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Product information begins on page 2.

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Ascend

RESOURCE GUIDE

## 30 Profit Making Tips for Internet Service Providers

ASCEND

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1. Introduction

The ISP market is fiercely competitive and only profitable ISPs—those that operate efficiently with attractive and competitive offerings—will thrive. If you are an Internet Service Provider who is looking for ways to increase profitability, this guide is for you. Following are 32 suggestions that illustrate how Ascend products and services can boost profitability by reducing operating costs and increasing revenue.

2. Reducing Costs

1. **Lease Your Equipment** — Leasing gives you an excellent way to acquire the latest networking equipment without having to actually purchase it. It also enables you to add the very latest equipment and services as your network continues to expand. Ascend Credit Corporation's master lease agreement offers fixed-rate financing and flexible leasing choices for ISPs of every size. Now you can start building the network of your dreams at a price you can afford.
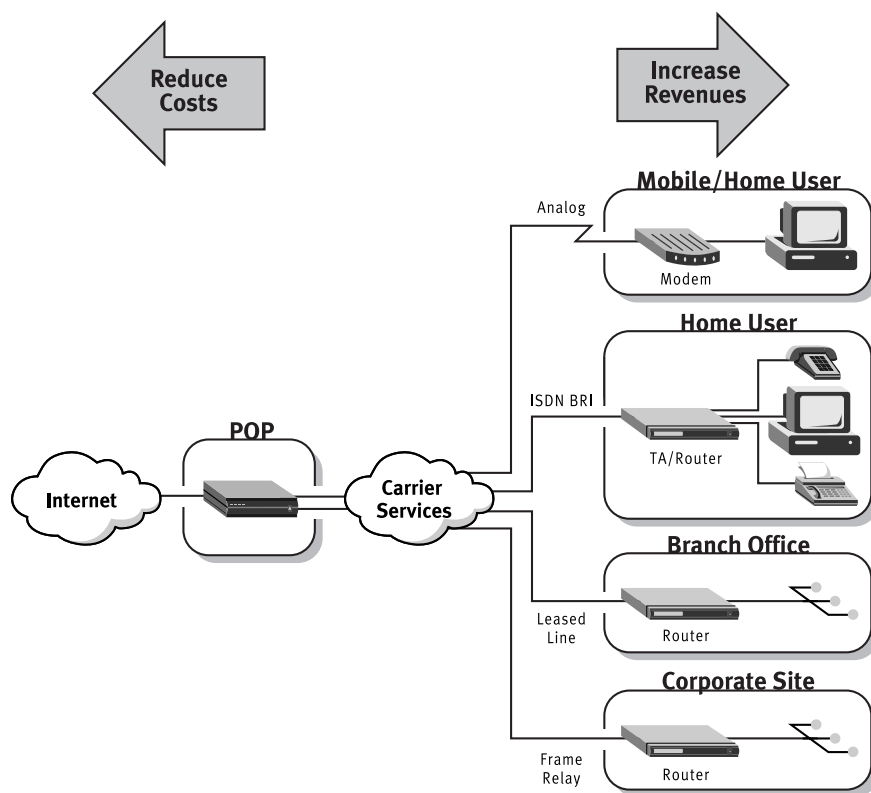
Ascend solutions make ISPs more profitable by reducing equipment, software and operating costs and by enabling ISPs to offer their customers attractive new services that generate revenue.

2. **Eliminate Modem Banks** — Although the days when analog modems were the only gateways to the net are gone, many POPs are still burdened with banks of "legacy" and more recent analog modems to support. But traditional modem banks are no longer a necessary evil — thanks to Ascend's proven digital modem technology. With digital modems, analog modem calls arrive as digital data streams from the carrier's central office on the same high-speed digital trunks that ISDN or Frame Relay subscribers use. The result is better line utilization. Because Ascend's Series56 Digital Modems are totally transparent and support virtual modem speeds up to 56 Kbps, analog subscribers continue to dial the same phone number and perceive absolutely no differences, other than better availability and performance. And because the technology is implemented in software, the configuration is totally manageable and can be upgraded easily to implement further advances in modem technology.

