Cisco **827-4V** ADSL Router
Voice-Enabled Business-Class **ADSL Access**
through the Power of **Cisco IOS**® Technology

The Cisco 827-4V business-class ADSL routers provide business-class functionality for small businesses, small remote offices and corporate teleworkers through the power of Cisco IOS technology. It enables service providers and resellers to increase service revenue by supporting features for business-class security, integrated toll-quality voice/ data, differentiated classes of service, and managed network access. These value-added features, along with the manageability and proven reliability of Cisco IOS technology, provide the mission-critical networking that businesses require.

The Cisco 827-4V router is a member of the award-winning Cisco 800 series. With the software upgradeable platform of the Cisco 827-4V router is a memeber of the award-winning Cisco 800 series. With the software upgradeable platform of the Cisco 827-4V router, service providers and resellers can increase revenue by offering DSL services today and provide value-added services as customer technology needs grow. (See Figure 1.)

Value-Added Services

The Cisco 827-4V router is ideal for up to 20 users in a small business, remote offices or as an enterprise telecommuting solution, supporting scalable:

- Business-class security
- Intranet toll-quality voice
- Differentiated classes of service
- Reliability and manageability using Cisco IOS Software

Reduced Cost of Operations

Because the Cisco 827-4V router is based on Cisco IOS technology, service providers and resellers can take advantage of their training and investments in Cisco IOS Software to reduce their overall costs of doing business. With key management and troubleshooting features, service providers and resellers can cost-effectively deploy and manage the Cisco 827-4V router at the business customers' premise, thanks to the following advantages:

- Cisco IOS manageability, including interactive diagnostics/debug features
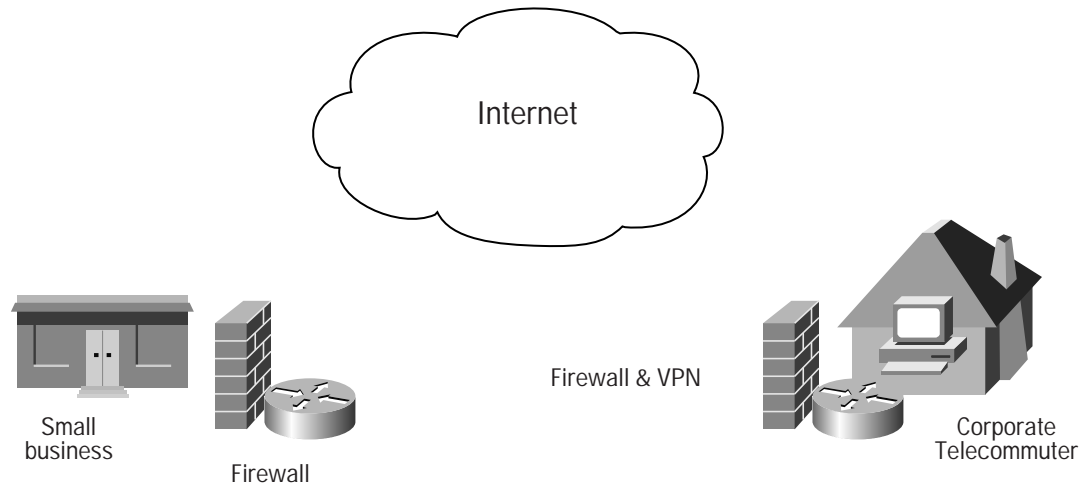- Familiar Cisco IOS command-line interface (CLI)
- Proven reliability

Figure 1:
Cisco 827-4V ADSL Router

Figure 1:

The Cisco 827-4V business-class ADSL router is ideal for up to 20 users in a small business or as an enterprise telecommuting solution to provide secure and reliable access to the Internet or corporate offices.

Benefits of Cisco 827-4V Business-Class ADSL Router

Business Class Security for Internet and VPN Access

To take advantage of unprecedented opportunities offered by Internet-based communications and commerce, private information must remain secure. Cisco IOS software provides many features to enable network security and the Cisco 827-4V router offers a stateful inspection firewall. It denies or permits WAN traffic based on a session's state, so requests from users behind the firewall can be received, while preventing unauthorized access. It also provides basic security features such as standard and extended access control lists (ACLs); Lock and Key (dynamic ACLs); router and route authentication, generic routing encapsulation (GRE) tunneling; and Network Address Translation. These perimeter security features control traffic entry and exit between private networks, intranets, extranets, and the Internet.

