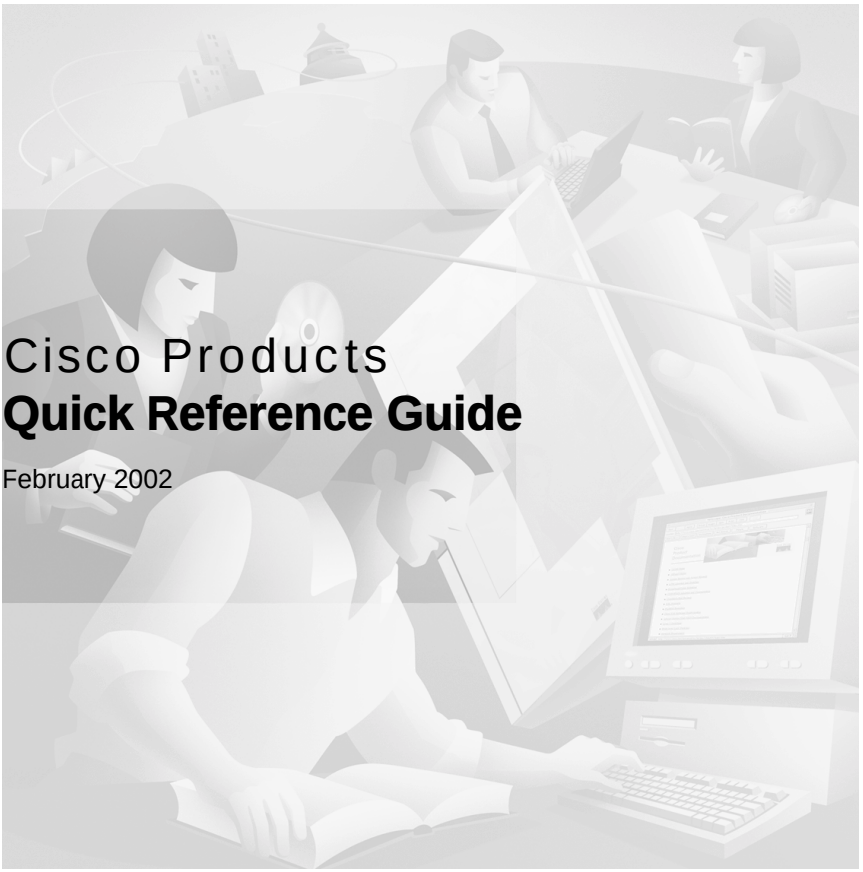

Cisco Products
Quick Reference Guide

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Broadband and Dial Access Products

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, dial access gateway • Universal Port technology for data/voice/fax on any port, any time • 2,4, & 8 T1/E1/PRI configurations for 48 to 240 channels • Supports broad range of async/ISDN/VoIP/wireless protocols • Two 10/100 Ethernet ports, two 8 Mbps serial backhaul ports	7-5
Cisco AS5400 Series Universal Gateways	• High performance, 2RU, universal gateway • Universal Port technology for data/voice/fax on any port, at any time • Two models: AS5400HPX and AS5400 • 8 to 16 T1/E1/PRI or 1 T3 configuration for 192 to 648 channels • Low power and high availability design • Supports a broad range of async/ISDN/VoIP/fax/wireless protocols • SS7 interconnect for voice and dial • Flexible, redundant backhaul methods	7-8
Cisco AS5850 Universal Gateway	The highest density universal gateway in the marketplace • Supporting up to 2688 calls (4 x CT3s), 96 T1s or 86 E1s of data, voice, fax and mobile wireless calls on any port at any time • Constant density regardless of codec type, ECAN or VAD settings • Extensive high availability features • TDM grooming capability	7-11
Remote Dial Access Network Management	*Suite of network management products for configuration, troubleshooting, and maintenance of Cisco dial access and VoIP solutions*	*7-13*
SS7 Signaling Products	• Cisco SC2200 Signaling Controller—Connects VoIP and dial access solutions to the public switched telephone network via SS7/C7 • Cisco VSC3000 Virtual Switch Controllers—MGCP-based call agent (softswitch) for large-scale VoIP and VoATM applications	7-14

1. For Cisco 2509 and 2511 Access Servers, see page 1-15.

Broadband Cable

Product	Features	Page
Headend and Distribution Hub Equipment		
Cisco uBR7100 Series Universal Broadband Router	Entry-level, fixed-configuration CMTS and integrated router for MxU, Tier 2 / Tier 3 cable operators, and ISPs • Choice of four DOCSIS- and EuroDOCSIS-qualified, fixed-configuration models • Integrated upconverter / modulator on the cable interface • Embedded dual 10/100 BaseT Ethernet network interface • Additional network interface with a variety of LAN and WAN options • Supports up to 1,000* data customers—*Actual number varies based on network/service loading and other configuration parameters	7-16

Product	Features	Page
Cisco uBR7200 Series Universal Broadband Router	Modular, standards-based CMTS and integrated router for high-growth broadband cable and fixed wireless deployments • Two models that share different cable and fixed wireless line cards, LAN and WAN interface options, and processors • Cisco uBR7223 supports up to 5,000 subscribers*; Cisco uBR7246VXR supports up to 10,000 subscribers*—*Actual numbers vary based on network/service loading, and other configuration parameters	7-18
Cisco uBR10012 Universal Broadband Router	High-capacity DOCSIS-based CMTS and integrated router that delivers the services, performance, scale, and carrier-class reliability large MSOs and ISPs demand: • High-performance aggregation platform that uses Parallel eXpress Forwarding technology • Eight line cards that include support for 2 downstreams and 8 upstreams each • Four network interfaces that include support for 1 Gbps over Gigabit Ethernet or 622 Mbps over OC-12 POS • Cisco uBR10012 supports up to 25,000 subscribers*—*Actual numbers vary based on network/service loading, and other configuration parameters	7-19
Customer Premise Equipment (CPE)		
Cisco uBR900 Series Cable Access Router	Integrated DOCSIS-based cable modem and router with hardware accelerated IPSec VPN tunneling support that includes: • Cisco uBR925 with 4 Ethernet, 1 CATV, 1 USB and 2 FXS ports that support telecommuter and small office DOCSIS-based data, VoIP, and VPN services • Cisco uBR905 with 4 Ethernet and 1 CATV port that supports DOCSIS-based data and VPN services	7-22
Cisco CVA120 Series Cable Voice Adapter	CPE product for SOHO locations that support VoIP and data (excludes firewall, IPSec, VPN tunneling): • CVA122 with 1 Ethernet, 1 USB, and 2 FXS ports to support DOCSIS operation • CVA122E with 1 Ethernet, 1 USB, and 2 FXS ports to support EuroDOCSIS operation	7-22
Other Cable-Related Products		
Cisco 6920 RateMUX Statistical Multiplexer	Specialized multiplexing device that performs advanced MPEG2 stream manipulation to allow cable, satellite and broadcast operators to support: • Customized channel lineups • Real-time bit rate manipulation • Rate reduction/splicing functionality and standards-based API support to interoperate with Ad Servers for local ad insertion in the digital (MPEG) video domain • Re-stat muxing • TV program grooming or add/drop	7-23
Remote Cable Broadband Network Management	Suite of network management products for configuration, troubleshooting, and maintenance of cable network, including Cisco CMTS, Cisco CPE products, and DOCSIS or EuroDOCSIS-compliant cable modems or set top boxes	7-25

DSL (Digital Subscriber Line) Access

Product	Features	Page
Cisco 6000 Series IP DSL Switches	• Cisco 6015—Small footprint, ideal for MxU or small remote DSL applications, 48 ports • Cisco 6160—Carrier-class, CO-based DSLAM, up to 256 ports per chassis, for North America • Cisco 6260—Carrier-class, CO-based DSLAM, for international environments	7-27
***DSL Access CPE*[1]**	*Wide variety of Cisco router-based DSL CPE solutions for business-class to small office applications*	*7-28*
Broadband Services Aggregation	• *Cisco 6400 Series Carrier-Class Broadband Aggregator—ATM switching core, up to 96,000 subscriber sessions per chassis* • *Cisco 7200 VXR Series Router—Up to 8000 sessions, PPP, PPPoE, PPPoA* • *Cisco 7400 Series Router—1 RU, up to 8000 sessions, supports one T1/T3, OC-3, ATM 7200 port adapter, PPP/L2TP, PPPoE, PPPoA, etc.*	*7-29*

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

ATM Multiservice WAN Switching

Product	Features	Page
Cisco BPX 8600 Series Switches	• *Large-scale ATM + IP switch for service provider and large enterprise applications* • *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)* • *20 Gbps of high-throughput switching for multiple traffic types data, voice, and video*	*7-30*
Cisco MGX 8850 Series IP + ATM Multiservice Switches	• *Multiservice switch, scales from DS0 to OC-48c/STM-16 speeds* • *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*	*7-31*
Cisco MGX 8200 Series Multiservice Gateways	• *Edge concentrators family provide a cost-effective narrowband multiservice solution for low to mid-band ATM and Frame Relay aggregation with QoS management features*	*7-32*
Cisco IGX 8400 Series Multiservice WAN Switches	• *ATM-based WAN switching, connects to public services for reduced leased-line costs* • *Available with 8, 16, or 32 slots*	*7-32*

