product information

# Ascend MAX 2000



Your long-term success depends on your ability to keep up with an evolving networking environment. The MAX 2000 protects your investment with a scalable central site solution that grows with your business.

Remote Access ▾ Telecommuting ▾ Internet Access

The MAX™ 2000 is a multiprotocol WAN access switch that gives service providers and small businesses an ideal platform for managing remote access applications. The low-entry cost of the MAX 2000 makes it an attractive solution for connecting remote users to their networks via a T1/PRI, serial port or Ethernet interface. The MAX 2000 consolidates a dynamic mix of analog and digital traffic as well as videoconferencing access over a single digital line.

By eliminating the need for separate lines, the MAX 2000 minimizes excessive network equipment and transmission costs and delivers the lowest price per port available. Adding users to the network is cost-effective via the Hybrid Access software included on MAX 2000 WAN access switches. It also gives small office workers, mobile users and telecommuters support for e-mail, Internet access, videoconferencing access and file transfer capabilities–directly from their remote sites. The MAX 2000 is the ideal WAN access switch developed to provide a cost-effective, single solution for managing a growing wide area network.

ASCEND

# Networking Solutions for Corporations and Service Providers

## Consolidation drives down the total cost of network ownership

By eliminating the need for separate modem banks, terminal servers and routers, the MAX saves network equipment and transmission costs. With Hybrid Access, the MAX 2000 consolidates a dynamic mix of access lines over high-speed digital trunks for up to 24 simultaneous connections.

- ISDN PRI
- T1 with integrated CSU
- Supports up to 24 modems per system

## High-speed digital modems enhance call performance and reduce operating costs

Integrated high-speed digital modems provide full access to analog callers that dial into the MAX over digital access lines such as channelized T1 or PRI. The MAX 2000 uses the 12-port Digital Modem (DM-12) expansion module to ensure reliability and eliminate the noise, downtime and operating costs that can be present with stand-alone analog modem technology.

- 12-port V.34 digital modem expansion module
- MNP and MNP10-EC error correction for cellular connections
- V.42 bis data compression
- Data throughput up to 115.2 kbps
- V.34 (33.6 kbps), V.FC, V.32bis, V.32, V.22, V.22bis, V.21, Bell 212A and Bell 103 compatible
- Group 3 fax support with MAXDial software
- Remote downloadable modem firmware

## Hybrid Access delivers state-of-the-art digital service connectivity

Hybrid Access provides integrated digital sessions via the T1 or ISDN PRI interface. It gives users integrated remote network access for ISDN and frame relay, and it supports other networking devices that use ISDN and frame relay (TAs, FRADs).

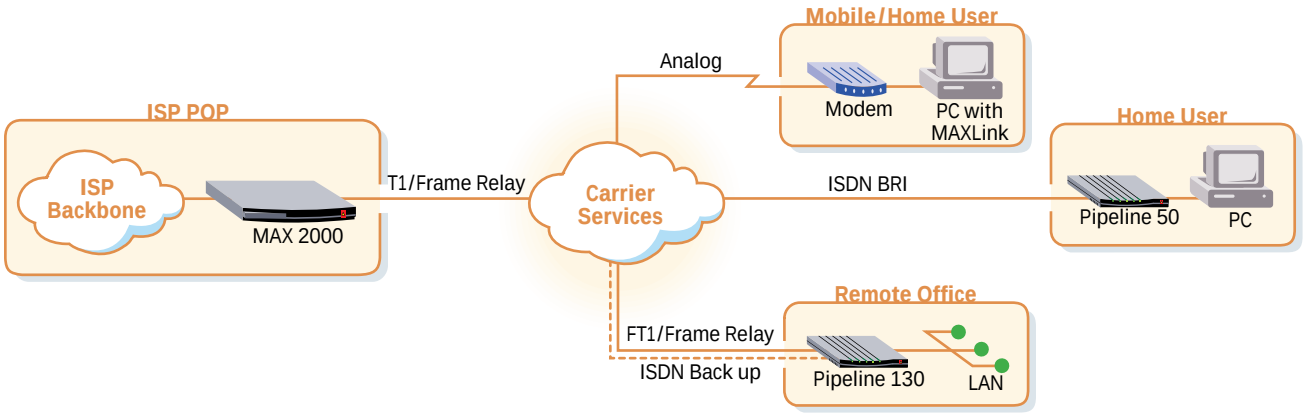
- 56 or 64 kbps B-channels for ISDN
- 56 or 64 kbps frame relay
- Up to 24 remote sessions

