

Subscriber Line

Product and Technology News From Patton Electronics

Patton adds DSL Modem to their NetLink™ Access Product Family

Increased demand for Internet access, along with the deregulation of the global telecommunication industry, has resulted in requirements for an array of new communication services. To deliver these new services, Internet Service Providers (ISPs), carriers, Inter-Exchange Carriers (IECs) and Incumbent Local Exchange Carriers (ILECs) must achieve affordable broadband transmission over the



existing copper infrastructure. Increasingly, these providers are looking to Digital Subscriber Line (DSL) technology as the best means for getting the job done.

In step with this worldwide trend, Patton Electronics Company—a US manufacturer of CSU/DSU, baseband modems and E1 access converters—has added the Model 1095 Netlink™ mDSL Modem to its growing family of Network Access Products. *continued on Page 6*

Televisa Uses 2800 RAS **2**

Reporters at Mexico's Largest TV Station use Patton's 2800 RAS to file stories

Enron Powers Up with 1080A SRM **4**

World's Largest Wind Generation Facility is Networked with Patton Multipoint Short Hauls

Patton NetLink mDSL Modem **6**

Model 1095 Supports 2-Wire Data Rates to 2.3 Mbps (continued from page 1)

Welcome to the first issue of *Subscriber Line*, a newsletter designed to keep you up to date with new products and technology from Patton Electronics Company.

In *Subscriber Line*, you will find case studies of how Patton's connectivity and network access products are being used in the real world, plus new product features and application notes that examine connectivity and access solutions for ISPs, carriers and corporate networks. For the latest from Patton, you will want to keep plugged into the *Subscriber Line!*

Televisa Gets the Story with Patton 2800 RAS

Reporters for the Spanish-Speaking World's Largest TV Broadcaster use Patton's 2800 Remote Access Server to File Stories at Home or on Location

It's a sweltering summer afternoon in Mexico City's Azteca Stadium—the world's largest—where a near-capacity crowd of 100,000 soccer fan cheers on first division team *América* against rival Pachuca in a razor-close match. The El Canal de las Estrellas (Channel 2) sports reporter watches the match closely, observing every nuance of the players, the coaches and the frenzied fans. He will file his report on a notebook computer and download it immediately via modem from the press box, so that fans who missed the broadcast of the game on Channel 9 can tune into Channel 2 at 10:30 PM to hear late night anchor Guillermo Ortega's wrap-up of the results.

Whatever the outcome of the match, it will have been a good day for Grupo Televisa. The Spanish-speaking world's largest media company owns Channel 9 that broadcast the match, as well as Channel 2 that will report it, plus Channels 4 and 5. What's more, Grupo Televisa also owns the team *América* and the Azteca Stadium, in which all their home games are played. And when soccer fans in the USA watch the match, they will likely do so through Univision, which reaches 92 percent of all US Hispanic households, and in which Grupo Televisa holds a 19.8 percent stake. Never mind Grupo Televisa's music recording labels, magazines, newspaper, AM and FM radio stations, Cablevision cable system (Mexico's largest), SKY direct-to-home satellite venture and SkyTel paging service.

If it is in Spanish, and one can watch it or listen to it, Grupo Televisa probably produced it... or owns part of it!

Networking Headaches

With such diverse media holdings, Grupo Televisa's networking requirements are formidable. Grupo Televisa's communications network encompasses over 4,000 pieces of hardware, including numerous routers. One particularly challenging task has been supporting 300 reporters as they submit stories around the clock to Televisa's proprietary UNIX/NT

based news processing system. Says Javier Paez Vogel, Grupo Televisa's Coordinator of Communications, "Speed and efficiency is everything when it comes to getting news on the air. Our news team is competing against other networks to get the latest information out to the public. The quicker one of our reporters can turn in a piece, the better chance we have of scooping the competition and being the first to break a story."



