


# Broadband and Dial Access

## Broadband and Dial Access Products at a Glance

### Remote Dial Access—Data and Voice (VoIP)

| Product[1] | Features | Page |
|---|---|---|
| **Cisco AS5350 Series Universal Gateways** | • High performance, 1RU, universal gateway<br>• Universal Port technology for multiple data, voice, and fax services on any port at any time<br>• 2,4, & 8 CT1/7 CE1/PRI configurations for 48 to 240 channels<br>• Supports broad range of async/ISDN/VoIP/wireless protocols<br>• Two 10/100 Ethernet ports, two 8 Mbps serial backhaul ports<br>• Two 8 Mbps serial backhaul ports<br>• Cisco SS7 signaling gateway interoperability<br>• Flexible, redundant backhaul methods | 7-4 |
| **Cisco AS5400 Series Universal Gateways** | • High performance, 2RU, universal gateway<br>• Universal Port technology for multiple data, voice, and fax services on any port at any time<br>• Two models: Cisco AS5400HPX and Cisco AS5400<br>• 8 to 16 CT1/CE1/PRI or 1 T3 configuration for 192 to 648 channels<br>• Low power and high availability design<br>• Supports a broad range of async/ISDN/VoIP/fax/wireless protocols<br>• Cisco SS7 signaling gateway interoperability<br>• Flexible, redundant backhaul methods | 7-7 |
| **Cisco AS5850 Universal Gateway** | The highest density universal gateway in the marketplace<br>• Supporting at least 2,688 sessions data, voice, and fax services on any port at any time using T1, E1, DS3 or STM-1 trunk interface<br>• Constant density regardless of codec type, ECAN or VAD settings<br>• Extensive high availability features<br>• TDM grooming capability | 7-9 |
| **SS7 Signaling & Softswitch Products** | • Cisco PGW 2200 Softswitch—Call Agent providing signaling and call control functionality for PSTN Gateway and transit applications in international markets<br>• Cisco BTS 10200 Softswitch—Class 4/5 softswitch for Voice over IP applications | 7-11 |

1. For Cisco 2509 and 2511 Access Servers, see page 1-24.

### Broadband Cable

| Product | Features | Page |
|---|---|---|
| **Headend and Distribution Hub Equipment** | | |
| **Cisco uBR7100 Series Universal Broadband Router** | Entry-level, standards-based fixed-configuration CMTS and integrated router for lower-density residential and MxU customers serviced by cable operators or ISPs.<br>• Compact form factor (2RU)<br>• Supports up to 2,000[1] broadband subscribers<br>• Layer 2 bridging and full Layer 3 routing<br>• DOCSIS 1.0, 1.1 and Euro--DOCSIS 1.0 qualified; supports DOCSIS Set-top Gateway (DSG)<br>• Fixed-configuration models including: Cisco uBR7111, Cisco uBR7111E, Cisco uBR7114, and Cisco uBR7114E<br>• Integrated upconverter/modulator<br>• Embedded dual 10/100 BaseT Ethernet network interface<br>• Selection of LAN and WAN interfaces | 7-12 |

| Product | Features | Page |
|---|---|---|
| **Cisco uBR7246VXR Universal Broadband Router** | Modular, standards-based communications-grade CMTS and integrated router for high-growth broadband cable deployments[1]<br>• Supports up to 10,000[1] broadband subscribers<br>• Offers large variety of LAN and WAN interface options and processors<br>• Full Layer 3 implementation<br>• DOCSIS, 1.0, 1.1, Euro-DOCSIS 1.0, 1.1, 2.0 (ATDMA-only) and PacketCable 1.0 qualified; Supports DSG<br>• Selection of cable line cards that includes Cisco uBR7200 Series MC28U, MC28X, MC16U, and MC16X Broadband Processing Engines (BPEs)<br>• Selection of nine cable line cards that include Cisco MC28C, MC16S, MC16E, MC16C, and MC14C Universal Broadband Router (uBR) cards and Cisco uBR7200 Series MC28U, MC28X, MC16U, and MC16X Broadband Processing Engines (BPEs) | 7-13 |
| **Cisco uBR10012 Universal Broadband Router** | Highest-capacity communications-grade CMTS on the market today. Delivers the services, performance, scale, and carrier-class reliability large cable operators and ISPs demand[1]<br>• Supports up to 64,000[1] broadband subscribers<br>• A-TDMA and advanced spectrum management<br>• Full Layer 3 implementation<br>• DOCSIS, 1.0, 1.1, Euro-DOCSIS 1.0, 1.1 and PacketCable 1.0 qualified; Supports DSG<br>• High-performance aggregation platform with Parallel Express Forwarding patented by Cisco<br>• Selection of line cards that includes Cisco 5x20U Broadband Processing Engine (BPE)<br>• Network interfaces that includes 1 Gbps over Gigabit Ethernet and OC-48-Dynamic Packet Transport (DPT) Interface Module Set | 7-14 |
| **Cisco uBR3x10 RF Switch** | • Exceeds packet cable availability requirements<br>• Enables a fully redundant CMTS with no single point of failure; works with the Cisco uBR7246VXR and uBR10012<br>• Maximizes density with more than 250 MCX-type connector | 7-15 |
| **Customer Premise Equipment (CPE)** | | |
| **Cisco uBR905 Cable Access Router** | Integrated DOCSIS-based cable modem and router with hardware accelerated IPSec VPN tunneling support that includes:<br>• 4 Ethernet and 1 CATV port<br>• Supports DOCSIS-based data and VPN services | 7-16 |
| **Video Edge QAM Equipment** | | |
| **Cisco uMG9820 QAM Gateway** | • Offers the highest-density Gigabit Ethernet QAM product available today on the market for digital video networks<br>• Modular, single-rack-unit chassis design enhances scalability by making it easy to add QAM channels as VoD service grows<br>• Optimized for Gigabit Ethernet networking accepting full line-rate Gigabit Ethernet video transport feeds | 7-17 |
| **Network Management** | | |
| **Cisco Broadband Configurator** | • Provides a user interface to collect information needed to generate DOCSIS or PacketCable configuration files | 7-18 |
| **Cisco Broadband Troubleshooter** | Provides a diagnostic tool for RF technicians to quickly and easily isolate problems in the cable plant<br>• Analyzes and sorts RF conditions into specific categories such as attenuation, provisioning, noise or packet corruption (CRC) errors<br>• Provides dashboard views of network health, CMTS and CM statistics, and CM snapshots<br>• Correlates CM to subscriber information<br>• Works with an optional tool to map CMs and status to subscriber street-level views | 7-18 |
| **Cisco Cable Diagnostic Manager** | Provides fault, configuration, and performance management for Cisco CMTS products and DOCSIS and EuroDOCSIS CMs via proactive network surveillance<br>• Supports CM software image downloads<br>• Offers topology tree map of CMTS and CMs<br>• Provides tabular and graphical historical utilization and performance reports<br>• Offers color-coded chassis views to provide at-a-glance status | 7-18 |

1. Numbers are for reference only. Actual numbers for specific systems will vary depending on network/service loading, traffic, and other parameters.

## DSL (Digital Subscriber Line) Access

| Product | Features | Page |
|---|---|---|
| **DSL Access CPE**[1] | Wide variety of Cisco router-based DSL CPE solutions for business-class to small office applications | 7-19 |
| **Broadband Services Aggregation** | • Cisco 7200 Series Router—Up to 16000 broadband sessions on a 3 RU platform, including aggregation of PPP, PPPoE, and PPPoA<br>• Cisco 7301 Series Router—1 RU Broadband Aggregation Router that is capable of delivering up to 16000 sessions per chassis<br>• Cisco 10000 Series Router—A carrier-class router that supports up to 61,500 broadband sessions with 99.999 percent system uptime | 7-20 |

1. For ADSL, ISDN, and IDSL small office/home office (SOHO) customer premise equipment (CPE), see Chapter 1: Routing

## ATM Multiservice WAN Switching

| Product | Features | Page |
|---|---|---|
| **Cisco BPX 8600 Series Switches** | • Large-scale Advanced ATM switch for service provider and large enterprise applications<br>• Narrowband and broadband services in a single, highly reliable platform using a multishelf architecture with intelligent call processing for Frame Relay and ATM switched virtual circuits (SVCs)<br>• 20 Gbps of high-throughput switching for multiple traffic types data, voice, and video | 7-21 |
| **Cisco MGX 8850 Series Advanced ATM Multiservice Switches** | • Multiservice switch, scales from DS0 to OC-48c/STM-16 speeds<br>• Serves as a stand-alone device for narrowband services, an integrated edge concentrator or a broadband edge switch when equipped with 45 Gbps switch card and broadband ATM modules<br>• Supports PNNI routing | 7-21 |
| **Cisco MGX 8830 Series Multiservice Switches** | • Multiservice switch scales from DS0 to OC-3c/STM-1 speeds<br>• A standalone switch with narrowband interfaces and broadband trunking to remote sites with low density and high service mix requirements with 1.2 Gbps switch fabric<br>• Supports PNNI routing | 7-22 |

## Long Reach Ethernet

| Product | Features | Page |
|---|---|---|
| **Cisco Catalyst 2950 LRE Switches** | Fixed configuration Ethernet switches for delivering converged voice, video, and data services over existing category 1/2/3 wiring for the in-building MxU, Hospitality, and Enterprise markets<br>• 8 or 24 LRE ports + 2 10/100/1000BASE-T ports + 2 Small Form-Factor Pluggable (SFP) ports (two of the four uplinks active at one time), deliver Ethernet traffic (up to 15 Mbps) over standard copper cabling (up to 5000 feet); ideal for in-building applications<br>• Co-exists with POTS and ISDN traffic on the same line and compatible with ADSL<br>• Advanced quality of service, security, and multicast features to support converged voice, video (broadcast and VoD), and high speed data services | 7-22 |
| **Cisco LRE CPE Devices** | • Cisco 575 LRE CPE—Compact, includes one RJ-45 Ethernet connection and two RJ-11 connectors (for telephone)<br>• Cisco 585 LRE CPE—Compact, includes four RJ-45 switched Ethernet connections and two RJ-11 connectors (for telephone). Supports 802.1p QoS | 7-23 |
| **Cisco LRE POTS Splitter** | • Cisco LRE 48 POTS Splitter—48 ports in 1RU. Ensures that POTS service is separate, and never compromised by LRE switch reconfiguration or downtime | 7-23 |
| **Cisco Broadband Building Service Manager** | • Server system enables automated online activation, integrated billing, tiered service levels<br>• Ideal for any form of broadband access technology, including Ethernet, LRE, Cable access, DSL, Wireless, or Fiber | 7-24 |

