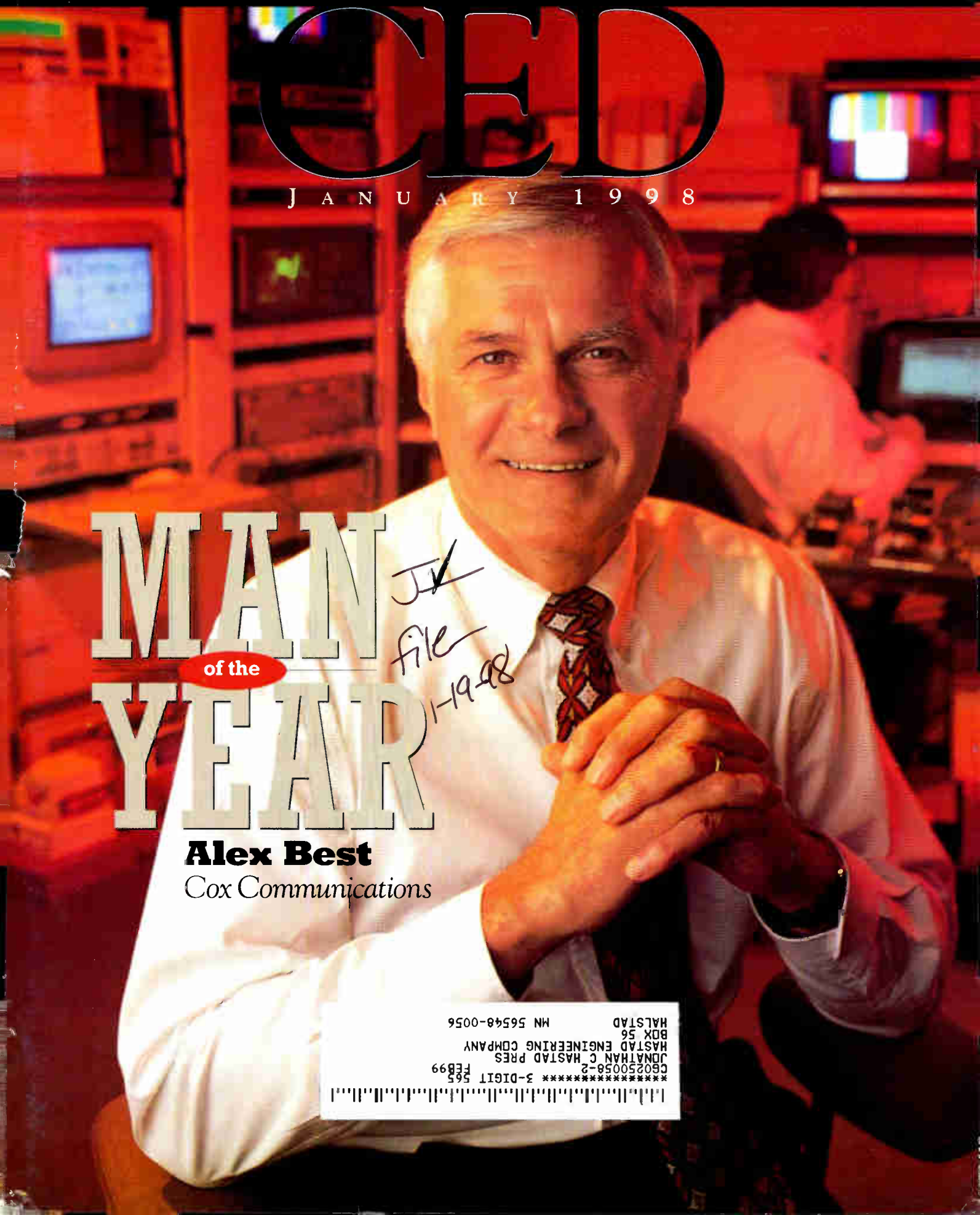
THE PREMIER MAGAZINE OF BROADBAND COMMUNICATIONS

CED

JANUARY 1998



MAN of the YEAR

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Alex Best

Cox Communications

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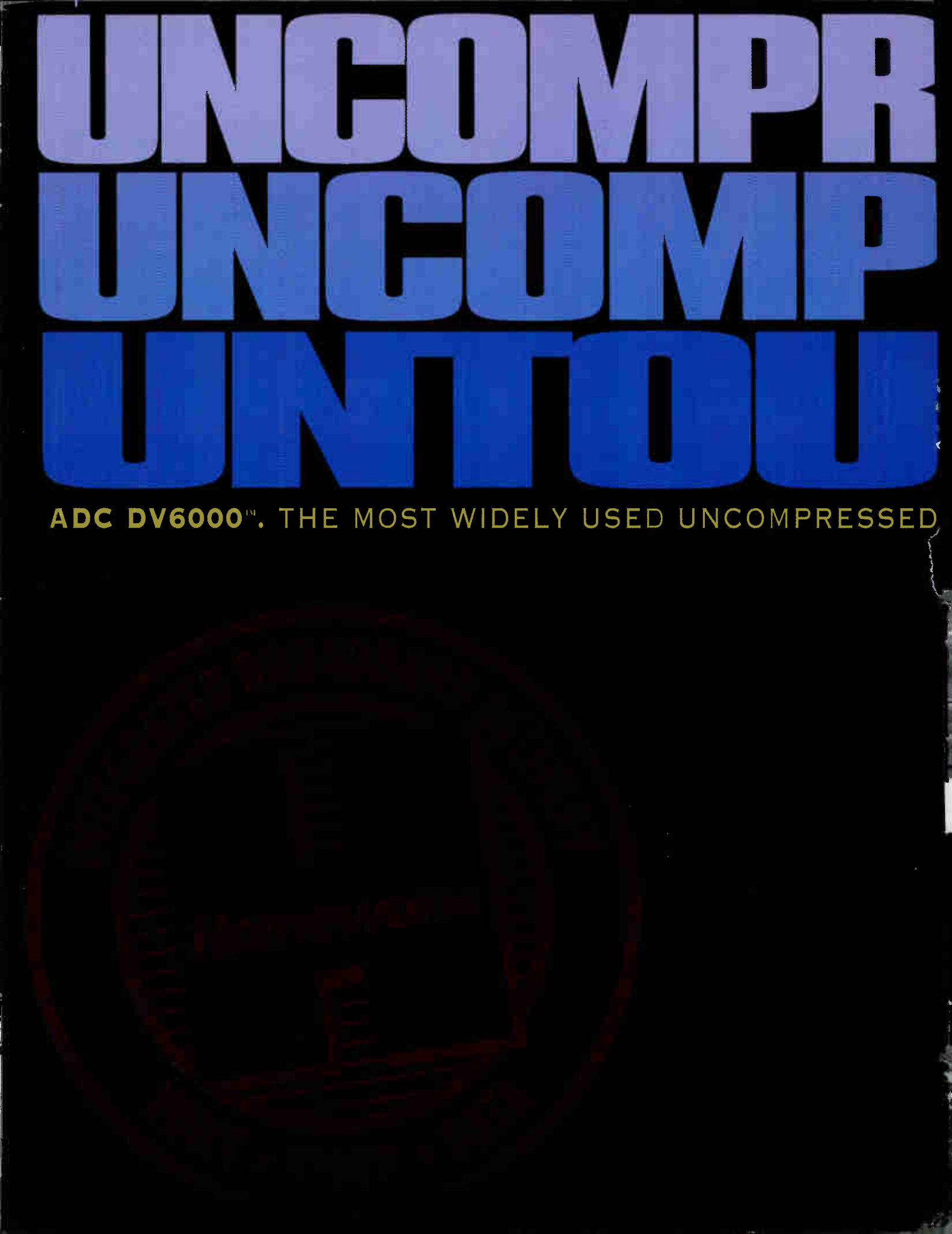