Of course, the days of reporters banging out stories on manual typewriters, and then reading them breathlessly over the phone to the news editor, are relegated to "B" detective movies. Televisa's reporters key their stories into notebook computers they carry with them on-location, or into their PCs at home (reporters are the ultimate telecommuters). So the critical link becomes the dial-in access line between the reporter—wherever he/she is at the moment—and Televisa's headquarters, where most of the news programming is produced. According to Paez, Televisa's previous method of filing reports was inefficient: "Each reporter was required to have a separate email account, to which they connected with a modem (see illustration, opposite page, top right). Our headquarters was connected through a leased line to the serv-

Case Study

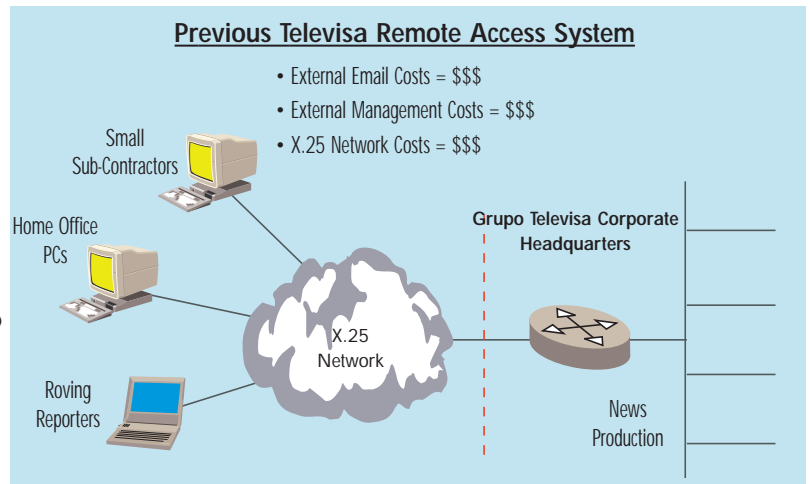
Televisa uses 2800 RAS

ice provider's X.25 network. With 25 to 30 reporters calling in at any one time, it was a bottleneck. And the service itself was expensive for what we were receiving. It was clear that we would soon have to develop our own in-house remote access capabilities."

More Efficient Remote Access

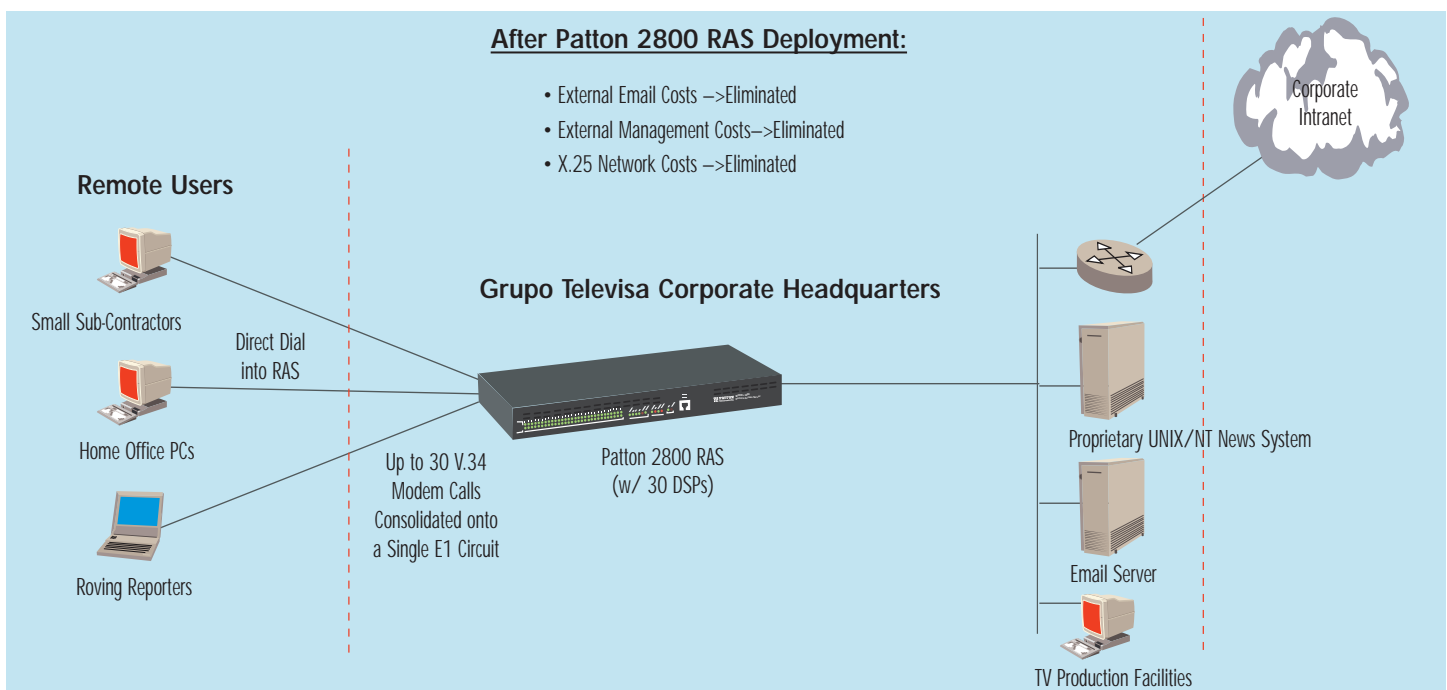
When Televisa elected to deploy an in-house remote access capability in 1998, the decision was narrowed to a choice between the **Patton 2800 RAS** and a more expensive, traditional access platform. The Patton 2800 RAS was selected for a number of reasons, among them its SNMP/HTTP Web browser configuration support, and its balance of capabilities and price. "The Patton 2800 was easy to configure, very practical, and met all of our requirements. The cost was very important to us; we did not want to purchase so large a platform that we would be paying up-front for capacity we did not need. That would have worked against our goal of becoming more efficient.", said Paez.