Long Reach Ethernet

Product	Features	Page
Cisco Long Range Ethernet Solution	• *Cisco Catalyst 2900 LRE XL Switches—12- or 24-port systems, deliver Ethernet traffic (up to 15 Mbps) over standard copper cabling; ideal for MxU broadband Internet access* • *Cisco 575 LRE CPE Device—Compact, includes one RJ-45 Ethernet connection and two RJ-11 connectors (for telephone)* • *Cisco LRE 48 POTS Splitter—Ensures that POTS service is separate, and never compromised by LRE switch reconfigurations or downtime*	*7-33*
Cisco Broadband Building Service Manager	• *Server system enables automated online activation, integrated billing, tiered service levels* • *Ideal for any form of broadband access technology, including Ethernet, LRE, Cable access, DSL, Wireless, or Fiber*	*7-35*

Memory Information for Access Routers

Router	Memory Type	Slots	Default Memory	Max Memory	Default Config. (Notes)
AS5350	System Flash	N/A	32 MB	64 MB	
	SDRAM		128 MB	512 MB	
	Shared		64 MB	128 MB	
	Boot Flash		8 MB	64 MB	
AS5400HPX Universal Gateway	Main SDRAM	2	256 MB	512 MB	AS5400HPX and AS5400 use different Boot and System Flash - NOT interchangeable
	Shared	1	64 MB	128 MB	
	Boot Flash (3V)	1	8 MB	16 MB	
	System Flash (3V)	2	32 MB	64 MB	
AS5400 Universal Gateway	Main SDRAM	2	256 MB	512 MB	AS5400HPX and AS5400 use different Boot and System Flash - NOT interchangeable
	Shared	1	64 MB	128 MB	
	Boot Flash (5V)	1	8 MB	16 MB	
	System Flash (5V)	2	32 MB	64 MB	
AS5850	RSC		512 MB	512 MB	Ships with all required memory
	Feature Cards		128 MB	128 MB	
Cisco uBR7100 Series	Flash (PCMCIA)	2	48 MB		
	System SDRAM	2	64 MB		
	Packet SDRAM		64 MB		
Cisco uBR7200 Series	Flash (PCMCIA)	2	20 MB		
	Flash (internal) with NPE-225, NPE-300 and NPE-400	2	48 MB		
	Shared with NPE-225, NPE-300 and NPE-400	2	128 MB		
Cisco uBR10012	Flash (PCMCIA)	2	48 MB	128 MB	Slot 0 = 48 MB
	Flash (internal)	1	256 kB		
	System SDRAM	2	512 MB	512 MB	
Cisco uBR900 Series	NVRAM		128 kB		
	Flash		4 MB		
	DRAM		16 MB		
Cisco CVA120 Series	Config NVRAM		128 kB		
	DRAM		16 MB		
	Flash		8 MB		

Cisco AS5350 Universal Gateway

The Cisco AS5350 Universal Gateway is the industry's only one-rack unit, 2, 4, or 8 T1/E1 dial access gateway that provides universal port data, voice, wireless, fax and unified communications services on any port at any time. The Cisco AS5350 offers high-performance and high-reliability in a compact, modular design. This cost-effective platform is ideally suited for Internet service providers (ISPs) and enterprises that require innovative universal services.

Universal port functionality enables the AS5350 to operate simultaneously as a dial-up network access server (NAS) and a voice gateway to deliver universal services. It achieves cost savings through optimized utilization of the universal port access infrastructure. Service providers can now quickly capitalize on new opportunities and realize multiple revenue streams from a single access infrastructure.

When to Sell

Sell This Product	When a Customer Needs These Features
Cisco AS5350	• 2 to 8 channelized T1/E1/PRI compact and modular dial access server • High-performance modem, ISDN, and voice call termination • Universal port services (data, voice, wireless, fax)

Key Features

- 1 RU modular high-performance 2 to 8 channelized T1/E1/PRI system
- Universal Gateway—Remote Access Server and Voice Gateway
- Universal DSPs—Data, voice, wireless and fax services on any DSP at any time
- Ideal for Tier 2/3 ISPs and enterprises requiring innovative remote access
- Dial feature cards:
  - 2, 4, or 8 CT1/CE1/PRI DFC cards (ISDN calls terminated on the card)
  - 60 or 108 channel Universal Port dial feature card
- Two 10/100BaseT autosensing Ethernet LAN ports
- Two 8 Mbs serial WAN ports for Frame Relay, HDLC, or PPP WAN backhaul
- One Fast console port for local administrative access; one auxiliary port for remote administrative access
- Carrier Class Resiliency:
  - All dial feature cards and fan tray are hot swappable
  - AC internal power supply with dual fans
  - Redundant LAN/WAN backhaul ports
  - Thermal management and environmental monitoring

Competitive Products

- Lucent/Ascend: Max 3000 and Max 4000
- 3Com: TC1000
- Intel/Shiva: LanRover series
- Lucent/Livingston: Portmaster 3
- Nortel/Bay: 5399

Specifications

Feature	Cisco AS5350
Processor	250 MHz RM7000 RISC processor
Memory	SDRAM: 128 MB (default), 512 MB (maximum) Shared Input/output (I/O): 64 MB (default), 128 MB (maximum) Boot Flash: 8 MB (default), 16 MB (maximum) System Flash: 32 MB (default), 64 MB (maximum) Layer 3 Cache: 2 MB
DFC Slots	Three slots
Egress Ports	Two 10/100-MB Ethernet ports Two 8-MB serial ports T1, E1 DS1 trunk DFCs
LAN Protocols	IP, IPX, AppleTalk, DECNet, ARA, NetBEUI, bridging, HSRP
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)
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.729a, G.729b
DSP Voice Features	Echo cancellation Transparent transcoding Voice activity detection/silence suppression DTMF, Multifrequency (MF)
Voice and Fax Signaling Protocols	H.323v2, H.323v3, SIP, SGCP T.38 real-time fax relay
Network Security	RADIUS or TACACS+ PAP or CHAP authentication Local user/password database DNIS, CLID, call-type preauthentication Inbound/outbound traffic filtering (including IP, IPX, AppleTalk, bridged traffic) Network Address Translation (NAT) Dynamic access lists
Virtual Private Networking	IP Security (IPSec) Policy enforcement (RADIUS or TACACS+) L2TP, Layer 2 Forwarding (L2F), and generic routing encapsulation (GRE) tunnels Firewall security and intrusion detection 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 EI	CAS, PRI, E1 R1, E1 R2, leased line, Frame Relay
ISDN Protocols Supported	Sync mode PPP, V.120, V.110 at rates up to 38400 bps Network- and User-side ISDN NFAS with backup D-channel QSIG, Feature Group B, Feature Group D DoVBS
Modem Protocols Supported	V.92 Modem on Hold, Quick Connect, PCM Upstream V.90 standard supporting rates of 56000 to 28000 in 1333-bps increments K56Flex at 56000 to 32000 in 2000-bps increments 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 ITU-T V.34 Annex 12, ITU-T V.42bis, V.32bis and many others
Wireless Protocols Supported	V.110 MNP10EC
Application Specific Support	AOL, MSN, CompuServe, and Prodigy traffic

Feature	Cisco AS5350
Full Cisco IOS Support	IP Plus and Enterprise Plus
Console and Auxiliary Ports	Asynchronous serial (RJ-45)
Chassis	Dimensions (H x W x D): 1.75 x 17.5 x 20.5 in. Weight (fully loaded): 22 lbs. (10 kg)

Selected Part Numbers and Ordering Information[1]

Cisco AS5350 Universal (Data & Voice) System Bundles	
AS535-2T1-48-AC	AC Chassis, 2 T1/PRI, 60 ports, 48 UP licenses, IP Plus IOS
AS535-2E1-60-AC	AC Chassis, 2 E1/PRI, 60 ports, 60 UP licenses, IP Plus IOS
AS535-4T1-96-AC	AC Chassis, 4 T1/PRI, 120 ports, 96 UP licenses, IP Plus IOS
AS535-4E1-120-AC	AC Chassis, 4 E1/PRI, 120 ports, 120 UP licenses, IP Plus IOS
AS535-8T1-192-AC	AC Chassis, 8 T1/PRI, 216 ports, 192 UP licenses, IP Plus IOS
AS535-8E1-210-AC	AC Chassis, 8 E1/PRI, 216 ports, 210 UP licenses, 240 ISDN, IP Plus IOS
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	
S535CP-12103XQ	Cisco AS5350 Series IOS IP Plus
S535AP-12103XQ	Cisco AS5350 Series IOS Enterprise Plus
Cisco AS5350 Memory Options & Spares	
MEM-UP1-AS535	16M Bootflash,64M System Flash,256M Main,128M Shared I/O Memory
MEM-16BF-AS535	AS5350 16MB Boot Flash upgrade
MEM-64F-AS535	AS5350 64MB System Flash upgrade
MEM-256M-AS535	AS5350 256MB Main SDRAM upgrade
MEM-128S-AS535	AS5350 128MB Shared I/O upgrade
Cisco AS5350 Spare DFC Boards	
AS535-DFC-2CT1=	AS5350 Dual T1/PRI DFC card
AS535-DFC-60NP=	AS5350 60 Nextport DFC card
AS535-DFC-CC=	AS5350 DFC Carrier 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-DFC-CC=	AS5350 DFC Carrier Card