# Memory Information for Access Routers

| Router | Memory Type | Slots | Default Memory | Max Memory | Default Config. (Notes) |
|---|---|---|---|---|---|
| **Cisco AS5350 Universal Gateway** | Main SDRAM<br>Shared<br>Boot Flash<br>System Flash | N/A | 256 MB<br>128 MB<br>16 MB<br>64 MB | 512 MB<br>128 MB<br>16 MB<br>64 MB | |
| **Cisco AS5400HPX Universal Gateway** | Main SDRAM<br>Shared<br>Boot Flash (3V)<br>System Flash (3V) | 2<br>1<br>1<br>2 | 512 MB<br>128 MB<br>16 MB<br>64 MB | 512 MB<br>128 MB<br>16 MB<br>64 MB | Cisco AS5400HPX and Cisco AS5400 use different Boot and System Flash — NOT interchangeable |
| **Cisco AS5400 Universal Gateway** | Main SDRAM<br>Shared<br>Boot Flash (5V)<br>System Flash (5V) | 2<br>1<br>1<br>2 | 256 MB<br>128 MB<br>16 MB<br>64 MB | 512 MB<br>128 MB<br>16 MB<br>64 MB | Cisco AS5400HPX and Cisco AS5400 use different Boot and System Flash — NOT interchangeable |
| **Cisco AS5850 Universal Gateway** | RSC SDRAM<br>Feature Cards SDRAMS | | 1 GB<br>128 MB | 1 GB<br>128 MB | Ships with all required memory |

# Cisco AS5350 Universal Gateway

The Cisco AS5350 Universal Gateway is the only one-rack-unit gateway supporting two-, four-, or eight-port T1/seven-port E1 configurations that provides universal port data, voice, and fax services on any port at any time. The Cisco AS5350 Universal Gateway offers high performance and high reliability in a compact, modular design. This cost-effective platform is ideally suited for Internet service providers (ISPs) and enterprise companies that require innovative universal services.

The Cisco AS5350 Universal Gateway eliminates the need for switches and routers to create a point-of-presence (POP) or "POP-in-a-box" solution. The Cisco AS5350 Universal Gateway has three primary universal gateway configurations: two Channelized T1(CT1)/Channelized E1(CE1)s, four CT1/CE1s, and eight CT1/seven CE1s. It also includes integrated signaling link termination (SLT) functionality for direct connection to a SS7/C7 signaling gateway.

The Cisco AS5350 Universal Gateway comes two high-speed serial ports are provided to support Frame Relay, Point-to-Point Protocol (PPP), and High-Level Data Link Control (HDLC) backhaul. All backhaul interfaces support Hot Standby Router Protocol (HSRP), and all cards and the fan tray are hot-swappable for carrier-class resiliency. The Cisco AS5350 Universal Gateway is the only access server in this form factor that offers universal port capability with these high-availability features.

## When to Sell

| Sell This Product | When a Customer Needs These Features |
|---|---|
| Cisco AS5350 | • 2 to 8 channelized CT1/7 CE1/PRI compact and modular universal<br>• High-performance modem, ISDN, and voice call termination<br>• Universal port services (data, voice, fax) |

## Key Features

- 1 RU modular high-performance 2 to 8 channelized CT1/7 CE1/PRI system
- Universal Gateway—which supports multiple data, voice, and fax services on any port at any time
- Ideal for Tier 2/3 ISPs and enterprises requiring innovative universal services
- Feature cards: 2, 4, or 8 CT1/7 E1/PRI feature cards (ISDN calls terminated on the card); 60 or 108 channel Universal Port feature card
- Two 10/100BaseT autosensing Ethernet LAN ports
- Two 8 MB serial WAN ports for Frame Relay, HDLC, or PPP WAN backhaul
- Carrier Class Resiliency: All feature cards and fan tray are hot swappable, modem and voice DSP are pooled and can be configured as spares, AC internal power supply with dual fans, Redundant LAN/WAN backhaul ports, Thermal management and environmental monitoring, ETSI/NEBS Level 3 compliant
- Single or Redundant AC or DC power supply with dual fans
- Cisco SS7 signaling gateway interoperability

## Competitive Products

- Lucent/Ascend: Max TNT
- 3Com/CommWorks: Total Control 1000
- Alcatel: 7505 Series
- Nuera: BTX Series
- Siemans: HiPath Series

## Specifications

| Feature | Cisco AS5350 |
|---|---|
| **Processor** | 250 MHz RISC processor |
| **Memory** | SDRAM: 256 MB (default), 512 MB (maximum)<br>Shared Input/output (I/O): 128 MB (default), 128 MB (maximum)<br>Boot Flash: 16 MB (default), 16 MB (maximum)<br>System Flash: 64 MB (default), 64 MB (maximum)<br>Layer 3 Cache: 2 MB |
| **Feature Card Slots** | Three slots |
| **Egress Ports** | Two 10/100-MB Ethernet ports<br>Two 8-Mbps serial ports<br>T1/E1 DS1 trunk feature cards |
| **LAN Protocols** | IP, IPX, AppleTalk, DECNet, ARA, NetBEUI, bridging, HSRP, 802.1Q |
| **WAN Protocols** | Frame Relay, PPP, HDLC (leased line) |
| **Routing Protocols** | RIP, RIPv2, OSPF, IGRP, EIGRP, BGPv4, IS-IS, AT-EIGRP, IPX-EIGRP, Next Hop Resolution Protocol (NHRP), AppleTalk Update-Based Routing Protocol (AURP) |
| **QoS Protocols** | IP Precedence, Resource Reservation Protocol (RSVP), Weighted Fair Queuing (WFQ), Weighted Random Early Detection (WRED), Multichassis Multilink PPP (MMP) fragmentation and interleaving, 802.1P |
| **Access Protocols** | PPP, Serial Line Internet Protocol (SLIP), TCP Clear, IPXCP, ATCP, ARA, NBFCP, NetBIOS over TCP/IP, NetBEUI over PPP, protocol translation (PPP, SLIP, ARA, X.25, TCP, local-area transport [LAT], Telnet), and Xremote |
| **Bandwidth Optimization** | Multilink PPP (MP), MLP, TCP/IP header compression, Bandwidth Allocation Control Protocol (BACP), bandwidth on demand, nonfacility-associated signaling (NFAS), traffic shaping |
| **Voice Compression** | G.711, G.723.1, (5.3K and 6.3K), G.726, G.729ab, G.Clear, GSM-FR |
| **DSP Voice Features** | Echo cancellation, programmable up to 128 ms<br>Transparent transcoding between A-law and mu-law encoding<br>Voice activity detection, silence suppression, comfort noise generation<br>Fixed and adaptive jitter buffering<br>Call progress tone detection and generation - Dial tone, busy, ring-back, congestion, and re-order tones with local country variants<br>DTMF, Multifrequency (MF)<br>Continuity Testing (COT) |
| **Voice and Fax Signaling Protocols** | H.323v2, H.323/v3, H.323v4, SIP, MGCP 1.0, TGCP 1.0, Voice Extensible Markup Language (VoiceXML), Real-Time Streaming Protocol (RTSP), Extended Simple Mail Transfer Protocol (ESMTP)<br>T.38 real-time fax relay<br>T.37 fax store and forward<br>Fax detection<br>Fax and modem passthrough<br>Open Settlements Protocol (OSP)<br>Media Recording Control Protocol (MRCP)<br>Text to Speech (TTS) Servers<br>Automatic Speech Recognition (ASR) Servers |
| **SS7** | Integrated SLT functionality |
| **Network Security** | RADIUS or TACACS+<br>PAP or CHAP authentication<br>Local user/password database<br>DNIS, CLID, call-type preauthentication<br>Inbound/outbound traffic filtering (including IP, IPX, AppleTalk, bridged traffic)<br>Network Address Translation (NAT)<br>Dynamic access lists<br>SNMPv2, SNMPv3 |
| **Virtual Private Networking** | IP Security (IPSec)<br>Policy enforcement (RADIUS or TACACS+)<br>L2TP, Layer 2 Forwarding (L2F), and generic routing encapsulation (GRE) tunnels<br>Firewall security and intrusion detection<br>QoS features (committed access rate [CAR], Random Early Detection [RED], IP Precedence, policy-based routing) |
| **Channelized T1** | Robbed-bit signaling; Loop Start, Immediate Start, and Wink Start Protocols |
| **Channelized E1** | CAS, PRI, E1 R1, E1 R2, leased line, Frame Relay, G.703, G.704 |
| **ISDN Protocols Supported** | Sync mode PPP, V.120, V.110 at rates up to 38400 bps<br>Network- and User-side ISDN<br>NFAS with backup D-channel<br>QSIG, Feature Group B, Feature Group D<br>DoVBS |
| **Modem Protocols Supported** | V.90 or V.92 standard supporting rates of 56000 to 28000 in 1333 bps increments<br>V.92 Modem on Hold<br>V.44 Compression<br>Fax out (transmission) Group 3, standards EIA 2388 Class 2 and EIA 592 Class 2.0, at modulations V.33, V.17, V.29, V.27ter, and V.21<br>K56Flex at 56000 to 32000 in 2000 -bps increments<br>ITU-T V.34 Annex 12 at 33600 and 31200 bps<br>and many others |
| **Wireless Protocols Supported** | V.110, V.120 |
| **Full Cisco IOS Support** | IP Plus and Enterprise Plus feature sets |
| **Console and Auxiliary Ports** | Asynchronous serial (RJ-45) |
| **Chassis** | Dimensions (H x W x D): 1.75 x 17.5 x 20.5 in.<br>Weight (fully loaded): 22 lbs. (10 kg) |