In 1998, Televisa replaced their X.25 remote access package with a leased E1 circuit and a Patton 2800 RAS containing 30 DSP modems. With this new in-house capability, reporters and sub-contractors can now dial directly into Televisa's Patton 2800 (using V.34 modems and POTS lines)



without having to go through the network of a 3rd party service provider. They can then access Televisa's UNIX/NT based news system, production system, email and corporate Intranet (see illustration, below).

Since its installation approximately 6 months ago, Paez estimates the new remote access system has more than paid for itself already. If demand for access grows as predicted, Paez plans to install a second Patton 2800 at the Grupo Televisa headquarters sometime in 1999. Until then, Grupo Televisa hopes that *América* will dominate on the soccer field in the same way its parent company continues to dominate in the media marketplace. SL



Enron Wind Corp. Powers-Up Lake Benton using Patton Short Range Modems

World's Largest Single Wind Power Generation Facility Connected by a Multipoint Network of 155 Patton 1080As

LAKE BENTON, Minnesota, September 24, 1998—Representatives of Enron Wind Corp and the US Department of Energy take part in the dedication of the world's largest single wind power generation facility, located near this small town in the Midwest plains. The 107-megawatt Lake Benton I Wind Power Generation Facility, constructed, owned and operated by Enron Wind, will supply electrical power sufficient for 43,000 average households, or 120,000 people.

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GENEVA, Switzerland, December 17, 1998—Scientists of the World Meteorological Organization (WMO) officially declare 1998 to be the hottest year on record, with average worldwide surface temperatures surpassing last year's record by 0.27 degrees. In their annual report on climate, the WMO scientists urge national governments to curb factory and automobile emissions—implicated as the worst man-made sources of heat-trapping “greenhouse” gasses.

Enron Ahead of the Game

Although the two news stories above may seem unrelated at first glance, they actually illustrate that Enron Wind Corporation is at the leading edge of a worldwide movement to reduce greenhouse gas emissions and conserve energy resources. Because Enron's Lake Benton I facility (pictured at right) uses propeller-driven wind turbines to generate electricity, instead of burning fossil fuels, its operation will produce the equivalent emission-reduction effect of removing 50,000 cars and light trucks from the road. It seems Enron has beaten the WMO to the punch-line by almost three months!

