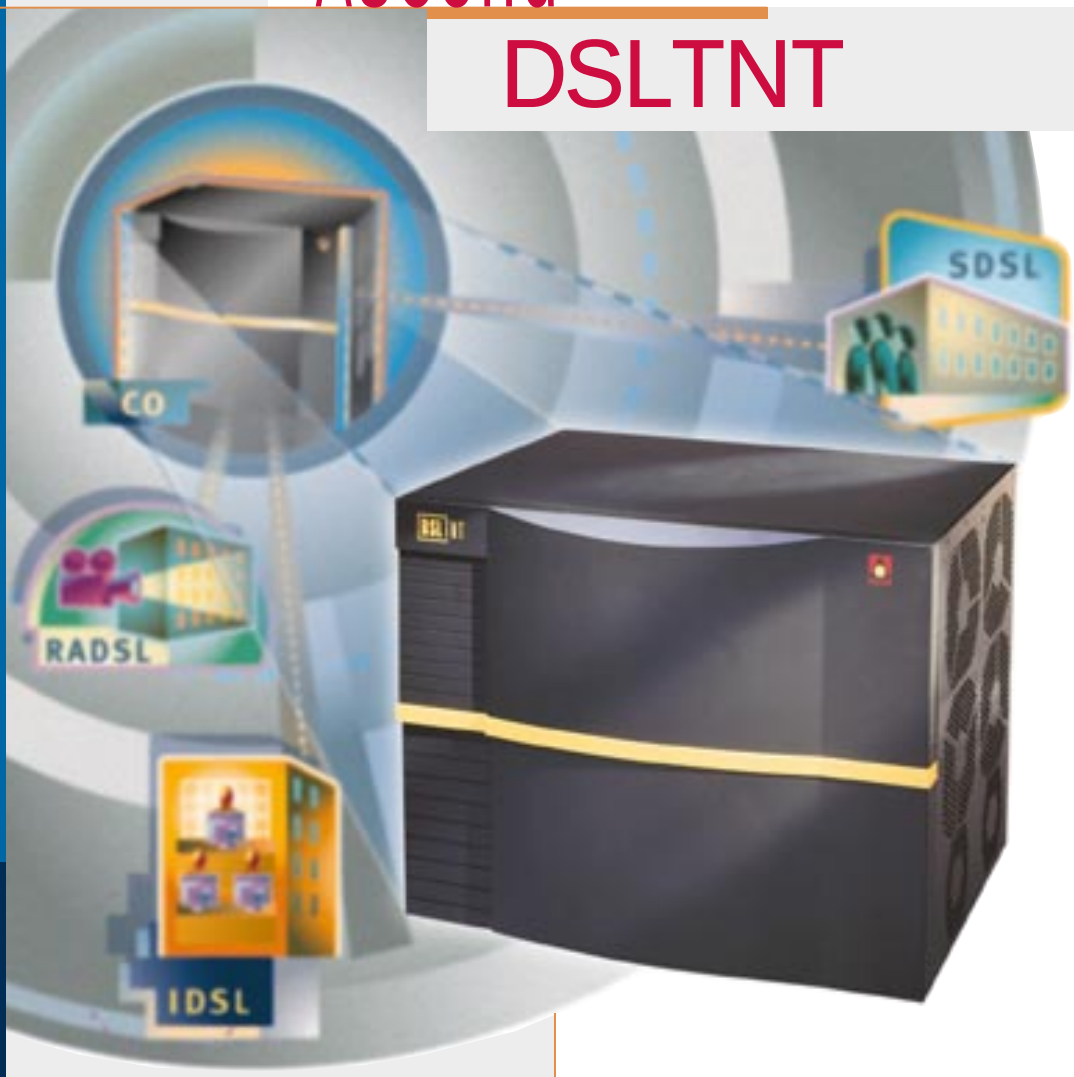
product information

Ascend DSLTNT



Central Office ▾ ISP POP ▾ High Rise/Campus

High performance, hyper density and maximum ROI are the hallmarks of the DSLTNT—Ascend's integrated MultiDSL concentrator for high speed access over local loops.