3. **Consolidate Point-of-Presence Equipment** — Are your POPs still populated with modem banks; terminal servers; bridges, routers and gateways; inverse multiplexers; data compression units and line adapters? If so, you can be sure that as your network grows, your business will suffer setbacks due to space, power and cabling restrictions, product obsolescence and network management difficulties. You can avoid these nightmares by replacing standalone equipment with a consolidated solution such as Ascend's MAX family of WAN access switches. The MAX consolidates numerous functions into a single, compact chassis that can replace entire racks of equipment. With the MAX, there are fewer interconnections, fewer cables and fewer problems. As a result, up-time is maximized as ongoing support is minimized. Consolidation also helps head off the long-term problem of physical build-out, where equipment proliferation overwhelms available power, air conditioning or physical space limitations — thereby causing costly upgrades that do nothing to enhance the network itself. MAX units are easy to install and the TAOS operating system makes them easy to use. And with Ascend's Navis management software, you can configure and control a whole army of POPs from a central location—an important consideration for rapidly growing networks.

4. **Facilitate Growth through Scalability** — One of the most important features for POP equipment is often overlooked: scalability. Plan from the very beginning for your long-term success and expansion by using the industry's most scalable product line — Ascend's MAX family of WAN access switches. MAX models are available supporting as few as eight or as many as 2,000 subscribers—all with the lowest cost of ownership available. Select a large chassis and populate it with cards as your needs grow. Or start with a smaller MAX and supplement it with a fully compatible system later. Or replace it with a larger model and move it to a small outpost POP. Or "stack" multiple MAX units to create a "virtual Network Access Server". With the MAX family's compatibility, there is no need to retrain your support staff. Compare this approach to that of other vendors whose product lines leave gaping holes between models, and whose "larger models" are often totally different systems with incompatible features, capabilities and management.

5. **Use Next-Generation Switching Routers** — The conventional router is the Internet's biggest single impediment to growth. Ascend's GRF® family of MultiGigabit routers delivers an order of magnitude improvement in price/performance by combining a Layer-3 switch with an intelligent IP router. The GRF is optimized for IP to eliminate bottlenecks, afford linear scalability, and provide line-speed throughput—all at a fraction of the cost of a conventional large-scale router. It also supports emerging multimedia applications. And unlike proprietary IP switch technologies, the GRF is fully interoperable with the existing Internet infrastructure. Plug-and-play compatibility with immediate savings and long-term potential make the GRF an ideal solution for larger ISPs.

6. **Use High-Speed Digital Trunks for Subscriber Access** — Consolidating incoming lines from your local carrier's Central Office with the MAX WAN access switch will save you real money. High-speed digital trunk lines carry multiple channels, and each channel can accommodate the full spectrum of WAN services on a per-call basis (modem, Switched 56, Frame Relay, ISDN). Each high-speed link is invariably less expensive than the equivalent bandwidth achieved using multiple low-speed links. In addition, the pooling of lines permits the MAX to achieve at least 25% better line utilization, allowing a single trunk's 24 channels to replace 30 or more individual lines. By consolidating equipment and lines, you could reduce your capital investment and carrier service expenditures by as much as 70%!

7. **Use Even Higher-Speed Trunks When Possible** — Why stop at the cost-saving advantages of 24-channel T1 (DS1) or ISDN PRI lines when the MAX TNT carrier-class switch supports a whopping 720 channels on a single DS3 line? These super-high-speed trunk lines can be used for both subscriber access and the backbone. Channelized DS3 lines are priced at about $14,000 per month, which is half the cost of the equivalent in T1 lines. You get a quick payback, and also save on associated rack space and management expenses.

8. **Advertise for Free** — Nothing beats free advertising—especially when the reach is nationwide or worldwide. When you enroll in the Ascend ISP Services Directory, potential subscribers in your area, nationwide or even worldwide can bring up your listing with just a few keystrokes and a click of the mouse. With easy access to your company name, phone number, e-mail address and Web site, it is an easy matter for potential customers to become paying customers.

9. **Minimize Problems with Your Local Carrier** — Even a properly functioning POP can experience carrier incompatibilities. That is why the MAX is homologated (formally certified) in more than 53 countries to work with carrier services and the top eight switch manufacturers. Ascend's on-going certification effort assures you of seamless compatibility today—especially with worldwide virtual private networks—and helps deliver prompt support for new carrier/switch capabilities in the future.

