Connections

NEWS AND INFORMATION FROM ASCEND COMMUNICATIONS, INC. JUNE 1996

All the Pieces of the Network Puzzle

Ascend's success is in providing integrated remote network solutions

An increasing number of people who used to fight rush hour commutes to the corporate headquarters are now working from home or driving to more conveniently located remote offices. They demand high-speed Internet access, videoconferencing support and remote access to the corporate LAN. These requirements have created a new set of problems for IS managers seeking cost-effective solutions that protect a company's information assets.

According to Mory Ejabat, president of Ascend, this dramatic shift in the way people work underscores a global paradigm that is changing the landscape of business—a cultural and technological evolution called *remote networking*. By definition, a remote network is a seamless and secure connection between mobile users, telecommuters, and remote offices to the corporate backbone, the Internet and online services.

Ascend's three product families—MAX, a remote access solution for the central site; Pipeline, used by home and remote offices for accessing the central site or the Internet; and Multiband, offering high-bandwith network access for multimedia or the Internet—provide integrated remote networking solutions.

"Now more than ever, companies and individuals are seeking alternative ways of sharing information," Ejabat said. "Remote networking is an umbrella that makes it possible for information managers to offer ubiquitous access to the corporate LAN and the Internet."

Building Blocks of Remote Networking

Although it must encompass a company's local area network, a remote network involves piecing together many diverse elements into a contiguous design. There is a distinct set of routing standards

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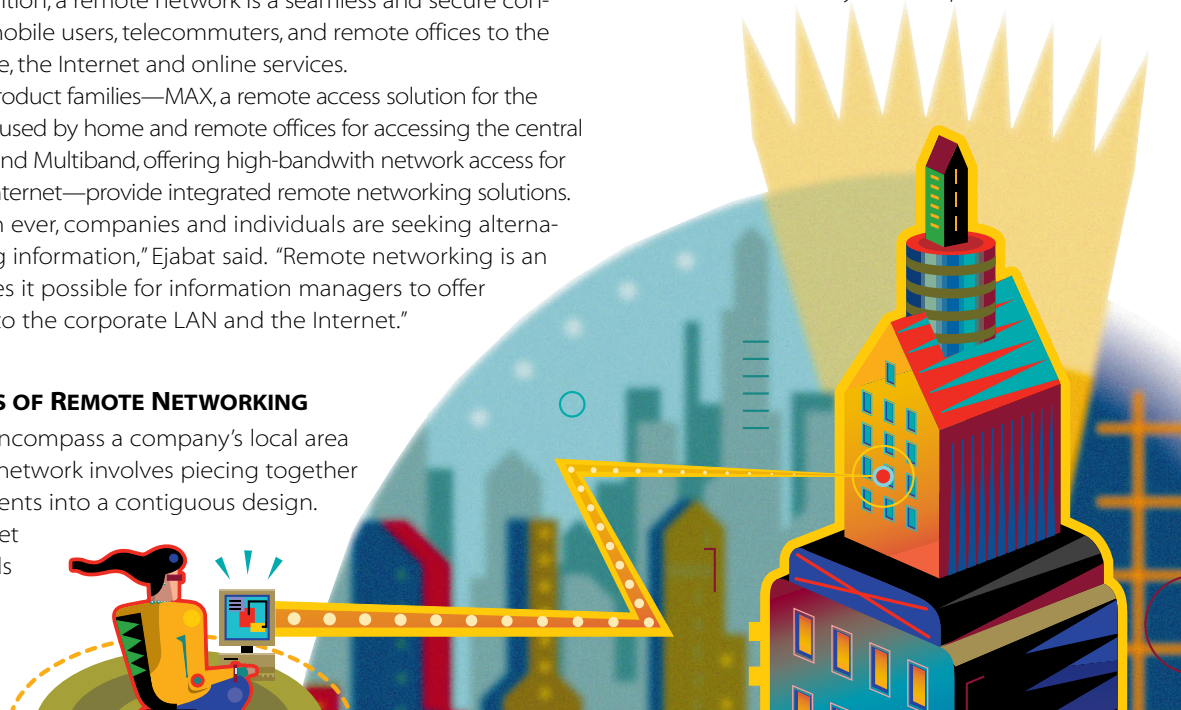


ASCEND

Growing Fast, Staying Ahead



This is the first issue of *Connections*, our newsletter for customers, partners and employees. We want to keep you informed about the latest remote networking trends, as well as Ascend's accomplishments, plans and strategies.

Q1 Financial Results

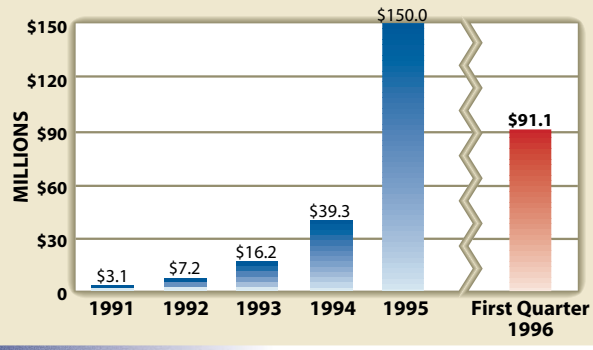
As our latest financial results show, Ascend continues to be the fastest growing company in the remote networking business. Our first quarter sales were $91.1 million, up 347% compared to the first quarter of 1995. Net income for the first quarter of 1996 was $20.9 million, a 505% increase over the previous year. We are continuing to see very strong momentum in our international sales channel, which accounted for approximately 42% of revenues in the quarter.