Beyond Firewall security the Cisco 827-4V router also supports optional data encryption for Virtual Private Networks. VPNs allow secure communications over a public infrastructure such as the Internet. While a firewall provides perimeter network security for a given location, VPNs protect data when sent from one site to another, such as a branch office to corporate headquarters. VPNs use data encryption and secure tunnels to protect the integrity of data traveling over these public connections. The Cisco 827-4V router supports IPSec 3DES encryption, which provides the most secure form of data encryption, and prevents hackers from gaining access to corporate information.

To simplify the set up of VPNs at remote locations the Cisco 827-4V router supports Cisco Easy VPN. The Cisco Easy VPN Remote feature allows a Cisco router with a static or dynamic IP address to automatically establish and maintain a VPN tunnel to a Cisco Easy VPN Server or concentrator. This allows the same ease of configuration and ongoing policy management of VPNs that VPN software clients provide. This cost effective solution is ideal for remote offices with little IT support, or large CPE deployments where it is impractical to individually configure

multiple devices. For remote offices or teleworkers, the Cisco Easy VPN Remote feature can be configured with the Cisco Router Web Set Up tool (CRWS), a Web-based GUI. This makes VPN configuration as easy as entering a password, increasing productivity and decreasing support costs.

Intranet Toll-Quality Voice

The Cisco 827-4V router, with four voice ports, is an H.323 standards-based voice-over-IP (VoIP) gateway today. The Cisco 827-4V router supports standards-based H.323 with Registration, Admission, and Status (RAS) protocol support, providing gateway-to-gatekeeper functionality. The gatekeeper maps destination phone numbers to IP addresses. (See Figure 2.)

The key advantages of the Cisco 827-4V router intranet toll-quality voice capability include the following:

Support for New World Services

The Cisco 827-4V router enables service providers to offer small business and enterprise telecommuters additional voice services by using their existing copper infrastructures. By taking advantage of DSL high-speed access, service providers can provide integrated, multi-line voice services over a single pair of copper wires. This enables service providers to offer new voice and data services without incurring the cost of a truck roll or expensive product forklift upgrade.

Award-Winning Toll-Quality Voice Technology

The Cisco 827-4V router employs the award-winning toll-quality voice technology used in the Cisco AS5300 VoIP Access Server Gateway.

This award-winning technology is an integral part of Cisco IOS Software and is available on a range of different products, from the service provider trunking gateways to customer premises equipment (CPE) such as the Cisco 827-4V router—all with the same, best-of-breed voice quality.

The Cisco 827-4V router enables multilayer prioritization of traffic, supporting ATM, Point-to-Point Protocol (PPP), and IP functionality. This product supports optimized voice compression at the application level with powerful digital signal processors (DSPs) and a full range of codecs to offer high-quality derived voice lines, thereby minimizing the use of bandwidth.

Standards-Based Voice Technology

The voice functionality of the Cisco 827-4V rouer , which is based on H.323 standards, enables third parties to develop applications to a standard protocol, resulting in an ecosystem of compatible voice applications such as enhanced call control via gatekeepers, service billing, and network management. Such an ecosystem provides a complete solution for rapid deployment of intranet voice services for small business and enterprise teleworkers.

Voice Applications

The Cisco 827-4V router enables service providers and resellers to increase revenue with new voice services, including intranet toll-quality voice, private branch exchange (PBX) extension, and additional phone lines over a single pair of copper wires.

- Intranet Toll-Quality Voice
- PBX Extension
- Additional Phone Lines

Figure 2:

The Cisco 827-4V router, which supports VoIP (and voice over ATM VoATM, allows service providers to offer multiple lines of toll-quality voice service with high-speed data access over a single pair of copper wires.