The DSLTNT™ is a fully integrated, xDSL concentrator designed primarily for telephone company central offices. A key member of Ascend's MultiDSL™ product family, the DSLTNT enables carriers, network service providers and corporations to offer their customers reliable, high quality data transmission at speeds up to 7 Mbps. This multiservice concentrator supports a wide range of Digital Subscriber Line services, including IDSL, SDSL, RADSL-CAP and RADSL-DMT. It also supports T1/E1 and Frame Relay, protecting investments in those services as users make the transition to high-speed DSL technologies.

With the highest port density available in a 7 foot rack, the DSLTNT helps telephone companies (RBOCs) serve the widest range of users in the least amount of space. And because the DSLTNT connects the central office to customers through existing copper wires, upgrading to DSL services can be done quickly and without costly changes to the network infrastructure. Other features, such as modular architecture, centralized management, hot-swappable line cards, redundant load-sharing power supplies, low power consumption and a wide range of egress options make the DSLTNT today's best value in central office equipment.

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DSLTNT Overview

The DSLTNT allows carriers, service providers and corporations to implement Digital Subscriber Line (DSL) technologies immediately in their networks. Its scalable, modular architecture supports a dynamic mix of DSL line cards and network interface cards, making the DSLTNT a truly customizable solution for telephone company central offices and campus/ high-rise applications.

The basic DSLTNT system hardware consists of a single 14" shelf (chassis) containing a shelf controller, dual power supply and 16 slots for MultiDSL line cards and network interface cards. Built-in support for RADSL-CAP and RADSL-DMT line cards is standard. The DSLTNT can also be software upgraded to accommodate IDSL, SDSL and other xDSL line cards.

- Supports multiple xDSL technologies
- Highest xDSL port density available
- Low power consumption per port
- Wide range of egress to the network
- Subscriber data transmission rates up to 7.0 Mbps
- Multiple transport protocol support
- Local and remote management
- Seamless integration with existing authentication infrastructure (RADIUS, TACACS+, token cards, etc.)

MultiDSL Line Cards

The explosive growth in Internet access, remote LAN access and telecommuting demand data rates that are much higher than what has been available over local loops. Because it was intended for voice transmission, the single, twisted pair of wire between the central office and the customer has a bandwidth that is inadequate for high-speed data. But when DSL technology is used, these same wires can transmit data at speeds from 128 Kbps up to 7.0 Mbps, depending on the DSL technology employed.

Ascend offers line cards for a wide range of DSL technologies, each with its own data rate and advantages.

- RADSL-CAP
- RADSL-DMT
- IDSL
- SDSL

Further information on all of the xDSL line cards can be found in their respective data sheets.

RADSL-CAP line card

The Rate Adaptive Asymmetric Digital Subscriber Line (RADSL) card employs the fastest DSL technology currently available. It allows data, voice and video traffic to be sent over existing single pair of copper wire at speeds up to 7 Mbps. Carrierless Amplitude Phase (CAP) modulation divides the spectrum into three parts with the lower band designated for voice transmission.

Support for the RADSL-CAP line card is included as a standard DSLTNT feature.

- Six RADSL-CAP ports per line card
- Up to 15 cards per DSLTNT for a total of 90 RADSL-CAP ports per chassis
- Dynamically adapts to optimize data transmission rate for the line condition
- 7 Mbps downstream and 1 Mbps upstream over twisted pair wire up to 10,000 feet long
- 2.5 Mbps downstream and 1 Mbps upstream over twisted pair wire up to 12,000 feet long
- 640 Kbps downstream and 544 Kbps upstream over twisted pair wire up to 17,000 feet long

RADSL-DMT line card

The RADSL-DMT (Discrete Multi-Tone) line card implements broadband local loops by breaking up available bandwidth into multiple subchannels and modulating each band. Link transmission is optimized by running each of the subchannels at the best possible data rate signal-to-noise conditions will allow. As with RADSL-CAP, the lower end of the spectrum is designated for voice transmission.