## Selected Part Numbers and Ordering Information[1]

| | |
|---|---|
| **Cisco AS5350 Universal (Data) System Bundles** | |
| AS535-2T1-48-AC | AC AS5350; 2T1, 60 ports, IP+ IOS, 48 Data Lic |
| AS535-4T1-96-AC | AC AS5350; 4T1, 108 ports, IP+ IOS, 96 Data Lic |
| AS535-8T1-192-AC | AC AS5350; 8T1, 216 ports, IP+ IOS, 192 Data Lic |
| AS535-2E1-60-AC | AC AS5350; 2E1, 60 ports, IP+ IOS, 60 Data Lic |
| AS535-4E1-120-AC | AC AS5350; 4E1, 120 ports, IP+ IOS, 120 Data Lic |
| AS535-8E1-210-AC | AC AS5350; 8E1,216 ports,240 ISDN ports, IP+ IOS,210 Data Lic |
| **Cisco AS5350 Universal (Voice) System Bundles** | |
| AS535-2T1-48-AC-V | AC AS5350 Voice; 2T1, 60 ports, IP+ IOS, 48 Voice Lic |
| AS535-4T1-96-AC-V | AC AS5350 Voice; 4T1, 108 ports, IP+ IOS, 96 Voice Lic |
| AS535-8T1-192-AC-V | AC AS5350 Voice; 8T1, 216 ports, IP+ IOS, 192 Voice Lic |
| AS535-2E1-60-AC-V | AC AS5350 Voice; 2E1, 60 ports, IP+ IOS, 60 Voice Lic |
| AS535-4E1-120-AC-V | AC AS5350 Voice; 4E1, 120 ports, IP+ IOS, 120 Voice Lic |
| AS535-8E1-210-AC-V | AC AS5350 Voice; 8E1, 216 ports, IP+ IOS, 210 Voice Lic |
| **Cisco AS5350 Spare Chassis** | |
| AS5350-AC= | AC 5350 Chassis with Motherboard, IP Plus IOS, default memory |
| AS5350-DC= | DC 5350 Chassis with Motherboard, IP Plus IOS, default memory |
| **Cisco AS5350 Software** | |
| S535AK9-12310 | Cisco AS5350 Series IOS ENTERPRISE PLUS IPSEC 3DES |
| S535AP-12310 | Cisco AS5350 Series IOS ENTERPRISE PLUS |
| S535CK9-12310 | Cisco AS5350 Series IOS IP PLUS IPSEC 3DES |
| S535CP-12310 | Cisco AS5350 Series IOS IP PLUS |
| **Cisco AS5350 Memory Options & Spares** | |
| MEM-512M-AS535 | AS5350 512MB Main SDRAM upgrade |
| **Cisco AS5350 Spare DFC Boards** | |
| AS535-DFC-2CT1= | AS5350 Dual T1/PRI DFC card |
| AS535-DFC-2CE1= | AS5350 Dual CE1/PRI DFC card |
| AS535-DFC-4CT1= | AS5350 Quad T1/PRI DFC card |
| AS535-DFC-4CE1= | AS5350 Quad E1/PRI DFC card |
| AS535-DFC-8CT1= | AS5350 Octal T1/PRI DFC card |
| AS535-DFC-8CE1= | AS5350 Octal E1/PRI DFC card |
| AS535-DFC-60NP= | AS5350 60 Nextport DFC card |
| AS535-DFC-108NP= | AS5350 108 Universal Port Card |
| **Cisco AS5350 Spare Accessories** | |
| AS5350RM-19/24= | AS5350 19/24 Rack Mount Kit, Spare |
| AS535-FTA= | AS5350 Fan Tray Assembly, Spare |
| AS535-AC-PWR= | AS5350 AC Power Supply, Spare |
| AS535-AC-RPS= | AS5350 AC Redundant Power Supply, Spare |
| AS535-DC-PWR= | AS5350 DC Power Supply, Spare |
| AS535-DC-RPS= | AS5350 DC Redundant Power Supply, Spare |

1. This is only a small subset of all parts available via URL listed under "For More Information." Some parts have restricted access or are not available through distribution channels.

## For More Information

See the Cisco AS5350 Universal Gateway Web site: **http://www.cisco.com/go/as5350**

# Cisco AS5400 Series Universal Gateways

Cisco AS5400 Series Universal Gateways offer unparalleled capacity in only two rack units (2RUs) and provides universal port data, voice and fax services on any port at any time. High-density (up to 1 CT3), low power consumption (7.2A at 48 VDC per CT3), and universal port digital signal processors (DSPs) make Cisco AS5400 Series Universal Gateways ideal for many network deployment architectures, especially colocation environments and mega points of presence (POPs).

The Cisco AS5400 Series consists of two models, the Cisco AS5400 and the Cisco AS5400HPX. The gateways share the same architecture; the primary difference is the processing capability of the two platforms. The Cisco AS5400 offers unparalleled dial capacity and scalability for MLPPP, L2TP, and V.120 sessions, whereas the Cisco AS5400HPX provides enhanced performance for processor intensive voice and fax applications.

Cisco AS5400 Series support a wide range of IP-based value-added services such as high-volume Internet access, regional/branch-office connectivity, corporate virtual private networks (VPNs), mobile wireless solutions, long distance for Internet service providers (ISPs), international wholesale long distance, distributed prepaid calling, Signaling System 7 (SS7) interconnect, and enhanced voice services.

## When to Sell

| Sell This Product | When a Customer Needs These Features |
|---|---|
| **Cisco AS5400HPX** | • High density in a small footprint (16 CT1/CE1 or 1 CT3)<br>• Universal port services (data, voice, fax)<br>• Enhanced performance for processor intensive voice and fax applications<br>• Compact form factor—easy to add capacity as the network grows<br>• Low power per port<br>• High performance async/ISDN/VoIP/wireless<br>• T.38 real-time fax relay, T.37 fax store and forward, fax detection, unified communications<br>• Flexible redundant backhaul methods |
| **Cisco AS5400** | • Async/ISDN/Wireless data to 1 CT3<br>• Universal port services (data, voice, fax) or voice only services to 16 CT1/CE1 |

## Key Features

- The Industry's only 2RU, CT3-capable universal gateway on the market with hot-swappable cards, internal redundant power supply
- Universal Gateway which provides universal port data, voice, and fax services on any port at any time
- Feature cards: 8 or 16 CT1/CE1 feature cards; 60 or 108 channel Universal Port feature card; All feature cards and fan trays are hot-swappable
- Redundant 10/100 Ethernet ports and redundant 8 Mbps serial backhaul ports for Frame Relay, HDLC or PPP WAN Backhaul
- One fast console port for local administrative access; one auxiliary port for remote administrative access
- Redundant LAN/WAN backhaul ports
- ETSI/NEBS Level 3 compliant
- Redundant AC or DC power supply with dual fans
- Cisco SS7 signaling gateway interoperability

## Competitive Products

- 3Com/CommWorks: Total Control C1000
- Alcatel: 7505 Series
- Lucent: Max TNT
- Siemens: HiPath Series