Q1 Accomplishments

Ascend has completed the acquisition of Morning Star Technologies, providing us with unparalleled security technology. We have integrated this technology into our MAX and Pipeline product families to provide a complete and secure end-to-end remote networking solution.

We also strengthened our sales channels this quarter with the addition of TechData and, more recently, Ingram Micro, as distributors, making our products much more obtainable through VARs. In March, US West chose our MAX 4000 as the dial-in access platform for INTERACT, its Internet-based computer networking service. Also in March, Bell Atlantic chose Ascend's Pipeline products for sales to its residential ISDN customers.

Financial Results



Broader Distribution

Implementing a remote access solution is not simply a matter of installing hardware. Many companies rely on local integrators to help solve problems, train their people and fine-tune systems over time. Because these integrators work with many customers and encounter a variety of situations, the breadth of in-depth experience they bring to the table can make their services much more cost-effective than maintaining an extensive in-house support staff.

Ascend's strategy is to select the best integrators and then provide backup training and support to help them excel at remote networking solutions. As a result, a massive amount of support for our products is available worldwide today—we estimate that more than 12,000 sales people and 2,000 support people are trained in Ascend products.

Moreover, our partnerships with ISPs are very strategic to our future. With 28 of the world's 30 largest ISPs using our remote networking products, we can market features such as Dynamic Bandwidth Allocation that users find very valuable, but that require Ascend devices at both ends of the connection for enhanced performance. As more companies move their private network traffic to virtual private networks on the Internet, ISPs will become even more essential to mission-critical corporate networking.

Plans For the Rest of 1996

One of Ascend's most exciting product development projects of 1996 is to deliver a complete system that enables corporations to use the Internet for secure virtual private networks. The broad use of our products within the Internet infrastructure puts Ascend in a unique position to deliver this capability—the MAX product line is used in more than 3,600 ISP dial-in sites. The benefit for corporations is dramatically reduced networking costs. Two of the key components of this capability are the Point-to-Point Tunneling Protocol (PPTP), which we are testing with Microsoft, and integrated Ascend's Secure Access Firewall for MAX and Pipeline products.

We hope you enjoy this issue of *Connections*. Your comments and suggestions are welcome–just drop us a line at info@ascend.com.



Mory Ejabat

President and Chief Executive Officer

Connecting with Carriers

Pacific Bell Internet Services chose the MAX 4000 because of its field-proven reliability and scalability

With an emphasis on reliability and customer service, Pacific Bell Internet Services has launched its new consumer dial-up Internet access service. After an extensive evaluation, Pacific Bell Internet Services chose Ascend's MAX 4000 WAN access switches to link customers to the carrier's backbone network.

"Ascend's industry-leading products, ISDN market leadership and carrier focus make them an ideal partner to provide our integrated dial-up and ISDN dial access platform," says Rick Hronicek, president of Pacific Bell Internet Services.

Pacific Bell Internet Services conducted focus groups to assess the needs of potential customers. Ruben Cota, vice president of Service Delivery and Support for Pacific Bell Internet Services describes the findings. "We found that customers want 100% reliability (no drop offs) and no busy signals. We concluded that reliability and customer service would be the key differentiators for Pacific Bell Internet's service."

That translates into requirements for the WAN access switch to be reliable and scalable. The product must be mature and proven in the Internet Service Provider (ISP) environment. Ascend's MAX 4000 meets those requirements. Sam Mathan, Ascend's assistant vice-president of Carrier Marketing, estimates that MAX 4000s already in use handle more than 1.5 million calls per day.

Tough Requirements, Field-Proven Product

Pacific Bell Internet Services extensively tested and evaluated WAN access switches from several vendors, leading to the decision to use the MAX 4000. Hronicek summarizes their conclusions. "The MAX 4000 with its PRI/T1 integrated access lines, support of industry-standard PPP, SLIP, V.120 protocols, RADIUS security and state-of-the-art digital modem technology allows for a more efficient dial access infrastructure. Ascend's MAX 4000 eliminates duplicate equipment and saves space and transmission costs, thereby enabling us to optimize our cost of service."

"At the end of May, our service had over 10,000 beta customers and we anticipate a sharp increase after our launch at the end of May," says Cota. "Most consumers use analog modems today, but many are expected to migrate to high-speed ISDN services over the next few years. The MAX 4000's integrated digital modems enable us to easily change our mix of services as ISDN demand builds."

Low cost/port was essential because Pacific Bell Internet Services is making an unusually high investment in access ports. It plans significantly more modems per customer than the industry average. "The MAX 4000 is very economical because everything is integrated in one device, eliminating the need for separate modem racks, analog access lines, routers and terminal servers," says Ruben.