Support for the RADSL-DMT line card is included as a standard DSLTNT feature.

- Dynamically adapts to optimize data transmission rate for the line condition
- 1.54 Mbps downstream and 64 Kbps upstream over twisted pair wire up to 18,000 feet long
- 6.14 Mbps downstream and 640 Mbps upstream over twisted pair wire up to 12,000 feet long

IDSL line card

The ISDN Digital Subscriber Line (IDSL) line card uses existing single pair copper wire on the local loop to transmit symmetric full duplex data at up to 128 Kbps. It uses a 2B1Q line code and is transparent to “U” loop repeaters and Digital Loop Carrier (DLC) systems.

- 32 IDSL ports per line card
- Up to 7 cards per DSLTNT for a total of 224 IDSL ports on a chassis
- Voice and fax dynamically supported along with data on the same IDSL line
- Protects end users’ investment in ISDN CPE
- 128 Kbps over twisted pair wire up to 18,000 feet

SDSL line card

The Single Pair HDSL (SDSL) line card uses existing single pair copper wire on the local loop to transmit full duplex data at up to 768 Kbps (one half the T1 rate) and uses 2BQ1 line code. Transmission at 1.54 Mbps is achieved by bonding two SDSL lines (2 pairs of wires).

- 16 SDSL ports per line card
- Up to 15 cards per DSLTNT for a total of 240 IDSL ports on a chassis
- Works well with T1 in the same binder group
- 768 Kbps over a single pair of wire up to 12,000 feet
- 1.54 Mbps over 2 pairs of wires up to 12,000 feet
- Highly reliable, symmetrical data transmission

Network interface cards

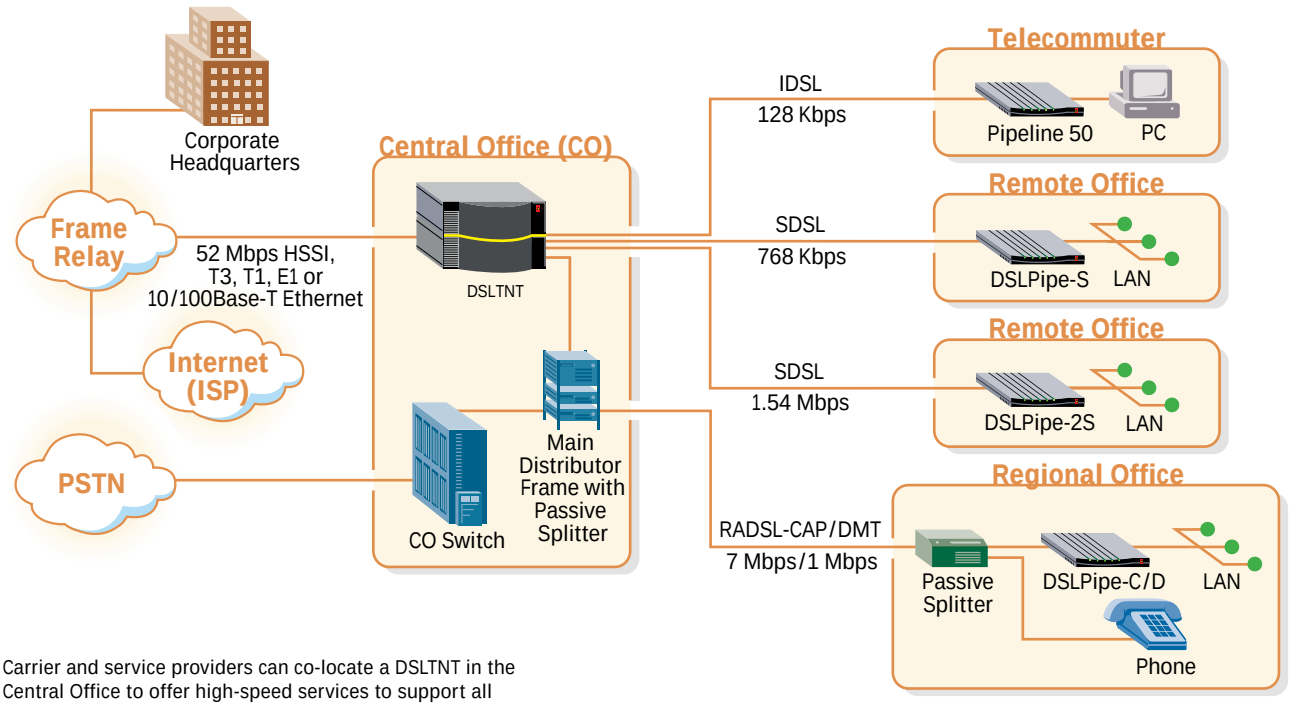
The DSLTNT is a truly versatile carrier-class access concentrator that can provide multiple egress points to the backbone network. Connections to various access lines (T1/E1/PRI, DS-3, T3, 10Base-T, 100Base-T, FDDI and HSSI) are made through network interface cards.