## Seamlessly connects to backbone network services over a variety of interfaces

The MAX 2000 provides users with options for connecting into a local or remote backbone network. Users can connect to switches or to backbone routers over any of the following transport options:

- Ethernet (AUI or 10Base-T) for connecting to the backbone network at up to 10 mbps
- Frame relay over a V.35 serial port for high-speed connections at up to 8 mbps
- T1/PRI ports with integral CSU for making remote connections to the backbone network

## Extending Backbone Network Capabilities to Smaller POPs




The MAX 2000 enables ISPs and carriers to increase their network availability to a wider customer base by enabling local POP access on the MAX 2000 T1/PRI. The leased T1 with integrated CSU can then be used to backhaul the sessions on a frame relay to the ISP backhaul network.

## Bandwidth on demand maximizes performance and decreases costs

Dial-up connections are automatically set up and torn down for transparent client-server computing across the WAN. Dynamic Bandwidth Allocation™ aggregates multiple calls for greater bandwidth and lower costs.

- Dial-on-demand bandwidth based on packet address
- Increase or decrease bandwidth dynamically during an active session
- 56 kbps to 4 mbps selectable bandwidth per call
- Bandwidth is controlled manually, automatically, or by time-of-day profile
- Supports inverse multiplexing protocols (MP, MP+, BONDING, AIM)
- Industry-standard STAC compression
- RFC 1144 TCP header compression

## Multiprotocol routing, bridging and terminal server functions ensure network interoperability

Robust support for multiprotocol routing and bridging functions enables users to connect to a variety of resources within corporate networks. The proven technology in routing and terminal server protocols permits service providers to extend their network to offer a broad range of services to users.

- RIP2 and OSPF routing protocols
- TCP/IP and IPX routing protocols
- Bridging all protocols (BCP standard bridging)
- PPP, SLIP and CSLIP terminal service
- Telnet, ARA
- Dynamic IP address assignment
- V.120 asynchronous rate adaption
- V.110 asynchronous rate adaption (optional)

## Integrated management features provide end-to-end network control

Manage all functions of the MAX 2000 through your choice of interface, either locally or remotely, using intuitive graphical configuration software.

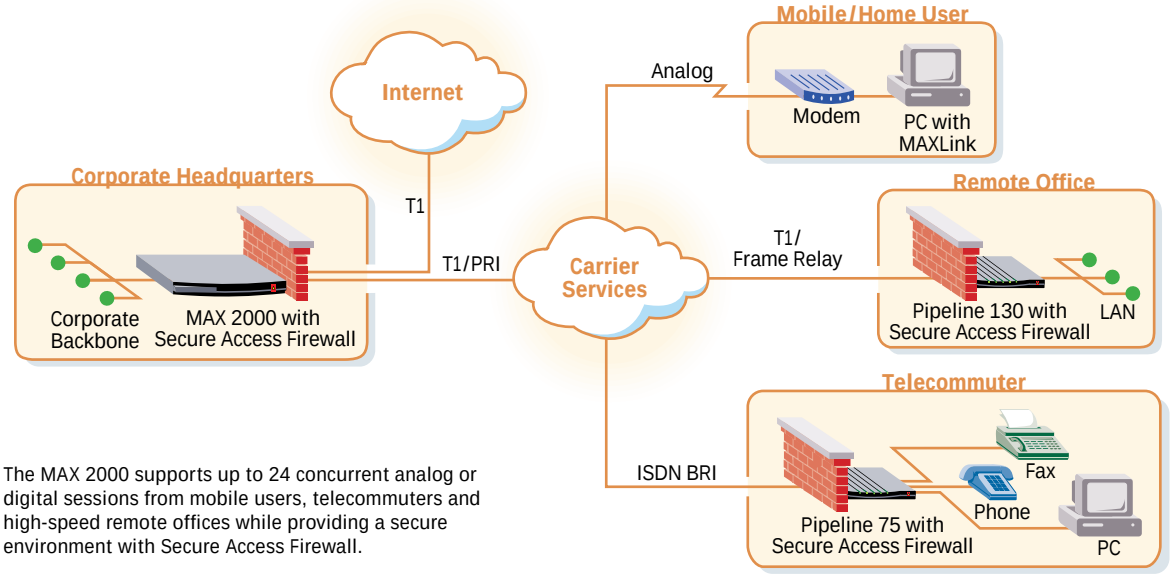
- SNMP MIBs
- Password protected Telnet remote management
- Local management via VT-100 terminal
- PPP Link Quality Monitoring (LQM)
- Annex D frame relay link monitoring
- FLASH memory for easy software download
- ISDN event log and SYSLOG support