10. **Enable Full Management of Your Entire Network** — Whether you have one or one hundred POPs, your network should be fully manageable from a single console. With Ascend's Navis network management family, you can manage your end-to-end multi-vendor configuration easily and economically. The Navis family includes tools for auto-discovery and mapping, WAN line monitoring, equipment configuration, performance management with historical statistics and trending, fault detection and alarm generation, integrated accounting and more. The console itself can be stand-alone or integrated with HP's OpenView. There is simply no other management system as comprehensive and capable as Navis.

11. **Use RADIUS for Security and Accounting Administration** — RADIUS, or Remote Authentication Dial-In User Service, is the most comprehensive database standard available in the industry. Ascend Access Control™ (Ascend's version of RADIUS) offers nearly 100 extensions that make RADIUS even more of a cost-saving productivity tool for ISPs. The Ascend Access Control database maintains detailed information—by user—for all security and accounting needs. Security provisions prevent moochers from logging on for free, and keep hackers from wreaking havoc on your systems. The accounting provisions make sure that every minute of usage is logged for invoicing subscribers. Call Detail Recording (CDR) in the MAX WAN access switch automatically feeds the RADIUS database, accurately tracking all usage by all users. Ascend Access Control and CDR track as little or as much information as needed, including subscriber account charged, the authentication process, call time and duration, channel and service used, calling phone number, volume of traffic, etc. And this wealth of information is readily available through Ascend Access Control's user-friendly management system, or via an ODBC-compliant interface to other applications like AllBill and VPNs.

12. **Automate Your Invoicing** — With Ascend Access Control's comprehensive RADIUS database, you can easily process your monthly invoices. But why incur the expense of supporting your own custom software when an off-the-shelf package will do just as well, if not better? AllBill, makers of the Operational Support System (OSS) software, offers a turnkey service based on OSS. AllBill can invoice your subscribers directly by mail or e-mail, or through the local carrier. It can even handle electronic funds transfers (EFTs) directly from your subscribers' bank accounts. The OSS applications integrate seamlessly with your Ascend Access Control RADIUS database. So once a month, you simply need to provide access to your account records, and AllBill does the rest. The regular management reports keep you fully informed, just as you would want to be with your own system, but without the expense and aggravation. And you get improved collection rates with faster payments.

13. **Minimize New Subscriber Start-Up Support** — You can minimize or entirely eliminate the hours of start-up time spent supporting new subscribers by ordering Selectools™. Available on CD-ROM and diskettes, Selectools contains everything a new subscriber needs for Internet access. Applications include Internet Explorer, Eudora Lite, WinVN News Reader, News Watcher, FTP and more. The built-in GUI wizard guides the user through the complete installation and configuration process, eliminating all of the common mistakes. The wizard can even be customized for your particular configuration with a companion diskette. Selectools, combined with Ascend's automated Configurator for Pipeline ISDN remote access routers, can save you over $100 of start-up labor expense supporting each new subscriber.

3. Generating Revenue

14. **Provide V.90 56 Kbps Modem Access** — Ordinary V.34 modems are simply too slow for most users today, making high-speed alternatives, such as ISDN digital services, more attractive. However, ISDN services are not available to all users and may be prohibitively priced in some areas. In these situations, asymmetric 56 Kbps modem technology is ideal. And the ideal 56 Kbps modem is Ascend Series56 Digital Modem Module. Available for installation in Ascend's MAX WAN access switches, Series56 modem modules deliver high-speed access, yet are still compatible with v.34 and slower modems, are V.90 compliant, and they accept calls from X2/v.90 as well as K56flex/V.90 modems. This means a larger potential subscriber base for you.

15. **Provide Dual 56 Kbps Modem Access** — For customers who live in areas where ISDN is expensive, dual 56 Kbps access can make costs more manageable. To implement this service (for which you can charge a premium), you need a MAX outfitted with Ascend Series56 modems. All the subscriber needs is a dual-line client 56K modem (available from several manufacturers) and two analog lines. Because the dual-line modem splits the data and sends it over two lines simultaneously, transmission time is cut by about half. The user benefits by getting fast access without resorting to ISDN, and you benefit by charging a premium for this service.