By consolidating a variety of access lines over high-speed digital trunks, the DSLTNT drives down network equipment and transmission costs.

Network interface cards connect the DSLTNT to the backbone network. A dynamic mix of interfaces are supported to optimize design for each service and tariff environment. Channelized interfaces allow high-speed multiplexed circuits to deliver many connections over a single interface while unchannelized interfaces are used for full-rate leased line connections. The network interface cards include:

- Four-port Ethernet 10Base-T and one FDDI
- One-port 52 Mbps HSSI
- One-port unchannelized T3
- 10-port unchannelized T1/E1
- 10-port T1/E1 FrameLine
- Eight channelized T1/PRI ports with integrated CSUs
- Eight channelized E1/PRI ports
- One channelized DS-3 port
- 10 unchannelized T1/E1 ports
- Four-port Ethernet 10Base-T
- Four-port Ethernet 10Base-T and one 100Base-T

Accessing Multiple xDSL Services at the Central Office



Carrier and service providers can co-locate a DSLTNT in the Central Office to offer high-speed services to support all their end users' diverse service requirements.

DSLTNT Applications

With the DSLTNT, carriers, service providers and corporations can enter the DSL market immediately. No other DSLAM offers the high bandwidth, features, varieties of ingress and egress, security and manageability of the DSLTNT.

Working with Ascend Customer Premises Equipment such as the DSLPipe™ product family, the DSLTNT offers a comprehensive, turn-key solution for Central Offices, high-rise buildings, and campus networks.

The DSLTNT Virtual Private Network (VPN) capability can be used in all of these cases to establish economical, convenient VPN "tunnels" through the network. This allows RBOCs, CLECs and CAPs to offer corporations private telecommuting and remote office connectivity through the Internet.

Central office location/co-location

The modular architecture and hyper density of the DSLTNT make it ideal for Regional Bell Operating Company (RBOC) CO locations, where hundreds of thousands of users and diverse services must be supported. Because the DSLTNT accepts a wide variety of Digital Subscriber Line cards, it is perfect for Internet access, remote office connectivity, telecommuting and other high-bandwidth applications.

The DSLTNT enables Competitive Local Exchange Carriers (CLECs) and Competitive Access Providers (CAPs) to enter the DSL market quickly and with minimal capital outlay by co-locating a DSLTNT at the Central Office and leasing the local loop. The CLEC or CAP can then resell xDSL ports to ISPs, thereby becoming the conduit for high-speed services between the service providers and their customers. Because the DSLTNT requires little maintenance or support, carriers and their service provider partners save money and can more competitively offer end users the bandwidth needed for today's Internet and intranet applications and on-line services.