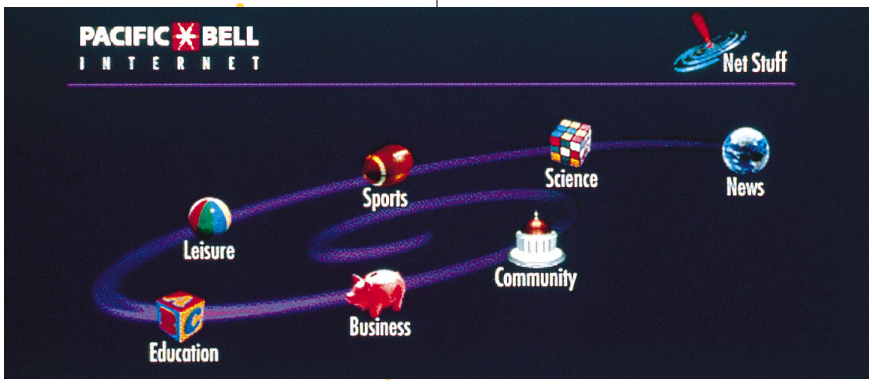
> "Ascend's industry leading products and their carrier focus makes them an ideal partner"

The MAX 4000 fits nicely with Pacific Bell Internet Services' existing operational support tools, such as its HP OpenView SNMP-based network management systems and RADIUS-based user registration, billing and provisioning systems. Pacific Bell Internet Services did not have to change its existing administrative systems to accommodate the MAX.

Carrier Support Requirements

Ascend is focusing considerable energy on supporting carrier efforts during 1996. Says Mathan, "We view dial-up access as a major service opportunity for carriers. To support their needs, we have established dedicated groups in marketing and technical assistance, as well as incorporating carrier-specific requirements into our products."

Adds Cota, "We felt comfortable with the Ascend MAX product because it is proven technology—used by more ISPs than any other vendor's product; we felt very comfortable working with Ascend because supporting ISP installations is a large part of their business."



Pacific Bell Internet Subscriber Page



Pipeline to the Pacific

Ascend Japan provides local customer service and technical support

In Japan, interest in the Internet has exploded almost overnight, creating a tremendous demand for local service and technical support. In response to this surge of activity, Ascend Japan has opened a new office in Shinjuku, one of Tokyo's largest suburbs.

"A strong, local organization enables us to act quickly and better serve our partners and end users," said Shigero Ota, general manager of Ascend Communications Japan K.K. "We can handle any issues that arise, provide immediate technical support, and respond quickly to changing needs.

"Our technical support will focus on both our MAX and Pipeline products," Ota continues. "These are used by a variety of end users, including small office/home office (SOHO) users. Our technical support team is also involved in product localization; for example, our support for NTT's INS64 (BRI) and INS1600 (PRI) has been very well accepted by all of our customers."

In addition to product support, Ascend Japan is actively involved in helping large enterprises build Intranets that can save thousands of dollars each year in communications costs. Many Japanese organizations today are evaluating Intranets, which use the Internet as an internal corporate networking communications link. "With its considerable experience in this area, Ascend's technical support group is well-qualified to help users make informed technical decisions," said Ota.

Sales, customer service and technical support are now available locally in Japan. For more information about Ascend Japan, visit Ascend Japan's web site at http://www.ascend.co.jp

It's Certified!

International product certificates granted

International product certificates are critical for global networking communications. As of May 1996, Ascend MAX®, Pipeline® and Multiband® products were certified in 24 countries including:

Australia	Ireland	Norway
Austria	Italy	Portugal
Belgium	Japan	Singapore
Denmark	Korea	Spain
Finland	Luxembourg	Sweden
France	Malaysia	Switzerland
Germany	Netherlands	Taiwan
Hong Kong	New Zealand	United Kingdom

Since this list of countries is steadily growing, see our home page at http://www.ascend.com for recent additions.

THE ASCEND MAX 200Plus



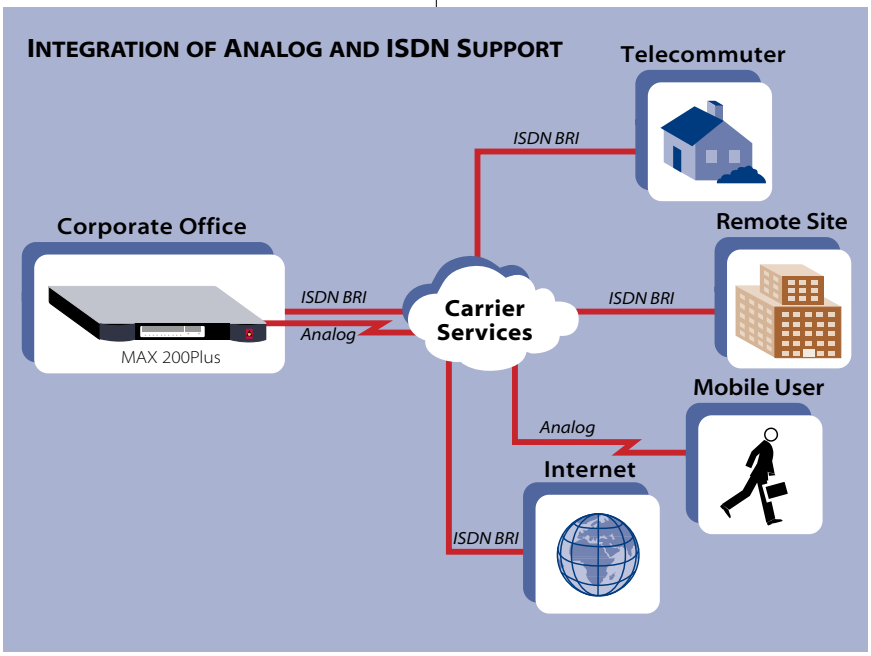
A new MAX product introduced by Ascend gives small- to mid-sized businesses and corporate remote sites a convenient way to set up and maintain a cost-effective remote networking program.