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 Cisco AS5350 Series 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 (RUs) with universal port data, voice, wireless, 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 AS5400HPX and the Cisco AS5400. The gateways share the same architecture; the primary difference is the processing capability of the two platforms. The 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 T1/E1 or 1 channelized CT3) • Cisco Any Service, Any Port (ASAP) services • Enhanced performance for processor intensive voice and fax applications • Compact form factor—easy to add capacity as the network grows • Low power per port • High performance async/ISDN/VoIP/Wireless • T.38 real-time fax relay, T.37 fax store and forward, fax detection, unified communications • Flexible redundant backhaul methods
Cisco AS5400	• Async/ISDN/Wireless data to 1 channelized CT3 • Cisco Any Service, Any Port (ASAP) or voice only services to 16 T1/E1

Key Features

- Cisco Any Service, Any Port (ASAP) service—Unified network architecture that delivers integrated voice, data, fax and wireless services at a profit. Access equipment that is capable of handling voice-only or data-only services remains unutilized during off-peak hours. Cisco AS5400 Series Universal Gateways alleviate this limitation by supporting more services that can be offered during off-peak hours, optimizing the utilization of the existing access infrastructure.
- Rich IOS-based software feature set enables high value services—Internet connectivity, wholesale dial, global long distance with SS7 interconnect, distributed pre-paid calling, telephony application hosting, enhanced voice services, unified communications, mobile wireless data, regional-office and branch-office connectivity, access VPN
- The Industry's only 2RU, CT3-capable universal gateway on the market with hot-swappable cards, internal redundant power supply, & environmental monitoring
- Cisco SS7 signaling gateway interoperability

Competitive Products

- 3Com/CommWorks: Total Control 1000
- Alcatel: X1000
- Sonus (voice)
- Lucent: Max 6000
- Clarent: Gateway
- Nuera (voice)

Specifications

Feature	Cisco AS5400HPX	Cisco AS5400
Processor Type	390-MHz RISC processor	250-MHz RISC processor
Memory	SDRAM: 256 MB (default), 512 MB (maximum) Shared input/output (I/O): 64 MB (default) 128 MB (maximum) Boot Flash: 8 MB (default) 16 MB (maximum) System Flash: 32 MB (default) 64 MB (maximum) Layer 3 cache: 8 MB	SDRAM: 256 MB (default), 512 MB (maximum) Shared input/output (I/O): 64 MB (default) 128 MB (maximum) Boot Flash: 8 MB (default) 16 MB (maximum) System Flash: 32 MB (default) 64 MB (maximum) Layer 3 cache: 2 MB
DFC Slots	7	7
DFC Trunk Cards	8 Channelized T1/E1/PRI 1 CT3	8 Channelized T1/E1/PRI 1 CT3
DFC DSP Card	60/180 Universal ports DFC	60/180 Universal ports DFC
LAN Protocols	IP, IPX, AppleTalk, DECnet, ARA, NetBEUI, bridging, HSRP	IP, IPX, AppleTalk, DECnet, ARA, NetBEUI, bridging, HSRP
WAN Protocols	Frame Relay, PPP, HDLC (leased line)	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)	RIP, RIPv2, OSPF, IGRP, EIGRP, BGPv4, IS-IS, AT-EIGRP, IPX-EIGRP, Next Hop Resolution Protocol (NHRP), AppleTalk Update-Based Routing Protocol (AURP)
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	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	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.729a, G.729ab	G.711, G.723.1 (5.3K and 6.3K), G.729a, G.729ab
DSP Voice Features	G.168 echo cancellation, programmable up to 128 ms Transparent transcoding between A-law and mu-law encoding Voice activity detection, silence suppression, comfort noise, fixed and adaptive jitter buffering Call progress tone detection and generation--Dial tone, busy, ring-back, congestion, and re-order tones, with local country variants Continuity Testing (COT) DTMF, MF	G.168 echo cancellation, programmable up to 128 ms Transparent transcoding between A-law and mu-law encoding Voice activity detection, silence suppression, comfort noise, fixed and adaptive jitter buffering Call progress tone detection and generation--Dial tone, busy, ring-back, congestion, and re-order tones, with local country variants Continuity Testing (COT) DTMF, MF
Voice and Fax Signaling Protocols	H.323v2/v3, SIP, MGCP 1.0 TGCP 1.0 T.37 fax store and forward T.38 real-time fax relay Fax detection Open Settlements Protocol (OSP)	H.323v2/v3, SIP, MGCP 1.0 TGCP 1.0 T.37 fax store and forward T.38 real-time fax relay Fax detection Open Settlements Protocol (OSP)
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, IPX, AppleTalk, bridged traffic) Network Address Translation (NAT) and Dynamic access lists	RADIUS or TACACS+, PAP or CHAP authentication, local user/password database DNIS, CLID, call-type pre-authentication Inbound/outbound traffic filtering (including IP, IPX, AppleTalk, bridged traffic) Network Address Translation (NAT) and Dynamic access lists
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 QoS features (committed access rate, random early detection, IP precedence, policy-based routing)	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 QoS features (committed access rate, random early detection, IP precedence, policy-based routing)

Channelized T1	Robbed-bit signaling; loop start, immediate start, and wink start protocols	Robbed-bit signaling; loop start, immediate start, and wink start protocols
Channelized E1	CAS, E1 R2, leased line, Frame Relay	CAS, E1 R2, leased line, Frame Relay
ISDN Protocols Supported	Sync mode PPP, V.120, V.110 at rates up to 38400 bps Network- and User-side ISDN DoVBS QSIG NFAS with backup D-channel	Sync mode PPP, V.120, V.110 at rates up to 38400 bps Network- and User-side ISDN DoVBS QSIG NFAS with backup D-channel
Modem Protocols Supported	V.92 Modem on Hold, Quick Connect V.90 standard supporting rates of 56000 to 28000 in 1333-bps increments 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 K56Flex at 56000 to 32000 in 2000-bps increments ITU-T V.44, V.34 Annex 12, ITU-T V.42bis, V.32bis and many others	V.92 Modem on Hold, Quick Connect V.90 standard supporting rates of 56000 to 28000 in 1333-bps increments 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 K56Flex at 56000 to 32000 in 2000-bps increments ITU-T V.44 V.34 Annex 12, ITU-T V.42bis, V.32bis and many others
Wireless Protocol	V.110	V.110
Full Cisco IOS Support	IP Plus and Enterprise Plus	IP Plus and Enterprise Plus
Console and Auxiliary Ports	Asynchronous serial (RJ-45)	Asynchronous serial (RJ-45)
Chassis Dimensions (H x W x D)	3.5 x 17.5 x 18.25 in.	3.5 x 17.5 x 18.25 in.
Chassis Weight (fully loaded)	35 lb maximum (15.8 kg)	35 lb maximum (15.8 kg)

For More Information

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

Cisco AS5850 Universal Gateway

The Cisco AS5850 Universal Gateway is the industries highest density universal gateway, offering unparalleled capacity and high availability. It is specifically designed to meet the demands of large, innovative service providers, supporting up to 2688 calls (4 x CT3s), 96 T1s or 86 E1s of data, voice, fax and mobile wireless calls on any port at any time. It offers high availability features such as hot-swap on all cards, load-sharing and redundant hot-swappable power supplies, redundant route processing cards and call admission control to ensure 99.999-percent availability. As a highly flexible voice gateway, the Cisco AS5850 supports any CODEC at 100-percent capacity simplifying network engineering. An open programmable architecture streamlines rapid voice service creation with H.323, SIP or MGCP protocols.

The Cisco AS5850 supports a wide range of IP-based value-added services such as high-volume Internet access, 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. 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.