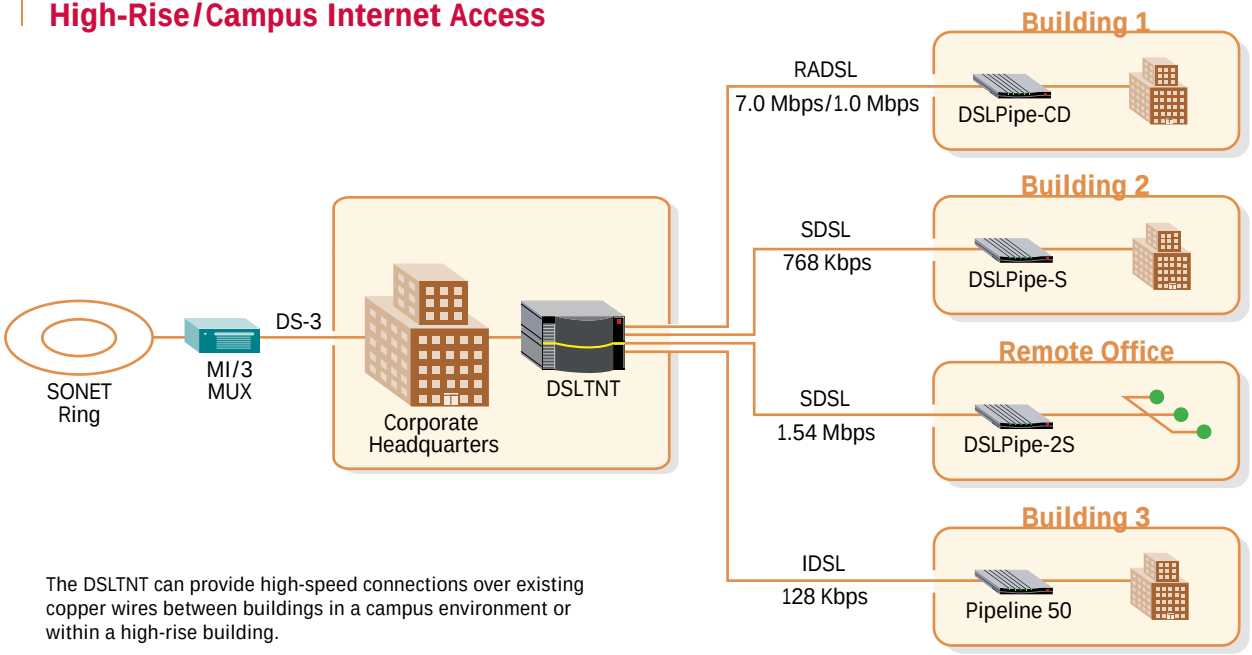
Cost-effective high-rise/intra-building connectivity

The DSLTNT is a fully featured high-rise and intra-building solution for property management firms, corporations and Internet Service Providers (ISPs).

By locating a DSLTNT in a building's wiring closet, property managers can use the existing copper pair within a large building to offer high-speed MultiDSL services to apartment residents or businesses.

Corporations can link various buildings at high speeds using existing copper wires in a campus environment without making expensive and disruptive changes to the existing infrastructure. In all cases, the DSLTNT is a profitable investment that can bring a variety of DSL services to thousands of buildings and millions of users.

High-Rise/Campus Internet Access



The DSLTNT can provide high-speed connections over existing copper wires between buildings in a campus environment or within a high-rise building.

Integrated, High-Speed Central Office Solutions

Modular architecture offers high port density, ensures scalability and protects investment

Expansion cards along with enhanced software capabilities help users build high-density, multiservice network infrastructures as well as Virtual Private Networks (VPNs). A standard 7-foot rack supports either 1,344 IDSL ports, 1,440 SDSL ports, or 540 RADSL-CAP ports, or any mix of services. By adding the appropriate line cards and network interface cards, carriers and service providers can install the DSLTNT into an existing network environment, protecting their investment in hardware and software.

Reliable hardware and software design assures system availability

Because downtime is not an option for your network, the DSLTNT is designed for continuous operation. The DSLTNT offers a full-range of management features that enable network managers to administer and maintain system performance without interrupting user operations.