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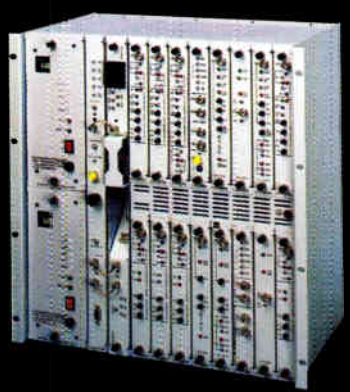

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Reader Service 1

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WAVETEK

Reader Service 2

in perspective

Marrying business with technology

In a former life, I was a professional newspaper photographer, and I always loved the feeling of knowing when I had "one in the can." Translated, that means knowing I had a picture of front-page quality.

After returning from the Western Cable Show, that feeling is back–for a number of different reasons. Those of you who have been on the trade-show circuit know that monstrous shows typically leave you with one of two feelings: pure elation or complete exhaustion. And sometimes, both.

This year's show, for me, was the former. Outside of digital video and the other lead topics of the show, for the first time since the hype began on high-speed Internet access and the deployment of data services, it really feels like our industry has a legitimate shot at securing the lead in the quest for data customers. And, there's much forethought going into the decisions related to both the technology and business aspects of this new service. That hasn't always been the case in our industry's 50-year history.

Understanding the business of technology will be paramount as we go forward

ROB STUEHRK, PUBLISHER

For the last few years, *CED* has been tuned into this industry's technical renaissance. Maybe it was the shot the telcos fired over our bow a few years ago or maybe it sprang from a new generation of customers who expect more convenience and information. Whatever the reason, it's no longer just technology, or business, as usual.

Today, technology doesn't happen in a vacuum. Technology decisions have ramifications for all aspects of a cable system's operations, including marketing, administration, customer service, and yes, even public policy. I think Dick Green from CableLabs said it well in our November issue. "We must look at the business perspective of OpenCable and technology in general and turn it around to the business/revenue side . . . and the business of technology is where CableLabs will focus most of its attention."

CED has always been a technology magazine; we have no intention of throwing out the baby with the bathwater. But the fact is, understanding the business of technology will be paramount as we go forward into a new, competitive era. By recognizing this trend, and capitalizing on it, we're convinced that we've got "one in the can." Conversations at the Western Show with readers and advertisers alike have shown an overwhelmingly positive response to the business-of-technology mentality.

This issue is the launch point for our new, enhanced editorial mission. You've undoubtedly noticed the new physical look to *CED* as well. Our facelift is designed to enhance your reading time and expand your horizons. That's a big statement, but one we feel strongly about.

New sections devoted to advanced networking and broadband business and management have been added. There are also expanded sections on new products, fiber optics and the technological news driving our industry, each with an eye on the business implications. Overall, *CED* magazine is committed to covering your industry with the same zeal and passion as it has for the past 22 years.

It's great to have that old feeling coming on strong again. Happy New Year.

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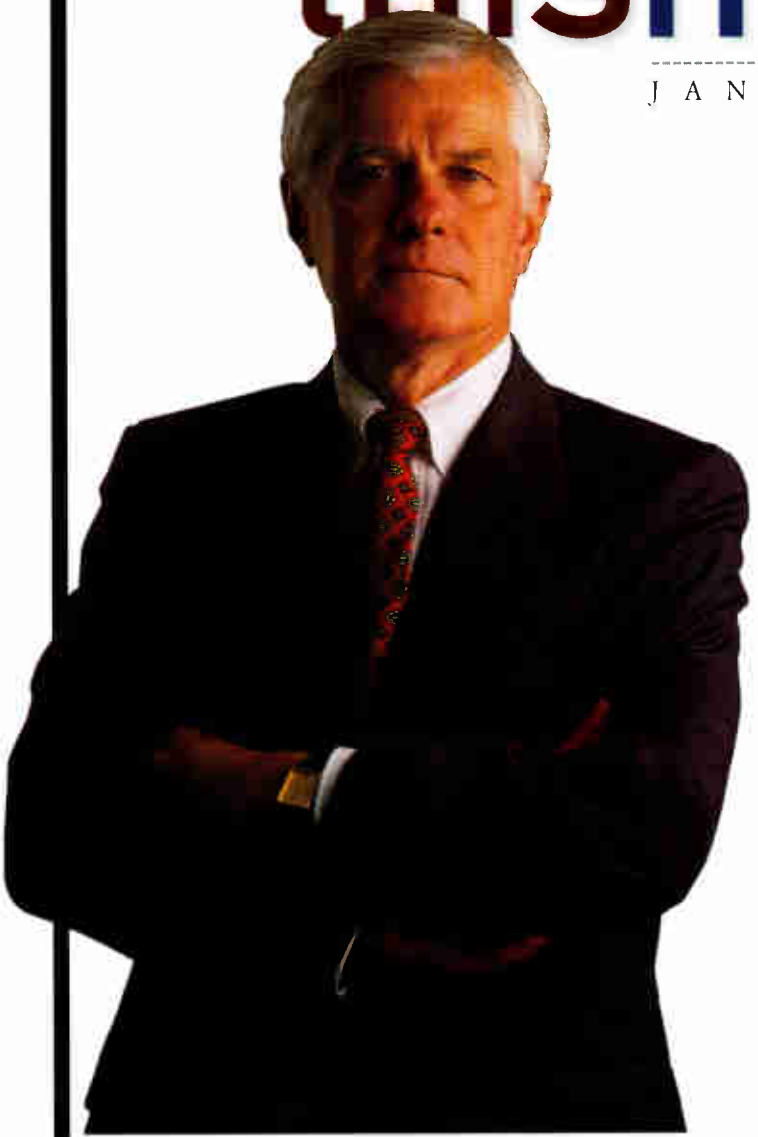