## Specifications

| | |
|---|---|
| **Processor Type** | Cisco AS5400HPX: 390-MHz RISC processor<br>Cisco AS5400:250-MHz RISC processor |
| **Calls Supported** | Cisco AS5400HPX: Voice or universal port services - to 648 concurrent calls (to 20T1s/16E1s) or<br>Remote access services - to 648 calls (to 1CT3/16E1s)<br>Cisco AS5400: Voice or universal port services - to 480 concurrent calls (to 20T1s/16E1s) or<br>Remote access services - to 648 calls (to 1CT3/16E1s) |
| **SDRAM** | Cisco AS5400HPX: 512 MB (default), 512 MB (maximum); Cisco AS5400: 256 MB (default), 512 MB (maximum) |
| **Boot Flash** | 16 MB (default) 16 MB (maximum) |
| **System Flash** | 64 MB (default) 64 MB (maximum) |
| **Layer 3 Cache** | Cisco AS5400HPX: 8 MB<br>Cisco AS5400:2 MB |
| **Shared input/output (I/O)** | 128 MB (default) 128 MB (maximum) |
| **Feature Slots** | 7 |
| **Trunk Feature Cards** | 8 T1/E1/PRI 1 CT3 |
| **DSP Feature Card** | 60/180 Universal ports |
| **LAN Protocols** | IP, IPX, AppleTalk, DECnet, ARA, NetBEUI, bridging, HSRP, 802.1Q |
| **WAN Protocols** | Frame Relay, PPP, HDLC (leased line) |
| **Routing Protocols** | RIP, RIPv2, OSPF, IGRP, EIGRP, BGPv4, IS-IS, AT-EIGRP, IPX-EIGRP, Next Hop Resolution Protocol (NHRP), AppleTalk Update-Based Routing Protocol (AURP) |
| **QoS Protocols** | IP Precedence, Resource Reservation Protocol (RSVP), Weighted Fair Queuing (WFG), Weighted Random Early Detection (WRED), Multichassis Multilink PPP (MMP) fragmentation and interleaving, 802.1P |
| **Access Protocols** | PPP, Serial Line Internet Protocol (SLIP), TCP Clear, IPXCP, ATCP, ARA, NBFCP, NetBIOS over TCP/IP, NetBEUI over PPP, protocol translation (PPP, SLIP, ARA, X.25, TCP, LAT, Telnet), & XRemote |
| **Bandwidth Optimization** | Multilink PPP (MLPPP), TCP/IP header compression, Bandwidth Allocation Control Protocol (BACP), Bandwidth on demand, Traffic shaping |
| **Voice Compression** | G.711, G.723.1 (5.3K and 6.3K), G.726, G.729ab, G.Clear, GSM-FR |
| **DSP Voice Features** | G.168 echo cancellation, programmable up to 128 ms<br>Transparent transcoding between A-law and mu-law encoding<br>Voice activity detection, silence suppression, comfort noise, fixed and adaptive jitter buffering<br>Call progress tone detection and generation—Dial tone, busy, ring-back, congestion, and re-order tones, with local country variants<br>Continuity Testing (COT)<br>DTMF, MF |
| **Voice and Fax Signaling Protocols** | H.323v2, H.323v3, H.323v4, SIP, MGCP 1.0, TGCP 1.0, Voice Extensible Markup Language (VoiceXML), Real-Time Streaming Protocol (RTSP), Extended Simple Mail Transfer Protocol (ESMTP)<br>T.37 fax store and forward<br>T.38 real-time fax relay<br>Fax detection<br>Fax and modem passthrough<br>Open Settlements Protocol (OSP)<br>Media Recording Control Protocol (MRCP)<br>Text to Speech (TTS) Servers<br>Automatic Speech Recognition (ASR) Servers |
| **SS7** | Integrated SLT functionality |
| **Network Security** | RADIUS or TACACS+, PAP or CHAP authentication, local user/password database<br>DNIS, CLID, call-type pre-authentication<br>Inbound/outbound traffic filtering (including IP, IPX, AppleTalk, bridged traffic)<br>Network Address Translation (NAT) and Dynamic access lists<br>SNMPv2, SNMPv3 |
| **Virtual Private Networking** | IP Security (IPSec) and Policy enforcement (RADIUS or TACACS+)<br>L2TP, Layer 2 Forwarding (L2F), and generic routing encapsulation (GRE) tunnels<br>Firewall security and intrusion detection |
| **Channelized T1** | Robbed-bit signaling; loop start, immediate start, and wink start protocols |
| **Channelized E1** | CAS, E1 R1, E1 R2, leased line, Frame Relay, G.703, G. 704 |
| **ISDN Protocols Supported** | Sync mode PPP, V.120, V.110 at rates up to 38400 bps<br>Network- and User-side ISDN<br>DoVBS<br>QSIG<br>NFAS with backup D-channel |
| **Modem Protocols Supported** | V.90 or V.92 standard supporting rates of 56000 to 28000 in 1333 bps increments<br>V.92 Modem on Hold, Quick Connect<br>V.44 Compression<br>Fax out (transmission) Group 3, standards EIA 2388 Class 2 and EIA 592 Class 2.0, at modulations V.33, V.17, V.29, V.27ter, and V.21<br>K56Flex at 56000 to 32000 in 2000 bps increments<br>ITU-T V.34 Annex 12 at 33600 and 31200 bps<br>and many others |
| **Wireless Protocol** | V.110, V.120 |
| **Full Cisco IOS Support** | IP Plus and Enterprise Plus feature sets |
| **Console and Auxiliary Ports** | Asynchronous serial (RJ-45) |
| **Chassis Dimensions (H x W x D)** | 3.5 x 17.5 x 18.25 in. |
| **Chassis Weight (fully loaded)** | 35 lb maximum (15.8 kg) |

### For More Information

See the Cisco AS5400 Universal Gateways Web site: **http://www.cisco.com/go/as5400**

## Cisco AS5850 Universal Gateway

The Cisco AS5850 Universal Gateway is a high-density universal gateway, with carrier-class attributes, offering highest capacity and high availability in its class. It offers high-availability features such as hot-swap on all cards, load-sharing and redundant hot-swappable power supplies, redundant blower for cooling, enhanced redundant route switch controller (eRSC) cards, and Call Admission Control (CAC), all part of the carrier class attributes required to provide a highly available system. Higher capacity configurations, depending on dial, voice, and fax application types are also supported.

The Cisco AS5850 supports a wide range of IP-based value-added services such as high-volume Internet access, corporate virtual private networks (VPNs), long distance for Internet service providers (ISPs), international wholesale long distance, distributed prepaid calling, Signaling System 7 (SS7) interconnect, and managed voice services such as hosted IP telephony, managed IP-PBX, multiservice VPNs, and IP contact centers.

Using the rich set of Cisco IOS Software features and Signaling System 7 (SS7) interconnection, service providers can quickly provision their network for new services to meet the rapidly changing demands of the communications provider marketplace.

As a highly flexible voice gateway, the Cisco AS5850 supports any coder-decoder (CODEC) at 100-percent capacity simplifying network engineering. An open programmable architecture streamlines rapid voice service creation with H.323, Session Initiation Protocol (SIP) or Media Gateway Control Protocol (MGCP).

### When to Sell

| Sell This Product | When a Customer Needs These Features |
|---|---|
| **Cisco AS5850** | • Supporting at least 2,688 sessions of data, voice, and fax services on any port at any time using T1, E1, channelized DS3 and STM-1 trunk interfaces. Larger configurations are supported for dial, MGCP voice, TDM switching, and simple H.323 or SIP applications.<br>• Service provider or IP-focused installations<br>• Highly available single system with multiple redundancy<br>• Wholesale dial/voice, retail dial/voice, TDM grooming or wireless applications |

### Key Features

- Hot-swappable redundant power supplies and power feeds
- Redundant DSPs and RSC
- Router Processor Redundancy+ for high availability
- Thermal/Power management and redundant fans
- DSP Resource Recovery Feature
- Supports H.323v2, H.323v3, H.323v4, SIP and MGCP 1.0
- Application-specific support including AOL and Prodigy traffic
- WAN optimization including routing filters, snapshot routine, dial-on-demand routing ASAP
- ETSI/NEBS Level 3 compliant
- Cisco SS7 signaling gateway interoperability
- Stratum-3 clock support
- 802.1Q/1p VLAN/ISL support

## Competitive Products

- 3Com: TC 2000
- Lucent: APX 8000
- Siemens: HiPath Series
- Alcatel: 7505 Series

## Specifications

| Feature | Cisco AS5850 |
|---|---|
| **Slots** | 12 feature board slots<br>2 eRSC slots |
| **Processor Type** | 650 MHz Broadcom 1250 Dual Core |
| **RSC Switch Fabric** | 5 GBps, Layer 3 / 4 switching |
| **Memory** | 1 GB SDRAM with ECC per RSC<br>128 MB SDRAM (with parity) per feature card |
| **Trunk Cards** | Single CT3 plus 216 DSP Channel feature card<br>24 CE1/CT1 feature card<br>Single port Channelized STM-1 feature card |
| **Universal Port Card** | 324 Channel DSP-feature card |
| **Egress Ports** | Dual Gigabit load-balanced redundant Ethernet ports with GBIC interfaces for user traffic<br>Dual 10/100-Mbps Ethernet port with RJ45 connector for management traffic |
| **LAN Protocols** | IP |
| **Service Support** | Port Policy Management and SS7/C7 |
| **Routing Protocols** | RIP, RIPv2, OSPF, IGRP, EIGRP, BGPv4, IS-IS, Next Hop Resolution Protocol (NHRP) |
| **Access Protocols** | PPP, Serial Line Internet Protocol (SLIP), TCP Clear |
| **Bandwidth Optimization** | Multilink PPP (MLPPP), TCP/IP header compression, Bandwidth Allocation Control Protocol (BACP), Bandwidth on demand, Nonfacility-associated signaling (NFAS), traffic shaping |
| **Network Security** | RADIUS or TACACS+, PAP or CHAP authentication, local user/password database, DNIS, CLID, call-type pre-authentication, Inbound/outbound traffic filtering (including IP), SNMPv2, SNMPv3 |
| **Virtual Private Networking** | IP Security (IPSec) and Policy enforcement (RADIUS or TACACS+), L2TP, Layer 2 Forwarding (L2F), and generic routing encapsulation (GRE) tunnels, Firewall security and intrusion detection, IP Precedence, policy-based routing |
| **Channelized T1** | PRI, robbed-bit signaling; loop start, immediate start, and wink start protocols, SS7 IMT |
| **Channelized DS3** | PRI, robbed-bit signaling; loop start, immediate start, and wink start protocols, SS7 IMT |
| **Channelized E1** | CAS, E1 R2, PRI, SS7 IMT |
| **Channelized STM-1** | CAS, E1 R2, PRI, SS7 IMT |
| **ISDN Protocols** | Sync mode PPP, V. 120, V. 110 at rates up to 38400 |
| **Voice Protocols** | G.711, G.723.1, G.726, G.729ab, G.Clear, GSM-FR<br>H.323v2, H.323v3, H.323v4, SIP, MGCP 1.0<br>ECAN up to 128ms<br>T.38 real-time fax relay<br>Fax detection<br>Fax and modem passthrough |
| **Modem Protocols** | V.90 or V.92 standard supporting rates of 56000 to 28000 in 1333-bps increments<br>V.44 supporting increased throughput by more than 100 percent for Internet browsing<br>Fax out (transmission) Group 3, standards EIA 2388 Class 2 and EIA 592 Class 2.0, at modulations V.33, V.17, V.29, V.27ter, and V.21<br>K56Flex at 56000 to 32000 in 2000-bps increments<br>ITU-T V.34 Annex 12 at 33600 and 31200 bps<br>and more |
| **ISDN Protocols** | Sync mode PPP, V.120, V.110 at rates up to 38400 bps |
| **Wireless Protocol** | V.110 |
| **Console** | Asynchronous serial (RJ-45) |
| **Chassis Dimensions (HxWxD)** | 24.5 x 17.5 x 24 in. |
| **Chassis Weight** | 220 lb (100 kg) |

## For More Information

See the Cisco AS5850 Web site: **http://www.cisco.com/go/AS5850**

# SS7 Signaling & Softswitch Products

## Cisco PGW 2200 Softswitch

The Cisco PGW 2200 provides the signaling and call control functionality that enables service providers (SPs) to bridge the boundary between the legacy PSTN and today's new world packet networks. Combined with Cisco's award winning media gateways, the PGW 2200 is the catalyst for PSTN Gateway solutions enabling dial offload, transit, business voice, H.323 and SIP based applications. The PGW 2200 leverages its protocol library of 90+ SS7/C7 variants to enable interconnect worldwide. In signaling mode the PGW adds SS7/C7 to the AS5X00 gateways, giving service providers around the world a proven cost-saving and reliable solution for connecting VoIP and Internet Dial Access solutions to the PSTN. SS7 signaling allows service providers to enter into new markets, optimize their networks for both voice and data traffic, and save drastically on monthly interconnect fees.