- Redundant, hot-swappable, load-balancing AC/DC power supplies on each shelf
- Hot-swappable line cards and network interface cards
- Software upgrade via built-in flash RAM, remote downloadable

Multiprotocol concentration and terminal server functions ensure network interoperability

The DSLTNT is designed specifically for multiplexing and concentrating xDSL connections and supporting the most widely-used protocols for remote access. Robust support for standard protocols ensures efficient connectivity for remote users within corporate intranets and accessing the Internet.

- AppleTalk, TCP/IP and IPX protocols
- PPP and Frame Relay
- Telnet
- Dynamic IP address assignment
- Frame Relay concentration

Centralized provisioning and management reduces maintenance costs

The DSLTNT lets network administrators manage all xDSL lines directly from the central office, thereby reducing on-site maintenance costs. In addition, Ascend's NavisAccess™ network management software gives network managers customized information about the DSLTNT for in-depth, end-to-end network control.

- Real Time Signal Quality measures signal strength and line quality, allowing network managers to pinpoint any copper-related problems
- NavisAccess provides discovery and mapping, configuration management, performance measurement and fault monitoring
- Out of service command lets network administrator take a line out of service for diagnostic purposes
- Loopback test command lets service providers place a line in loopback mode

Comprehensive authentication capabilities guard against unauthorized access

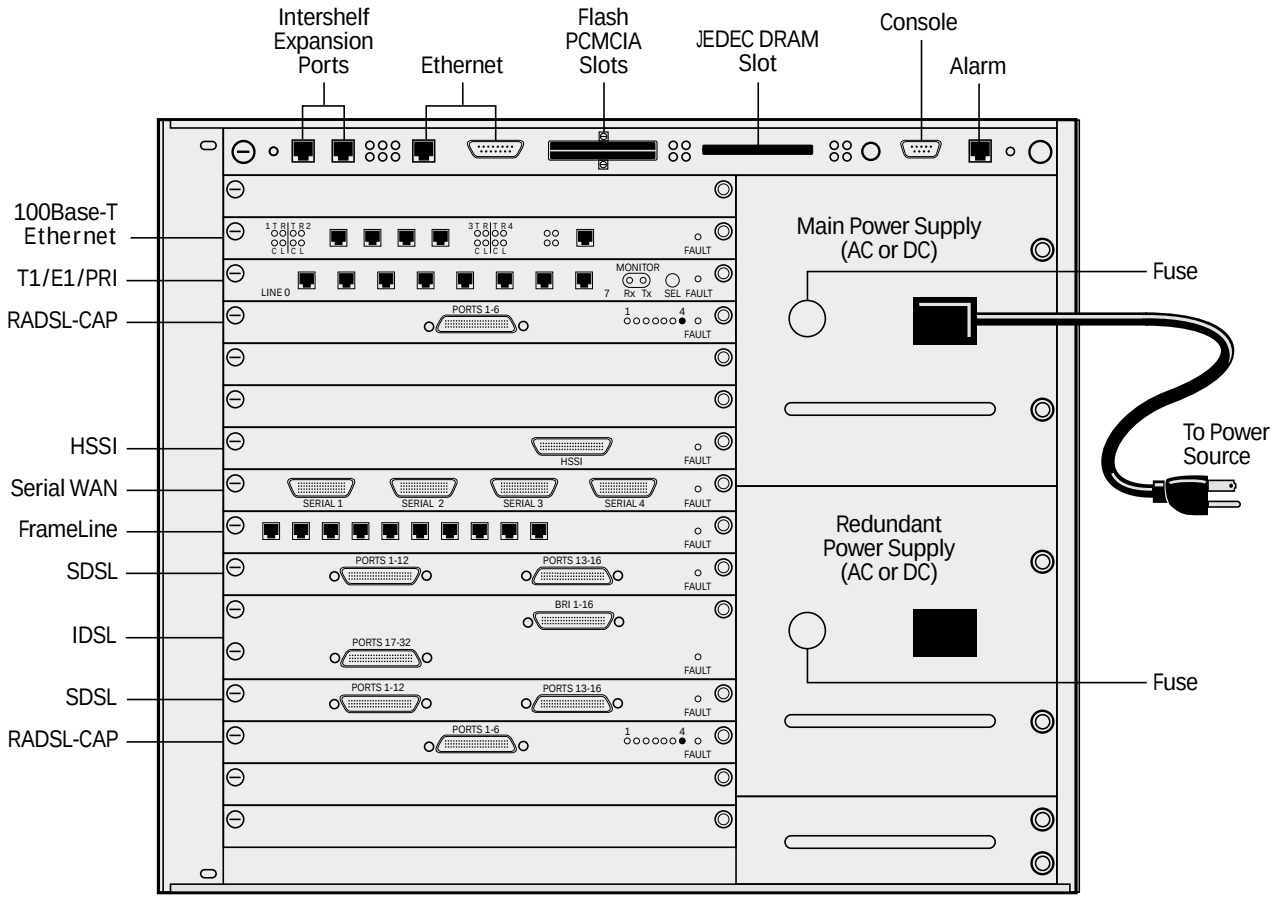
Support for standard user-authentication systems fits into your current network security architecture. Networked, server-based authentication makes it easy to manage large-scale remote access applications from a central site.