H.323 VoIP Sample Infrastructure
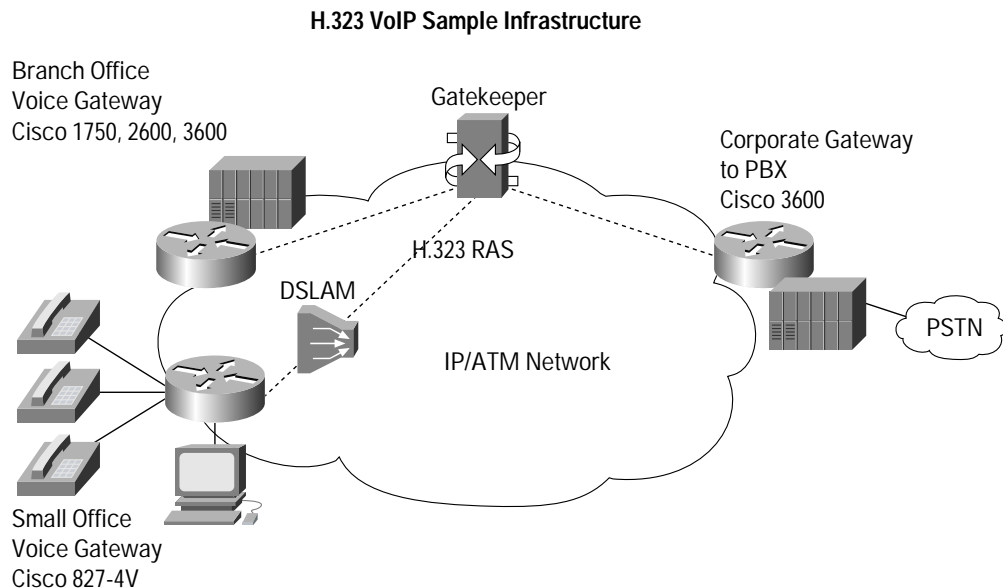
Differentiated Classes of Service

The Cisco 827-4V business-class ADSL router enables service providers to increase revenue by building differentiated service options based on premium, standard, or best-effort service classes.

It employs quality-of-service (QoS) features such as application-aware networking with IP QoS features and traffic management with ATM QoS features. This enables the router to expedite the handling of mission-critical or delay sensitive applications, such as enterprise resource planning (ERP) or videoconferencing while sharing network resources with lower-priority applications such as Web surfing.

Application-Aware Networking with IP QoS

Using low latency queuing (often called LLQ or Priority Queuing Class-Based Weighted Fair Queuing [PQCBWFQ]), the Cisco 827-4V router enables service providers and resellers to guarantee or differentiate bandwidth based on a specific application or a specific user. For example, the order entry department traffic can be given priority over the marketing department traffic. The ability of the Cisco 827-4V router to restrict the bandwidth of certain applications or users allows service providers and resellers to manage traffic on the basis of application or user requirements.

Resource Reservation Protocol (RSVP) provides QoS admission control, resource reservation requests, and feedback to allow end-to-end bandwidth reservation and management.

Traffic Management Using ATM QoS

In addition to IP QoS features, the Cisco 827-4V router provides ATM QoS features that enable service providers to manage their core ATM network infrastructures to deliver scalable, cost-effective services with QoS guarantees to their customers. Per-virtual-circuit traffic shaping and queuing allow further optimization of the existing bandwidth between customers and various services.

Using the following features, service providers can offer true QoS and cater to applications with special requirements:

- Per-virtual-circuit queuing (ATM QoS)
- Traffic management (ATM QoS)
- Low latency queuing (IP QoS)
- PPP fragmentation and interleaving (PPP QoS)
- Policy-based routing (IP QoS)
- Weighed Random Early Detection (IP QoS)

Managed Network Services with Cisco IOS Software

Service providers can offer small business and enterprise telecommuters managed network or Internet access with the Cisco 827-4V router, providing service level agreement (SLAs) and response time. SLAs can be critical requirement in serving the business market that is accustomed to uninterrupted service with traditional WAN services such as T1 lines or Frame Relay. When deploying business services with multiple Cisco 827-4V routers, service providers can use tools to provision and monitor these services. The Cisco 827-4V rouer supports the SA Agent feature in Cisco IOS Software that enables the monitoring of SLAs all the way to the customer site. Additionally, in deploying VPNs with multiple Cisco 827-4V routers, service providers can use the Cisco VPN Solutions Center software or Cisco AVVID partner software and services to set up and manage VPN and Firewall connections between customer sites.

Reduced Cost of Operations

Cisco IOS Software Manageability

The Cisco 827-4V router incorporates the same Cisco IOS technologies used by service providers and enterprises, allowing service providers and resellers to use existing knowledge of Cisco IOS Software to reduce training costs when configuring, installing, and deploying Cisco 827-4V ADSL routers. Additionally, Cisco IOS Software provides many debug features that allow a service provider to remotely diagnose network problems. The Cisco 827-4V routers support centralized administration and management via Simple Network Management Protocol (SNMP), HTTP, or Telnet, or local management through the router console port. The world-class support offered by the Cisco Technical Assistance Center (TAC) provides unparalleled support services.