When to Sell

Sell This Product	When a Customer Needs These Features
Cisco AS5850	• Up to 2688 calls (4 x CT3s), 96 T1s or 86 E1s of data, voice, fax and mobile wireless calls on any port at any time (universal access) • Service provider or IP-focused installations • Highly available single system with multiple redundancy • Wholesale dial/voice, retail dial/voice, TDM grooming or wireless applications

Key Features

- ASAP services-enables the Cisco AS5850 to operate simultaneously as a network access server and voice gateway, delivering universal services on any port at any time
- High availability architecture, with redundancy and hot swap capability
- Density remains the same regardless of modem protocol, voice codec type, ECAN or VAD settings
- Up to 3072 DS0s can be groomed through the TDM Switching feature
- Up to 4 Channelized T3 or 86 Channelized E1/PRI interfaces
- Port management features for large-scale wholesale dial applications
- ETSI/NEBS Level 3 compliant
- Distributed, multiprocessor design for maximum performance and growth
- SS7/C7 support through the Cisco SC2200 signaling controller
- V.110 protocol support for wireless applications

Competitive Products

- 3Com: TCH HiPer
- Lucent: MAX TNT, APX 8000
- Nortel: Aptis CVX 1800
- Alcatel: 1600 / 7410 Access Server

Specifications

Feature	Cisco AS5850
Slots	12 feature board slots 2 RSC slots
Processor Type	266 MHz RISC processor plus 2B of L3 cache SDRAM
RSC Switch Fabric	5 GBps, Layer 3 / 4 switching
Memory	512 MB with ECC per RSC 128 MB SDRAM (with parity) per DFC
Trunk Cards	One CT3 and 216 DSP feature card 24 CE1/CT1 feature card
Universal Port Card	324 DSP-feature card
Egress Ports	Dual Gigabit load-balanced redundant Ethernet ports with GBIC interfaces for user traffic One 10/100-Mbps Ethernet port with RJ45 connector for management traffic
Voice Protocols	G.711, G.729a, G.723.1 H.323v2/v3, SIP, MGCP 1.0, TGCP 1.0 ECAN can be configured up to 128ms on all ports T.38 real-time fax relay Auto-fax detection
Modem Protocols	V.90 or V.92 standard supporting rates of 56000 to 28000 in 1333-bps increments V.44 supporting increased throughput by more than 100 percent for Internet browsing 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 K56Flex at 56000 to 32000 in 2000-bps increments ITU-T V.34 Annex 12 at 33600 and 31200 bps ITU-T V.34 at 28800, 26400, 24000, 21600, 19200, 16800, 14400, 12000, 9600, 7200, 4800, or 2400 bps V.32bis 14400, 12000, 9600, 7200, 4800; V.32 9600, 4800; V.22bis 2400, 1200, V.21 300; Bell 103, 300; V.22 1200; and V.23 1200/75 ITU-T V.42 (including MNP 2-4 and LAPM) error connection ITU-T V.42bis (1000 nodes) and MNP 5 data compression Async-mode PPP
ISDN Protocols	Sync mode PPP, V.120, V.110 at rates up to 38400 bps
Wireless Protocol	V.110
Console and Auxiliary Ports	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**

Remote Dial Access Network Management Products

Universal Gateway Manager (UGM)

The Cisco Universal Gateway Manager (UGM) is a next-generation element management system offering robust, scalable, carrier-class capabilities for the Cisco AS5000 series of Universal Gateways. Providing comprehensive FCAPS (fault, configuration, accounting/inventory, performance, security) capabilities, the UGM enables operators to effectively configure, manage, and maintain dial access networks. The Cisco UGM facilitates the rapid deployment of new services and provides quick and effective network diagnostics to meet the rigorous demands of today's fast-moving marketplace.

FastStep for Access Servers

The FastStep for Access Servers configuration tool offers three main features to make the set up of an AS5300 quick and painless. The first is a simple GUI interface for fast configuration and set up; the second is a step by step configuration of trunk lines, LAN and WAN interfaces, IP address pools, and authentication; and the third is an easy download utility to load IOS and modem portware images to server. Fast Step for Access Servers comes bundled with every AS5300 purchase.

Resource Pool Manager

Cisco Resource Pool Management (RPM) enables wholesale access providers to virtually lease universal ports supporting either voice or dial to their retail SP customers. Wholesalers can aggregate resources across universal gateways (UGs) and allocate subsets of these resources to retail SPs, guaranteeing that customers receive their allocated ports. Service level agreements (SLA) for each retail SP are enforced by RPM. Resource pool management can be done using the RPM component of the resource pooling solution on the UG or by using this in conjunction with one or more external RADIUS-based Cisco Resource Pool Manager Servers (RPMS). RPMS supports multi-vendor environments, providing the universal gateways meet the RADIUS RFC standard.

Selected Part Numbers and Ordering Information[1]

FastStep for Access Servers	
FS-5300-1.1=	FastStep for 5300
Resource Pool Manager	
FR53-RPML-192	Resource Pool Manager License 192 Ports
FR5X-PM-LIC	Port management license for 1 port (includes Resource Pool Manager, Call Tracker)
CRPMS-1.0	Cisco Resource Pool Manager Server v1.0 (1 server)

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 Access Server Web site or the Element Management Framework (EMF) Web site for more information on the Universal Gateway Manager: **http://www.cisco.com/go/as** and **http://www.cisco.com/go/emf**

See the FastStep Web site: **http://www.cisco.com/go/faststep**

See the Resource Pool Manager Web site: **http://www.cisco.com/go/rpm**

SS7 Signaling Products

Cisco AS5300, AS5400, and AS5800 series products interoperate with various SS7 solutions, including the Cisco SC2200 SS7 Signaling Controller, as well as partner solutions such as HP OpenCall Internet Access Controller, ipVerse Control Switch/Internet Call Diversion, and Illuminet Internet Offload Signaling.

Cisco SC2200 Signaling Controller

The Cisco SC2200 adds SS&/C& 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. Using the SC2200's 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 because SS7 trunks cost a fraction of what PRIs cost.

Cisco PGW 2200 Signaling Controller

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 (formerly known as the VSC 3000) is the catalyst for PSTN Gateway solutions enabling transit, TDM/PRI grooming and H.323 and SIP based applications. The PGW 2200 leverages its protocol library of 80+ SS7/C7 variants to enable interconnect worldwide.

For More Information

See the SC2200 Web site: **http://www.cisco.com/go/sc2200**

Additional Remote Dial Access Products

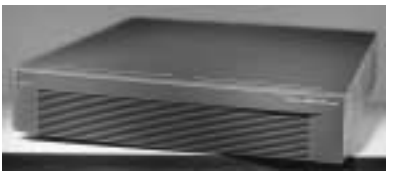
- In addition to the AS5300/AS5400 series access gateways, the Cisco 2600/3600 series routers (see pages 1-17 and 1-23) also support dial-up, data, and voice access via network and modem modules, and voice interface cards.
- For sites that require access via multiple external analog modems, the AS2509/AS2511-RJ access servers (see page 1-15) and 2600 series routers (see page 1-17) are ideal for low-density, dial applications.
- For small office ISDN connectivity, see Cisco 800 series routers (see page 1-8).

Remote Cable Access Solutions Overview

Cisco offers a complete portfolio of standards-based products that deliver high-quality IP-based data, voice, and video services over a broadband cable infrastructure. Standards supported include Data-Over-Cable Service Interface Specifications (DOCSIS) and European Data-Over-Cable Service Interface Specifications (EuroDOCSIS). Cisco is committed to being at the forefront to advance open standards and continue to innovate broadband cable data, voice and digital entertainment offerings. Cisco cable products include:

- Headend and distribution hub Cable Modem Termination Systems (CMTSs): Cisco uBR10012 Universal Broadband Router, Cisco uBR7200 Series Universal Broadband Router, Cisco uBR7100 Series Universal Broadband Router
- Customer premises equipment (CPE): Cisco uBR900 Series Cable Access Router and Cisco CVA120 Series Cable Voice Adapter
- Video equipment: Cisco 6920 RateMUX Statistical Multiplexer
- Network management and operational support systems

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, multi-dwelling (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 specifications. The Cisco uBR7111E and Cisco uBR7114E models are tComLabs® qualified to EuroDOCSIS 1.0 specifications. 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 bi-directional 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 • 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 combined router and CMTS with an integrated upconverter, embedded Network Interface, and configuration tools to provision hosts, cable modems, and set top boxes

- Standards-based: DOCSIS and EuroDOCSIS models available
- Reliable operation to ensure the system remains online
- Uses Cisco IOS software