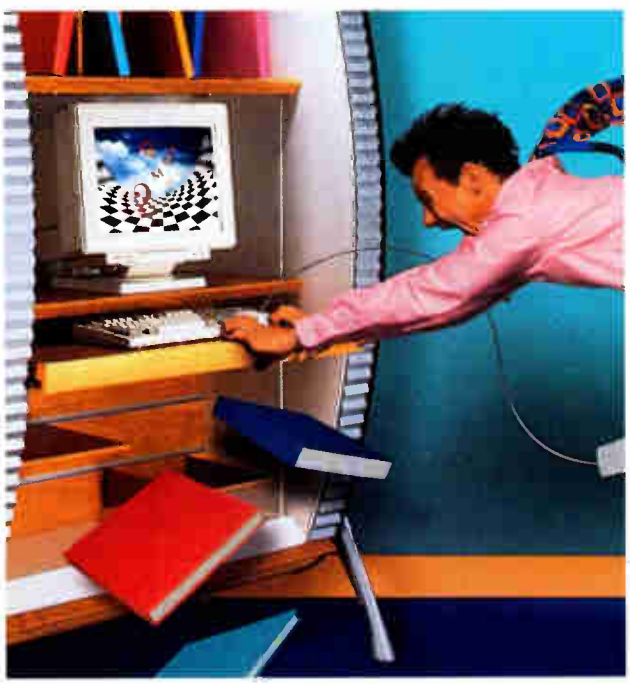
Man of the year–Alex Best

20 Firmly committed to rolling out new businesses like digital video, telephony and high-speed data, Cox Communications' Alex Best is going where other engineering executives fear to tread. Because of his fearless outlook, coupled with the engineering savvy he has poured into Cox's telecom networks, Alex is being honored as *CED's* Man of the Year for 1997. This profile reveals why Alex has won his peers' respect as both an engineer, and a human being.

COVER PHOTOGRAPHY BY ROD REILLY

Cable gets data blast at Western

52 Today's question is: who's *not* offering high-speed data modems? Engineers attending the recent Western Cable Show were bombarded with new modems, new modem chips, and more ways to craft compelling content to run on them. And the Show offered much more in terms of new technology, including numerous solutions for cleaning up the return path and the latest in network monitoring and management tools. *CED's* show wrap-up also includes coverage of educational sessions, with tips on the hottest emerging business/technology opportunities, as well as reports on the deployment of digital technology.



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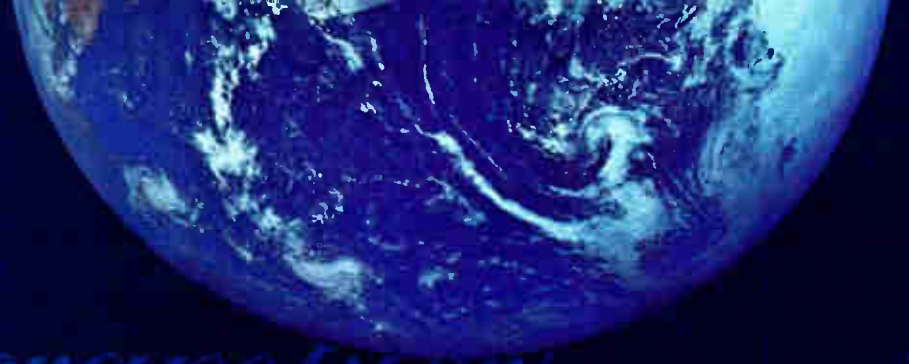

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JANUARY 1998

FiberLine

78 Choosing the right fiber splice closure makes all the difference in keeping the cable plant running efficiently. Here's a review of what's been learned by telcos and cable companies.

Advanced Networking

84 **Business applications over cable networks.** What steps should operators consider if they want to tap the lucrative commercial high-speed data market? This article supplies the answer.

Which way to the data bonanza? Operators ponder the best route to making cable modems mainstream.

Broadband Business

100 While cable telephony has yet to get off the ground in the U.S., in the Netherlands, cable operator A2000 has successfully launched residential telephony service and is planning an even broader product offering in the near future. With a recent commitment to Tellabs for $100 million worth of telephony gear, A2000 is taking the cablephone business very seriously.

Jack Methven of A2000 and Bob Fordham of Tellabs

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INGRESS PROBLEMS SLOWING YOU DOWN?

Speed has never been as important in the race to install and maintain your return path as it is today. So the last thing you need is a problem with ingress. That's where the HP CaLan 3010R/H Sweep/Ingress Analyzer comes in.

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  New! One headend box for both forward and return sweep means more efficient use of bandwidth, more space in the headend and less equipment to buy.
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When speed counts, there's no faster way to activate your return path and troubleshoot ingress than the HP CaLan 3010R/H.

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Reader Service 6

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upfront

LATEST NEWS AND INSIGHT

GI nails $4 billion digital deal

In an unprecedented move, General Instrument (which also announced it was changing its name back to GI from NextLevel) said last month that it had reached an agreement with nine major cable MSOs for "up to 15 million" digital set-tops, in exchange for those operators becoming equity investors in the company. The deal is reportedly worth about $4.5 billion over the next three to five years, according to GI officials.

In a separate yet related deal, GI also said it had acquired the digital transport and authorization functions of Tele-Communications Inc.'s Headend in the Sky (HITS) organization, in exchange for a 10 percent stake in GI.

Although the MSOs were not specifically named, GI said they represent "about half of the entire cable industry."

Under terms of the announced deal, GI will give MSOs who purchase set-tops stock warrants that will allow those operators to purchase up to 16 percent of GI equity for about $15 per share. The warrants will vest only as set-tops are actually shipped between 1998 and 2000.

TCI is expected to be GI's biggest customer. During a widely covered speech at last month's Western Show, John Malone said that the company expects to purchase several million digital set-tops based on the emerging OpenCable specification that would ensure interoperability.

In a press release issued by TCI just prior to presstime, TCI said it would purchase between 6.5 million and 11.9 million devices for TCI and certain other HITS affiliates over the next three to five years.

Jim Chiddix, chief technical officer at Time Warner Cable, said his company had committed to purchase 500,000 digital boxes from GI. He also hailed GI's actions as good for the OpenCable initiative.

Cox licenses OSS software

MetaSolv Software Inc., a provider of telecommunications software solutions, has signed a software licensing and software services agreement with Cox Communications Inc. to support the Atlanta-based operator's back-office operations for telecom services.

The software will manage the order management, service provisioning, network design, trouble management, gateway interconnections and work-flow management business functions for Cox.

"As we deliver on our promise of becoming a 'one-stop' shop of complete telecommunications services, we value MetaSolv's integrated business solutions," said Mark Dickherber, director, national operations for Cox Fibernet. For example, modules will be used to track and configure the hardware that Cox integrates into its fiber optic Sonet networks.

Telewire to distribute V-chip device

Tri-Vision Electronics Inc. has awarded exclusive North American distribution rights to its "ViewControl" V-chip set-top box decoder line to three leading distributors in the retail and cable TV industries, including Telewire Supply.

Tri-Vision has signed letters of intent for exclusive territories and markets in this region with: Ingram Entertainment, to exclusively target retail sales to consumers in the U.S.; Telewire Supply (a division of Antec Corporation), to exclusively target cable television operators in the U.S.; and Beamscope Canada, which will market to consumers in Canada. Tri-Vision will retain distribution rights to cable television operators in Canada, perhaps under a different brand name which will be announced later.

Ingram is the largest national distributor of home entertainment products, including pre-recorded videocassettes.

Beamscope is one of Canada's leading sales, marketing and distribution companies.

In addition to these letters, Tri-Vision has recently signed a joint development agreement with Samsung Electronics Co. Ltd. to build the first "V-chip enabled" television set and is in the process of establishing licensing agreements with Samsung and other TV manufacturers for the incorporation of its V-chip technology into new television sets.

