

Cisco SOHO 76 ADSL-over-ISDN Router— Manageable, Reliable and Affordable Multiuser ADSL with the Power of Cisco IOS® Software

The Cisco SOHO 76 ADSL-over-ISDN router provides an affordable, secure, multiuser DSL access to small office/home office (SOHO) customers while reducing deployment and operational costs for service providers. It provides superior manageability and reliability through the power of Cisco IOS® Software technology.

The Cisco 826 ADSL Router supports ADSL over ISDN, allowing it to be deployed in environments where local loops support ISDN service. Additionally, the Cisco 826 ADSL router supports the U-R2 specification for deployments in Deutsche Telekom's ADSL network.

SOHO customers require affordable, multiuser access on a single asymmetric DSL (ADSL) line. They also require firewall security and reliability. Services providers need to deploy and manage intelligent customers premises equipment (CPE) that supports SOHO customers' needs without increasing keeping operating costs.

Because it allows multiple users to share a DSL line and single IP address, the Cisco SOHO 76 Router is ideal for small offices or home offices (see Figure 1). It provides:

- Affordable, multiuser access
- Secure, packet-filtering firewall protection
- Easy setup and deployment with Web-based configuration

The Cisco SOHO 76 Router is based on Cisco IOS Software technology, allowing service providers to take full advantage of their training and investments in Cisco IOS Software to reduce overall operational expenses. With its key management and troubleshooting features, the Cisco SOHO 76 Router offers service providers the following advantages:

- The manageability of Cisco IOS Software, which includes interactive diagnostics and debug features
- Familiar Cisco IOS command-line interface (CLI)
- Proven reliability and industry-leading support
- Cost-effective, remote management capability

Figure 1
 The Cisco SOHO 76 Router



Cisco Systems, Inc.



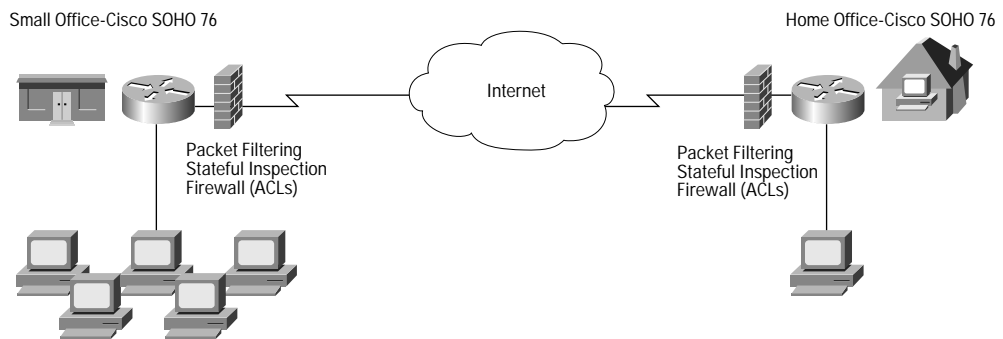
Benefits of Cisco SOHO 76 Router

Affordable, Multiuser Access with a Single DSL Line

The Cisco SOHO 76 Router enables service providers to deploy affordable, multiuser routers that are ideal for customers who require fast, reliable access to the Internet (see Figure 2). Unlike a DSL modem, which allows only a single PC to connect to the Internet at a time, the SOHO 76 Router allows multiple PCs to connect to the Internet simultaneously when connected to a simple hub. Network Address Translation (NAT) allows multiple users to share one DSL line with a single IP address, eliminating the need to readdress all PCs with individual network addresses.

Figure 2

The Cisco SOHO 76 Router is ideal for the SOHO environment, providing basic, secure, and reliable access to the Internet.



Internet Security with Packet-Filtering Firewall

With a DSL “always-on” connection, network security is essential. The Cisco SOHO 76 Router allows service providers to offer a packet-filtering firewall to protect users from unauthorized access. Through the use of an access control list (ACL), friendly traffic passes through while unwanted traffic is stopped at the firewall.

If an intruder attempts to gain access to the network through the Cisco SOHO 76 Router and is rejected by the ACL, the packet-filtering firewall tracks the hacker through an audit trail. This audit trail can then help identify an attack in progress and then pinpoint the location of an intruder to prevent future attempts. In addition, the packet-filtering firewall uses NAT to hide internal IP addresses from the outside world, providing further network security.

