure consistent line-rate throughput with multiple IP services enabled. A comprehensive suite of value-added IP services, such as quality of service (QoS), Multiprotocol Label Switching (MPLS), and access control lists (ACLs), has been performance-optimized to deliver exceptional throughput to every subscriber. With PCMM support, the Cisco uBR10012 now supports Dynamic QoS (D-QoS) for a range of new service offerings.

In contrast to other CMTS products that support only distributed processing or only centralized processing, the Cisco uBR10012 supports a mix of distributed, centralized, and parallel processing. This helps ensure optimized performance to a comprehensive suite of line-rate IP services.

DOCSIS SET-TOP GATEWAY SUPPORT

Traditionally, physical transport of OOB messaging is carried over dedicated channels as defined by the Society of Cable Telecommunication Engineers Digital Video Subcommittee (SCTE DVS) 167 and SCTE DVS 178. DSG Version 1.1 allows the Cisco uBR10012 to deliver OOB messages with just a software upgrade. Based on CableLabs OpenCable standards, DSG is a technology that bridges the traditional video environment with what can be considered "next-generation OOB." DSG moves away from traditional OOB transport, incorporating it into DOCSIS digitally modulated carriers now used for cable modem service. The CMTS transports digital video OOB messaging/signaling between the video headend and subscriber digital STBs.

Consolidating cable modem and STB traffic over a common DOCSIS network enables cable operators to support new features and technology with minimal hardware change and offers an intelligent and more lasting network infrastructure that increases return on investment and reduces operating expenses. DSG adds the power of DOCSIS technology for new services, accelerating deployment of bandwidth-intensive, interactive video services such as online gaming, t-commerce, and targeted advertising. Migration of OOB messaging traffic to an operationally superior and higher bandwidth DOCSIS channel is critical to adoption of interactive services. For these services, the traditional OOB mechanism (DVS 167 and DVS 178) is inefficient and provides insufficient bandwidth at a higher cost point.

Using Cisco IOS Software Release 12.3(13)BC or greater, advanced mode DSG, based on CM-SP-DSG-I04-050408, is supported. Advanced mode DSG includes features such as downstream channel descriptors, regionalization, fragmentation, QoS, and enhanced security for multicast delivery of out-of-band messages dynamically to set-top boxes.

APPLICATIONS

With the Cisco uBR10012, cable operators can deploy advanced cable IP services while supporting a large variety of applications, including:

- High-speed data (HSD)
- Very high-speed data using wideband channel bonding
- Managed access and tiered services
- Business services
- VoIP
- Video over IP
- VPNs

The high density and high reliability of the Cisco uBR10012 contribute to high service margins. The Cisco uBR10012 offers an optimal solution to expand services and penetrate new markets. A mix of VoIP, VPN, IP Multicast, and basic HSD services is consistently, efficiently, and optimally supported throughout the network. No other CMTS offers the combination of density, reliability, flexibility, and performance found in the Cisco uBR10012 (Table 1).

Table 1. Cisco uBR10012 Features and Benefits

Feature	Description
Wideband channel bonding with modular CMTS architecture	• Expands the current 30-Mbps service portfolio options up to 240 Mbps • Enables efficient video delivery over IP • Opportunity to scale services to meet new subscriber growth • Path to gigabit services • Cost-effective option to scale DOCSIS deployments • Easy first step in moving to DOCSIS 3.0
PCMM support, PacketCable 1.0, as well as DOCSIS and Euro-DOCSIS 1.1 qualified	• Protects investment and helps ensure compatibility with next-generation multiservice networks • Provides QoS support, access lists, Multicast, MPLS traffic engineering
Highest density and scalability in the industry	• Reduces capital expenses • Protects existing capital investment
High availability	• Reduces operational expenses • Increases customer satisfaction • Enables service-level agreements • Enables delay-sensitive applications, such as voice and video • Advanced, PXF-optimized IP services Consistent high throughput, even with multiple, simultaneous services enabled

SPECIFICATIONS

Table 2 provides technical specifications for the Cisco uBR10012.

Table 2. Cisco uBR10012 Universal Broadband Router Hardware Specifications

Description	Specification
Chassis	18 rack units with two chassis per 7-foot rack; fully configured chassis weight is 235 lb (106.6 kg); each chassis is 31.25 in. (79.4 cm) high, 17.2 in. (43.7 cm) wide, and 22.75 in. (57.8 cm) deep
Power	DC input voltage of –48 to –60 VDC with 2400W maximum power consumption, 240 VAC option
Temperature	41 to 104°F (5 to 40°C) operating and –40 to 158°F (–40 to 70°C) nonoperating
Interfaces	Eight line card slots; four LAN/WAN interface slots; interfaces include Gigabit Ethernet and wideband SPA
Backplane capacity	51.2 Gbps
Compliance and emissions	UL 1950, CAN/CSA 22.2 No. 950-95, EN60950, IEC 60950, ACA TS001, AS/NZS3260, 47CFR
Class	B (FCC), CISPR22 Class B, EN55022 Class B, AS/NZS 3548 Class B, ICES-003 Class B, VCCI Class B, BSMI (CNS 13438) Class B, IEC1000-3-2, IEC1000-3-3, EN61000-4-2, EN61000- 4-3, EN61000-4-4, EN61000-5, EN61000-4-11, NEBS Level 3, Bellcore: GR-63-CORE, GR-1089- CORE, SR-3580, ETS 300 386-1, ETS 300 386-2, ETS 300 132-2
Software support	Cisco IOS Software Release 12.3(13)BC minimum to support PCMM, admission control, Advanced Mode DSG, and SII

ORDERING INFORMATION

Visit http://www.cisco.com/en/US/ordering/index.shtml to place an order.

Table 3 details the product part numbers for the Cisco uBR10012.

Table 3. Part Numbers for Cisco uBR10012

Product Part Number	Product Description
UBR10012	uBR10012, 8 MC + 4 WAN + 2 TCC + 2 PRE slots, display, fan tray
UBR10-PWR-MON-CAB	uBR10012, monitor cable for ext AC power shelf
UBR10-PWR-MON-CAB=	uBR10012, monitor cable for ext AC power shelf
UBR10-PWR-AC-EXT	External AC power option (2 DC PEM + AS5800 converter)
UBR10-PWR-AC	AC power supply
UBR10-PWR-AC=	AC power supply, spare
UBR10-PWR-DC	UBR10012 Series DC power entry module with monitoring
UBR10-PWR-DC=	UBR10012 Series DC power entry module with monitoring, spare
AS58-PWR-3AC/2400	AS5800 AC power option (120/240VAC)
AS58-PWR-3AC/2400=	AS5800 AC power option (120/240VAC), spare
AS58-PWR-3AC/MOD=	AS5800 3AC/2400 power module, spare
ESR-PRE-MEM-FD128	C10000 PRE 128M flash disk option
ESR-PRE-MEM-FD128=	C10000 PRE 128M flash disk option
ESR-PRE-MEM-512M=	C10000 PRE 512M DRAM

SERVICE AND SUPPORT

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FOR MORE INFORMATION

For more information about the Cisco uBR10012, visit http://www.cisco.com/en/US/products/hw/cable/ps2209/index.html or contact your local account representative.

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