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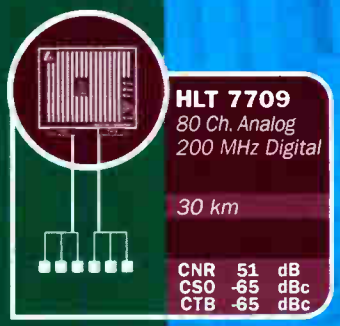
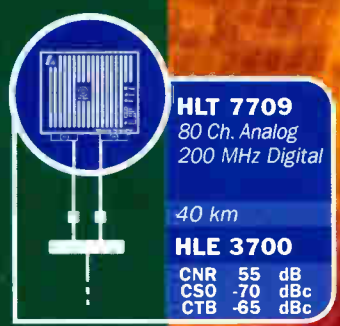
The high combined output power of the new MAXLink enables efficient 1550 nm distribution. The high signal output allows for remote location of the optical amplifier, producing high signal quality in the new fiber-to-the-node transport architectures. In supertrunking applications the new transmitter increases efficiency and improves CNR due to elimination of the optical amplifier. And no matter how you look at it, this all means better economy–in either long-distance or fiber-dense environments.

As television, telecommunications and high-speed telecomputing converge into one compatible digital domain, Harmonic will be there in every headend, hub and node with products that keep you online. Simpler, faster and better.



Efficient Distribution

1550-to-the-Node with Digital Narrowcast



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Reader Service 7

T-W of Cincy goes with mobile radios

In order to improve communications between its dispatch and field personnel, Time Warner of Cincinnati and SEA Inc. have teamed up to equip the MSO's cable television installation and maintenance vehicles with SEA 220 MHz radios. Time Warner will purchase more than 300 ESP520D mobiles and 30 SEA700 handheld portables.

Time Warner's field service personnel will use the SEA radios on the 220 MHz trunked radio system for dispatch communications, operated by Wright Radio of Cincinnati. The radio system will be used by the dispatchers to communicate with field personnel or for field-to-field communications. Wright's 220 MHz trunked radio system is a wide-area radio system.

The SEA trunked radio system allows Time Warner to configure its system into small radio "talk-groups" for efficient communications among service personnel who routinely communicate within a small defined group of users. Dispatchers will have the ability to quickly call an individual, a talk group, or all personnel at once with simple push-to-talk controls, without ever having to dial a number.

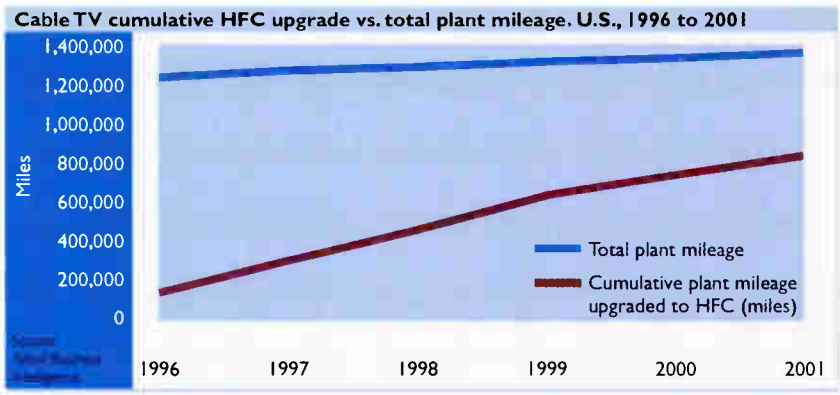
SEA manufactures and supplies spectrum efficient 220 MHz radio systems including mobile radios for voice and data transmission, portable radios, and base station radio repeaters. SEA has supplied the radio infrastructure equipment for more than 600 operating trunked systems.

BellSouth deploys Zenith set-tops

BellSouth Corporation's recent launch of its americast digital home entertainment service in New Orleans marks the first full-scale deployment of digital set-top boxes from Zenith Electronics Corporation.

With the Zenith terminals, BellSouth will offer its New Orleans subscribers more than 160 channels of digital video entertainment, with advanced on-screen graphics and near-video-on-demand capability. The feature-rich terminals are based on open industry standards and are designed to support BellSouth's state-of-the-art digital wireless service.

Zenith has integrated technology from C-Cube Microsystems' DiviCom Inc. subsidiary, for example, to help Zenith create standards-compliant, digital technology for competitive, timely and cost-effective digital systems. The box's flexible design uses interchangeable network interface modules for various kinds of digital video networks, including wireless and wired cable systems and satellite systems.



United Video invests in Ka-band group

United Video Satellite Group's DirectCom division has invested in a Colorado-based Ka-band satellite company called KaStar Satellite Communications to provide next-generation satellite services for data and multimedia transmission. Under terms of the deal, UVSG will initially own a 42 percent interest, with the ability to own up to 49 percent. KaStar has been awarded the Ka-band frequencies at 73 and 109.2 degrees.

"This agreement represents a new foray into satellite telecommunications for UVSG," stated Gary S. Howard, chairman and chief executive officer of United Video.

"Ka-band satellite spectrum is capable of many things, including very robust data transmission utilizing sophisticated switching on the satellite at tremendous speeds," said Peter C. Boylan III, president and chief operating officer of United Video. "Although Ka-band on-board processing technology is still emerging, it is believed that two-way transmissions, data routing, as well as spot beaming, will be available at price points and speeds attractive to commercial and residential users."

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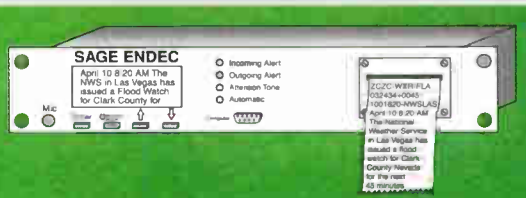