Few projects have actually earned the title “massive”, but Enron's Lake Benton I certainly qualifies as one of them. Each of Lake Benton's 143 wind turbines—manufactured by Zond Energy Systems, a subsidiary of Enron Wind Corp.—sits

atop a 173 ft. high tower and is able to generate 750 kilowatts of electricity. The 3-blade, variable pitch propeller used on the Z-750 (as this latest-generation turbine is called) measures 156 ft. in diameter, and weighs 34,000 lbs! The turbines are spread over 10 square miles of farmland.



Propelled into Networking

Decidedly upscale from the version battled by Don Quixote, these 21st Century “windmills” feature a motorized yaw system that automatically turns the entire turbine assembly to the right or left for maximum wind exposure. They also feature a hydraulically controlled propeller hub that varies the angle of the blades automatically (to maintain optimum RPM) or manually (to “pause” the turbine by feathering the

“The Patton Model 1080A... met our requirements, and continues to perform reliably in the field.”

—Jody Shadden, Senior Product Engineer
Zond Energy Systems

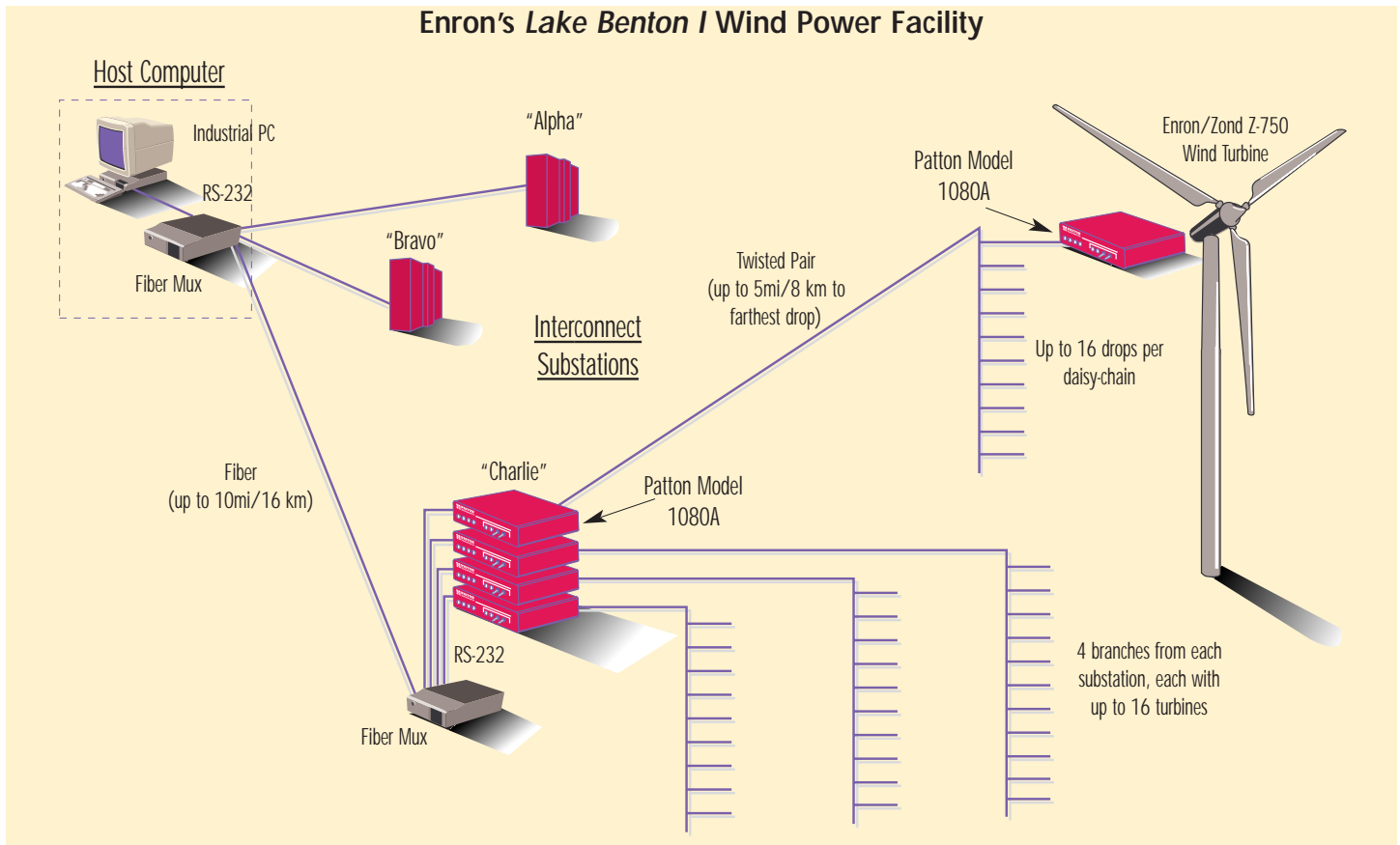
prop). But getting 143 high-tech giants to waltz on cue is no easy task. Rather than hiring an operator to inhabit each tower and manipulate the turbine's controls manually (it would be a long way down for coffee breaks), Enron's engineering team devised a SCADA (Supervisory Control and Data Acquisition) based system. SCADA allows a single central site operator to issue software commands that are received by one turbine, several turbines, or all 143 simultaneously. For example, if the utility desires to shut down or curtail the operation of certain turbines, in order to maintain their overhead distribution line, SCADA allows them to per-