16. **Digitize Your Analog Subscribers** — For an increasing percentage of users, even the current ultimate in modems—56 Kbps—is inadequate. To attract or retain these users, you need to offer high-speed digital services. Ascend makes this easy and affordable with the MAX WAN access switch which supports both ISDN and analog modem access on common high-speed trunk lines. An ISDN Basic Rate Interface (BRI) gives your subscribers up to 128 Kbps throughput, and optional 4:1 STAC compression increases the performance to 512 Kbps. At rates like that, and with fast call set-up (under 300 ms), your subscribers will think they are connected directly to a LAN.

17. **Supercharge Your Users with Digital Subscriber Line** — For businesses that need even higher throughput than ISDN allows, the answer is the Digital Subscriber Line, or DSL. DSL delivers today's best performance over existing local loop wiring. The industry's most comprehensive DSL solution is Ascend's MultiDSL™ offering. Covering both POP and subscriber equipment, MultiDSL enables your customers to choose the DSL technology that is right for them. Offer ISDN DSL (IDSL) for continual 128 Kbps access over existing ISDN customer premises equipment, or offer Symmetric DSL (SDSL) for six times the throughput (768 Kbps). IDSL and SDSL are both ideal for multi-user offices—especially those with Web servers. For real power users, offer Rate-Adaptive Asymmetric DSL (RADSL) with downstream throughput in the multiple megabits/second range. RADSL-CAP (Carrierless Amplitude Phase) modulation enables a modem to examine lines of differing lengths and noise characteristics and select the one with the highest baud rate and best signal-to-noise ratio. RADSL-DMT (Discrete Multi-Tone) breaks up available bandwidth into multiple subchannels and runs each subchannel at the best possible data rate to optimize transmission. These RADSL technologies are perfect choices for Internet access, telecommuting and other applications where bandwidth in the downstream direction is typically much larger than in the upstream direction.

18. **Deploy DSL in a "MiniPOP" Near Your Subscribers** — An alternative to using local loop wiring to deliver MultiDSL is to install a MiniPOP at the site. Any campus setting or large building — from an office complex to a high-rise apartment — has MultiDSL-compatible unshielded twisted pair wiring in place. Install a MAX right on the premises, then run a cost-effective high-speed line to your nearest MegaPOP™. Users connected via the on-site MiniPOP get maximum MultiDSL performance and, with no local loop line charges, you get a competitive offering for a large "captive audience" of prospective subscribers. SDSL, IDSL and RADSL, with their integration of analog voice and digital data on the same wire, make for a total communications solution. Just split off the analog voice and reconnect it to the PBX or local loop.

19. **Resell Customer Premises Equipment (CPE)** — As users migrate to new WAN services, they need new equipment. This ever-growing need spells o-p-p-o-r-t-u-n-i-t-y for ISPs. Users get one-source shopping for both systems and services, and ISPs get more revenue and better account control with fewer support headaches. Ascend offers several ISP programs that give you specific advantages as a reseller of Ascend solutions.

20. **Offer a Complete SOHO Solution** — The growing small office/home office (SOHO) market presents the perfect opportunity to resell CPE. The typical SOHO needs at least three phone lines: one for personal use (sometimes more for children or roommates), another voice line for business calls, and, of course, a dedicated data/fax line. Why so many lines? Any fewer would mean missing incoming calls or faxes during an Internet session. But installing three or more lines in the home presents a serious problem: few are wired for more than two. A better and less expensive solution is to install an Ascend Pipeline remote access router with Multilink Protocol Plus™, or MP+. Ascend's MP+ dynamic bandwidth management allows a single line to behave as three. With the Pipeline, a user can have both ISDN channels (a total of 128 Kbps without compression) accessing the Internet and still receive incoming voice or fax calls—all on a single twisted pair wire. SOHO is a big opportunity for ISPs, especially since the user is likely to encounter the wiring problem when getting serious about Internet access. Ascend's two most popular models are the Pipeline 75 and the Pipeline 85. Both have a single ISDN port, two ordinary phone/fax ports and an optional integral firewall. The Pipeline 75 has a single Ethernet port; the Pipeline 85 has a built-in 4-port Ethernet hub. And both have SmoothConnect™ for easy setup as well as other useful features.

21. **Use ISDN to Attract Business Subscribers** — ISDN is also an excellent choice for a business customer's many field offices. For small offices, Ascend's Pipeline 85 with a built-in 4-port Ethernet hub is ideal; a single remotely manageable box provides a total LAN and WAN solution. For medium-sized offices that already have a LAN configuration, the award-winning Pipeline 50, also with an integral firewall, adds a complete WAN solution. And with Ascend's Pipeline Configurator, installing and configuring a Pipeline remote access router takes less than 15 minutes, including the configuration of the ISDN line.