The MAX 200Plus is the industry's only remote networking product based on PCMCIA technology, giving businesses a convenient way to add capacity as needs change and grow. Businesses can migrate from analog to ISDN and other new technologies simply by swapping out PCMCIA cards.

"The MAX 200Plus sets a new standard for price/port and price/performance in the industry," said Sunil Dhar, senior product manager. "As a member of the MAX family, the MAX 200Plus is completely compatible with larger-scale MAX products including integrated network management, state-of-the-art security and sophisticated call accounting."

By utilizing the industry-standard PCMCIA cards, businesses can readily purchase low-cost PC cards over the counter. Ascend offers a PC card that supports ISDN—the first manufacturer to do so. The MAX 200Plus supports up to eight analog cards or four ISDN cards.

"You don't need to be a network manager to set up and maintain a MAX 200Plus remote network," said Dhar. "The system is self-configuring and provides everything you need to begin your remote networking program, including client software for telecommuters and fax dial-out software for users on the office LAN."



The MAX 200Plus provides a cost-effective remote networking solution for small- to mid-sized businesses and corporate remote sites

A Complete Solution



MAXDial software enables LAN users to access the outside world by sharing modems in the MAX 200Plus, which creates a "virtual modem" at the desktop. This eliminates the cost of installing a direct line and desktop modem in every office.

MAXLink client software gives mobile users and telecommuters access to the MAX 200Plus in the remote office via any modem or terminal adapter. Once connected, telecommuters can work as if they were a node on the LAN itself.

By providing an Ascend-to-Ascend connection between the business office and remote users, businesses get the significant cost savings associated with Ascend's Multilink Protocol Plus™ (MP+), which increases or decreases the number of modem lines or ISDN channels in use depending on traffic requirements.

Like all MAX products, the MAX 200Plus provides many options to ensure remote access security. Not only does it support standard user authentication protocols (Calling Line ID, packet filtering, callback, password protection), but it also supports server-based authentication protocols such as RADIUS.

For more information about the MAX 200Plus, please call Ascend at 1-800-621-9578 or visit Ascend's World Wide Web home page, http://www.ascend.com.

Ahead of the Curve

EROL'S COMPUTER & INTERNET OFFERS TURNKEY SIMPLICITY FOR INDIVIDUALS AND BUSINESSES



Erol's Computer & Internet of Springfield, Va., is one of the fastest growing Internet Service Providers (ISPs) in the Eastern United States. Erol's near-term expansion plans alone call for installing 200 points-of-presence (POPs) serving 17 major markets.

Founded in 1963, Erol's Computer & Internet has evolved from a family-owned TV and radio repair shop to a supplier of custom-built business computer systems, and, most recently, to one of the fastest growing ISPs on the East Coast. Erol's mission is to be the Internet provider of choice by guaranteeing low prices, high volume and unbeatable customer service.

A Platform for Growth

Erol's, like most ISPs, originally targeted individual subscribers. The company noticed that its lines were operating at 80 percent of capacity in the evening hours but at only 20 percent during the day. According to Erol's president, Orhan Onaran, "We realized we could tap this potential and target day users such as government, small business and corporate customers if we had state-of-the-art POPs." So Erol's set out to evaluate the alternatives.

Erol's wanted a system that had ample capacity and security, supported both analog modems and ISDN access, offered advanced features like bandwidth on demand, and provided maximum compatibility with customer premises equipment (CPE). The system also needed to be easy to install and operate, and it had to be affordable, especially considering the large number of POPs involved.

Erol's chose Ascend's MAX family of WAN access switches. Each MAX is a complete POP solution, supporting from 8 to 96 ports. The comprehensive integration provided the easiest installation and operation possible–and at the lowest price per port. For Erol's the decision was easy: "Ascend is at least a year ahead of everyone else in both price/performance and technology," Onaran said.

No More Modem Banks

The elimination of modem banks with Ascend's digital modem technology was particularly beneficial to Erol's. The vast majority of Erol's subscribers use analog modems, and the existing modem banks fell short of the company's goals for quality and reliability. With digital modems, analog modem calls now arrive as digital data streams from the carrier's central office on the same high-speed digital trunk lines that ISDN and frame relay subscribers use. Sharing the same trunk means there is no need to devote a fixed number of ports for each carrier service.

> "Ascend is at least a year ahead of everyone else in both price/performance and technology."
>
> Orhan Onaran, President
> Erol's Computer & Internet

The digital modems are totally transparent, so all analog subscribers continue to dial the same phone number and perceive absolutely no differences except for better performance. The enhanced performance results from fewer analog/digital conversions, the error-free nature of digital transmissions and a smaller likelihood that analog connections will degrade because of noisy lines. And because digital modem features are implemented in software, a routine upgrade assures compatibility with advances in analog modem technology, including error detection enhancements, performance upgrades and cellular support.

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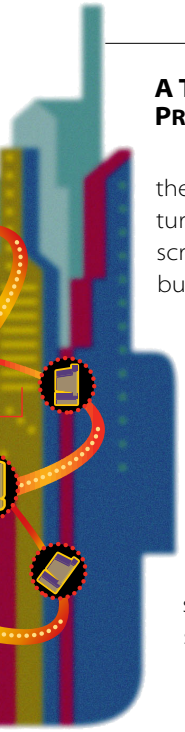


A Turnkey Solutions Provider

Erol's differentiates itself from the competition by offering turnkey simplicity for all subscribers, whether individuals or businesses. A growing number of the individual subscribers have needs that go beyond what analog modems provide. Some are sole proprietors who operate from a small office/home office (SOHO). Others are regular telecommuters or Internet power users. For these subscribers, Erol's sells and supports Ascend's Pipeline 25 Integrated Access Device (IAD) as a turnkey solution. Pipeline 25 IAD allows a single ISDN BRI line to behave as three. Internet sessions can occupy both ISDN channels (for a total of 128 Kbits/s without compression), and users can still receive incoming voice and fax calls—all on a single twisted pair of wire.