Easy to Set Up

The Cisco 827-4V router includes the Cisco Router Web Set Up tool, a Web-based configuration tool for simplified installation and setup. To configure the product, users simply point a Web browser to the IP address of the router and follow a few simple steps. This allows the Cisco 827-4V router to be readily installed by non-technical personnel or end users. The setup tool allows a user to enable security, such as packet filtering, as well as the Cisco IOS Software Firewall Feature Set.

Additionally, Cisco offers at no additional cost, Cisco Configuration Express for direct purchase partners which allows Cisco to ship pre-configured routers to end users. Service Providers, System Integrators and Enterprise can utilize Configuration Express to save on the cost of deployment logistics and warehousing of products. Cisco Configuration Express also enables true plug and play deployments of Cisco 827-4V routers without the need for any configuration tools through custom loaded configurations.

Proven Reliability

Because Cisco 800 series routers are based on the same proven Cisco IOS technology used on 80 percent of the Internet and because Cisco IOS Software is the industry-standard application for mission-critical enterprise networks, small business and enterprise telecommuters can depend on them day after day, year after year.

Figure 3:

Cisco Router Web Set Up tool (CRWS)

Table 1 Key Product Features and Benefits

Key Feature	Benefit
Multiuser Access	
NAT/PAT	• Creates multiple private IP addresses from a single valid public IP address • Allows multiple users to share a single broadband connection
PPPoE	• PPP over Ethernet encapsulation ensures compatibility with Service Providers network requirements
Business-Class Security	
Cisco IOS Firewall Feature Set	• Offers internal users, per-application dynamic access control (stateful inspection) for all traffic across perimeters • Defends and protects router resources against denial-of-services attacks • Checks packet headers, dropping suspicious packets • Protects against unidentified, malicious Java applets • Details transactions from reporting on a per-application, per-feature basis

Table 1 Key Product Features and Benefits (Continued)

Key Feature	Benefit
IPSec DES and 3DES Encryption	• Ensure confidential data integrity and authenticity of origin by using standards-based encryption • Provide encryption for all users on the LAN without configuring individual PCs • Encryption available on a single WAN devices allows users to access IP aware devices such as print servers, IP phones, etc, where as encryption initiated with PC software clients prevents access to those devices
Cisco Easy VPN Remote	• Easy deployment and maintenance of VPN connections with auto-IPSec tunnel initiation and pushed policy acceptance
Multiuser IPSec Pass-through	• Allows IPSec tunnels to pass through the router when VPN PC Software clients are required • Support for PPTP tunnels, encrypted or unencrypted, initiated at the PC
PAP, CHAP, and ACLs	• Protects network from unauthorized access
Route and Router	• Accepts routing table updates from only known routers, ensuring that no corrupt information from unknown sources is received
NAT/PAT	• Hides internal IP address from external networks • Prevents certain denial-of-service attacks from outside networks on internal hosts
Integrated Toll-Quality Voice/Data	
Four Analog Telephone (FXS) Interfaces	• Provides toll-quality, award-winning derived VoIP; software-upgradable to VoATM/AAL2 (Q3 CY'01)
Standards-Based H.323 (H.225) Signaling	• Allows an ecosystem of third-party vendors to develop applications for a complete solution; allows rapid low-cost deployment of VoIP
DSPs and Voice-Compression Codecs G.711, G.729, G.723.1	• Provides hardware-based compressed voice to fit significantly more voice lines over a single copper-pair without breaking the end-to-end delay budget
Differentiated Classes of Service	
IP QoS LLQ, Weighted Random Early Detection	• Ensures consistent response times for multiple applications by intelligently allocating bandwidth • Allows for classification of applications and gives the most important applications priority use of the WAN line • Provides congestion avoidance by telling certain TCP sessions depending on priority to throttle down • Provides QoS admission control and end-to-end management of bandwidth reservation and allocation
ATM Traffic UBR, VBRnrt, VBRrt, and CBR with per-VC Queuing and Traffic Shaping	• Ensures QoS guarantees for real-time traffic, with ability to send traffic over the appropriate virtual circuit to provide ATM level shaping and ensure that no head-of-line blocking can happen between circuits of different or equal traffic classes
Choice of Encapsulation (PPP over ATM, PPP over Ethernet and RFC 1483 (RFC 2684)	• Ensures compatibility with existing network