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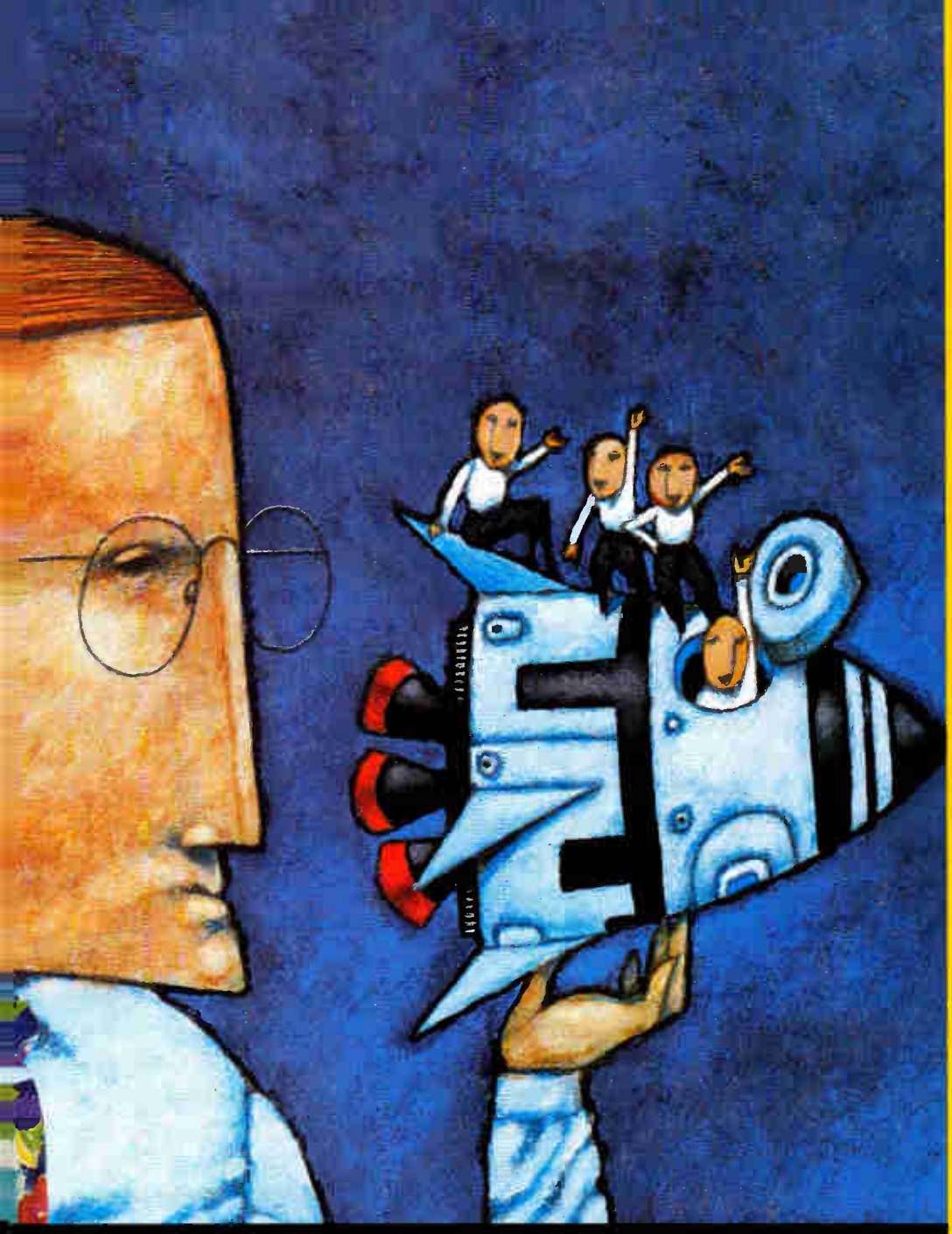

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Reader Service 9

upfront

LATEST NEWS AND INSIGHT

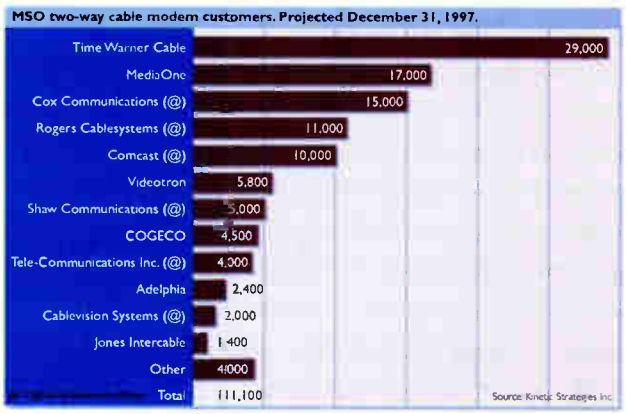
Will consumers pay for fast Internet service?

A recent Yankee Group survey of more than 1,900 U.S. households found that nearly two-thirds of all on-line homes want faster access to the Internet, with over half specifically interested in cable modem service. That's the good news. But the bad news is that it appears the number of consumers who are willing to pay for faster access is much smaller, the study found.

According to the survey, about one-sixth of U.S. households currently have access to the Internet through a proprietary on-line service or dedicated Internet Service Provider. While 66 percent of these on-line homes expressed interest in receiving some type of faster service, only seven percent of current subscribers said they were "very interested" in a service providing unlimited access for $40 per month. When asked specifically about cable modems, 52 percent expressed general interest, but just four percent were "very interested" at the $40-per-month price point.

"Clearly, we see a strong overall interest in high-speed data services, and cable modems perform well with early adopters," notes Bruce Leichtman, director of the Yankee Group's Media and Entertainment Strategies Group. "But the real challenge for the cable industry will be to make the product available to more homes, and to convince more consumers that it's worth the cost."

"It is also important to remember that the individuals who will subscribe to high-speed data services from cable companies and other providers over the next few years are largely those people who are already subscribing to a service today," adds Leichtman.



S-A Explorer box to support HTML and Java

Scientific-Atlanta Inc. will include support of HyperText Markup Language (HTML) as a standard feature in its Explorer 2000 digital set-top, with support of JavaScript available for a nominal fee to cover third-party licensing costs.

The announcement supports an industry-wide initiative by Cable Television Laboratories (CableLabs) to forge a consensus on achieving open specifications for advanced two-way cable networks. Recently, CableLabs announced that its OpenCable initiative would endorse open Internet specifications, including HTML and JavaScript, instead of specifying any single processor or operating system. Many industry participants recommended HTML and JavaScript application programming interfaces (API) in their OpenCable submissions to CableLabs. APIs are the software interfaces required by developers to author interactive applications.

HTML and JavaScript complete an open and robust platform for applications from a variety of content developers. For example, Internet-TV applications such as e-mail, Web-casting and Web-browsing on the television can be supported.

The HTML and JavaScript client engines will be developed and provided by PowerTV Inc. with the PowerTV operating system, all of which will be included in the Explorer 2000 set-top. The new APIs will exist as middleware layers on top of the operating system.

The API enhancements are scheduled to be available for Explorer set-tops delivered as early as Spring 1998; older units can be enhanced through software downloads.

Com21 takes cash infusion

Com21, which recently announced its intention to develop MCNS-compliant modems with Cisco, recently received a $5 million shot in the arm from the Public Communication Networks Group of Siemens AG, the German mega-company.

Com21 also recently said it will offer a modem with a dual-mode return path, making it useful in either one- or two-way cable networks.

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upfront

LATEST NEWS AND INSIGHT

Interactive TV: Not dead yet!

Think interactive TV is dead? Think again! Wink Communications says interactive television sets will be available in the U.S. market this year. A case in point is Toshiba America Consumer Products Inc., which will be the first manufacturer to offer Wink-equipped televisions.

Toshiba was also the first to introduce Wink TV sets in Japan last year. Today, in addition to Toshiba, Sony, JVC and Matsushita (Panasonic) all have Wink-enhanced television sets in the Japanese market.

"Today's announcement is another example of Toshiba's leadership in advanced technologies," said Maggie Wilderotter, president and CEO of Wink. The Wink technology provides enhanced television viewing through simple interactivity and more information on popular shows. By putting Wink directly inside Toshiba televisions, consumers do not have to purchase any additional hardware or pay a monthly fee for the enhanced broadcasting because all features are activated by the television's remote control.

Wink Enhanced Broadcasting includes on-demand plot summaries, trivia quizzes, profiles of athletes and actors, sports scores, news headlines, viewer polls and local weather. In addition, Wink-equipped TV sets allow viewers to interact with advertisements by enabling them to purchase products, request coupons and receive free product samples and brochures by simply pushing a button on their remote control .