22. **Use ATM to deliver data, voice and video services to corporate central sites and remote offices** — Gone are the days when corporate offices were all housed in one location. Today's corporations must interconnect many remote locations, each of which has its own internal interconnection difficulties to overcome. If you are looking for lucrative new services to offer, this is a good place to start. With Ascend's SA Broadband Access Family of concentrators, you can use your ATM network infrastructure to deliver a wide range of advanced ATM-based services. With the SA family, routers, PBXs, Ethernet segments and servers, video codecs and other CPE typically found in remote offices are easily connected, adapted and integrated into an ATM network. Subscribers could use the economical SA 100 Broadband Access Concentrator to consolidate multiple WAN feeds into one with plug-and-play convenience. The network feed could be kept relatively low-speed to keep costs down (T1/E1), and migrated to higher rates via Inverse Multiplexing over ATM (IMA), T3/E3 or OC-3/STM-1. Service deployment could begin with SA 100s as CPE devices to meet the needs of your emerging subscriber base, then you could move up to SA 600 units to support multisubscriber locations and provide local service concentration for remote subscribers. The integrated, highly scalable SA Broadband Access Family gives you an excellent way to maximize your capital investment, minimize management operations overhead, and grow with your customer base.

23. Offer Leased Line or Frame Relay Access for Larger Offices — For the largest facilities, with potentially hundreds of employees, leased lines or Frame Relay are better WAN choices than ISDN. Ascend's Pipeline 130 has an Ethernet interface and a high-speed WAN port (up to 1.5 Mbps) that supports fractional T1, T1 and Frame Relay. The Pipeline 130 also has a built-in ISDN port for backup and overflow bandwidth, which proves valuable in mission-critical situations. Ascend's Pipeline 220 has the same high-speed WAN port as the Pipeline 130, but with two independent Ethernet ports: one protected by the integral firewall and encryption for the private LAN, and another for an unprotected "public" LAN where Web servers reside.

24. Sell Security — Providing security as part of your standard service adds the kind of value that benefits and attracts business subscribers. The customer's most cost-effective option is one you can provide: security integrated with the CPE that interfaces to your POP. Ascend's SecureConnect family provides a whole spectrum of protections, from user authentication to sophisticated encryption. It is ideal for establishing Virtual Private Networks (VPNs) and for electronic commerce. Ironclad security not only attracts customers and protects their connections, but also protects your network and your business from hackers and other unauthorized parties who pose a serious threat.

25. Capitalize on the Popularity of Web Servers — One of the easiest ways ISPs generate revenue is by hosting Web servers for business subscribers. But what about those businesses that want their Web server farms in-house? Rather than walk away from this situation, there are two things you can do: provide consulting services and sell special CPE for the application, such as Ascend's Pipeline 220 remote access router—an Internet/intranet solution in a single box. The Pipeline 220 offers two independent Ethernet ports, one of which can be isolated and encrypted for internal or intranet applications while the other Ethernet port can be left accessible to the Internet and the World Wide Web. Potential customers will be eager to buy or lease a Pipeline 220 from you because only the Pipeline 220 combines such fast access and security in one economical package.

26. Provide Internet Voice Services — Voice-over-IP (VoIP) service is an excellent service for attracting new customers. It allows you to add real-time voice transport to your network, thereby enabling your customers to make long distance calls for the price of a local call. There are no capital costs to subscribers and no equipment charges—making VoIP all the more attractive—and you can use your existing network infrastructure. Ascend's MultiVoice™ product for the MAX 6000 is ideal for VoIP because it is highly scaleable, integrated and based on international standards. Basing your VoIP service on Ascend hardware and management solutions enables you to sell Quality of Service (QoS) guarantees to your customers, assuring them of toll-quality voice transport that would be difficult to obtain elsewhere. Transaction-based billing that scales with network usage is another revenue-generating VoIP service you might offer.