form this function remotely. In addition, SCADA queries each turbine for real-time data, such as operating temperature, propeller RPM, outside air temperature, wind speed and power generated. This data is critical in determining whether or not each turbine is operating at 100% efficiency.

Nerve Cells by Patton

Just like the myriad parts of the human body are connected to the Central Nervous System by an interwoven network of nerve cells, so the 143 turbines at Lake Benton I are connected to the SCADA Host Computer by a specialized network. And at each “synapse” is a **Patton Model 1080A** short range modem. The illustration (below) shows how the SCADA network is laid out. At the Host Station is a rack mounted industrial PC, connected by RS-232 to a fiber multiplexer. From the multiplexer, individual fiber optic cables run out in a 10 mile radius to three Interconnect Substations: “Alpha,” “Bravo” and “Charlie”. At each substation, the fiber line is connected to another fiber multiplexer, which de-muxes the

signal into four RS-232 outputs. Each of the four RS-232 outputs is, in turn, connected to its own Patton Model 1080A short range modem, which functions as the “master” modem in a multipoint array. Finally, in a wind farm variation on “last mile access,” a single twisted pair cable is run in daisy-chain fashion from each master Model 1080A to up to 16 “slave” Model 1080As, one mounted in each tower. In this manner, each of the three substations may potentially serve as a data collection and control hub for up to 64 turbines. The distance from any substation to the most remote tower in its group can be up to 5 miles—quite a long stretch for *any* short haul in a multipoint scenario! According to Jody Shadden, Senior Product Engineer at Enron, it was primarily the Model 1080A’s long distance performance that won Patton the job: “We tested the Patton Model 1080A against a competitive multipoint short range modem, and the other company’s product could not support the distance we needed. On the furthest drops, the other short haul essentially quit communicating. We found *continued on Back Cover*



Product Snapshot

The *Netlink™ mDSL* supports synchronous, full duplex transmission over one unconditioned twisted pair (2-wires), and provides high-speed connectivity for Frame Relay, Internet Access, Wireless backbone, Intranet, Campus and ATM networks. The Model 1095 uses a unique multi-rate digital subscriber line (mDSL) technology which transmits data at various line rates from 128 kbps to 2.3 Mbps.

Routers, Switches or other access devices can be connected at distances over 5.4 miles/8.8 km using standard 24 AWG/ 0.5mm wire.

Using Carrierless Amplitude and Phase Modulation (CAP) for Line Encoding (or optional 2B1Q), the *Netlink™ mDSL* has built-in diagnostics, V.54 loopbacks (Local and Remote) and V.52 compliant BER pattern generation and detection (511/511E). It is compliant with FCC Part 15 and UL1950, and is CE Marked.