Business subscribers have even more sophisticated requirements. Rather than install individual analog modems or IADs for all employees needing access to the Internet, most businesses take advantage of the MAX products advanced bandwidth management to simplify operations and achieve lower carrier costs. Again, Erol's offers a turnkey solution by selling and supporting Ascend's Pipeline 50 and Pipeline 130 remote access routers.

The Pipeline attaches to the company's Ethernet LAN and offers shared bandwidth on demand for Internet access via a choice of digital WAN services. Bandwidth is added (or reduced) as needed to support all LAN-attached users. Integral firewall security with Ascend's Secure Access Firewall, a feature Erol's believes is vitally important to all businesses, prevents intruders from gaining unauthorized access to corporate resources on the network.

Virtual is a Reality

The Internet is a powerful infrastructure capable of handling both inter- and intra-company communications. Businesses can now create complete, multiprotocol virtual private networks (VPNs) over the Internet for their mobile users, telecommuters and branch offices. VPNs can interconnect all of a company's users and facilities into an enterprise-wide network that replaces private and expensive WANs.

Virtual networks employ tunneling protocols to encapsulate private communications within TCP/IP packets for transmission via the Internet infrastructure. A VPN can eliminate all long-distance charges, along with the management and security responsibilities of maintaining private WANs. For these reasons and more, many ISPs expect VPNs will become enormously popular with businesses. Erol's Computer & Internet plans to continue its tradition of leadership by offering VPNs as another of its turnkey solutions.

For more information, visit Erol's home page at http://www.erols.com.

Executive Summary

Problem:
Provide more efficient line usage for analog access while at the same time increasing the usage of lines during business hours

Solution:
Ascend's MAX family of WAN access switches that support up to 96 ports

Benefit:
Easy installation and operation; elimination of modem banks; enhanced performance for subscribers for both analog and digital sessions

Did You Know...?

- 28 of the world's 30 largest Internet Service Providers have standardized on Ascend MAX equipment.
- The MAX 4000 recently won the Editor's Choice Award from *Network Computing*.
- Ascend is the ISDN market share leader, with more than 46 percent of all B-channel ports shipped worldwide.
- Some 3,600 Internet Points of Presence (POPs) have standardized on the Ascend MAX for dial-up access.
- Ascend is the central site market share leader with 47 percent of the access concentrator market (ISDN and async ports).
- The Pipeline 50 remote access router has won more industry awards than any other product of its class, including five during the past six months.

FREQUENTLY ASKED QUESTIONS

This compilation represents some frequently asked questions from our customers.

Q: How does Dynamic Bandwidth Allocation work?

A: Dynamic Bandwidth Allocation™ (DBA) technology enables the MAX to automatically add or subtract bandwidth from a switched connection in real time without terminating the link. Both Multilink Protocol Plus™ (MP+) and Ascend Inverse Multiplexing Protocol (AIM) support Dynamic Bandwidth Allocation.

The MAX uses a time period that you specify as the basis for calculating average line utilization (ALU), then compares ALU to a target percentage threshold. When ALU exceeds the threshold for a specified period of time, the MAX attempts to add channels. When ALU falls below the threshold for a specified time period, the MAX attempts to remove channels.

If you use a circuit between two locations to capacity 24 hours per day, a dedicated line is more cost-effective than a switched line. However, if you only need the circuit sporadically, or if the circuit is sometimes underutilized, it is often better to lease a smaller amount of dedicated bandwidth, then supplement it with additional switched bandwidth as traffic requirements dictate.

For example, you might establish some connections only when you need to transfer data. In this case, a single circuit can accommodate low traffic levels. But if traffic levels grow beyond the capacity of the circuit (such as during a large file transfer), DBA works with MP+ to automatically add additional switched channels. When traffic levels subside, MP+ automatically removes the channels from the connection. The bandwidth and connection costs are thereby reduced; you pay only for bandwidth when you need it.

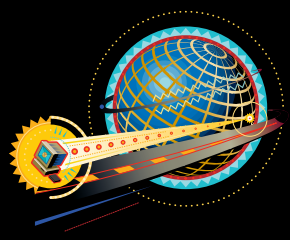
Q: What is the difference between an ISDN router and a terminal adapter?

A: A terminal adapter connects to a single PC only. Its throughput is limited to the baud rate of the PC's serial port and typically supports only one B-channel at 64 Kbits/s or less. Most terminal adapters cannot be managed remotely. They also do not have the flexibility of adjusting bandwidth during the call, and they do not offer the routing and bridging features necessary to access corporate LANs.

In contrast, an ISDN router like the Pipeline 25-*Fx* can be connected to an Ethernet LAN supporting multiple PCs. It takes full advantage of the 128 Kbits/s available on an ISDN BRI line for making file transfers or browsing the Internet (adding or removing a second B-channel as needed). Routers such as Pipeline products can be managed remotely. They provide the routing and bridging functions needed to access corporate LANs.