27. **Utilize IP Multicast for New Applications** — New applications for collaborative work, distance learning and event "broadcast" are tailor-made for the Internet—and ISPs. The Internet's emerging multicast capability will establish the most robust and affordable infrastructure for communicating among groups of users on demand. Ascend's MAX WAN access switch supports the Internet Group Management Protocol (IGMP), which is how participants "enroll" in a particular group session. Your customers probably know that the Internet's Multicast backbone (MBone) does not yet extend to every corner of the world. But with the MAX, you can attract business customers now by advertising your ability to handle the connection to IP multicast. And if you have implemented IP multicast routing protocols on your own backbone, you can even deliver the service ends-to-ends at your POPs today.

28. **Offer a Complete VPN Solution** —Virtual Private Networks or VPNs must certainly top the list of money saving uses for the Internet. A VPN enables businesses of all sizes to utilize the Internet instead of expensive private WANs for contacting mobile users, telecommuters and branch offices. Because they eliminate long distance charges, utilize existing network infrastructures and offer greater flexibility and reach, VPNs save companies as much as 60% over equivalent private networks. This popular technology creates unprecedented revenue generating opportunities for ISPs because many companies prefer to outsource their remote access needs. Their business, however, belongs to the ISP who offers important features, such as secure tunneling, Frame Relay and ATM connectivity, and Quality of Service (QoS) guarantees. You can offer these and other important features by basing your VPN offering on Ascend's MultiVPN solution. MultiVPN unites tunneling, security, management and all other pieces of the VPN puzzle into an integrated solution covering every aspect of Virtual Private Networking. Whereas other VPN solutions cannot deliver the same uptime and performance as private networks, Ascends MultiVPN solution delivers a full range of products and services to fit any need. For example, Virtual Private Remote Networking (VPRN) enables data to tunnel through public networks using a variety of tunneling protocols, and offers authentication and encryption besides. Virtual Private Trunking (VPT) provides Frame Relay and ATM connectivity. Virtual IP Routing (VIPR) enables you to offer your subscribers a choice of QoS levels, including "Absolute" QoS for guaranteed throughput and never-to-exceed latency. VIPR also enables you to offer Service Level Agreement (SLA) reports and customer network management access, which gives every organization full control over every aspect of its own VPN. No other VPN solution covers all three areas of Virtual Private Networking—VPRN, VPT, and VIPR—and creates all these kinds of revenue-generating opportunities for you.

29. **Combine and Conquer** — Many ISPs are just too small to offer comprehensive VPN, faxing or multicast solutions. But there is now a way for smaller ISPs to pool their resources: iPass, a consortium of ISPs, is an independent organization that provides technical and administrative assistance to its hundreds of member POPs worldwide. Ascend has made all of the necessary accounting enhancements to Ascend Access Control so that calls to your MAX on behalf of another ISP are properly recorded for invoicing. Similarly, you can expand your reach with iPass to areas where you have no physical point of presence. Your customers can then roam the globe while remaining in touch with their favorite "local" ISP—you!

30. **Get Certified** — ISPs occupy an energetic field in which competitive advantages must constantly be found. One of the best ways to get an edge on the competition is to become certified. The Ascend Certified Technical Expert (ACTE) program offered by Ascend Global Education gives industry recognition to professionals who demonstrate a solid knowledge of Ascend products and underlying network ACTE certification demonstrates to customers and potential customers that your company's service is backed by a solid understanding of Ascend products, which increases your company's professional standing and credibility. Given the choice between otherwise similar ISPs, potential customers will naturally gravitate toward the service provider with credentials.

4.   Ascend: Leading the Way to Profitability

These proven tips are the result of Ascend's extensive experience working with ISPs. Ascend products are used by some 2,000 ISPs around the globe – including 90 of the 100 largest ISPs – in over 15,000 POPs. In all, Ascend's MAX provides 79% of the digital ports used for Internet access, according to the Dell Oro Group.

In the Internet backbone, over half of the Frame Relay and ATM switches installed are from Ascend. This affords ISPs much higher performance and assures end-to-end compatibility of advanced, profit making features.

Ascend also has the largest installed base of digital CPE for Internet access, including routers for multi-user offices and specialized systems for SOHO environments. In total, Ascend is recognized as the industry's leading supplier of digital communications equipment at both ends of Internet access.

Please contact Ascend (800-621-9578 or info@ascend.com) to learn more about how you can benefit from any of these suggestions, or to get detailed information on Ascends POP and CPE product lines.

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