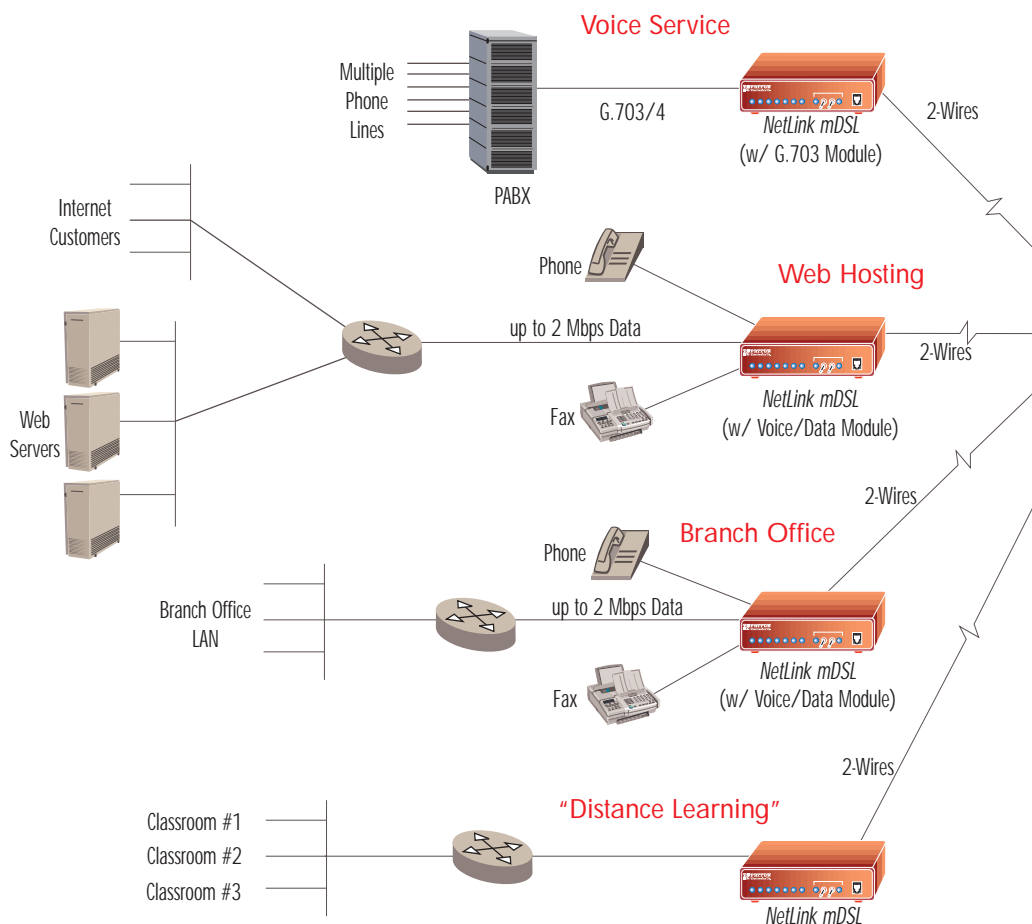
The *Netlink™ mDSL* is available in three standalone versions: **Model 1095-T1**, which supports data rates from 128kbps to 1.536 Mbps; **Model 1095-E1**, supporting data rates from 128kbps to 2.304 Mbps; and **Model 1095-CampuS**, which supports data rates from 128kbps to 2.304 Mbps. A rack-mount version, the **Model 1095RC**, is also available.

QuikConnect™ Modules

The standalone *Netlink™ mDSL* unit supports all of Patton's *QuikConnect* interface modules (V.24/RS-232, RS-422/530, V.35, X.21, 64k/G.703, Ethernet Bridge and Voice/Data). The Ethernet Bridge module, **Model 1M1/I**, supports Transparent 10Mbps Ethernet Bridging, and the Data/Fax/Voice Module, **Model 1M1/J**, multiplexes two analog voice lines—or one voice/one FAX—and one high speed data line on a single 2-wire circuit. It supports DTE speeds from 128k kbps to 2.3 Mbps in user definable increments.