## Expandable bandwidth on demand server for high-powered video and data applications

The MAX 2000 has been designed to integrate audio and videoconferencing across the same wide area network interfaces. By utilizing the bandwidth on demand technology and the Ascend Inverse Multiplexer (AIM) slot card, users can leverage the existing data network to support videoconferencing between two or more sites.

- Two- and six-port AIM slot cards
- Compatible with Multiband inverse multiplexers for greater density and specialized multimedia networks
- Port-to-port local switching
- Up to 24 channels per system
- Call routing by port, group or called number

## Corporate Telecommuting and Internet Access




The MAX 2000 supports up to 24 concurrent analog or digital sessions from mobile users, telecommuters and high-speed remote offices while providing a secure environment with Secure Access Firewall.

## Iron-clad Security

### Comprehensive security for iron-clad remote networking

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. Extended RADIUS functionality allows service providers and network managers to integrate the accounting, authentication and authorization capabilities needed to manage their remote network.

- PAP and CHAP
- RADIUS, TACACS and TACACS+
- Encrypted token-card security
- Callback (digital connections)
- Calling Line ID (CLID)
- Password protected terminal server access
- Transmit and receive packet filtering
- Secure Access Firewall (optional)

### Protect corporate resources with Ascend's Secure Access™ Firewall

Ascend's Secure Access Firewall is a software option on the MAX 2000 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 your company's information assets at the corporate LAN, remote offices and telecommuters' home offices. It also integrates the standard security features that are offered on your Ascend remote networking system with comprehensive security features such as transparency, dynamic firewall, 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).

## Enhanced Software Capabilities

The software for the MAX family allows corporations, carriers and service providers to use the scalable MAX architecture to optimize their networks. The MAX software enhances connectivity by providing a single solution for users with Hybrid Access, frame relay and ISDN.

### Frame relay software

Optional frame relay software integrates incoming frame relay traffic from Ascend's Pipeline and other frame relay access devices with analog and digital dial-in traffic. A high-speed synchronous V.35 port connects directly to a frame relay switch at 8 mbps.

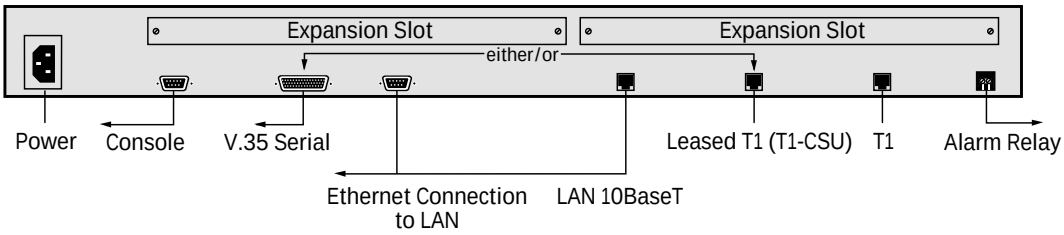
- Route to multiple frame relay PVCs over single or multiple interfaces
- Supports up to 4096 PVCs with RADIUS authentication software
- Dial-in PPP to frame relay gateway function with PVC selected on a per user basis
- RFC 1490 encapsulation
- ANSI Annex D and ITU Annex A management
- PVC switching
- Frame relay forum UNI and NNI
- Dial Access Signaling Interface (DASI)