Specifications

Feature	Cisco uBR7111 and uBR7114	Cisco uBR7111E and uBR7114E
Embedded Processor	MIPS RISC527/RM7000, 75 MHz Bus	MIPS RISC527/RM7000, 75 MHz Bus
Throughput of Services	50 Mbps	50 Mbps
Memory	Flash: 48 MB; Packet: 64 MB; System: 128 MB System memory expandable to 256 MB	Flash: 48 MB; Packet: 64 MB; System: 128 MB System memory expandable to 256 MB
Line Card with Integrated Upconverter (Cable Plant Interface)	uBR7111: 1 downstream and 1 upstream uBR7114: 2 downstream and 4 upstreams	uBR7111E: 1 downstream and 1 upstream uBR7114E: 2 downstream and 4 upstreams
Integrated Upconverter	DOCSIS Annex B, 6 MHz High level output: =+61dBmV, 55 to 858 MHz Optimized for 64 and 256 QAM	DOCSIS Annex A, 8 MHz, High level output: = +61 dBmV, 55 to 858 MHz Optimized for 64 and 256 QAM
Port Adapter (WAN or backbone Interface)	Embedded dual 10/100 BaseT Ethernet (TX FE) provided Supports one additional PA; options include the following using Cisco IOS Release12.1(8)EC minimum: Ethernet: • PA-4E-4-port Ethernet 10BASE-T Fast Ethernet: • PA-FE-TX-1-port 100BASE-TX Fast Ethernet • PA-FE-FX-1-port 100BASE-FX Fast Ethernet • PA-2FE-TX 2-port 100BASE-TX Fast Ethernet • PA-2FE-FX 2-port 100BASE-FX Fast Ethernet Serial: • PA-MC-4T1 4-port multichannel T1 Port Adapter with integrated CSU/DSUs • PA-MC-2T1 2-port multichannel T1 Port Adapter with integrated CSU/DSUs • PA-E3-1-port E3 serial Port Adapter with E3 DSU • PA-T3-1-port T3 serial Port Adapter with T3 DSU • PA-2E3-2-port E3 serial Port Adapter with E3 DSUs • PA-2T3-2-port T3 serial Port Adapter with T3 DSUs • PA-4T+-4-port serial Port Adapter, enhanced • PA-4E1G-75-4-port E1-G.703 serial Port Adapter (75-ohm/unbalanced) • PA-4E1G-120-4-port E1-G.703 serial Port Adapter (120-ohm/balanced) • PA-8T-V35-8-port serial V.35 Port Adapter HSSI: • PA-2H-2-port HSSI ATM: • PA-A3-8T1IMA, 8-port ATM inverse T1 multiplexer Port Adapter • PA-A3-OC3MM, 1-port ATM enhanced OC3c/STM1 multimode Port Adapter POS: • PA-POS-OC3SMI, 1-port Packet/SONET OC3c/STM1 single-mode Port Adapter	Same as Cisco uBR7111 and Cisco uBR7114
Power Options	Single; 100 to 240 VAC input voltage	Single; 100 to 240 VAC input voltage
Minimum Cisco IOS release	12.1(5)ECI minimum	12.1(7)EC minimum

For More Information

See the Cisco uBR7100 series Web site: **http://www.cisco.com/go/ubr7100**

Cisco uBR7200 Series Universal Broadband Router

The Cisco uBR7200 Series are integrated routers and cable CMTSs. The Cisco uBR7200 Series provide a single, multi-service, scalable platform that gives cable companies and ISPs the ability to deliver IP data and VoIP services to DOCSIS or EuroDOCSIS-compliant cable modems and set-top boxes. The Cisco uBR7200 Series is CableLabs® qualified to DOCSIS 1.0 specifications. The product is also tComLabs® qualified to EuroDOCSIS 1.0 specifications. The Cisco uBR7200 Series enables service providers to build cable network architectures that support two-way or one-way NTSC, PAL, or SECAM channel plan operations.

The products deliver a smooth migration path as cable operators upgrade their cable plants or expand their broadband service offerings. Because the products are designed in conjunction with current and emerging standards, they offer scalability, flexibility, and investment protection.

When to Sell

Sell This Product	When a Customer Needs These Features
Cisco uBR7246VXR	• Positioned for high-growth cable or fixed wireless deployments • Flexible port expansion for multi-service deployment options • Supports up to 10,000 subscribers per chassis with 1 Gbps back plane • 4 line card slots, 2 port adapter slots, 1 I/O controller slot, 1 NPE slot, and 1 clock card slot for VoIP
Cisco uBR7223	• Positioned for mid-to-small cable and fixed wireless deployments • Compact and modular to give service providers a choice in configuration • Supports up to 5,000 subscribers per chassis with 600 Mbps back plane • 2 line card slots, 1 slot for single-width port adapter, 1 I/O controller and 1 NPE slot

Key Features

- Standards-based—Supports DOCSIS/EuroDOCSIS 1.0 and 1.1
- Modularity allows for customized configuration per plant characteristics for optimization of topology and network bandwidth
- Cisco IOS Software—Delivers proven stability and offers advanced features such as multi-protocol routing, tunneling, bandwidth management, QoS, guaranteed service levels, service level monitoring and many CPE management options
- Ease of management and upgrades—Supports online insertion and removal of components to allow seamless upgrades of port adapters, line cards, and power supplies without service interruption. Provides single, centralized point of administration for remote devices

Competitive Products

- Motorola: CAS2000, DCM - 2100
- Terayon: BE2800, BE2K00

Specifications

Feature	Cisco uBR7246VXR	Cisco uBR7223
Modem Cards and Number of Slots	4	2
Supported modem cards (Cable Plant Interfaces)	uBR-MC11C; uBR-MC14C; uBR-MC16C; uBR-MC16E; uBR-MC16S; uBR-MC28C; uBR-MC28-BNC	uBR-MC11C; uBR-MC14C; uBR-MC16C; uBR-MC16E; uBR-MC16S; uBR-MC28C; uBR-MC28-BNC
Port Adapter Slots (LAN/WAN interfaces)	2	2
Supported PA categories	Ethernet: Fast Ethernet; Gigabit Ethernet Serial (V.35, E1-G.703/G.704, T3/E3) Serial Multi-channel T1 HSSI ATM T3/E3 ((PCI-based) ATM OC-3c (PCI-based) POS OC-3c DPT OC-12c/STM4c	Fast Ethernet Serial (V.35, E1-G.703/G.704, T3/E3) Serial EIA/TIA-232 Serial X.21 Serial Multi-channel T1 Serial Multi-channel E1 Serial Multi-channel T3/E3 HSSI ATM T3/E3 ((PCI-based) ATM OC-3c (PCI-based) POS OC-3c
Power Supply Shots	2	1
Power Supply Option	AC; Dual AC; DC; Dual DC	AC; DC
Input/Output (I/O) controller	uBR7200-I/O uBR7200-I/O-FE	uBR7200-I/O uBR7200-I/O-FE
I/O flash options for PCMCIA slots	Flash memory (20MB) Flash disk (48 MB) Flash disk (128 MB)	Flash memory (20MB) Flash disk (48 MB) Flash disk (128 MB)
Network processing engines (NPE)	NPE-400, and NPE-225	NPE-225 and NPE-200
Add-on processor memory options	SDRAM (128 MB, 256 MB) for NPE-225 only SDRAM (128 MB, 256 MB = 512 MB) for NPE-400 only	SDRAM (128 MB, 256 MB) for NPE-225
Router Bandwidth	1 Gbps	600 Mbps

For More Information

See the uBR7200 web site: **http://www.cisco.com/go/ubr7200**

Cisco uBR10012 Universal Broadband Router

The Cisco uBR10012 Universal Broadband Router is a new class of CMTS, designed to handle the volume, capacity, and complexity of large cable MSO headends or distribution hubs. It combines the revenue-generating features and stability of the market-leading Cisco uBR7200 Series with an architecture that is optimized for aggregation and virtually limitless future growth. The Cisco uBR10012 goes beyond the traditional “carrier class” definition, to deliver 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.

When to Sell

Sell This Product	When a Customer Needs These Features
Cisco uBR10012	• High-end throughput, capacity, and service handling for a mix of IP data, voice, and video services over cable—supporting a wide variety of applications, media, session types, subscriber profiles, and access devices • Support for advanced feature sets, varying QoS requirements, service-level differentiations, and transport strategies (MPEG, IP, multicast, unicast, broadcast) that include implementing flow control to various cable CPE devices

Key Features

- Highest-capacity CMTS that leverages the proven stability of the industry-standard Cisco uBR7200 Series, the highly scalable architecture of the Cisco 10000 Edge Services Router, and feature-rich Cisco IOS Software
- Multiservice support, optimized to provide high throughput and accelerated processing using PXF technology; exceptional throughput on each connection in the chassis is achieved
- Standards-based design, support includes DOCSIS 1.0 and DOCSIS 1.1
- Reliability—Designed to eliminate single points of failure and allow technicians to swap out cards online; architected to provide redundancy throughout the system that includes redundant processing engines, bus interconnects, and power supplies
- Secure, scalable choices protect your investment and ensure current and future business growth can be accommodated; the architecture supports planned system and network expansion, including scaling IP services forwarding capacity, increasing connection speeds and densities, and extensive route scaling techniques

Competitive Products

- ADC/BAS: Cuda 12000
- RiverDelta: BSR 64000
- Motorola: CAS 2000
- Terayon/RiverStone: RS 8x00

Specifications

Feature	Cisco uBR10012
Modular Slots	8 slots for cable line cards that include support for 2 downstreams and 8 upstreams each 4 slots for LAN/WAN interfaces 2 slots for Performance Routing Engines (PREs) 2 slots for Timing Communication and Control Plus (TCC+) modules
Supported Cards	Cable line cards with a Cisco Line Card Processor (LCP) Timing, Communications, and Control Plus (TCC+) card Gigabit Ethernet (GE) network uplink card OC-12 Packet Over SONET (POS) network uplink card
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 Release 12.2(2)XF
Power Supply	DC
Hot-Swappable	Yes
Backplane Capacity	51.2 Gbps

Feature	Cisco uBR10012
Physical Dimensions (H x W x D)	Height: 31.25 in. (79.4 cm)—18 Rack Units (RU) Width: 17.2 in. (43.7 cm) Depth: 22.75 in. (57.8) Mounting: 19 in. rack mountable (front or rear), 2 units per 7 ft. rack 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/ubr10012**

Broadband Cable—Customer Premise Equipment (CPE)

Cisco uBR900 Series Cable Access Routers

The Cisco uBR900 Series Cable Access Routers are designed to provide commercial services for cable operators, allowing them to expand their broadband service offerings. The Cisco uBR925, an integrated DOCSIS Cable Modem and Cisco IOS router, provides an easy-to-manage solution for telecommuters and small offices. It offers Voice-over-IP (VoIP), Virtual Private Network (VPN), and router functionality in a one-box solution. The Cisco uBR905 is CableLabs-certified to DOCSIS 1.0 specifications and supports IP data transmission over a cable plant. The model can support voice through an Ethernet port. Both Cisco uBR900 Series models offer hardware-accelerated IPSec VPN support.