- PAP, CHAP and MS-CHAP
- Ascend Access Control™ (extended RADIUS), TACACS, TACACS+
- Encrypted token card security
- Password protected terminal server access
- Transmit and receive packet filtering

Enhanced Software Capabilities

Item	Port Density
RADSL-CAP line card	6 ports
SDSL line card	16 ports
IDSL line card	32 ports
Channelized T1 card	8 ports
Channelized E1 card	8 ports
Unchannelized T1/E1 card	10 ports
T3 channelized card	1 port
T3 unchannelized card	1 port
Channelized E1 card	8 ports
10 Mbps Ethernet card	4 ports
10 Mbps Ethernet plus FDDI card	4 ports plus 1 port
100 Mbps Ethernet card with 10 Mbps Ethernet card	1 port plus 4 ports
Serial WAN card	4 ports
HSSI WAN card	1 port
FrameLine card	10 ports

DSLTNT Back Panel Options



System Components

Software for the MultiDSL family enables corporations, carriers and service providers to use the scalable DSLTNT architecture to optimize their networks.

Frame Relay software

Frame Relay software on the DSLTNT integrates incoming Frame Relay traffic from a DSLPipe or Pipeline. A high-speed synchronous V.35 port connects directly to a Frame Relay switch at 8 Mbps. An HSSI (EIA-612/EIA-613) port connects directly to a Frame Relay switch at rates up to 52 Mbps and a DS-3 port at 45 Mbps.

- Route to multiple Frame Relay PVCs over single or multiple interfaces
- Supports up to 4096 PVCs with RADIUS authentication software
- PPP to Frame Relay gateway function with PVC selected on a per user basis
- RFC 1490 encapsulation
- ANSI Annex D and ITU Annex A management
- PVC switching
- Frame Relay forum UNI and NNI signaling

Virtual Private Networking

The Virtual Private Network (VPN) software option lets users create a logical or virtual network over a single physical network.

VPNs are used by ISPs, carriers and large corporations to ensure secure and private networks over a shared IP network. VPN takes advantage of the shared media to deliver lower cost remote networking, single network management and network simplicity.

Users can implement VPNs using one of the following technologies:

- Frame Relay Direct
- IP Direct
- Ascend Tunnel Management Protocol (ATMP)
- Point to Point Tunneling Protocol (PPTP)
- Layer-2 Tunneling Protocol (L2TP)

DSLTNT™

Hardware Specifications

Height	14 in x 17.4 in x 11.5 in [35.6 cm x 44.2 cm x 29.2 cm]
Weight	130 lbs [59 kg] fully loaded (single power supply) 27.2 lbs [12.3 kg] empty (no power supplies)
LAN Interface	Ethernet 10Base-T, 100Base-T, FDDI
WAN Interfaces	T3, T1/E1, Serial (V.35, RS449, X.21), HSSI, (EIA-612, EIA-613), DS-3
Software Upgrade	Via built-in flash RAM, remote downloadable
Power Requirements	800 watts, 47-63 Hz, 90-240 VAC, -40 to -60 VDC
Operating Requirements	Temperature: 32-104˚F [0-40˚C] Altitude: 0-14,800 feet [0-4500 meters] Relative Humidity: 0-90% (non-condensing)
NEBS Compliance	Level 3
Safety Certifications	CSA 950, NTRL/UL 1950, TUV EN 60 950
EMI/RF	FCC Part 68, FCC Part 15, E55081-1, EN50082-1, EN55022B