What's Available on Our Web Site



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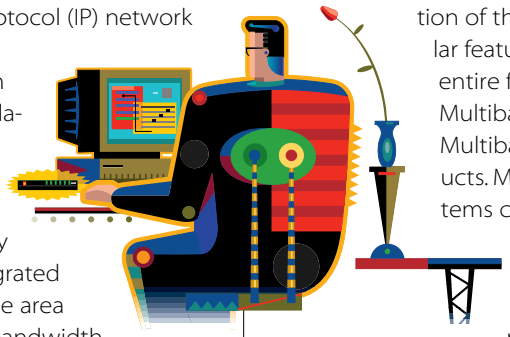
Ascend Worldwide	International Sales Offices, International Product Certification List
Internet Access Solutions	Home User Equipment, Internet Access Resources, ISP Resources, Success Stories
Telecommuting Solutions	Central Site Equipment, Network Connectivity, Telecommuting Resources, Success Stories
Product Information	Product Datasheets, FAQs, Installation Tips, Online Registration, Feature Request Forms, Links to Software Releases
Technical Library	User Guides, White Papers, Technical Backgrounders, Supplements to the MAX Documentation Set, Line Provisioning Details, Glossary of Networking Terms, etc.
Service and Support	Contacting Technical Support, FAQs, Links to Software Release, Links to FTP Services, Outside Resources
Seminars & Education	On-site and Corporate Training Opportunities, Seminar Descriptions, Online Seminar Registration

Ascend to Acquire NetStar

On May 31, Ascend announced an agreement to acquire NetStar, Inc., a developer of high performance, high-speed Internet Protocol (IP) network routers. NetStar's technology, which combines the scalability of switching with the intelligence and manageability of IP routing, integrated with Ascend's wide area networking and bandwidth on demand technologies will provide the next generation of IP switching products, which will be capable of switching IP traffic over any available medium. Integration of the technologies from Ascend and NetStar will provide the industry's only single-platform IP switching product suitable for medium- to large-sized ISPs or carrier POPs, as well as the backbone of the Internet.



New Pipeline Models

On May 13, Ascend announced the new Pipeline 25-*Fx*, Pipeline 25-*Px* and Pipeline 75. Ascend took the features that made the Pipeline 25 and Pipeline 50 products so successful—bandwidth on demand, analog device support and rock-solid bridging and routing capabilities—and incorporated them into these three new products to address the specific needs of the small office/home office and corporate telecommuter markets.

Ingram Micro to Distribute Ascend Products

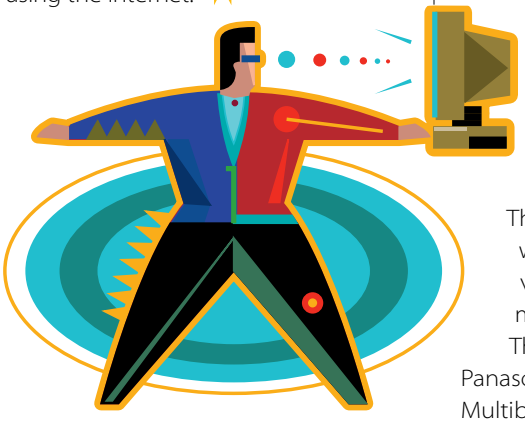
On May 6, Ascend and Ingram Micro announced an agreement whereby Ingram will distribute Ascend's remote networking products to its VARs in North America and Canada. The agreement is part of Ascend's two-tier distribution strategy using leading national distributors to support the growing number of VARs and systems integrators interested in selling Ascend products.

Multiband Products Consolidated

On May 16, Ascend announced a consolidation of the most popular features for its entire family of Multiband Plus and Multiband VSX products. Multiband systems combine inverse multiplexing with dynamic bandwidth management to support videoconferencing, multimedia, and voice/data backup and overflow applications in a single network access unit. By bundling these key popular features into each basic model, Ascend is able to simplify the ordering and installation of all Multiband systems, achieve price reductions on certain units and better serve its customers.

Ascend and StrataCom Collaborate

On May 13, Ascend announced a joint development with StrataCom that will help companies address current bottleneck problems between dial access servers and frame relay/ATM switches. The new Dial Access Server Interface (DASI) significantly improves dial-up and ISDN BRI access to existing StrataCom frame relay and ATM-based networks. DASI will enable ISPs and carriers to more cost effectively provide dial access services such as building virtual private networks (Intranets) using the Internet.



MAX Product Line Expanded

On May 20, Ascend announced the MAX 2000, MAX 4002 and MAX 4004, along with Hybrid Access and the new DM12 card. The MAX 2000 offers a cost-effective solution for small businesses and ISPs while the MAX 4002/4004 offer scalability and low cost per port for up to 96 sessions. Hybrid Access gives corporate network managers, ISPs and carriers greater flexibility in supporting their existing analog modem-based applications while providing a migration path to high-speed digital services such as frame relay, ISDN and leased lines. Each DM12 card provides 12 digital modems—50 percent more than its predecessor—and supports all popular modem standards.