Customers who need to connect to company networks while working from home can use the Cisco SOHO 76 router with IP Security (IPSec) pass-through. Customers using virtual private network (VPN) software clients on a PC can connect through the Cisco SOHO 71 Router for encrypted traffic. NAT with IPSec pass-through support ensures that PC-based VPN clients can be used on the local-area network (LAN), even when using a NAT connection.

This router meets Germany’s Deutsche Telekom U-R2 specification for ADSL operation over copper loops running ISDN in the base band (lower frequencies). This is a superset of the G.992.1 Annex B standard, which allows for greater cross-vendor interoperability.



Easy Setup and Deployment

Included with the Cisco SOHO 76 Router is the Cisco Router Web Setup tool, an easy to use a Web-based installation software tool.. In addition, the Cisco SOHO 76 Router comes with color-coded cables and connectors for ease of physical installation allowing even users with limited technical experience to quickly install and activate a Cisco SOHO 76 Router.

Through the Cisco Configuration Express service, service providers can order preconfigured Cisco SOHO 76 Routers and have them shipped directly to the customer site. End users simply enter username and password to complete the installation.

Many alternatives exist for optimizing services and ease of deployment. If a service provider wishes, the router can negotiate all IP information over a Point-to-Point Protocol-over-Asynchronous Transfer Mode (PPPoA) connection, using IP Control Protocol (IPCP) which will transfer all required interface addresses and remotely configure the Dynamic Host Configuration Protocol (DHCP) server. This can be achieved using existing Remote Access Dial-In User Service (RADIUS) server information, adding the netmask and providing real nontranslated IP addresses to users on the LAN. In this solution, all IP addresses and users are handled on centralized RADIUS servers; the only unique feature on each router is the username and password.

The Power of Cisco IOS Software

Remote Management

The Cisco SOHO 76 Router incorporates the same Cisco IOS technology already in use by service providers and enterprises worldwide, which allows service providers to capitalize on existing Cisco IOS Software expertise and reduce training costs when configuring, installing, and deploying Cisco SOHO 76 Routers.

In addition, Cisco IOS Software provides many debug features that allow service providers to remotely diagnose network problems. For example, the ADSL loop analysis feature provides remotely gathered information to analyze line quality and data-transfer rates, including upstream and downstream train speeds, bit-error rates, margins, chipset status, and information on bits-per-frequency bin.

The Cisco SOHO 76 Router supports centralized administration and management via Simple Network Management Protocol (SNMP), HTTP, Telnet, or local management through the router console port. In addition, the world-class Cisco Technical Assistance Center (TAC) provides unparalleled support services.

Proven Reliability

The Cisco SOHO 76 ADSL router is based on the same proven Cisco IOS technology used on 80 percent of the Internet. Cisco IOS Software is the industry standard application for mission-critical enterprise networks, so SOHO customers can be assured that they are receiving a reliable, future-proof product.