Table 1 Key Product Features and Benefits (Continued)

Key Feature	Benefit
SLA Support	
Cisco IOS SA Agent	• Provides a way to measure statistics used in analyzing Service Level Agreements (SLAs)
Lower Cost of Operations	
Cisco IOS Interactive Debug Features	• Allows service providers or system administrators to remotely or locally diagnose network problems in detail (for example, via Telnet into the router)
Cisco IOS CLI	• Allows customers to use existing knowledge of Cisco IOS CLI for easier installation and manageability without additional training
Installation and Management	
Cisco IOS Software Management	• Enables remote management and monitoring via SNMP, Telnet, or HTTP and local management via console port
Cisco IOS Software CLI	• Allows customers to use existing knowledge of Cisco IOS Software CLI for easier installation and manageability without additional training
Cisco IOS Software Technology	• Offers technology that is used throughout the backbone of the Internet and in most enterprise networks
Cisco Router Web Setup tool (CRWS)	• Allows non-technical users to complete installation by simply by pointing a browser at the router and providing user information
Supported by Cisco VPN Solution Center and Cisco Secure Policy Manager	• Security management tools that allow for scalable deployments of security policies
Secure Shell (SSH) Protocol	• Provides a secure, encrypted connection to a router for proving secure telnet functionality
NAT/PAT	• Lets businesses and service providers conserve valuable IP address space • Reduces time and costs by reducing IP address management
Cisco IOS Easy IP	• Enables true mobility-client IP addresses to be transparently configured via the Cisco IOS Dynamic Host Configuration Protocol (DHCP) server each time a client powers up
Color coded Ports and cables and Quick-Start Reference Guide	• Help users make proper connections • Provide easy-to follow installation
SNMP	• Enables remote management and monitoring via SNMP, Telnet, or HTTP as well as local management via console port

Table 2 Model Matrix

Hardware Specifications	Cisco 827-4V
Processor	MPC 855T RISC
Processor Speed	50 MHz
Default DRAM[1] Memory	32 MB
Maximum DRAM Memory	32 MB
Default Flash[2] Memory	8 MB
Maximum Flash Memory	8 MB
Analog Telephone Ports[3]	4
REN	5 REN/port
Ethernet	10 Mbps
Console	RJ-45
LEDs	11
Support for Kensington-Style Physical Lock	Yes
Stackable	Yes
Crossover Hub Switch	Yes
Power Supply	Universal 100 - 240 VAC

1. DRAM must be obtained from Cisco Systems
2. Additional Flash memory is Intel "Mini-card" technology
3. Supports VoATM

Table 3 Memory Requirements and Software Feature Sets of Cisco 827-4V

Cisco IOS® Feature Sets	Requirements	
	Flash	DRAM
IP	8 MB	16 MB
IP Firewall	8 MB	16 MB
IP Plus	8 MB	16 MB
IP/IPX Firewall Plus IPSec 3DES	8 MB	24 MB
IP/ Voice	8 MB	24 MB
IP Firewall Voice Plus IPSec 3DES	8 MB	24 MB

Table 4 Cisco 827-4V Software Feature Set

Protocols and Features Supported by Cisco 827-4V Software Feature Sets —Basic Protocols/Features	IP Voice	IP Voice Plus	IP Voice FW	IP Firewall Plus IPSec 3DES	IP Plus Voice Firewall IPSec 3DES
Routing/Bridging					
Transparent Bridging	X	X	X	X	X
IP	X	X	X	X	X
IPX	–	–	–	X	–
Routing Protocols					
IP Enhanced IGRP	–	X	X	X	X
IP-Policy Routing (also listed in QoS)	X	X	X	X	X
RIP, RIPv2	X	X	X	X	X
IP Multicast (relay only)	X	X	X	X	X
Business-Class Security					
Route and Router Authentication	–	X	X	X	X
PAP, CHAP, Local Password	X	X	X	X	X
GRE Tunneling	–	X	X	X	X
IP (and IPX when applicable) Basic and Extended Access Lists	X	X	X	X	X
Stateful Firewall	–	X	X	X	X
Context-Based Access Control Lists	–	–	X	X	X
Java Blocking	–	–	X	X	X
Denial-of-Service Detection	–	–	X	X	X
Easy VPN Remote	–	–	X	X	X
Multiuser IPSec Pass-through (TCP and Un-encapsulated)	X	X	X	X	X
Real-Time Alerts	–	–	X	X	X
IPSec 56 Bit Encryption	–	–	–	X	X
IPSec 3DES Encryption	–	–	–	X	X