Wink also recently announced a number of agreements with cable and broadcast networks. "There will be a dozen networks and cable programming services enhancing their current shows by the first quarter of 1998," Wilderotter stated.

GI to intro WorldGate boxes

General Instrument Corp. said it will introduce a new version of its advanced analog set-top terminal that supports WorldGate Communications' Internet TV Service.

Dubbed the CFT2200-I, the new set-top will be priced equally to or slightly higher than current CFT2200 models, said GI officials. In the case of digital, all that is required is a simple software download. The addition of WorldGate Internet access capabilities can enable operators to provide their customers with Web browsing, e-mail and chat applications over a TV.

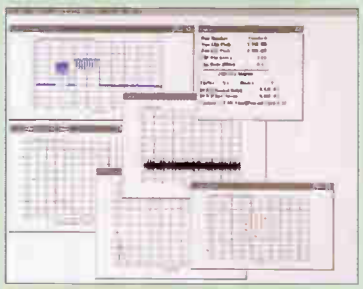
WorldGate services can be enabled on the CFT2200-I for a configuration cost that mimics today's advanced analog pricing. Alternatively, the CFT2200-I can support all of the applications available on the CFT2200 platform today, while also enabling the WorldGate services for a small cost penalty.

The CFT 2200-I is designed to provide resolution comparable to the best that can be viewed on a TV set, true color (65,000 colors), and the capability to receive Internet information at data rates (128-300 kbps) from four to 10 times faster than standard telephone modems (28.8 kbps). The digital capabilities of the DCT-1000 allows for significantly higher data rates, 27 Mbps (using 64 QAM modulation), all delivered with crisp MPEG-2 video and Dolby AC-3 digital audio.

Don't sing the return-path blues

Got the return path blues? Scientific-Atlanta is offering a free service to help qualified cable operators model the future performance of the reverse path in hybrid fiber/coax (HFC) networks.

The key to the service is a proprietary software simulation program that quickly determines the optimum configuration



for planned service offerings. S-A developed the HFC reverse path simulation software to predict the performance of the reverse path in various network configurations and traffic loading scenarios.

"Numerous variables are involved in setting up a reverse path network. Scientific-Atlanta's HFC reverse path simulation software is a tool we can use to help network designers validate their particular scenarios for reverse path configurations, services and traffic," said Dwight Duke, president of Scientific-Atlanta's Terrestrial Network Systems sector.

The simulation software can be used to: predict the bit error performance of QPSK and QAM modulated digital signals in the presence of noise and distortion; model laser transfer and noise parameters; and select signal parameters, including modulation type, data rate, frequency assignment, and power level.

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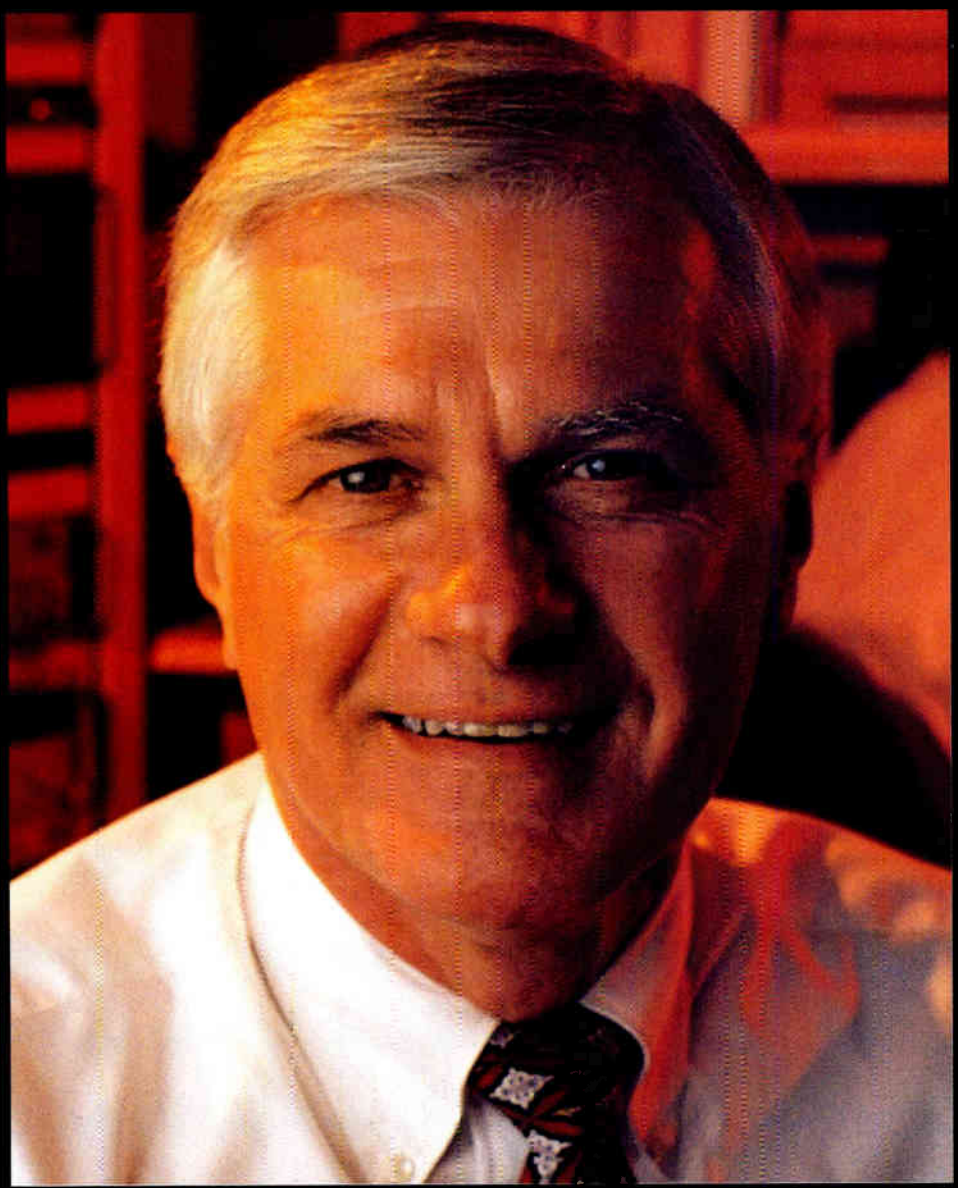
Reader Service 10