### ISDN software

Optional ISDN signaling software supports incoming ISDN signaling from Ascend's Pipeline, MAX products or other ISDN access devices. The ISDN signaling supports ISDN connections for analog modem and digital services dial-in traffic

- BRI with integrated NT1
- PRI with integrated CSU
- PRI to T1 signaling conversion
- D4 to ESF conversion
- D-channel multiplexing
- Frame relay over ISDN B channels
- X.25 over ISDN B channels
- D-channel X.25 Packet Services
- Calling Line Identification (CLID)
- Signaling homologation in over 30 countries worldwide

## MAX 2000 Backpanel




## MAX Product Family At A Glance

| Feature | MAX 200Plus | MAX 1800 | MAX 2000 | MAX 4002 | MAX 4004 |
|---|---|---|---|---|---|
| T1 with integrated CSU | — | — | 1 | 2 | 4 |
| ISDN BRI (S/T) | Up to 4 | 8 | — | Up to 32 | Up to 32 |
| ISDN BRI (U) | Up to 4 | 8 | — | — | — |
| Hybrid Access | — | Included | Included | Optional | Optional |
| Ethernet | 1 | 1 | 1 | 1 | 1 |
| High-speed serial | — | 1 | 1 | 1 | 1 |
| Digital Modem Capacity | 8** | 16 | 24 | 48* | 72 |
| Concurrent Digital Sessions | — | 16 | 24 | 48* | 96 |
| Expansion slots | 8 type II PCMCIA | 2 | 2 | 6 | 6 |
| Two- and six-port IMUX module option | — | 2 | 2 | 6 | 6 |

*up to 72 digital modems and 96 concurrent sessions with upgrade option
**supports analog PCMCIA modems

# MAXLink and MAXDial Client Software included

## Client Software Option

MAXLink™ and MAXDial™ client software are provided with the MAX 2000 at no charge. The host software for the MAX 2000 is available as an option.

Use of MAXLink and MAXDial client software assures complete interoperability between users and the MAX 2000. They also provide an easy way to add users to your growing network.

## MAXLink

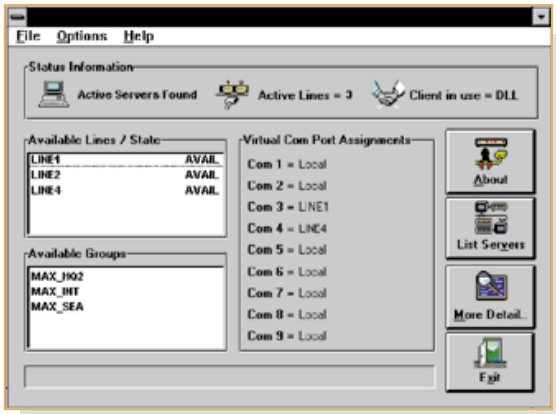



### MAXLink software connects remote users with their offices

Telecommuters can access a MAX 2000 using MAXLink software and any asynchronous device, such as a modem or a terminal adapter. Once connected, MAXLink users become full-fledged nodes on the LAN, with complete access to file servers, printers and electronic mail. Windows users can log in or map drives from a single icon, and create icons which automatically connect them to specific servers.

- Includes PPP, TCP/IP and IPX protocol stacks
- On-screen indicator continuously monitors connection status
- Supports Novell Netware client
- Supports Callback, PAP and CHAP
- Runs under MS-DOS and Windows 3.x
- WINSOCK DLL lets users run IP applications such as Internet browsers
- Compatible with MacOS via ARA
- Used with any device that supports the AT command set

## MAXDial




### MAXDial software eliminates the need for stand-alone modems

Users with a PC workstation on the LAN can access the outside world through MAXDial software and MAX 2000, which create a “virtual modem” at the desktop. MAXDial eliminates the need to install a direct line and a desktop modem in every office by providing the same functionality without the added expense. The software enables users to dial up modem calls or send out faxes via the modem cards in the MAX 2000.