Table 1 Cisco SOHO 76 Router Features and Benefits

Key Features	Benefits
Affordable, multiuser access	
NAT/Port Address Translation (PAT)	<ul style="list-style-type: none"> Allows multiple users to share a single DSL line and IP address Enables businesses and service providers to conserve valuable IP address space Reduces management time and costs by reducing IP address management
ADSL Annex B	<ul style="list-style-type: none"> Allows the SOHO 76 Router to be deployed along side ISDN local loops
U-R2 Support	<ul style="list-style-type: none"> Supports the U-R2 Specification for deployments in Duetsche Telekom's DSL network
PPPoE	<ul style="list-style-type: none"> PPP over Ethernet Encapsulation (PPPoE) ensures compatibility with service Provider network requirements
Security	
Stateful Inspection Firewall	<ul style="list-style-type: none"> Protects network from unauthorized access
NAT/PAT	<ul style="list-style-type: none"> Hides internal IP addresses from external networks Prevents certain denial-of-service attacks from outside networks on internal hosts
IPSec pass-through	<ul style="list-style-type: none"> Allows VPN software clients on PCs to enable VPN connections for users behind the Cisco SOHO 76 router
Easy setup and deployment	
Web-based configuration/CRWS	<ul style="list-style-type: none"> Provides a user-friendly configuration wizard that allows users to easily set up the router in minutes Available in German (May 2002)
Cisco Configuration Express	<ul style="list-style-type: none"> Allows service providers to order preconfigured CPE to be shipped directly to the customer site
Color-coded ports and cables, and Quick-Start Reference Guide	<ul style="list-style-type: none"> Allows easy installation for users with limited technical experience Provides easy-to-follow installation instructions
Proven reliability with Cisco IOS management	
Cisco IOS Software interactive debug features	<ul style="list-style-type: none"> Allows service providers to remotely or locally diagnose network problems in detail (for example, via Telnet or terminal connection into the router)
Cisco IOS Software CLI	<ul style="list-style-type: none"> Allows customers to use existing knowledge of Cisco IOS CLI for easier installation and manageability without additional training
Cisco IOS Software "Easy IP"	<ul style="list-style-type: none"> Enables true mobility-client IP addresses to be transparently configured via the Cisco IOS DHCP server each time a client powers up Also supports learning all addresses over IPCP using PPPoA to install IP addresses on LAN interface and DHCP server
Simple Network Management Protocol (SNMP)	<ul style="list-style-type: none"> Enables remote management and monitoring via SNMP, Telnet, or HTTP and local management via console port
Industry-proven technology	<ul style="list-style-type: none"> Based on Cisco IOS Software, which has become the backbone of the Internet; used by more than 80 percent of the service providers and enterprise worldwide.
World-class support	<ul style="list-style-type: none"> The Cisco TAC helps customers keep their Cisco SOHO 76 routers running



Table 2 Model Matrix Hardware Specifications

Processor	MPC 855T RISC
Processor speed	50 MHz
DRAM memory	16 MB
Flash memory	8 MB
Ethernet	10 Mbps
Console	RJ-45
LEDs	7
Support for Kensington-style Physical Lock	Yes
Crossover hub switch	Yes
Power supply	Universal 100–240 VAC, 50–60 Hz, grounded outlet

Table 3 Cisco SOHO 76 Router Software Feature Set—Basic Protocols and Features

	IP
Operation	
Transparent bridging	X
IP	X
Encapsulations	
PPPoA, PPP over Ethernet over ATM, RFC 1483/2684 routed and bridged encapsulations	X
Transmission Control Protocol/Internet Protocol (TCP/IP) maximum segment size (MSS) adjustment to avoid maximum transmission unit (MTU) size issues in PPPoE	X
Routing	
Routing Information Protocol (RIP), RIPv2	X
Password Authentication Protocol (PAP), Challenge Handshake Authentication Protocol (CHAP), local password	X
Security	
IP basic and extended access lists	X
IPSec pass-through	X
Ease of use and deployment	
Web-based configuration	X
“Easy IP” Phases I and II	X
Management	
Web-based management tool	X
SNMP, Telnet, console port	X
Trivial File Transfer Protocol (TFTP) client and server	X
Quality of service (QoS)	
Constant bit rate (CBR), unspecified bit rate (UBR), variable bit rate non-real-time (VBR-nrt) per virtual circuit (VC) shaping	X



Table 3 Cisco SOHO 76 Router Software Feature Set—Basic Protocols and Features (Continued)

	IP
Address conservation	
NAT many to one (PAT)	X
IPCP address, Netmask, DNS), and WINS	X
DHCP client address negotiation	X

Note: Ordinary circuit-switched telephone service can be supported on the same copper pair as ADSL by using micro-filters or basic telephone service splitters between the telephone line and the user's phones, fax machines, or modems, which filter the high-frequency ADSL signal to avoid interference between the voice and the ADSL service.

Table 4 Cisco SOHO and 800 Series—DSLAM Interoperability

DSLAM	Alcatel ASAM 1000		Alcatel 7300		Cisco 6x60/6015		ECI		
	AME ADSL	AME ADSL	GSI G.SHDSL	ADI ADSL	GSI ADSL	GSI G.SHDSL	ADI 918 ADSL	ADI 930 ADSL	Metalink G.SHDSL
Cisco 826	X	X	–	–	P (ext)	–	P	P	–
Cisco 827H	X	X	–	X*	X	–	P	P	–
Cisco 828	–	–	P	–	–	X	–	–	R
Cisco SOHO 76	X	X	–	–	P (ext)	–	P	P	–
Cisco SOHO 77H	X	X	–	X*	X	–	P	P	–
Cisco SOHO 78	–	–	P	–	–	X	–	–	R