ALEX BEST

Helping Cox make emerging technologies pay off competitively

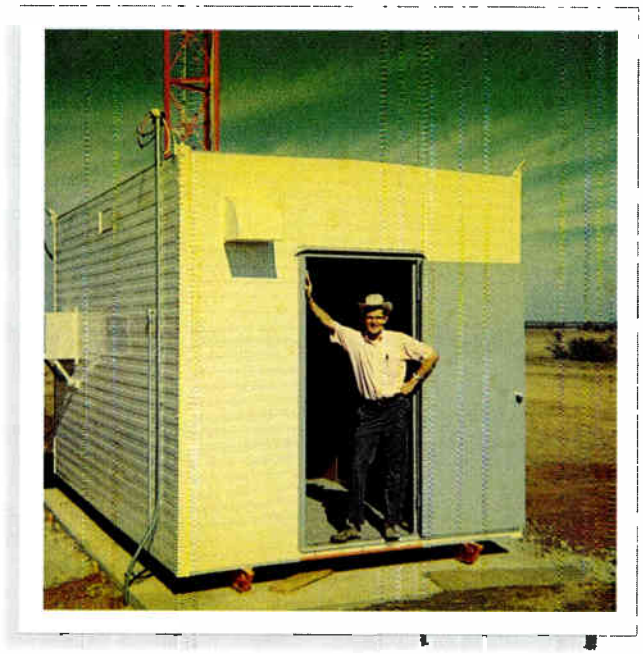
Alex Best has been having visions. No, there's nothing wrong with Alex's health. Quite the contrary. The visions Alex is having are good ones, related to the future competitive landscape. Like many of his cable engineering brethren, they revolve around his company becoming the primary provider of video and telecom services. But unlike the many who have dared to dream of launching new services only to eventually fall back to Earth, Best and his crew at Cox Communications are (hold your breath) actually doing it.

MAN OF THE YEAR



I'M KIND OF QUIET. I LIKE HUMOR AND I LIKE TO LAUGH, ALTHOUGH I CAN'T TELL YOU HOW MANY PEOPLE WALK UP TO ME AND ASK, "WHY DON'T YOU SMILE MORE?"

Alex went to RCA right after graduating from Georgia Tech, and hoped to get an all-around exposure to technology. Later, he would make his living working in rural headends and designing products for Scientific-Atlanta in cable's early days.



"It's the ability to offer an integrated combination of services that will determine whether we succeed in the long-run," notes Alex. With Cox aggressively upgrading its systems and kicking off three new lines of business–digital video, digital telephony and high-speed data services–the company is poising itself to win the competitive clash. The secret, according to Alex, is the all-powerful cable network. "I don't see any other network out there that can touch what we can do," Alex boasts.

It's because of that can-do attitude and decidedly clear vision of the future that *CED* proudly names Alex Best, senior vice president of engineering at Cox Communications, as its 1997 Man of the Year.

Starting early

With high marks in science and math while in high school, "It was only logical that I should go to a technical school, which for a Georgia boy meant Georgia Tech," drawls Alex. This "rambling wreck" graduated with a bachelor's degree in electrical engineering in 1963 and in short order accepted a job with RCA in the Northeast. RCA was an appealing employer because of its policy of putting new-hires on a several-site rotation that exposes them to numerous different technologies–giving employees a chance to pick the type of electronic work that most appealed to them.

Alex spent six weeks in Burlington, Mass., where RCA designed military equipment, but was soon sent packing to Indianapolis, where the company designed TVs. It turned out to be a long-term assignment, and the only other stop Alex would make on his high-tech rotation. Says Alex: "It was somewhat disappointing, but quite frankly, the TV industry was fascinating to me."

During those revolutionary early 1960s, companies such as RCA were transitioning from tube technology to solid-state circuitry. Alex was focused on developing a new AGC system that helped make TVs more immune to noise sources such as automobile ignitions and vacuum cleaners.

It was interesting work, but after a couple of years, Indy's cold climate–and perhaps a touch of homesickness–got the better of Alex. "Evidently, my blood was too thin, because there was one Monday morning that I'll never forget. I opened the door to my apartment and the snow was level with the hood of my car. I realized this wasn't the right place for a Georgia boy."

So, in 1965, Best took a leave of absence from RCA and returned to Georgia Tech, where a year later he earned his master's degree.

While in grad school, Alex took a part-time job at the Georgia Tech Engineering Experiment Station, a university-sponsored company that performed basic contract research. While doing work on military receivers, Alex noticed a colleague who was tinkering with a side project. Overcome with curiosity, Alex inquired and was told it related to a tower-mounted television pre-amp that was being designed for a company called Scientific-Atlanta.

"I took an interest in that project," Best recalls. In short order, he was introduced to Tom Smith, who was charged with the task of developing products that would take the company beyond antennas to include a line of headend products for the then-nascent cable TV business. Given Alex's experience with TV technology, Tom took a shine to him, and after Alex completed his master's work, Smith hired him immediately.

"I'll never forget my first day at S-A," says Alex. "Tom walked in my office, threw down an instruction manual for a Jerrold tube-type headend processor and told me my job was to design one of those–but it had to be solid-state."

Alex, of course, had no idea what the product was–but would soon find out.

Typical day in the life . . .

These days, most of Alex's time is devoted to meeting with equipment suppliers, talking with analysts, fielding calls from the press, attending internal meet-

CED Man of the Year

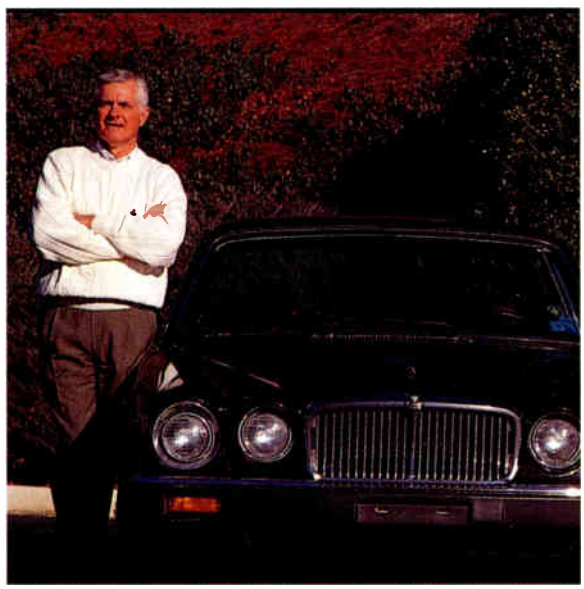
Alex Best

It is our pleasure
to applaud your vision
and leadership.
We are proud to have
called you colleague,
customer and friend.
Your innovative ideas
and energetic drive
inspire us all.
Congratulations!

Scientific
Atlanta

was in recognition of the fact) I'm highly motivated and love a challenge."

Hard work has taken Alex far. He's fond of telling the story about the time, years ago, when he had finished wiring a headend and was waiting on the system's owners to come by. "I'm not real good at just sitting around, so I cleaned up the inside of the headend," he says. "And when they still hadn't come by, I found an old rake and decided to clean up the area when they showed up. They were amazed. I remember they called Jay Levergood (of S-A) and told him what I was doing.



PHOTOS ON PAGES 21 & 26 BY ROD REILLY

He might be nearing retirement, but Alex has no intention of slowing down. "This is absolutely the most exciting time to be in this industry," he says.

The incident taught him yet another valuable life lesson–one that Alex is trying to pass on to his children. "You can spend hours and hours doing sophisticated stuff, but the fact I was out there raking the yard is what they remember," Alex says. "I try to tell my sons (30-year-old Michael and 27-year-old Bryant) the same thing: Do your job, and then go one step further. Do more than you're supposed to do, because when the time comes that they're looking for people to move up, they're going to pick the one who goes a step farther."