### Key Features:

- Peer-to-peer Interconnect with the PSTN via SS7/C7
- SS7/C7 support for carrier-class Cisco AS5x00 network access servers and voice gateways
- Flexible, distributed architecture that scales to meet customer requirements
- Calling-party analysis (A-number analysis)
- Called-party number analysis (B-number analysis)
- ANI- or CLI-based number screening with on-board database
- Overload control; Automatic congestion control (ACC)
- Advice of charge (AOC)
- E.164 and North American numbering plan (NANP) support
- Over-decadic digits
- Toll-free/800 number calls

### For More Information

See PGW 2200 Web site:
**http://www.cisco.com/en/US/products/hw/vcallcon/ps2027/index.html**

## Cisco BTS 10200 Softswitch

The Cisco BTS 10200 Softswitch offers tremendous flexibility to service providers who want to deploy local and transit services and facilitates cost reduction through grooming.

The standards-based Cisco BTS 10200 Softswitch enables new, innovative, easily differentiated services for a fortified broadband services offering. Services can be quickly deployed, and time-consuming and costly upgrades to each transport element are not required-the Cisco BTS 10200 Softswitch extracts and centralizes the call-control and service applications from the transport network. In addition to telecommunications services, service providers can offer a wider range of other business and residential services, including multiservice VPNs, Web hosting, and Internet access.

Leveraging the power of packet networks while seamlessly operating with legacy circuit switched infrastructures, the Cisco BTS 10200 Softswitch empowers service providers and carriers to gracefully transition to packet-based technology. Implementing the Cisco BTS 10200 Softswitch ensures rapid service deployment, carrier-grade reliability, service flexibility, scalability to millions of subscribers, and cost savings through investment optimization and operational

### When to Sell

| Sell This Product | When a Customer Needs These Features |
|---|---|
| Cisco BTS 10200 Softswitch | • Cable operators<br>• Startup local services carriers<br>• Resellers moving to facilities-based services<br>• Facilities-based competitive local exchange carriers (CLECs)<br>• Fixed-wireless carriers |

### Key Features

- Comprehensive industry-standard protocol support
- Carrier-grade reliability with Network Equipment Building Systems (NEBS) compliance and redundant platform components
- Interoperable with numerous commercial feature servers
- Feature server architecture, which provides an open protocol
- Streamlined maintenance, provisioning, and service activation
- Integrated access device and IP Phone support
- GUI and CLI
- Comprehensive reporting features, including billing records
- Network scalability through deployment of multiple, centrally managed call agents

### For More Information

See Cisco BTS 10200 Softswitch Web site:
**http://www.cisco.com/en/US/products/hw/vcallcon/ps531/index.html**

## Cisco uBR7100 Series Universal Broadband Router

The Cisco uBR7100 Series is a complete, compact, easy-to-use product that enables cost-effective, high-speed Internet access in the hospitality multidwelling (MDU) and multi-tenant (MTU) market space using the coaxial cable already in a building. The product requires exceptionally low capital investment and minimal setup time to provide online Internet access and support residential voice services. For Tier 2 or Tier 3 cable operators, it is the industry's most cost-effective, feature-rich CMTS and integrated router. The Cisco uBR7111 and Cisco uBR7114 models are CableLabs qualified to DOCSIS 1.0 and 1.1 specifications. The Cisco uBR7111E and Cisco uBR7114E models are tComLabs qualified to EuroDOCSIS 1.0 and 1.1 specifications. Includes support for DSG. The Cisco uBR7111 and Cisco uBR7111E contain one downstream port and one upstream port. The Cisco uBR7114 and Cisco uBR7114E contain one downstream port and four upstream ports. All models support bidirectional or telco-return traffic.

### When to Sell

| Sell This Product | When a Customer Needs These Features |
|---|---|
| Cisco uBR7100 Series | • For MxU customers: the Cisco uBR7100 Series enables high-value Internet and residential voice services over a DOCSIS or EuroDOCSIS cable infrastructure<br>• For cable operators: the multi-tenant/dwelling unit (MxU) market represents an untapped opportunity to expand broadband cable service. Given the small subscriber base of a typical MxU setting, the challenge has been to deliver robust services quickly and cost-effectively for an accelerated break-even point and a quicker return on investment—enabled by the Cisco uBR7100 Series |

### Key Features

- Complete package that includes a full Layer 3 router and CMTS with an integrated upconverter, and embedded Network Interface, and configuration tools to provision hosts, cable modems, and set top boxes
- Standards-based: DOCSIS and EuroDOCSIS
- Reliable operation to ensure the system remains online
- Uses Cisco IOS Software

### Specifications

| Feature | Cisco uBR7111 and uBR7114 | Cisco uBR7111E and uBR7114E |
|---|---|---|
| **Memory** | Flash: 48 MB; System: 128 MB | Flash: 48 MB; System: 128 MB |
| **Line Card with Integrated Upconverter (Cable Plant Interface)** | uBR7111: 1 downstream and 1 upstream<br>uBR7114: 2 downstream and 4 upstreams | uBR7111E: 1 downstream and 1 upstream<br>uBR7114E: 2 downstream and 4 upstreams |
| **Integrated Upconverter** | DOCSIS Annex B, 6 MHz<br>High level output: =+61dBmV, 55 to 858 MHz<br>Optimized for 64 and 256 QAM | DOCSIS Annex A, 8 MHz,<br>High level output:<br>= +61 dBmV, 55 to 858 MHz<br>Optimized for 64 and 256 QAM |
| **Power Options** | Single; 100 to 240 VAC input voltage | Same as Cisco uBR7111 and Cisco uBR7114 |
| **Recommended Minimum Cisco IOS Software Release** | 12.1(19)EC1 or later | 12.1(7)EC minimum |
| **Port Adapter (WAN or backbone Interface)** | Embedded dual 10/100 BaseT Ethernet (TX FE) provided; supports one additional PA that includes: Ethernet, Serial, ATM, and POS. | Same as Cisco uBR7111 and Cisco uBR7114 |

### For More Information

See the Cisco uBR7100 series Web site:
**http://www.cisco.com/en/US/products/hw/cable/ps2211/index.html**

## Cisco uBR7246VXR Universal Broadband Router

The Cisco uBR7246VXR Universal Broadband Router, a member of the Cisco uBR7200 Series, provides a single, Layer 3 routing, multiservice, scalable platform that gives cable companies the ability to deliver IP data, voice and video services to DOCSIS or Euro-DOCSIS-compliant cable modems and set-top boxes. The Cisco uBR7246VXR is CableLabs qualified to PacketCable 1.0, DOCSIS 1.0 and 1.1 specifications. The Cisco uBR7246VXR is tComLabs qualified to Euro-DOCSIS 1.0, 1.1, and 2.0 (ATDMA-only) specifications. The product also supports DSG.

### When to Sell

| Sell This Product | When a Customer Needs These Features |
|---|---|
| **Cisco uBR7246VXR** | DOCSIS-qualified, modular design that easily scales from small to large subscriber bases<br>• Flexible port expansion for multiservice deployment options<br>• Service support of up to 10,000 subscribers per chassis with 3.2 Gbps back plane[1]<br>• Powerful processor and edge intelligence; Field proven and carrier class reliability<br>• Support for multimedia services<br>• High tolerance to HFC network/spectrum noise |

1. Numbers are for reference only. Actual numbers for specific systems will vary depending on network/service loading, traffic, and other parameters

### Key Features

- Modular design—1,000- 10,000 subscribers per chassis
- Five 9's availability for low cost maintenance
- Advanced PHY
- ATDMA / DOCSIS compliant
- Euro-DOCSIS 2.0 and DOCSIS 1.1 qualified
- Powerful Layer 3 routing intelligence and sophistication

## Specifications

| Feature | Cisco uBR7246VXR |
|---|---|
| Cable Line Cards and Number of Slots | 4 |
| Supported cable line cards (Cable Plant Interfaces) | uBR7200 Series MC28U, MC28X, MC16U, and MC16X Broadband Processing Engines<br>uBR-MC14C, MC16C, MC16E, MC16S and MC28C Universal Broadband Router line cards |
| Port Adapter Slots (LAN/WAN interfaces) | 2 |
| Supported PA categories | Ethernet<br>Serial<br>HSSI<br>ATM<br>POS<br>DPT |
| Power Supply Shots | 2 |
| Power Supply Option | AC; Dual AC; DC; Dual DC |
| Input/Output (I/O) controller | uBR7200-I/O<br>uBR7200-I/O-FE<br>uBR7200-I/O-2FE/E |
| I/O flash options for PCMCIA slots | Flash disk (48 MB)<br>Flash disk (128 MB) |
| Network processing engines (NPE) | uBR7200-NPE-G1 and NPE-400 |
| Add-on processor memory options | SDRAM (128 MB, 256 MB) for NPE-225 only<br>1 GB, 512 MB, 128 MB for uBR7200-NPE-G1 |
| Router Bandwidth | 3.2 Gbps |

## For More Information

See the uBR7200 Web site:
**http://www.cisco.com/en/US/products/hw/cable/ps2217/index.html**

# Cisco uBR10012 Universal Broadband Router

The Cisco uBR10012 Universal Broadband Router addresses the volume, capacity, and complexity of large cable headends or distribution hubs. The Cisco uBR10012 delivers the highest level of service availability and capacity of any production CMTS available today. It employs a mix of distributed, centralized, and parallel processing to enable consistently high, real-world performance. The Cisco uBR10012 is CableLabs qualified to PacketCable 1.0, DOCSIS 1.0 and 1.1 specifications. The product is also tComLabs qualified to EuroDOCSIS 1.0 and 1.1 specifications. The product further supports DSG.