DSLAM	Siemens Xpresslink 2.0		Fujitsu/Westell		Marconi DSLAM AXH600		Lucent Stinger	
	TI ADSL	GSI G.SHDSL	AME ADSL	GSI G.SHDSL	AME ADSL	Metalink G.SHDSL	AME ADSL	GSI ADSL
Cisco 826	P	–	–	–	–	–	?	R
Cisco 827H	P	–	P	–	R	–	?	R
Cisco 828	–	R	–	P	–	R	–	–
Cisco SOHO 76	P	–	–	–	–	–	?	R
Cisco SOHO 77H	P	–	P	–	R	–	?	R
Cisco SOHO 78	–	R	–	P	–	R	–	–

Legend	
P	In progress
P (ext)	In progress
X	Supported
R	On roadmap
–	No plan/not supported
*	Needs external attenuator
?	TDB, testing required



Regulatory and Standards Compliance

Supported Requests for Comments (RFCs)

- RFC 2516 Point-to-Point Protocol (PPP) over Ethernet (PPPoE)
- RFC 2364 Point-to-Point Protocol (PPP) over ATM PVCs
- RFC 2684 (formerly 1483) Multiprotocol ATM Encapsulation
- RFC 1577 Classical IP over ATM
- RFC 1213 MIB II for IP
- RFC 1695 AToM MIB for ATM
- RFC 1058 RIP1, RIP1-compatible
- RFC 1389 RIP2
- RFC 2131, 2132 DHCP Server
- RFC 1542, 2132 Bootp and DHCP Relay Agent
- RFC 2132 DHCP Client
- RFC 1974 Data Compression of up to 4:1 (STACTMLZS)
- RFC 1144 Van Jacobson TCP Header Compression
- RFC 1631 Network Renumbering
- RFC 1334, 1994 User Authentication (PAP/CHAP) with PPP
- RFC 1631, 2663 IP Network Address Translation (NAT)

Safety

- FCC Part 68
- UL 1950/CSA 950-95, Third Edition
- IEC 950: Second Edition with Amendments 1, 2, 3, and 4
- EN60950: 1992 with Amendments 1, 2, 3, and 4
- CSO3, Canadian Telecom requirements
- AS/NZS 3260: 1996 with Amendments 1, 2, 3, and 4
- ETSI 300-047
- TS 001 with Amendment 1
- EMI
- AS/NRZ 3548:1992 Class B
- CFR 47 Part 15 Class B
- EN60555-2 Class B

- EN55022 Class B
- VCCI Class II
- ICES-003, Issue 2, Class B, April 1997
- IEC 1000-3-2

Immunity

- IEC 1000-4-2 (EN61000-4-2)
- IEC 1000-4-3 (ENV50140)
- IEC 1000-4-4 (EN61000-4-4)

ADSL Specifications

Alcatel DynaMiTe ADSL 20140 Chipset

- T1.413 ANSI ADSL DMT issue 2
- G.992.1 ITU Annex B, with refinements to cover the Deutsche Telekom U-R2 specifications

Physical Specifications

Dimensions and Weight Specifications

- Dimensions (H x W x D):
2.0 x 9.7 x 8.5 in. (5.1 x 24.6 x 21.6 cm)
- Weight:
1.48 lb (0.67 kg)

Environmental Operating Ranges

- Operating temperature:
32° to 104°F (0° to 40°C)
- Operating humidity:
10 to 85%, relative humidity (noncondensing)
- Operating altitude:
0 to 10,000 ft (0 to 3000m)
- Nonoperating temperature:
-4° to 149°F (-20° to 65°C)
- Nonoperating humidity:
5 to 95%, relative humidity (noncondensing)
- Nonoperating altitude:
0 to 15,000 ft (0 to 4570m)

Router Power

- AC input voltage:
100 to 250 VAC, 50 to 60 Hz, grounded outlets
- Power consumption:
6 to 23W (idle-maximum consumption)

- Power supply rating:
29W

Pinout ADSL Port

- Tip and Ring:
Pins 3 and 4

Service and Support

In today's Internet-paced world, success means flexibility, agility, and availability. In response to customer needs, Cisco provides businesses the industry's most comprehensive portfolio of programs that businesses can then customize for today and tomorrow. Cisco offers upgrade and implementation services and customized solutions, with support offerings that are continually refined to provide lasting growth and continued reliability.



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