Key Features for the Cisco uBR900 Series

- Integrated high-speed cable modem and router that operates with any DOCSIS 1.0-compliant CMTS; both Cisco uBR900 Series models are DOCSIS 1.1-ready
- Integrated Cisco IOS router, cable modem, and four-port Ethernet hub that offers advanced networking capabilities and investment protection
- Cisco IOS-based, simplifies training and leverages existing knowledge

Cisco CVA120 Series Cable Voice Adapters

The Cisco CVA120 Series Cable Voice Adapters are residential voice-enabled cable modems and integrated routers that provide high-speed data and voice services to small office/home office (SOHO) and residences. Models include the Cisco CVA122 that supports DOCSIS and the Cisco CVA122E that supports EuroDOCSIS. The Cisco CVA122 is CableLabs-certified to DOCSIS 1.0 specifications. Both products deliver data at broadband speeds. The supported telephony features allow Multiple Service Operators (MSO) to support both data and voice services using a single coaxial cable connection.

Key Features for the Cisco CVA120 Series

- Supports value-added data services including separately routed Ethernet and USB
- Supports Cisco Easy IP for NAT/PAT, multi-NAT, and DHCP server
- Toll-quality voice (VoIP) enabled with H.323, SGCP, MGCP support and broad codec support including G.711, G.723.1, G.726, G.728, G.729, G.729a
- Cisco IOS operating environment
- Easy set-up and installation with USB port for “plug and play”

When to Sell

Sell This Product	When a Customer Needs These Features
Cisco uBR905 Cable Access Router	• Requires data-only broadband services (or voice separately via Ethernet) • High-speed, secure remote tunneling via hardware accelerated IPSec VPN
Cisco uBR925 Cable Access Router	• Supports two voice (VoIP) connections via RJ-11 ports • Provides data broadband services, router functionality, and VPN support
Cisco CVA122 and Cisco CVA122E	• Combined high-speed data and voice service for residential or small office applications • Supports features like caller ID, distinctive ringing, call back, 3-way calling, and call forwarding

Specifications

Feature	Cisco uBR905	Cisco uBR925	Cisco CVA122 and Cisco CVA122E
Ports	4-port 10Base-T Ethernet hub 1 port Console 1 port CATV (Female F Connector)	4-port 10Base-T Ethernet hub 1 port USB 2 ports RJ-11 (telephone) 1 port Console 1 port CATV	1-port 10Base-T Ethernet hub 1 port USB 2 ports RJ-11 (telephone) 1 port CATV
Routing Features	NAT/PAT, DHCP Server	Same as Cisco uBR905	Same as Cisco uBR905
Security Features	56 Bit IPSec 3DES IPSec optional IPSec Hardware Acceleration Firewall optional	Same as uBR905	None
Voice Support	No	Yes	Yes
UPS Battery Backup	No	No	Yes

For More Information

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

See the CVA120 series Web site: **http://www.cisco.com/go/cva120**

Cisco 6920 RateMUX Statistical Multiplexer

The Cisco 6920 RateMUX is a specialized multiplexing device that optimizes MPEG transport streams to distribute multiple video, audio, and data streams over a cable plant to digital set-top boxes (STBs). It delivers a real-time, bandwidth management solution that allows cable, satellite, and broadcast operators to add value to their programming and increase revenue. It allows multiple programs to be bundled into one optimized, multiplexed output stream, blending digital programming from a variety of sources-including satellite-based services, local content, and movie video servers—to create custom lineups.

When to Sell

Sell This Product	When a Customer Needs These Features
Cisco 6920 RateMUX	• Cable operators who are interested in the ability to increase the number of programs in their existing digital tier will find the Cisco 6920 RateMUX of interest. • The upgrade of cable plants from 64 to 256 QAM provides another opportunity for operators to add programming to their digital tier. • The rollout of HDTV presents a need to support SDTV in the unused portion of the HDTV transport.

Key Features

- Transport grooming allows customization of digital program lineups
- Transration supports significant bit rate reduction on individual input programs
- Statistical multiplexing optimizes output bandwidth
- MPEG splicing enables local ad insertion in the digital domain

Competitive Products

- Terayon: CherryPicker
- Harmonic: Transrater
- Scientific Atlanta: PowerVu Plus™ BitMizer
- Big Band Networks: Broadband Media Router

Specifications

Feature	Cisco 6920 RateMUX
Digital Video Format	MPEG2 Main Profile at Main Level Bit Rate less than or equal to 15 Mbps for transcoding; 20 Mbps for pass through VBR or CBR systems
Video Resolution	Vertical: 480, 240 (NTSC), and 576, 288 (PAL); Horizontal: 704, 544, 352
Video Aspects Ratios	4:3 or 16:9
Digital audio formats	Musicam, Dolby AC3
Ethernet Port	10BaseT; TCP/IP (for remote management/configuration)
Input Interface	Number of inputs: Up to 15 discrete transport streams Interface: DHEI, DVB-ASI; Information rate: 40 Mbps for DHEI, 216 Mbps for DVB-ASI
Output Interface	Number of outputs: Up to 3 Interface: DHEI, DVB-ASI for use with either 64 or 256 QAM; Information rate: 40 Mbps for DHEI, 54 Mbps for DVB-ASI

For More Information

See the Cisco 6920 RateMUX Web site: **http://www.cisco.com/go/6900rm**

Remote Cable Access—Network Management Products

Cisco Cable Manager

Cisco Cable Manager is a client/server application that helps cable service providers deploy, maintain, monitor, and troubleshoot cable equipment on an HFC network. The product manages Cisco CMTS products, as well as Cisco and third-party DOCSIS and EuroDOCSIS-compliant cable modems.

Version 2.0 adds:

- Domain management of the Cisco uBR7200 Series, Cisco uBR905, and the Cisco CVA122
- Scale to support 100,000 cable modems or CPE devices per Cisco Cable Manager server
- Security to support task- and device-based partitioning of user groups
- Performance reporting to provide multiple statistics in a single graphical display
- Fault management to support formula-based and user-configurable alarm thresholds

Version 2.1 adds domain management of:

- Cisco uBR7100 Series
- Cisco uBR10012
- Cisco uBR925
- Cisco CVA122E

Both Cable Manager versions come bundled with:

- CiscoView version 4.2
- Cisco Cable Troubleshooter version 1.3
- Cisco DOCSIS CPE Configurator File Editor version 3.2

Cisco Broadband Troubleshooter

The Cisco Broadband Troubleshooter (formerly known as the Cisco Cable Troubleshooter) provides an efficient tool to help network operations center personnel or field technicians detect, diagnose and isolate problems between the cable plant and connected RF CPE devices. The product allows technicians to characterize upstream and downstream trouble patterns and quickly identify “flapping” CPE devices experiencing connectivity problems. Operators can quickly discern a cable modem or set-top box having problems; determine which amplifier or feeder line is faulty; distinguish an upstream from downstream path problem; and isolate an ingress noise impairment from a plant equipment problem.

New features in the latest release of product—version 2.0 (not bundled with Cisco Cable Manager)—include:

- Multi-user client-server architecture; Web-based; allows remote access
- Ability to interrogate CMTS and cable modems for fault isolation
- Ability to perform scheduled capture and provide real-time status of cable modems

- SQL database for subscriber information
- Pinpoints geographic location of cable modems through an optional third-party mapping tool

Cisco DOCSIS CPE Configurator

Cisco DOCSIS CPE Configurator is a GUI-based tool designed to collect information needed to generate and download configuration files for DOCSIS or EuroDOCSIS cable modems and set-top boxes. There are two versions of the tool: a free, web-based version accessible via Cisco Connected Online (CCO), and a stand-alone Java-based desktop version. Cisco DOCSIS CPE Configurator enables point and click configuration of CPE values for RF, class of service, vendor information, SNMP parameters, BPI, TFTP, telco-return attributes, and CPE data.