Software Specifications

Protocols Supported	TCP/IP, IPX, AppleTalk, RIP, RIP2, OSPF, IGMP multicast forwarding
WAN Protocols Supported	PPP, Async PPP, Sync PPP, HDLC, ARA, Async IPX, D4 framing (T1/E1), G703/732 framing (R1), Frame Relay PVC, PPP-FR gateway, FR NNI
Bandwidth Management	Multilink PPP, Multilink Protocol Plus, TCP header compression, data compression (Ascend/Microsoft/ STAC V9)
Security	Secure Access Firewall, Ascend Access Control (extended RADIUS), TACACS, TACACS+, Password Authentication Protocol (PAP), Challenge Authentication Protocol (CHAP), token card, packet filtering, SNMP, console management (VT-100), user authentication
Management	Console management software (runs on Windows 95 and Windows 3.x) Telnet, NASI, SNMP II, PPP LQM, Frame Relay ITU Annex A, Frame Relay ANSI Annex D

Protect corporate resources with Ascend's Secure Access Firewall

Ascend's Secure Access Firewall™ is a software option on the DSLTNT that uses state-of-the-art firewall technology and delivers a comprehensive, fully integrated security solution for corporate networks. Secure Access Firewall allows carriers and ISPs to offer secure services to their customers. It protects information assets at the corporate LAN, remote offices and telecommuters' home offices. The standard security features that are offered on your Ascend remote networking system are integrated with comprehensive security features such as transparency, dynamic firewall, option encryption, and monitoring and logging.

Secure Access Firewall provides a cost-effective single vendor solution for securing your company's remote network against attacks on sensitive data. (See the Secure Access Firewall datasheet or visit our web site for more information).

Ascend Communications, Inc.

Worldwide and North American Headquarters
One Ascend Plaza
1701 Harbor Bay Parkway
Alameda, CA 94502, United States
Tel: 510.769.6001
Fax: 510.747.2300
E-mail: info@ascend.com
Toll Free: 800.621.9578
Fax Server: 415.688.4343
Web Site: http://www.ascend.com

European Headquarters
Rosemount House
Rosemount Avenue, West Byfleet
Surrey KT14 6NP, United Kingdom
Tel: +44 (0) 1932.350.115
Fax: +44 (0) 1932.350.199

Japan Headquarters
Level 19 Shinjuku Daiichi-Seimei Bldg.
2-7-1 Nishi-Shinjuku
Shinjuku-ku, Tokyo 163-07, Japan
Tel: +81.3.5325.7397
Fax: +81.3.5325.7399
Web Site: http://www.ascend.co.jp

Asia-Pacific Headquarters
Suite 1908, Bank of America Tower
12 Harcourt Road
Hong Kong
Tel: +852.2844.7600
Fax: +852.2810.0298

Latin, South America and the Caribbean Headquarters
One Ascend Plaza
1701 Harbor Bay Parkway
Alameda, CA 94502, United States
Tel: 510.769.6001
Fax: 510.747.2669

Ascend Communications, Inc. develops, manufactures and sells wide area networking solutions for telecommunications carriers, Internet service providers, and corporate customers worldwide. For more information about Ascend and its products, please visit the Ascend web site at http://www.ascend.com, or e-mail info@ascend.com.

Ascend markets the B-STDX, CBX, GRF, GX, IP, MAX, Multiband, MultiDSL, Navis, Pipeline, SA, SecureConnect and STDX families of products. Ascend products are available in more than 40 countries worldwide.

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