Table 4 Cisco 827-4V Software Feature Set (Continued)

Protocols and Features Supported by Cisco 827-4V Software Feature Sets —Basic Protocols/Features	IP Voice	IP Voice Plus	IP Voice FW	IP Firewall Plus IPSec 3DES	IP Plus Voice Firewall IPSec 3DES
Business-Class Quality of Service					
Weighted Random Early Detection	X	X	X	X	X
CBR, VBRrt, VBRnrt, UBR Traffic Classes	X	X	X	X	X
Per-VC Shaping	X	X	X	X	X
Per-VC Queuing	X	X	X	X	X
IP Policy Routing	X	X	X	X	X
Bandwidth Optimization					
STAC Compression	X	X	X	X	X
Ease of Use and Deployment					
Cisco Router Web Set Up tool (CRWS)	X	X	X	X	X
Easy IP Phase I and II	X	X	X	X	X
Management					
SNMP, Telnet, Console Port	X	X	X	X	X
Syslog	–	X	–	X	X
SNTP	X	X	X	X	X
CiscoView	X	X	X	X	X
TACACS+ (also a security feature)	X	X	–	X	X
TFTP Client and Server	X	X	X	X	X
SA Agent	–	X	X	X	X
Address Conservation					
NAT Many to One (PAT)	X	X	X	X	X
NAT Many to Many (Multi-NAT)	X	X	X	X	X
IPCP Address Negotiation	X	X	X	X	X
DHCP Client Address Negotiation	X	X	X	X	X

Table 4 Cisco 827-4V Software Feature Set (Continued)

Protocols and Features Supported by Cisco 827-4V Software Feature Sets —Basic Protocols/Features	IP Voice	IP Voice Plus	IP Voice FW	IP Firewall Plus IPSec 3DES	IP Plus Voice Firewall IPSec 3DES
Voice Features (Cisco 827-4V only)					
VoIP H.323	X	X	X	–	X
RAS Gatekeeper Communications Protocol	X	X	X	–	X
G.711, G.729, G.723.1 Codecs with High-Performance DSP Support	X	X	X	–	X
Loop-Start Key-System or Direct Phone Support	X	X	X	–	X
Routing/Bridging					
Transparent Bridging	X	X	X	X	X
IP	X	X	X	X	X
IPX	–	–	–	X	–
Routing Protocols					
IP Enhanced IGRP	–	X	X	X	X
IP-Policy Routing (also listed in QoS)	X	X	X	X	X

Note: Ordinary circuit-switched telephone service can be supported on the same copper pair as ADSL by using micro filters or Plain Old Telephone Service (POTS) splitter connected between the line and phones, fax machines, or modems, to provide filtering of the high-frequency ADSL signal to avoid interference between the voice and the ADSL service.

Regulatory and Standards Compliance

The Cisco 827-4V business-class ADSL routers are available for worldwide deployment.

Safety

- 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 1997S
- 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 Chipset

- T1.413   ANSI ADSL DMT issue 2
- G.992.1 ITU G.DMT support
- G.992.2 ITU G.Lite support
- G.992.3 ITU G.hs ADSL type negotiation

The chipset does not provide interoperability with carrierless amplitude modulation/phase modulation (CAP)-based ADSL lines.

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: 1.5 lb (0.67/0.68 kg)

Environmental Operating Ranges

- 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)
- Operating temperature: 32 to 104˚ F (0 to 40˚ C)
- Operating humidity: 10 to 85%, relative humidity (noncondensing)
- Nonoperating altitude: 0 to 10,000 ft (0 to 3000m)

Router Power

- AC input voltage: 100 to 250 VAC, 50 to 60 Hz
- Power consumption: 6 to 23W (idle-maximum consumption)
- Power supply rating: 29W

Telephone Port Power

- Voltages: –24V and –71V

Pinout ADSL Port

- Tip and Ring: Pins 3 and 4

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