For More Information

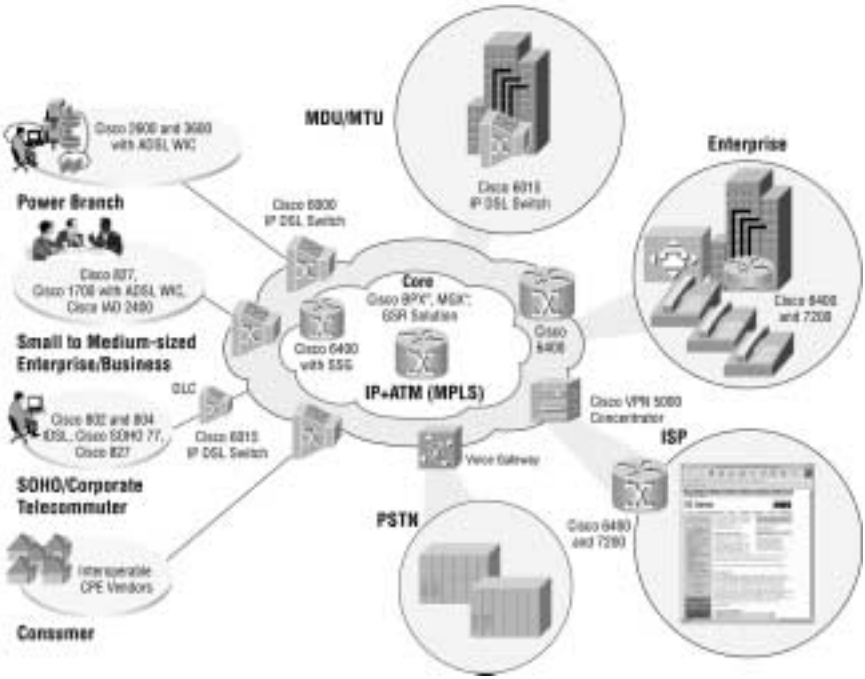
See the Cable Manager 2.0 Web site: **http://www.cisco.com/go/cablemgr**

See the Troubleshooter 1.0 Web site: **http://www.cisco.com/go/troubleshooter**

See the DOCSIS CPE Web site: **http://www.cisco.com/go/docsis**

Digital Subscriber Line (DSL) Access Solutions

Sample DSL Solution Overview



Cisco 6000 IP DSL Series Switches

The Cisco 6000 IP DSL switch family is the evolution of current Cisco smart Digital Subscriber Line Access Multiplexers (DSLAM) that support the most comprehensive IP+ATM feature set with common multi-DSL technologies for central offices (CO), remote terminals (RT), and Multi-Dwelling Units (MDU). This series supports Multiprotocol Label Switching/virtual private networking (MPLS/VPN), multicasting, and IP routing with quality of service (QoS).

Cisco 6015 IP DSL Switch[1]

The Cisco 6015 IP DSL Switch extends the DSL reach beyond the CO to the outside plant (OSP) and MDU. It is a companion to the Cisco 6160 and 6260 products, with an ideal form factor for smaller-scale DSL deployments, but with the same robust IP+ATM features of the larger products. The Cisco 6015 is designed for commercial deployments in incumbent local exchange carrier (ILEC); international post, telephone, and telegraph (PTT); and competitive local exchange carrier (CLEC) networks, as well as Multi-Tenant/Dwelling Units (MxU) and remote terminal (RT) / OSP environments.

1. For other Cisco MxU solutions, see Long Range Ethernet Solutions (page 7-33)

Cisco 6160 IP DSL Switch (targeted for use in North America)

The Cisco 6160 is a 32-slot, multiport line-card architecture that supports industry-standard asymmetric digital subscriber line (ADSL), ISDN over digital subscriber line (IDSL), and symmetric digital subscriber line (SDSL) line technologies. Targeted at North American central-office environments, the Cisco 6160 is fully compliant with NEBS, ANSI, and ATM carrier-class network-element standards. Network transmission connections include DS3, 8xT1 inverse multiplexing over ATM (IMA), and OC-3c single mode/multimode. Up to 256 ports per chassis can be provisioned with ADSL (DMT), SDSL, G.shdsl, and IDSL. A variety of configuration and cabling options are available to support a mix of xDSL services within a common chassis. For "above voice-band" or "line sharing" ADSL applications, the Cisco 6160 can also be used with various third-party Plain Old Telephone Service (POTS) splitters recommended by Cisco.

Cisco 6260 IP DSL Switch (targeted for International deployment)

Built for rapid, large-scale deployment of DSL services, the Cisco 6260 is designed for ILECs, competitive LECs (CLECs), and MDU service providers around the world who need next-generation DSL service solutions today. The Cisco 6260 IP DSL switch enables the most comprehensive set of IP+ATM capabilities with common multi-DSL technologies. The Cisco 6260 switch is IP-ready and supports an evolution path for managed services using MPLS, VPN, multicasting, IP routing and QoS. The Cisco 6260 switch supports both asymmetrical and symmetrical DSL (ADSL and SHDSL) technologies.

For More Information

See the 6000 Series IP DSL Switch Web site: **http://www.cisco.com/go/6000ipdsl**

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 77 ADSL Routers (page 1-7)
- Cisco 800 Series Routers (page 1-8)
- G.SHDSL WAN Interface Cards (WICs) for 1700, 2600, 3600 Series (see Chapter 1—Routers)
- Cisco IAD 2400 Series (w/G.SHDSL) (page 4-22)

Broadband Services Aggregation

Cisco 7200 VXR

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 medium-density applications (between 4000 and 8000 Ethernet-bridged, PPPoA, PPPoE 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 **http://www.cisco.com/go/7200aggregation** and page 1-28 for more information on the 7200 series.

Cisco 7400 Series

When ordered as a part number 7401ASR-BB, the 7400 series provides high-performance broadband services aggregation like the 7200, but in a low-power one rack unit (1 RU) form factor. It offers one port adapter (PA) slot supporting over 40 standard 7200 series PAs, including T1/E1, DS3, OC-3, Fast Ethernet, and Gigabit Ethernet; making it ideal for small- and medium-density applications. See page 1-34 for more information on the 7400 series.

Cisco 6400 Series Carrier-Class Broadband Aggregator

The Cisco 6400 is designed for use in high-availability environments such as service provider central offices, and corporate premises; and aggregates access media (DSL, cable, wireless, and dial) to serve as the intelligent equal access point, allowing multiple operating companies and service providers access to end users. It includes switch, router, and line card redundancy.

The Cisco 6400 is a high-performance service gateway that enables the delivery of network services, VPNs, and voice- and entertainment-driven traffic over any access media. ATM interfaces connect the Cisco 6400 to dial access servers, DSLAMs, and Cisco IP DSL Switches; ATM and packet interfaces connect to the network core.

Key Features

- Session scalability and modular design—The Cisco 6400 represents a quantum leap in session scalability, capable of scaling from 2000 subscribers in its entry level configuration to 96,000 subscribers in a full configuration.
- Routing and VPN scalability—Using the Cisco 6400, service providers can simultaneously route end-user traffic over secure, independent pathways exceeding 1000 different domains or end destinations, with an aggregate throughput of over 2.4 Gbps forwarding capacity for handling even the most bandwidth-intensive broadband traffic.

For More Information

See the 6400 series Web site: **http://www.cisco.com/go/6400**

ATM Multiservice WAN Switching

Cisco BPX 8600 Series—IP+ATM Multiservice Switches

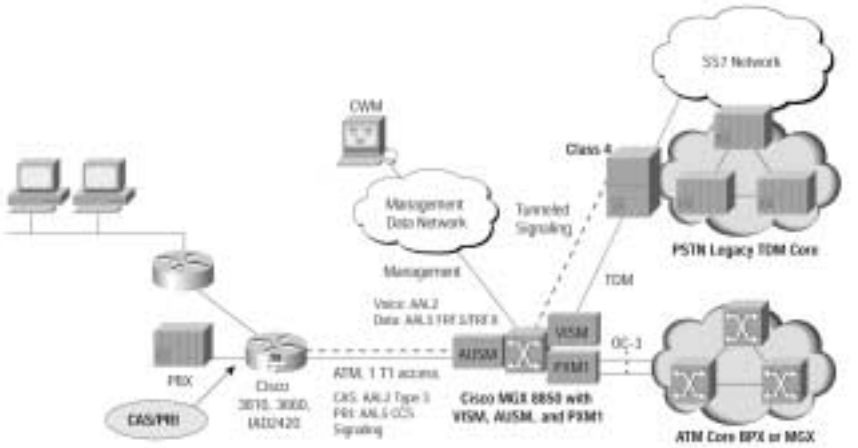
The Cisco BPX 8600 series is standards-based ATM switch with advanced IP and ATM capabilities. Designed to meet the demanding, high-traffic needs of a public service provider or large private enterprise, the BPX switch delivers high-performance ATM switching, multiservice adaptation and aggregation for 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. 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) today, and this functionality can be easily added to any BPX switch already installed in the field.

For More Information

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

Sample ATM Access Solution Overview—Integrated Voice and Data



Cisco MGX 8850 IP+ATM Multiservice Switch

The Cisco MGX 8850 IP+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 the new high-margin voice and data services while maintaining existing services.

The MGX 8850 universal chassis provides a unified IP+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.

Note: The Cisco MGX 8850 can function in two 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-45 configuration—Serves as a broadband edge switch and includes the 45 Gbps switch card and broadband ATM modules

Key Features

- Flexible IP+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

For More Information

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

Cisco MGX 8200 Series

Cisco MGX 8230 Edge Concentrator

The Cisco MGX 8230 Edge Concentrator provides the most cost-effective gateway for narrowband services in space and power limited situations. It can acts as a stand-alone gateway or as an edge concentrator for the Cisco BPX 8600, Cisco MGX 8850 with PXM-45, and IGX 8400 series multiservice switches. The MGX 8230 offers a full range of narrowband service interfaces and a switching capacity up to 1.2 Gbps.