## When to Sell

| Sell This Product | When a Customer Needs These Features |
|---|---|
| Cisco uBR10012 | • Large subscriber bases<br>• Edge routing or aggregation of DOCSIS traffic<br>• High-end throughput, capacity, and service handling<br>• Advanced multimedia service delivery<br>• Sophisticated Layer 3 routing intelligence<br>• Complex network interface configurations |

## Key Features

- Highest density and capacity: 5,000 - 64,000 subscribers
- Powerful process and throughput
- Five 9's availability
- GE line rate -> OC-48
- Scalable performance
- ATDMA / DOCSIS 2.0
- Advanced intelligence features

### Specifications

| Feature | Cisco uBR10012 |
|---|---|
| Modular Slots | 8 slots for cable line cards<br>4 slots for LAN/WAN interfaces<br>2 slots for Performance Routing Engines (PREs)<br>2 slots for Timing Communication and Control Plus (TCC+) modules |
| Supported Cards | Cable line cards that include Cisco 5X20U BPE<br>Timing, Communications, and Control Plus (TCC+) card<br>Gigabit Ethernet (GE) network uplink card and OC-48 DPT Interface |
| Processor Type | Parallel Express Forwarding (PXF) |
| Flash Memory | 48 MB (default); 128 MB (maximum) |
| DRAM Memory | 512 DRAM (default) |
| Software Supported | Minimum software requirement: Cisco IOS Software Release 12.2(11)BC1 minimum for the Cisco 5X20 BPE, Cisco IOS Software Release 12.2(13)BC minimum for the Cisco OC-48 DPT Interface, Cisco IOS Software Release 12.3(9)BC minimum to support DSG and the Cisco PRE-2 |
| Power Supply | DC, AC |
| Hot-Swappable | Yes |
| Backplane Capacity | 51.2 Gbps |
| Physical Dimensions (H x W x D) | Height: 31.25 in. (79.4 cm)—18 rack units (RU)<br>Width: 17.2 in. (43.7 cm)<br>Depth: 22.75 in. (57.8)<br>Mounting: 19 in. rack mountable (front or rear), 2 units per 7 ft. rack<br>Note: Mounting in 23 in. racks is possible with optional third-party hardware |
| Weight | Weight: 235 lb (106.6 kg) fully configured chassis |

### For More Information

See the Cisco uBR10012 Web site:
**http://www.cisco.com/en/US/products/hw/cable/ps2209/index.html**

## Cisco uBR 3x10 RF Switch

The Cisco uBR 3x10 RF Switch works with the Cisco uBR10002 and uBR7246VXR universal broadband routers to provide a fully redundant CMTS. The Cisco uBR 3x10 RF Switch accommodates three downstream switch modules and 10 upstream modules.

### When to Sell

| Sell This Product | When a Customer Needs These Features |
|---|---|
| Cisco uBR 3x10 RF Switch | • Carrier class N+1 network and service architecture<br>• High density HA service support<br>• Scalability to tens of thousands of subscribers |

### Key Features

- Hot swap capability that eliminates downtime for RF paths
- Support of DOCSIS, Euro-DOCSIS and PacketCable RF performance specifications
- Most comprehensive set of high availability features
- Modular upstream and downstream capacity
- Fully passive working path
- Active components only in protect path
- Position-sensing latching relays
- Unmatched port density and flexibility
- N+1 redundancy

## Specifications

| Feature | Cisco RF Switches |
|---|---|
| **Input Power Requirements** | • AC: 100 to 240 VAC, 50 or 60 Hz, operating range: 90 to 254 VAC<br>• DC: -48 to -60 VDC, operating range: -40.5 to –72 VDC, 200 mVpp ripple/noise |
| **Environmental** | • Operational temperature range: 0 to +40°C<br>• Operating temperature range: -5 to +55°C |
| **Unit Control** | • 10BaseT Ethernet—SNMP<br>• Switching time from active (working) to standby (protect): 150 mS maximum after SNMP command |
| **Connectors** | • RF connectors: MCX<br>• AC power: IEC320 type<br>• DC power: Three terminal block<br>• Ethernet: RJ-45<br>• RS-232 Bus: 9-pin male D |
| **Reliability** | • 41,000 MTBF @ +50°C as calculated by Bellcore 5, 80 percent confidence factor |
| **Physical** | • Dimensions (H x W x D): 19 x 15.5 x 5.25 in. (48.2 x 384 x 132 cm)<br>• Weight: 36 lbs (16.4 kg) |
| **RF requirements** | • Input/output impedance: 75 ohms<br>• Maximum RF input power: +15 dBm (63.75 dBmV)<br>• Switch type: Electro-mechanical, absorptive for working path, non-absorptive on the protect path<br>• Switch setting time per switch module: 20 ms maximum<br>• Downstream frequency range: 54 to 860 MHz<br>• Typical downstream insertion loss: +/-1.1 dB from CMTS to cable plant; +/- 2.1 dB from protect to cable plant; 5.5 dB from working to output; 8.0 dB from protect to output<br>• Downstream insertion loss flatness: +/- 1.1 dB from CMTS to cable plant; +/- 2.1 dB from protect to cable plant<br>• Downstream output return loss: >15.0dB at <450 MHz, > 12.0 dB at >= 450 MHz<br>• Downstream input return loss: >15.0 dB<br>• Downstream isolation: > 60 dB from channel to channel in working mode; > 52 dB from CMTS to protect when in protect mode<br>• Upstream frequency range: 5 to 70 MHz<br>• Typical upstream insertion loss: 4.1 dB from cable plant to CMTS; 5.2 dB from cable plant to protect<br>• Upstream insertion loss flatness: +/- 0.4 dB from cable plant to CMTS, +/- 0.6 dB from cable plant to protect<br>• Upstream input return loss:> 16 dB<br>• Upstream isolation: > 60 dB from channel to channel in working mode; > 60 dB from CMTS to protect when in protect mode<br>• Protect mode: CMTS return loss >10 dB, cable plant return loss: >10dB |

### For More Information

See the Cisco uBR 3x10 RF Switch Web site:
**http://www.cisco.com/en/US/products/hw/cable/ps2929/index.html**

# Broadband Cable—Customer Premise Equipment (CPE)[1]

## Cisco uBR905 Series Cable Access Router

The Cisco uBR905 Cable Access Router provides commercial services for cable operators, allowing them to expand their broadband service offerings and support IP data transmission over a cable plant. The Cisco uBR905 offers hardware-accelerated IPSec VPN support.

1. Cisco VoIP Residential CPE Partner Program—To help drive deployment of residential VoIP services to market, Cisco offers a program that identifies low-cost residential VoIP modems that have passed interoperability testing with Cisco. Cable service providers should contact their sales representatives for vendors, models, pricing and volume discount opportunities.

### When to Sell

| Sell This Product | When a Customer Needs These Features |
|---|---|
| Cisco uBR905 Cable Access Router | • Data-only broadband services (or voice separately via Ethernet)<br>• High-speed, secure remote tunneling via hardware accelerated IPSec VPN |

### Key Features

- Integrated high-speed cable modem and Layer 3 router that operates with any DOCSIS 1.1 or DOCSIS 1.0-compliant CMTS; Cisco uBR905 is DOCSIS 1.1-ready
- Integrated Cisco IOS Software router, cable modem, and four-port Ethernet hub that offers advanced networking capabilities and investment protection

### Specifications

| Feature | Cisco uBR905 |
|---|---|
| Ports | 4-port 10Base-T Ethernet hub<br>1-port console<br>1-port CATV (Female F Connector) |
| Routing Features | NAT/PAT, DHCP Server |
| Security Features | 56-bit IPSec<br>3DES IPSec optional<br>IPSec hardware acceleration<br>Firewall optional |
| Voice Support | No |

### For More Information

See the uBR900 series Web site: **http://www.cisco.com/go/ubr900**

## Video Edge QAM Equipment

### Cisco uMG9820 QAM Gateway

The Cisco uMG9820 QAM Gateway is a high-density, Gigabit Ethernet-optimized video QAM product that offers nonstop high-performance operation for VoD services. The Cisco uMG9820 QAM Gateway performs as the IP-to-MPEG-2 gateway between the Gigabit Ethernet transport network and the HFC cable network. The modular design of the Cisco uMG9820 QAM Gateway offers an initial base configuration of 8 QAM channels and scales to a maximum of 24 QAM channels in a single-rack-unit chassis. The product accepts full line-rate Gigabit Ethernet video transport feeds, providing 100% efficiency. Customers no longer need to daisy-chain QAM devices, eliminating the single point of failure present in the first QAM device in the chain. The Cisco uMG9820 QAM Gateway lowers headend/distribution hub capital expenditures and increases resiliency by reducing switching costs inherent in other QAM devices with lower densities.

### When to Sell

| Sell This Product | When a Customer Needs These Features |
|---|---|
| Cisco uMG9820 QAM Gateway | • Cost-effective, high-density, and scalable QAM product for North American digital video service deployments<br>• Reduced VoD costs—Cisco uMG9820 accepts full line-rate Gigabit Ethernet transport feeds from video servers, eliminating the need to cascade multiple QAM devices<br>• Flexible expansion—Easy for customers to add more QAM channels as VoD service grows and allows customers to purchase spare components, rather than an entire fixed-configuration system<br>• High-availability features allow hot-swappable installation of QAM modules on active systems in operation. |

# Remote Cable Access—Network Management Products

## Cisco Broadband Troubleshooter

Cisco Broadband Troubleshooter is an easy-to-use tool that gives network administrators and technicians a Graphical User Interface (GUI) that streamlines RF problem resolution. The tool dynamically monitors RF characteristics on a per modem or per upstream basis, provides a measurement interface for the upstream that looks and feels like a spectrum analyzer, decentralizes RF monitoring and analysis, and automatically sorts and categorizes RF problem conditions. The product provides a fault-analysis tool that enables network managers and RF technicians to quickly and easily isolate performance, cable plant, and CM problems. On-demand and scheduled diagnostics can be issued.