- Supports AT command set for V.34 modems
- Supports Novell IPX LANs
- Runs under MS-DOS, Windows 3.x. and Windows 95
- Graphical User Interface (GUI) for easy configuration

## Hardware Specifications

| | |
|---|---|
| Dimensions | 1.75 in x 17 in x 12 in [4.5 cm x 43.2 cm x 30.5 cm] |
| Weight | 10 lbs [4.6 kg] |
| LAN Interface | Ethernet 10Base-T via RJ-45 jack, Ethernet AUI via DB-15 Connector |
| WAN Interfaces | 1 T1/PRI line with integrated CSU, serial port |
| Software Upgrade | Via built-in flash RAM, remote downloadable |
| Power Requirements | 80 Watts, 47-63 Hz, 90-240 VAC, 270 BTU/hour |
| Operating Requirements | Temperature: 32-104˚F [0-40˚C]<br>Altitude: 0-14,800 feet [0-4,500 meters]<br>Relative Humidity: 5-90% (non-condensing) |
| Safety Certifications | CSA 950, NTRL/UL 1950, TUV EN 60 950 |
| EMI/RF | FCC Part 68, FCC Part 15, E55022, EN50082-1 |

## Software Specifications

| | |
|---|---|
| LAN Protocols Supported | TCP/IP, IPX |
| Routing Protocols Supported | Appletalk, BCP Bridging, RIP, RIP2, OSPF (IP only), IGMP multicast forwarding |
| WAN Protocols Supported | PPP, ARAP, SLIP, C-SLIP, Async PPP, Sync PPP, V.110 Async, HDLC, ARA, Async IPX, X.25 PAD, X.25 over B-channel, V.120, D4 framing (T1), G703/732 framing (R1), frame relay PVC, Hybrid Access, PPP-FR gateway, BONDING, AIM, FR NNI |
| Modem | V.34, MNP 10-EC, MNP, V.42bis, fax modem send up to 14.4 kbps |
| Multimedia/Inverse Multiplexing | BONDING, local port to port switching, 56 or 64 kbps adaption, AIM |
| Bandwidth Management | MultiLink PPP, MultiLink Protocol Plus, TCP header compression, data compression (Ascend/Microsoft/STAC V9), Appletalk Remote Access, compatible with ARA 1.0 and 2.0 |
| Security | Secure Access Firewall, RADIUS, TACACS+, Password Authentication Protocol (PAP), Challenge Authentication Protocol (CHAP), token card, Calling Line ID (CLID), packet filtering, SNMP, console management (VT-100), PPP callback, user authentication |
| Management | Console management software (runs on Windows 95 and Windows 3.x), Telnet, NASI, SNMPII, PPP LQM, Frame Relay Annex D, Frame Relay ITU Annex A, Frame Relay ANSI Annex D |
| Client Software | MAXLink™ client software<br>MAXDial™ client software |

## Ascend's Remote Networking Products

### MAX™ Family

Designed specifically for remote access server applications. Supports ISDN BRI, ISDN PRI, T1/E1 and Ethernet on the base unit.* Allows simultaneous calls from ISDN BRI, frame relay and/or modem users over ISDN PRI, channelized T1/E1, or ISDN BRI lines.

### Pipeline® Family

Pipeline products are designed to connect users in small or home offices to backbone networks and/or the Internet. Pipeline models support Ethernet to ISDN, Switched 56 or Leased 56 services, and Ethernet to 56 kbps or 64 kbps frame relay services.*

### Multiband™ Family

Multiband bandwidth-on-demand controllers are designed primarily for videoconferencing applications and let users dial-up bandwidth in increments of 56/64 kbps up to 4 mbps, using all types of digital access lines*—Switched 56, T1/E1, ISDN BRI, ISDN PRI and network carrier services.

* Depending on model and configuration


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Ascend Communications, Inc. (NASDAQ: ASND) develops, manufactures, markets, sells and supports a broad range of high-speed digital wide area network access products. These products use bandwidth on demand to enhance existing corporate networks for applications such as remote LAN access, telecommuting, SOHO and Internet access, and videoconferencing/multimedia access.

Ascend markets the MAX, Pipeline , Multiband and Secure Access families of products. Ascend products are available in more than 30 countries worldwide.


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