Cisco MGX 8250 Edge Concentrator

The Cisco MGX 8250 is a high-density edge concentrator designed for service providers needing flexibility for aggregation of IP, voice, Frame Relay, circuit emulation, and ATM services. An IP+ATM narrowband edge concentrator, the MGX 8250 can serve as a stand-alone edge concentrator or as a feeder node for the Cisco BPX 8600 series and MGX 8850 switches. The MGX 8250 Edge Concentrator offers up to 1.2 Gbps of IP + ATM switching capacity.

For More Information

See the Cisco MGX 8200 Series Web site: **http://www.cisco.com/go/mgx8200**

Cisco IGX 8400 Series Multiservice WAN Switch

Efficient bandwidth utilization, intelligent QoS management features, and carrier-class reliability make the IGX 8400 series switch the ideal choice for meeting unique Wide-Area Networking (WAN) needs. This series provides the IP+ATM backbone required to deliver data, voice, fax, and video services with guaranteed quality of service (QoS). The IGX 8400 series switch connects to public services for reduced leased-line costs by maximizing the use of these WAN links.

Available with 8, 16, or 32 slots, the IGX 8400 series switches offers high flexibility to meet a wide range of Enterprise and Service Provider needs. Tight integration with the broad range of Cisco access products enables you to efficiently and cost-effectively run backbone-to-branch data, voice, fax, and video services between premises. By integrating IOS technology, the Cisco IGX 8400 series switch helps deliver a seamless migration path to technologies such as VoIP and MPLS.

For More Information

See the Cisco IGX 8400 Web site: **http://www.cisco.com/go/igx**

Cisco Long Reach Ethernet Solution

The Cisco Long-Reach Ethernet (LRE) networking solution delivers cost-effective, high-performance broadband access to multitenant/dwelling units (MxU) such as hotels, residential units, multitenant office buildings, shopping malls; and enterprise campus environments such as manufacturing, educational campuses, and medical facilities. Cisco LRE technology dramatically extends Ethernet over existing Category 1/2/3 wiring at speeds from 5 to 15 Mbps (full duplex) and distances up to 5,000 feet. This technology delivers broadband service over the same lines as standard telephone (POTS), digital telephone, and ISDN circuits. In addition, Cisco LRE supports modes compatible with asymmetric digital subscriber line (ADSL), allowing service providers to provision LRE to buildings where broadband services already exist. This solution also provides multicast, Layer 2 quality of service (QoS), security, and Web-based Cisco Switch Clustering network management.

The Cisco LRE solution includes Cisco Catalyst 2900 LRE XL switches, the Cisco 575 LRE Customer Premise Equipment (CPE) device, and the Cisco LRE 48 POTS Splitter.

Catalyst 2900 LRE XL Desktop Switches

Cisco Catalyst 2900 LRE XL switches are based on the Cisco market-leading Catalyst 2900 Series XL 3.2-Gbps switch architecture, and include all Enterprise-class features available in Catalyst 2900 XL switches. Now, service providers can address a broad range of wiring environments beyond Category 5 cabling. This gives users a low-cost, end-to-end solution and eliminates costly training.

The Catalyst 2900 LRE XL switches are one rack-unit (1RU) high, 13-inches deep, and can be either mounted on a wall or placed on a rack. The switches deliver dedicated bandwidth per port at rates up to 15 Mbps. LRE transmissions coexist with POTS and ISDN, and can be compatible with ADSL traffic in the same building. The switches can be configured on a per-switch basis to support the following modes:

- 5 Mbps symmetrical rate (up to 5,000-feet distance)
- 10 Mbps symmetrical rate (up to 4,000 feet)
- 15 Mbps symmetrical rate (up to 3,500 feet)

The Catalyst 2900 LRE XL switches provide fast and easy connectivity into building patch panels with one RJ-21 telco connector. The 10/100 Ethernet ports can be used to connect servers, daisy-chain multiple LRE switches, or uplink to a Cisco Catalyst 3500 XL, 2900 XL, or 2948G-L3 10/100 Ethernet switch. These connectivity options provide multiple price/performance options to meet building and budget requirements.

Cisco 575 LRE CPE Device

Each LRE port is terminated in the room with the Cisco 575 LRE Customer Premise Equipment (CPE) device. This compact device bridges LRE and Ethernet, and provides one RJ-45 Ethernet connection and two RJ-11 connectors—one for the wall and one for a telephone. The Cisco 575 LRE CPE device can be mounted on or under a desk, or on a wall. It ships with a mount lock-in mechanism and clip-on Ethernet cable guard to discourage theft, as well as an Ethernet cord. 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. A POTS Splitter is required for connectivity to the PBX and LRE switch stack.

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.

When to Sell

Sell This Product	When a Customer Needs These Features
Catalyst 2924 LRE XL	• 24 Long-Reach Ethernet ports and four 10/100 Ethernet ports for higher density deployments • Ethernet over existing Category 1/2/3 wiring at speeds from 5 to 15 Mbps (full duplex) and distances up to 5,000 feet
Catalyst 2912 LRE XL	• 12 LRE ports and four 10/100 Ethernet ports • Ethernet over existing Category 1/2/3 wiring at speeds from 5 to 15 Mbps (full duplex) and distances up to 5,000 feet
Cisco 575 LRE CPE Device	• A device to bridge LRE and Ethernet connections • Support for POTS phone and high-speed data connections
Cisco LRE 48 POTS Splitter	• Supports 48 LRE ports with 6 RJ-21 connectors • Required only where LRE traffic must co-exist with POTS traffic on same wire

Key Features

- Quality of Service—802.1p QoS support provides high and low priority queuing on a per-port basis. Layer 3 QoS support-including DiffServe and application-based queuing—when aggregated by a Layer 3 switch.
- Scalability—Up to 15-Mbps symmetric performance over single-pair wiring; Fast EtherChannel port aggregation.
- Security—802.1Q port-based virtual local-area network (VLAN) support; Cisco private VLAN access, assuring port security without requiring a VLAN per port; Access control list (ACL) security when a LRE switch is aggregated by a Cisco Layer 3 10/100 Ethernet switch.
- 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

- Elastic Networks: BitStorm solution (Etherloop)
- Tut: Expresso (HPNA)
- Extreme: Alpine FM-8Vi (Ethernet over VDSL)

Specifications

Feature	Cisco 2924 LRE XL	Cisco 2912 LRE XL
Fixed Ports	24 Long-Reach Ethernet ports and four 10/100 Ethernet ports	12 Long-Reach Ethernet ports and four 10/100 Ethernet ports
Backplane	5 Gbps	Same as Cisco 2924 LRE XL
VLAN Maximum	250 port based VLANs or ISL/802.1Q trunks	Same as Cisco 2924 LRE XL
Management Capabilities	SNMP, Telnet, RMON, CWSI, CLI-based out-of-band, embedded Cisco Cluster Management Suite (CMS), Web-based interface	Same as Cisco 2924 LRE XL
Processors	Cisco designed ASICs, Power PC 403C	Same as Cisco 2924 LRE XL
Memory	4 MB (Flash); 8 MB (CPU DRAM)	Same as Cisco 2924 LRE XL
Embedded RMON	History, Events, Alarms, Statistics	Same as Cisco 2924 LRE XL
Dimensions (HxWxD)	1.665 x 13.25 x 17.4 in.	Same as Cisco 2924 LRE XL

Selected Part Numbers and Ordering Information[1]

Catalyst 2900 LRE XL Desktop Switches	
WS-C2924-LRE-XL	Catalyst 2924 LRE XL switch: 24-port LRE + 4-port 10/100
WS-C2912-LRE-XL	Catalyst 2912 LRE XL switch: 12-port LRE + 4-port 10/100
Cisco 575 LRE CPE Device	
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
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 Services Manager (BBSM)

Cisco Building Broadband Service Manager (BBSM) is the software-based service creation platform for the Cisco Building Broadband Solutions for hotels, apartments, office buildings, campuses, and other multi-tenant locations. Cisco BBSM software works with Cisco in-building LAN infrastructures, including Long-Reach Ethernet (LRE), Ethernet, Cable and Wireless LAN products to provide a complete solution that enables service providers or property owners to create, market and operate broadband access services. Cisco BBSM provides plug-and-play access and allows customers to self-provision services to reduce support requirements and increase usage. Cisco BBSM is a flexible platform that is compatible with any form of broadband technology, including Ethernet, Long-Reach Ethernet, digital subscriber line (DSL), cable, wireless, or fiber.

Customizable portals, advertising platforms, and tiered service levels allow property owners and service providers to generate incremental revenue. Cisco BBSM supports multiple authentication and billing options, including credit card, RADIUS, property management system and access codes, through either existing interfaces or open APIs. A comprehensive software developers kit allows customization. Cisco BBSM is available as a pre-loaded server appliance.

For More Information

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

Sample LRE Solution Overview—Broadband Internet Access for MxU