Cisco Broadband Troubleshooter automates reporting and expert analysis of the measured RF statistics. Diagnostics are available from both customer-account and network-event perspectives. The product allows a technician to characterize upstream and downstream trouble patterns and quickly identify "flapping" CPE devices that are experiencing persistent connectivity problems. Operators can quickly discern CPE connectivity impairments by identifying noise, attenuation, provisioning, and packet-corruption issues.

### For More Information

See the Cisco Broadband Troubleshooter Web site:
**http://www.cisco.com/en/US/products/sw/netmgtsw/ps530/index.html**

## Cisco Broadband Configurator

Cisco Broadband Configurator is an easy-to-navigate, Java-based application that simplifies the creation and maintenance of configuration files for PacketCable 1.0 media terminal adapters (MTAs) and DOCSIS 1.0 and 1.1 cable modems. The product provides a simple-to-use, forms-based approach that leads cable operators through the process of configuring or editing values of a configuration file. These values include RF parameters, vendor information, DOCSIS 1.0 class of service, DOCSIS 1.1 service flow or Service Flow Identifiers (SFIDs), Simple Network Management Protocol (SNMP) values, DOCSIS 1.0 baseline privacy (BPI), DOCSIS 1.1 BPI+, as well as customer premises equipment (CPE) data.

### For More Information

See the Cisco Broadband Configurator Web site:
**http://www.cisco.com/en/US/products/sw/netmgtsw/ps819/index.html**

### Cisco Cable Diagnostic Manager

Cisco Cable Diagnostic Manager is an automated, web-based tool that enables customer service representatives (CSRs) to quickly diagnose problems with DOCSIS networks, better handle subscriber inquiries, and improve the routing of trouble tickets. The tool provides first-line CSR troubleshooting and support. Cisco Cable Diagnostic Manager enables a CSR to quickly identify to a customer reporting a problem with their cable modem service if the problem resides with the cable modem (CM), set top box (STB), hybrid fiber coax (HFC) cable plant segment, the CMTS, or a provisioning server. The CSR simply enters a customer identifier such as the customer's phone number, assigned IP address, or cable modem media access control (MAC) address to obtain relevant information.

Cisco Cable Diagnostic Manager uses Simple Network Management Protocol (SNMP), DOCSIS, and Cisco-extension management information bases (MIBs) to retrieve real-time information from the CMTS and CM or STB. The product uses scripts to poll subscriber and provisioning information from appropriate databases. Gathered information is presented using color-coding to help CSRs identify problems at-a-glance. CSRs can then know how to route problems appropriately.

### For More Information

See the Cisco Cable Diagnostic Manager Web site:
**http://www.cisco.com/en/US/products/sw/netmgtsw/ps3825/index.html**

## DSL Remote Access—Customer Premise Equipment (CPE)

Cisco offers the industry's broadest array of business-class DSL (G.SHDSL and ADSL) CPE solutions, from Enterprise to branch office, to Small Office/Home Office (SOHO) applications. Cisco's CPE solutions offer the choice of key features including Firewall, VPN, and Voice-over DSL support. And, Cisco's industry leading IOS-based capabilities enable QoS, policy management, and standardized set-up and configuration. Cisco CPE Products include:

- Cisco SOHO Series Ethernet, ADSL over ISDN, ADSL and G.SHDSL Routers (page 1-8)
- Cisco 800 Series Routers (page 1-9)
- ADSL and G.SHDSL WAN Interface Cards (WICs) for 1700, 1800, 2600XM, 2800 and 3800 Series (see Chapter 1: Routing)

**Note** Refer to Chapter 1: Routing section for easy-to-order xDSL bundles.

## Broadband Services Aggregation

The Cisco broadband aggregation portfolio includes the Cisco 7200 Series Router, the Cisco 7301 Series Internet Router, and the Cisco 10000 Series Internet Router. This portfolio covers all possible broadband aggregation markets. The Cisco 10000 Series routers is a carrier class broadband aggregation router designed to provide high-density, high-performance services while maintaining the high-availability standards of large-scale carrier deployments. The Cisco 7200 and Cisco Series routers cover the ISP and retail space by providing a dense, feature-rich platform but only taking a small footprint in the network.

- Cisco 7301: Highest Density PPP aggregation per rack-unit
- Cisco 7200: Most versatile platform
- Cisco 10000: Highest availability on a carrier-class integrated edge router

With this portfolio, Cisco can address the broadest set of requirements in terms of form factor, density, performance and scale, and offer customers a unique level of choice, with products optimized for any customer deployment.

### Cisco 7200 Series

When ordered with the Cisco IOS 7200 Series Broadband User Services License (part number FR-BUS72), the 7200 delivers scaled PPP, RBE, and L2TP sessions and tunnels in addition to rich IP services. It enables service providers to provision broadband Internet access and supports all of the popular access technologies deployed today, including DSL, Cable, Wireless, and Dial Access. It is ideal for low- to medium-density applications and is capable of handling up to 16000 subscribers in a single chassis. The 7200 is a modular platform with a choice of processing engines and a wide variety of WAN and LAN port adapters, including T1/E1, DS3, OC-3, Fast Ethernet, and Gigabit Ethernet. See page 1-36 for more information on the 7200 series.

### Cisco 7301 Series

When ordered as 7301-BB-8K and 7301-BB-16K (16K License) the Cisco 7301 Series Router provides a compact, high-performance single-rack-unit (1RU) router coupled with a broad set of interfaces and Cisco IOS® Software features, which makes it ideal for Broadband applications. The Cisco is capable of handling up to 16,000 simultaneous sessions and allowing for a pay-as-you-grow “rack and stack” architecture.

### Cisco 10000 Series

The Cisco 10000 is the industry’s only integrated edge router that delivers highly available, line-rate performance without compromises for service providers deploying advanced IP services to broadband, leased line, ATM, and Frame Relay customers. With 99.999 percent uptime, the platform delivers high-performance broadband features including support for 61,500 broadband subscribers, hardware-accelerated PPP over Ethernet and PPP over ATM, routed bridge encapsulation and 1483 routing. New to the Cisco 10000 is support for Ethernet 802.1Q VLANs and QinQ further broadening the spectrum of encapsulations. See page 1-45 for more information on the 10000 series.

# ATM Multiservice WAN Switching

## Cisco BPX 8600 Series—Advanced ATM Multiservice Switches

The Cisco BPX 8600 series is an ATM switch with advanced IP and ATM capabilities. Designed to meet the demanding, high-traffic needs of a public service provider or large private enterprise, the BPX switch delivers high-performance ATM switching, multiservice adaptation and aggregation for all types of user traffic. Proven in the world's largest ATM and Frame Relay networks, the BPX 8600 enables service providers and large enterprises to meet skyrocketing network demands.

The Cisco BPX 8600 series switch offers up to 20 Gbps of high-throughput switching for multiple traffic types data, voice, and video and supports a wide range of interfaces, from Frame Relay to full broadband subscriber interfaces, up to 622 Mbps with a connection to an Edge Concentrator. You can offer multiple services for LAN, X.25, SNA, IP, Frame Relay, and ATM traffic from a single BPX platform. The Cisco BPX 8600 series supports multiprotocol label switching (MPLS).

### For More Information

See the Cisco BPX Web site: **http://www.cisco.com/go/bpx**

## Cisco MGX 8850 ATM Multiservice Switch

The Cisco MGX 8850 ATM Multiservice Switch enables delivery of a complete portfolio of service offerings while scaling from DS0 to OC-48c/STM-16 speeds. It enables service providers to be first to market with high-margin voice and data services while maintaining existing services. The MGX 8850 universal chassis provides a unified ATM architecture that delivers a complete portfolio of differentiated services —from circuit emulation to IP VPNs—all with a single chassis, to enable service providers to easily add new services.

The Cisco MGX 8850 can function in three different modes of operation:

- PXM-1 configuration—Operates as a stand-alone device for narrowband services, or as an integrated edge concentrator for the Cisco BPX 8600 series or the Cisco MGX 8850 PXM-45
- PXM-1E configuration-Operates as a stand alone switch for low density narrowband services, it includes a 1.2 Gbps switch card and PNNI routing
- PXM-45 configuration—Serves as a broadband edge switch and includes the 45 Gbps switch card and broadband ATM modules. The PXM-45 configuration also supports standards-based PNNI routing.

### Key Features

- Flexible ATM multiservice platform
- Highly scalable—from 1.2 to 45 Gbps of non-blocking throughput in single chassis
- Highest reliability, availability, and serviceability in the industry
- IP VPNs using Cisco IOS software-based Multiprotocol Label Switching (MPLS)
- Market-leading Frame Relay capabilities, with price-per-port leadership and advanced QoS
- High-density Point-to-Point protocol (PPP) for Internet access and aggregation
- Full-featured narrowband ATM for managed data, voice, and video services; high-density broadband ATM for wholesale ATM services
- Circuit Emulation for Private Line replacement
- Highly scalable packet voice gateway providing VoIP, VoATM(AAL1 & AAL2), ATM SVCs, and Onboard MPLS

### For More Information

See the Cisco MGX 8850 Web site: **http://www.cisco.com/go/mgx8850**

## Cisco MGX 8830 ATM Multiservice Switch

The Cisco MGX 8830 Advanced ATM Multiservice Switch extends a full suite of narrowband interfaces and broadband trunking to remote sites with low density and high service mix requirements, using PNNI and MPLS are used for flexible network and services evolution. The Cisco MGX 8830 has a switching capacity of up to 1.2 Gbps and acts as a standalone switch. It offers a full range of service interfaces.

### For More Information

See the Cisco MGX 8830 Series Web site: **http://www.cisco.com/go/mgx8830**

## Cisco Long Reach Ethernet Solution

Cisco LRE enables the transport of symmetrical, bi-directional data over unshielded, copper twisted-pair telephone wires originally intended for the frequency bands used for traditional telephone voice services (300 Hz and 3.4 KHz). The system employs Frequency Division Duplexing (FDD) to separate the downstream channel, the upstream channel, and POTS, ISDN, or PBX signaling services in the frequency domain. This enables users to overlay LRE on existing POTS, ISDN, or analog PBX signaling services without disruption, extending intelligent Ethernet services at distances of up to 5000 over existing phone or legacy wiring. Both LRE and POTS/ISDN/analog PBX services may be transmitted over the same line without interfering with each other.