Central Site Rack Cards

The Model 1095RC mDSL rack card is only 3.5"/8.9cm high, allowing 16 hot-swappable DSL modems to fit into one 2U high, 19-inch rack. The rack can be powered by 90-260VAC or -48VDC single or dual redundant power supplies (optional). The Model 1095RC works in the same rack as our 64k/128k *Netlink™ 2B1Q* modem (Patton Model 1092/1092A) and our T1/E1 CSU/DSU (Patton Model 2700 Series).



Service-Based NetLink mDSL Applications

What specific services are ISPs, carriers, satellite companies, IECs and ILECs going to be delivering using Patton's *Netlink™ mDSL* modem? While there are numerous possibilities, the four applications illustrated below are good places to begin.

Voice Services

With new digital PABX switches, corporations are no longer bound to delivery of voice services over a group of analog POTS lines, or even a 4-wire T1/E1 circuit. Instead, using the *Netlink™ mDSL* modem with a 2Mbps G.703 module, carriers can offer the corporate customer a high-speed local loop connection to the C.O. voice switch using a single 2-wire leased line. A standalone Model 1095 would be used at the customer site, and racks of Model 1095RC modems at the C.O.

single, cost-effective 2-wire leased line. And if a particular customer requires their own DSL connection, the Model 1095's multi-rate capability allows the ISP to support a multi-tiered service offering.

Branch Office Support

Corporations can use the *Netlink™ mDSL* modem, with Voice/Data module, to support a branch office with voice, fax, and data services over a single 2-wire leased line. If several branch offices are within a local metropolitan area—or are spread out over a large physical campus—it is possible for the corporate headquarters to use point-to-point connections and a central rack of *Netlink™ mDSL* modems. If branch offices are in different cities (or even countries), they can be connected to the corporate Intranet via a Frame Relay or ATM network using the *Netlink™ mDSL*.

“Distance Learning”/Video Conferencing
Whether in the academic classroom or corporate training facility, “distance learning” means that teacher and students no longer have to be in the same physical location. A video camera in one location captures the teacher’s lecture, and the signal is transmitted in real time to multiple classrooms via a Frame relay or ATM network. The *Netlink™ mDSL* allows a service provider or corporation to support this bandwidth-hungry application in a cost-effective manner.