Ports	MAX 2000	MAX 4002	MAX 4004
T1 with integrated CSUs	1	2	4
Ethernet	yes	yes	yes
High-speed serial	yes	yes	yes
Expansion slots	2	6	6
Hybrid Access	yes	option	option
Simultaneous modem calls	up to 24	up to 48[1]	up to 72
Concurrent sessions	24	up to 48[2]	up to 96

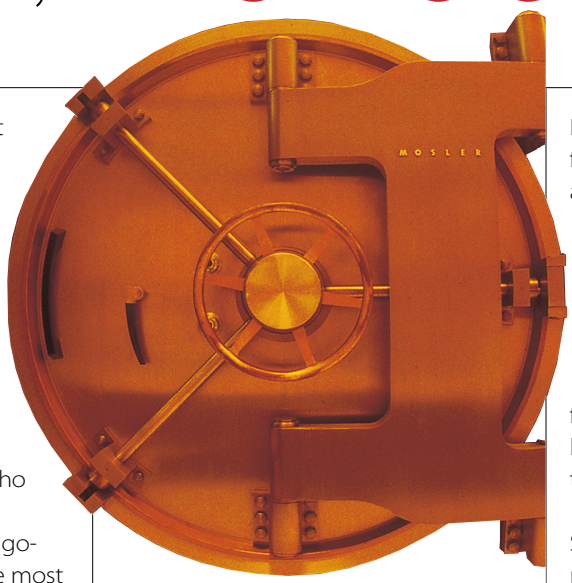
[1]Up to 72 with upgrade
[2]Up to 96 with upgrade

Panasonic Partners with Ascend

On April 30, Ascend and Panasonic Broadcast & Television Systems Company (PBTSC) announced that they will integrate Ascend's Multiband VSX inverse multiplexers with Panasonic's VisionSeries videoconferencing systems. The integration provides bandwidth on demand for superior video and audio quality, and multilocation conferencing. The agreement also permits Panasonic to resell the entire Ascend Multiband VSX product line.

Be sure you're SECURE

Ascend RADIUS provides top-notch security for dial-up networks



Security is one of the hottest networking issues today. If your network has ever been the victim of a virus or if a hacker has gained access to your system, then you know the importance of a comprehensive security solution.

As companies begin to support large numbers of users, it becomes critical to authenticate callers—verifying that they are who they claim to be. There is a wide range of security products and algorithms available today. One of the most exciting has become a de facto standard and is being used by several thousand major corporations. RADIUS (Remote Authentication Dial-In User Service) software runs on a server and connects the access device, such as Ascend's MAX.

The server software performs user authentication and allows remote access to central LANs. It also provides accounting information about the use of the network. RADIUS is particularly attractive to large corporate networks and Internet access service providers that have many dial-up users. It allows per-user privileges control as well as access by many more users than an access device alone. RADIUS can also be equipped with a fast database engine—another benefit for large corporate networks.

The figure shows an example of using RADIUS with the MAX. When the telecommuter or mobile user dials in, the MAX requests the correctly formatted User ID and password. Once that information is received, the MAX forwards it to the RADIUS server for authentication. If authentication succeeds, the MAX establishes the connection; if it fails, the MAX terminates the call. The MAX informs the RADIUS server when the session begins and ends so it can maintain user accounting records.

One special advantage of a RADIUS server is its support for back-up servers. If the primary RADIUS server fails, the MAX will contact a secondary RADIUS server for user authentication. If the second one is inoperable, MAX contacts the third, and so on. This provides a highly available authentication subsystem for critical remote access.

Why Ascend RADIUS?

The Ascend version of the RADIUS server supports the Internet Engineering Task Force standard, but Ascend has taken the lead in extending it to better serve the needs of ISPs and corporate networks. Ascend's implementation of RADIUS includes over 70 enhanced features, providing the following key advantages compared to other RADIUS implementations:

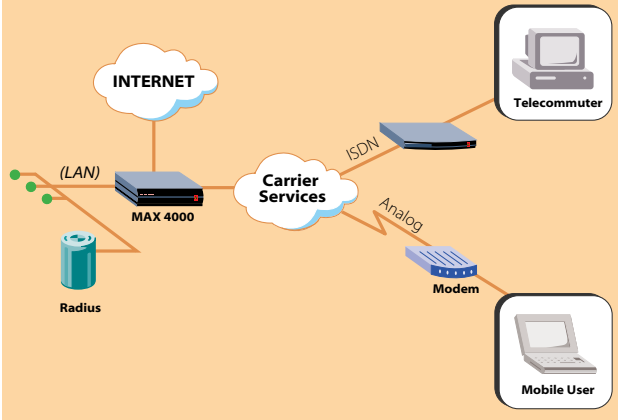
Greater flexibility: The Pipeline and MAX product lines can handle information on user-definable User Datagram Protocol (UDP) ports in addition to what the standard specifies. Therefore, customers do not have to make extensive changes to their network.

Wider authentication support: Several additional authentication mechanisms, including token card security, are supported by Ascend MAX products. This additional flexibility allows the security scheme to fit into the customer's way of doing business.

Additional security: The Ascend MAX products support for call and data filtering enables control over the types of applications and resources that may be used by a remote user.

The Ascend RADIUS server is one of the most widely used authentication servers in the market today.

RADIUS Server Provides Authentication



RADIUS servers working with the Ascend MAX provide highly reliable user authentication

CONTINUED FROM COVER

All the Pieces of the Network Puzzle

(IP, IPX and bridging), a myriad of platforms (PC, UNIX and Macintosh), and a diverse set of carrier services (analog modems, ISDN, frame relay, Switched 56 and leased lines) that create a complexity far beyond traditional LAN requirements. Ascend has identified key building blocks that it considers essential to implementing a remote networking solution:

Remote site equipment. Users need low-cost, high-speed access and the ability to migrate from traditional analog to digital technology while supporting existing phone and fax equipment.