The Cisco 2950 LRE solution includes the Cisco Catalyst® 2950 LRE switches, the Cisco 575 and 585 LRE Customer Premise Equipment (CPE) devices, and the Cisco LRE POTS Splitter. Each LRE link is terminated with either the Cisco 575 or 585 LRE CPEs, and a POTS splitter is required when POTS traffic coexists with the LRE link over the same line.

### Catalyst 2950 LRE Series Intelligent Ethernet Switches

The Cisco Catalyst® 2950 LRE switches are fixed-configuration, stackable models that provide wire-speed LRE and Gigabit Ethernet connectivity for small and midsized networks. The Catalyst 2950 Series is an affordable product line that brings enhanced security, high availability and advanced quality of service (QoS), to the network edge-while maintaining the simplicity of traditional LAN switching. When a Catalyst 2950 LRE switch is combined with a Catalyst 3550 Series switch, the solution can enable IP routing from the edge to the core of the network. Embedded in Catalyst 2950 Series switches is the Cisco Cluster Management Suite (CMS) Software, which allows users to simultaneously configure and troubleshoot multiple Catalyst desktop switches using a standard Web browser. In addition to CMS, Cisco Catalyst 2950 LRE switches provide extensive management tools using Simple Network Management Protocol (SNMP) network management platforms such as CiscoWorks for Switched Internetworks.

The two built-in Gigabit Ethernet SFP ports support 1000BASE-SX and 1000BASE-LX modules. The dual SFP-based and copper Gigabit Ethernet implementation provides customers with tremendous deployment flexibility-allowing customers increased availability with the redundant uplinks. High levels of stack resiliency can also be implemented by deploying dual redundant Gigabit Ethernet uplinks and UplinkFast technologies for high-speed uplink and stack interconnection failover, and Per VLAN Spanning Tree Plus (PVST+) for uplink load balancing.

## Cisco 575 and 585 LRE CPE Devices

Each LRE port is terminated in the room with either the Cisco 575 or 585 LRE Customer Premise Equipment (CPE) devices. These compact devices bridge LRE and Ethernet. The 575 CPE has one RJ-45 Ethernet connection and two RJ-11 connectors—one for the wall and one for a telephone. The 585 CPE has four RJ-45 switched Ethernet connections and two RJ-11 connectors and supports 802.1p QoS so that voice and video traffic are prioritized over normal data traffic. Both the Cisco 575 and 585 LRE CPE device can be mounted on or under a desk, or on a wall. They ship with a mount lock-in mechanism and clip-on Ethernet cable guard to discourage theft. It supports voice (Plain Old Telephone Service—POTS) traffic-including ISDN or digital phones-that coexists over the same LRE line by splitting LRE and POTS traffic at the CPE device.

## Cisco LRE 48 POTS Splitter

The Cisco LRE 48 POTS Splitter is a high-density, low-cost device that is ideal for building deployments where the PBX system is on-site and POTS traffic must coexist over the same copper wiring as LRE traffic. Unlike “splitterless” building broadband network solutions, the Cisco LRE 48 POTS Splitter ships as a separate, compact form factor to ensure that POTS service is separate, and never compromised by LRE switch reconfigurations or downtime.

The Cisco LRE 48 POTS Splitter supports 48 ports in a 1RU form factor. Each splitter has six RJ-21 connectors-two each for connectivity to the patch panel, the LRE switch(es), and the on-site PBX system.

### Key Features

- Performance—Delivers 2-15 Mbps symmetric over existing category 1/2/3 wiring at distances up to 5000 feet. Rate Selection feature automates the process of selecting a data rate for a line for ease of installation and increased robustness.
- Powerful Gigabit Ethernet uplink options—1000BaseT and SFP ports
- Superior control through intelligent services—advanced quality of service and security based on Layer 2 through Layer 4 parameters.
- Multicast support—Multicast VLAN Registration (MVR) and IGMPv3 Snooping.
- Enhanced Cisco IOS Services
- Network Management—Cisco Switch Clustering technology and the advanced, Web-based Cisco Cluster Management Suite (CMS) software deliver easy-to-use configuration and ongoing monitoring and management of up to 16 switches. This software is embedded in the switches and delivers remote management of clustered switches and connected CPE devices through a single IP address

### Competitive Products

- Paradyne Networks: BitStorm solution (Etherloop) and ReachDSL products
- Huawei: Quidway s3026v
- Tut Systems: IntelliPOP VDSL

### Specifications

| Feature | Cisco 2950ST 24 LRE | Cisco 2950ST 8 LRE |
|---|---|---|
| **Fixed Ports** | 24 LRE ports + 2 10/100/1000BASE-T ports + 2 Small Form-Factor Pluggable (SFP) ports (two of the four uplinks active at one time) | 8 LRE ports + 2 10/100/1000BASE-T ports + 2 SFP ports (two of the four uplinks active at one time) |
| **Backplane** | 8.8 Gbps | Same as Cisco 2950ST 24 LRE |
| **Forwarding Rate** | 3.5 Mpps | 3.2 Mpps |
| **VLAN Maximum** | 250 port based VLANs or ISL/802.1Q trunks | Same as Cisco 2950ST 24 LRE |
| **FEC** | Yes | Same as Cisco 2950ST 24 LRE |

| Feature | Cisco 2950ST 24 LRE | Cisco 2950ST 8 LRE |
|---|---|---|
| **802.1Q** | Yes | Same as Cisco 2950ST 24 LRE |
| **Multicast** | IGMPv3 Snooping, IGMP Throttling | Same as Cisco 2950ST 24 LRE |
| **QoS** | 802.1 p, 4 egress queues, WRR, Layer 3 and 4 services | Same as Cisco 2950ST 24 LRE |
| **Management Capabilities** | SNMP, Telnet, RMON, CW2000, CLI-based out-of-band, embedded Cisco Cluster Management Suite (CMS), Web-based interface | Same as Cisco 2950ST 24 LRE |
| **Memory** | 84 MB (Flash); 32 MB (CPU DRAM) | Same as Cisco 2950ST 24 LRE |
| **Embedded RMON** | History, Events, Alarms, Statistics | Same as Cisco 2950ST 24 LRE |
| **Dimensions (HxWxD)** | 1.75" (44.5 mm) x 17.5" (444.5 mm) x 9.7" (246.6 mm) | Same as Cisco 2950ST 24 LRE |

### Selected Part Numbers and Ordering Information[1]

| | |
|---|---|
| **Catalyst 2950 LRE Series Switches** | |
| WS-C2950ST-24-LRE | Catalyst 2950 LRE switch: 24-port LRE + 2 10/100/1000BASE-T ports + 2 SFP ports |
| WS-C2950ST-8-LRE | Catalyst 2950 LRE switch: 8-port LRE + 2 10/100/1000BASE-T ports + 2 SFP ports |
| **Cisco 575 and 585LRE CPE Device** | |
| CISCO575-LRE | Cisco 575 LRE CPE device: 1-port Ethernet + 2 RJ-11 connectors |
| CISCO575-LRE-6P | Cisco 575 LRE CPE device (6 pack): 1-port Ethernet + 2 RJ-11 connectors |
| CISCO575-LRE-24P | Cisco 575 LRE CPE device (24 pack): 1-port Ethernet + 2 RJ-11 connectors |
| CISCO585-LRE | Cisco 585 LRE CPE device: 4-port Ethernet + 2 RJ-11 connectors |
| CISCO585-LRE-6P | Cisco 585 LRE CPE device (6 pack): 4-port Ethernet + 2 RJ-11 connectors |
| CISCO585-LRE-24P | Cisco 585 LRE CPE device (24 pack): 4-port Ethernet + 2 RJ-11 connectors |
| **Cisco LRE 48 POTS Splitter** | |
| PS-1M-LRE-48 | Cisco LRE 48 POTS Splitter: 48 ports |

1. This is only a small subset of all parts available via URL listed under "For More Information." Some parts have restricted access or are not available through distribution channels. Resellers: For latest part number and pricing info, see the *Distribution Product Reference Guide* at: http://www.cisco.com/dprg (limited country availability).

### For More Information

See the LRE Web site: **http://www.cisco.com/go/lre**

## Cisco Building Broadband Service Manager (BBSM) Version 5.3

Cisco Building Broadband Service Manager (BBSM) is an access gateway for public access networks that enables simple, plug-and-play access, end user self-provisioning of services, customizable portal and advertising platforms and Web-based management, reporting and configuration. In addition, multiple automated authentication and billing options are supported, including credit card, RADIUS, property management system and access code. The Cisco BBSM platform manages Internet access services with no routine IT support, enabling venues to offer services in remote and unattended locations. BBSM supports tiered service levels in order to deliver targeted customer offerings. For instance, a hotel can set-up daily network access for a series of meetings providing a variety of bandwidth/pricing options to capture lucrative meeting room revenue opportunities. LAN products to provide a complete solution that enables venues to create, market and operate broadband access services in markets such as: Hospitality, Higher-Education, Healthcare, Retail, Enterprise guest access, and Public Access.

## Cisco BBSM Hotspot Server Version 5.3

The Cisco Building Broadband Service Manager (BBSM) Hotspot server connects mobile users to broadband services anywhere, anytime. Cisco BBSM Hotspot is a cost effective access management gateway suited for small- to medium-sized public access locations, as well as for guest access in enterprise locations. BBSM Hotspot enables simple plug-and-play connectivity, end user self-provisioning of services, and multiple authentication options.

BBSM Hotspot works with Cisco Local Area Network (LAN) products to provide a complete solution for secure wired and wireless Internet Access for visitors, contractors, patients, and other temporary users. Use Cisco BBSM Hotspot to manage and operate broadband access services in public hotspots, small hotels, and public overlays on enterprise networks.

### For More Information

See the BBSM Web site: **http://www.cisco.com/go/bbsm**