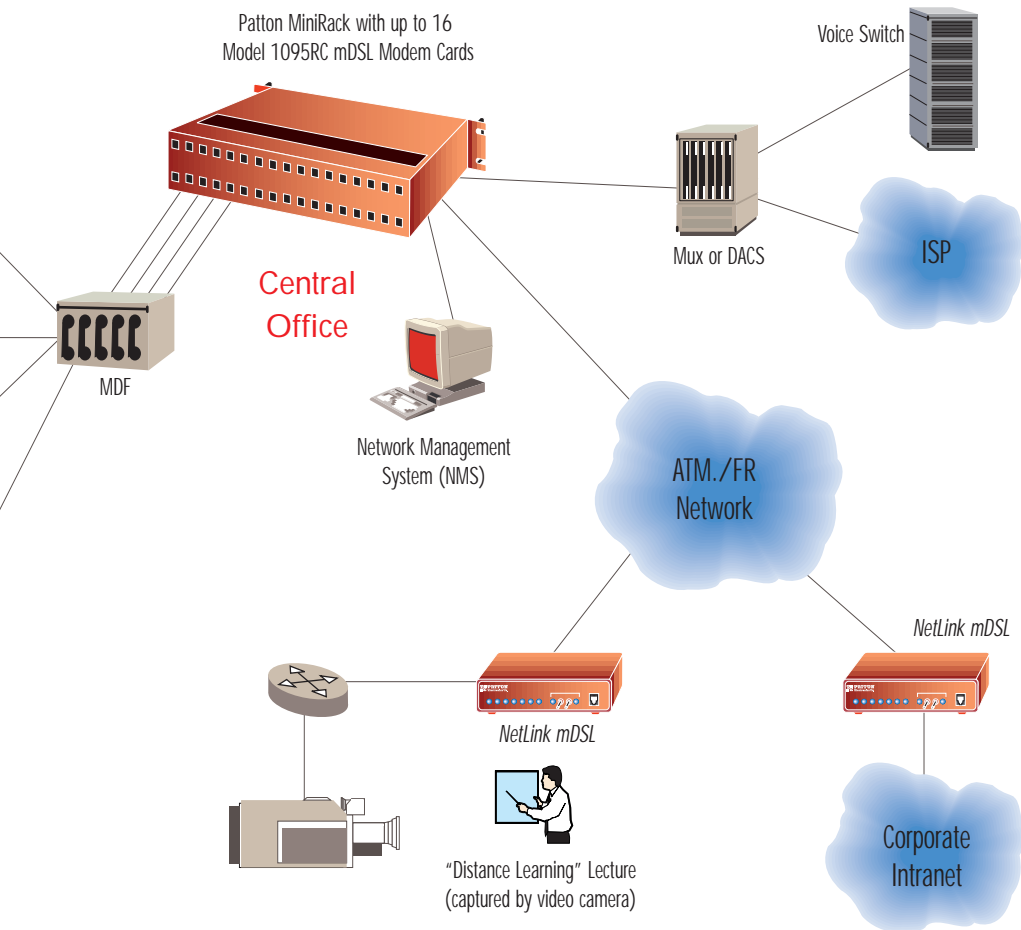
Conclusion

This sampling of applications shows the power and flexibility of the Patton Model 1095*Netlink™ mDSL* modem.

Contact Patton Electronics for more information on the entire *NetLink* Access Product Family.

Web Hosting/Video-on-Demand

Competition to support high bandwidth Internet services such as Web hosting, video-on-demand and pay-per-view movies is putting pressure on ISPs to make higher speed Internet access connections available at the local loop. The *Netlink™ mDSL* modem (with Voice/Data module) is perfect for this application, allowing the ISP to supply a remote PoP with a voice/fax/2Mbps data link—all over a



Wind Generators *Continued from Page 5*

no similar distance problems with the Patton Model 1080A; it met our requirements and continues to perform reliably in the field.”

While the multipoint communication technique used by the Model 1080As is by no means cutting-edge technology, it was perfect for the Lake Benton I application. Says Shadden, “The Model 1080A’s multipoint setup lets us broadcast the same message to every slave modem in the group, even if we only want to talk to one of the towers. When the modem in the correct tower ‘sees’ its unique address in the broadcast, it raises a carrier signal that is recognized by the appropriate master modem. At that point, an exclusive link between the substation and that one tower is set up. We can then download that turbine’s specific data, or issue commands without the other towers ‘listening’ in. It’s simple and effective.”

Enron Wind was chosen as the contractor for an additional 102-Megawatt wind power facility, also near Lake Benton, and construction is already underway. It is expected that Patton Model 1080As will be deployed at that site as well.

Blowin’ in the Wind

In his famous ‘60s protest song, Bob Dylan sings that, “...the answer, my friend, is blowin’ in the wind.” When it comes to the planet’s future energy needs, Dylan’s words were clearly prophetic. Over the past decade, global use of wind power has expanded at the rate of 20% per year. And the American Wind Energy Association predicts that over 47,000 Megawatts of new wind generation capacity will be added worldwide by the year 2007. With over 3,400 of its own wind turbines already installed at various sites around the globe, Enron Wind Corp. expects to be leading this invasion of “green giants” for many years to come. SL

Patton Electronics... In Brief

Patton Electronics Company is a manufacturer of connectivity, transmission and network access products for data communication applications. Founded in 1984, Patton Electronics is headquartered in Gaithersburg, Maryland (just north of Washington D.C.)

Patton Electronics manufactures its own products, with **ISO-9001** quality, **BABT** approval and **Y2K** compatibility. Call on us for your next project—we’re ready to deliver!

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