Network services. Remote networking products must support a wide range of public network services such as analog, ISDN, frame relay, Switched 56 and T1/E1.

Central site equipment. Remote access servers should be scalable so companies can install additional dial-up lines quickly. They need the ability to integrate multiple network services (ISDN, analog and frame relay) into a single unit. They also need to fit remote networking equipment seamlessly into the corporate backbone (bridging and IP/IPX routing).

Security and management. To prevent unauthorized access to sensitive information, remote networking products must offer a multitude of security choices, including standard security such as passwords, token cards and Calling Line ID, as well as extensive support for the RADIUS accounting server, TACACS, packet filtering and dynamic firewall protection.

Internet. No remote networking solution would be complete without providing fast, secure and reliable connections to the abundance of information available on the Internet and World Wide Web.

End-to-end Integration

"The strength of a remote network lies in its ability to provide an end-to-end solution," said Bernie Schneider, Ascend's vice president of marketing. "Ascend has fully integrated the key building blocks of remote networking into all of its products."

Network managers can link telecommuters and remote LANs into their central site without worrying about problems like interoperability, scalability and security.

For instance, a telecommuter can use a high-speed ISDN line and an Ascend Pipeline 25-*Fx* for accessing the nearest remote office. Calls to the remote office can be answered by a MAX 200Plus, Ascend's entry-level access switch that handles multiple analog and digital callers simultaneously. Those calls then can be routed to a much larger MAX located at the corporate central site or at the points of presence for Internet Service Providers (ISPs). "Telecommuters, in effect, become full-fledged nodes on the corporate LAN even though they may be located thousands of miles away," according to Schneider. "The connections and security operate transparently to the user, with network managers maintaining control over who gets access to what."

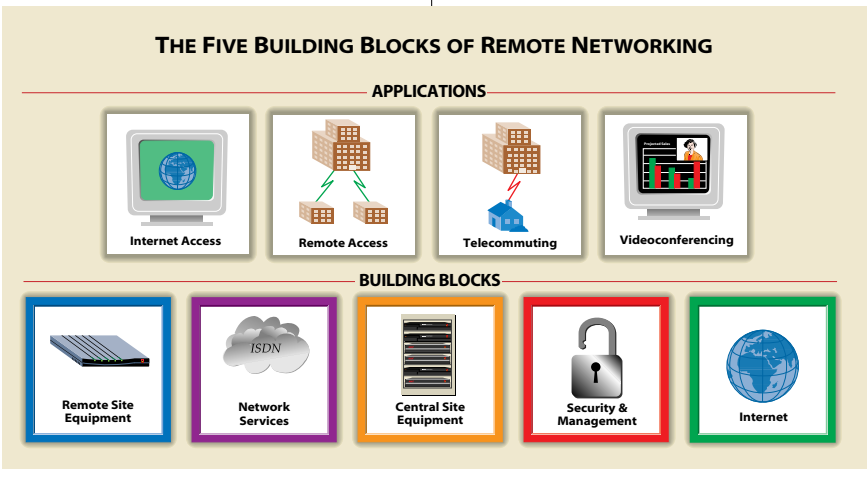
> "The strength of a remote network lies in its ability to provide an end-to-end solution."

Cost-effective Solutions. By using Ascend equipment for end-to-end solutions, network managers can fully utilize the built-in dynamic bandwidth capability. Ascend's Multilink Protocol Plus (MP+) establishes and removes dial-up connections transparently without interruptions to the user. This results in dramatically reduced costs because you pay for bandwidth only when you need it.

Ascend's MAX products also allow ISPs and corporations to integrate analog and digital services while providing the ability to scale as their requirements grow.

According to Schneider, companies need to consider the costs of maintaining remote networks once they are installed. Ascend has built-in remote management capabilities that allow network managers at an ISP or central site to check the configuration and settings any time of the day or night.

"Today, over 500 ISPs, including 28 of the 30 top ISPs world-wide, have standardized on Ascend equipment," Schneider said. "That means companies can now create cost-effective remote network solutions—offering security, scalability and interoperability—from the telecommuter to the central site to the Internet."



The five building blocks of remote networking provide the basis for many types of applications

Ascend Product Awards

Isn't it time you moved up to Ascend?

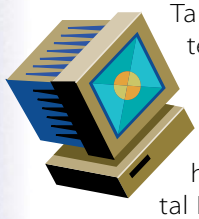
ASCEND

Telecommuting Seminars



In three hours you can learn the basics of effective telecommuting

You need reliable, secure access to your corporate network and the Internet. ISDN, frame relay, high-speed modems… what's the best telecommuting solution for you and your company?



Take three hours and attend an Ascend telecommuting seminar. Learn about analog, ISDN, and frame relay connections; the types of digital access lines available; equipment necessary at your remote and central sites; how to provide your telecommuters with digital Internet access; how to secure your network; how to manage your telecommuting environment; and how to create a telecommuting solution that fully supports both your modem and digital telecommuters.

Because of the high attendance in 1995, Ascend has expanded its popular telecommuting seminar program from 21 to 28 cities.

So take a step in the right direction. Reserve your space now with a quick phone call. But hurry—space is limited!

DATE	LOCATION
June 19	*Toronto, Canada*
June 25	*Chapel Hill, NC*
June 27	*Orlando, FL*

Additional seminars are planned for other cities in our fall series

For more information on Ascend's Telecommuting and Internet Access Seminars, call 1-800-366-4058.

Connections

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