Time to move on

That hypothesis certainly worked for Alex. In the mid-1980s, he had become a principal engineer, the highest technical position at S-A. By designing innovative products and understanding the needs of the cable operators, he had gained recognition and the respect of his peers.

He also caught the eye of Jim Robbins of Cox, who was looking for a vice president of engineering. Curious, Alex agreed to meet Jim and talk about the job. "I had gone about as far as I could go at Scientific-Atlanta," says Alex. "The only way to go any higher was to manage one of the divisions, and that didn't look like it was in the cards. This was a chance to do something different."

As it turned out, Robbins was looking for someone with the one thing Alex lacked–operations experience. But Robbins' protracted search kept coming back to Alex. Eventually, however, he agreed to give Best a shot at the job.

More than a little nervous about changing jobs after 20 years at S-A, Alex delicately asked Jim if he could have a job guarantee. "I was giving up a lengthy career to go to a company that admitted I didn't have what they were looking for," Alex says. "(Jim) kinda laughed and said, 'Hey Alex, even I don't have a job guarantee'."

Alex's reticence was obviously misplaced. In the 12 years he's been at Cox, he's presided over the company's technology push into fiber optics, addressability and repeated bandwidth upgrades in support of new service launches, and succeeded.

That effort continued until about four or five years ago, when Alex's professional life changed with the advent of new technology and a new business paradigm. "Life is much more complicated today than it used to be," he emphasizes. "A few years ago we realized we were headed toward an era of competition and (realized) that the company that could most effectively offer a host of services would probably be the winner."

Under Robbins' guidance, Cox realized it had to do several things in order to compete and win. First, it had to have size, so Cox acquired Time Mirror and grew past 3 million customers. It also had to dominate the markets in which it operated, so it clustered its franchises in order to control those markets. And finally, it had to be perceived as a customer-friendly, reliable operation, so the company spent money on customer service and technical upgrades. The latter effort paid off handsomely when it won the 1996 J.D. Power Award for best customer service.

But perhaps the biggest upgrade involved the use of fiber optics, says Alex. "The beauty of fiber is that it solves two issues: picture quality and reliability. It's almost as if we had rebuilt the network to where we put a bunch of headends out closer to the customer."

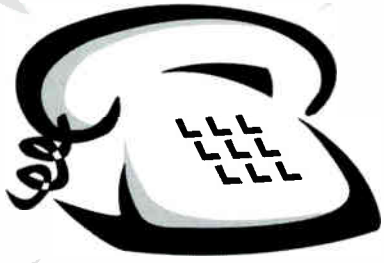
Recognizing the advantage fiber offered, Cox management bought into the concept. Since then, Cox engineers went one step further by introducing the "Ring-in-Ring" architecture. It effectively closes the loops that are started in a traditional fiber "star" architecture, which provides greater network reliability.

Today, the company stands ready to embrace other new, emerging technologies. Digital video is rolling out almost as fast as Cox can buy the hardware; telephony services are being deployed in selected markets; ATM and PCS are being tested in places like Oklahoma and San Diego. "From a technical perspective, that's been our success," Alex says. "We deploy the latest technology as soon

Thank you

Alex

For leading this
dynamic industry
to a brighter
tomorrow.



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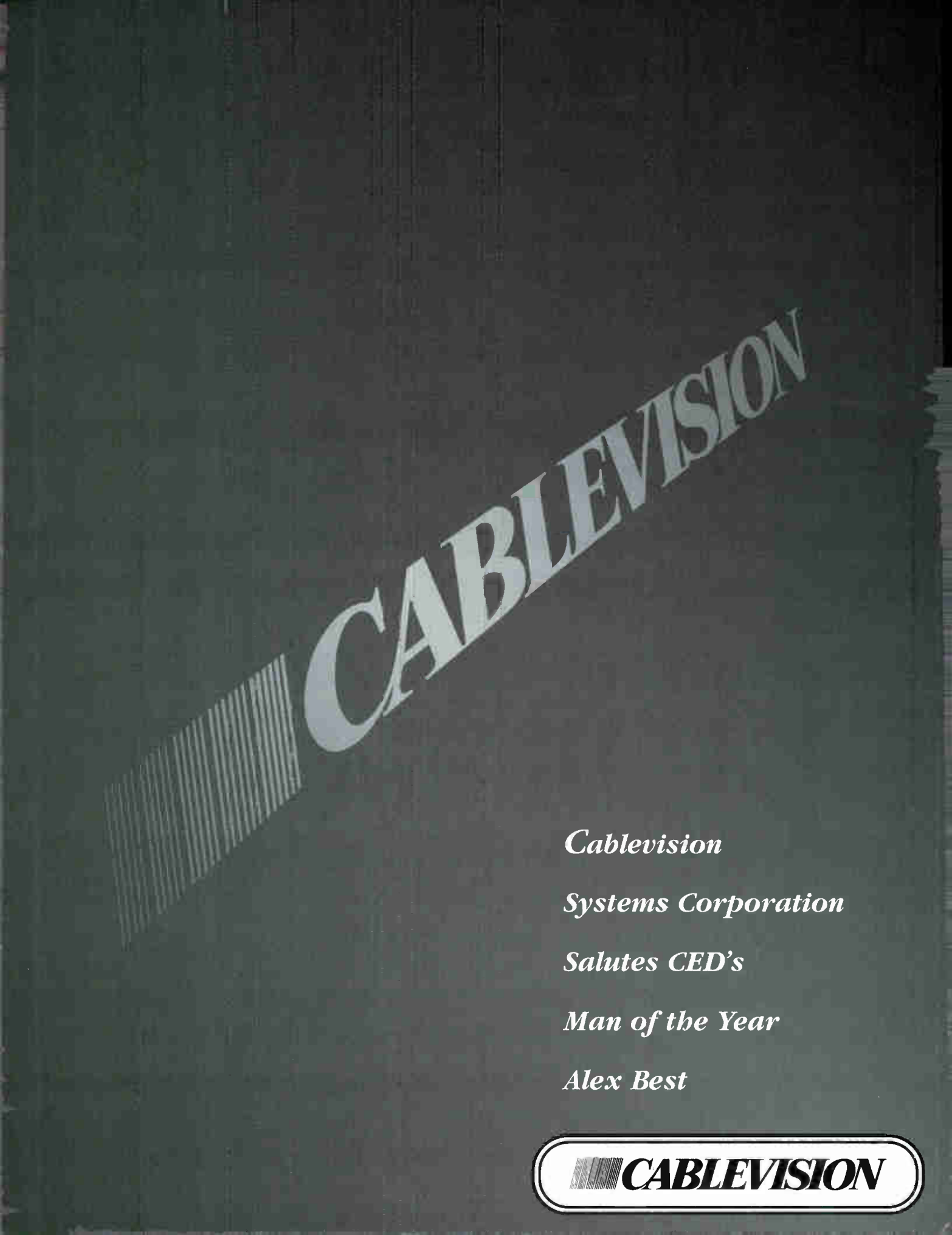

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Salutes CED's

Man of the Year

Alex Best

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Pirelli Cables and Systems North America would like to congratulate Alex Best of Cox Communications as the *CED* magazine Man of the Year. This award recognizes his dedication and his outstanding contributions to our industry.

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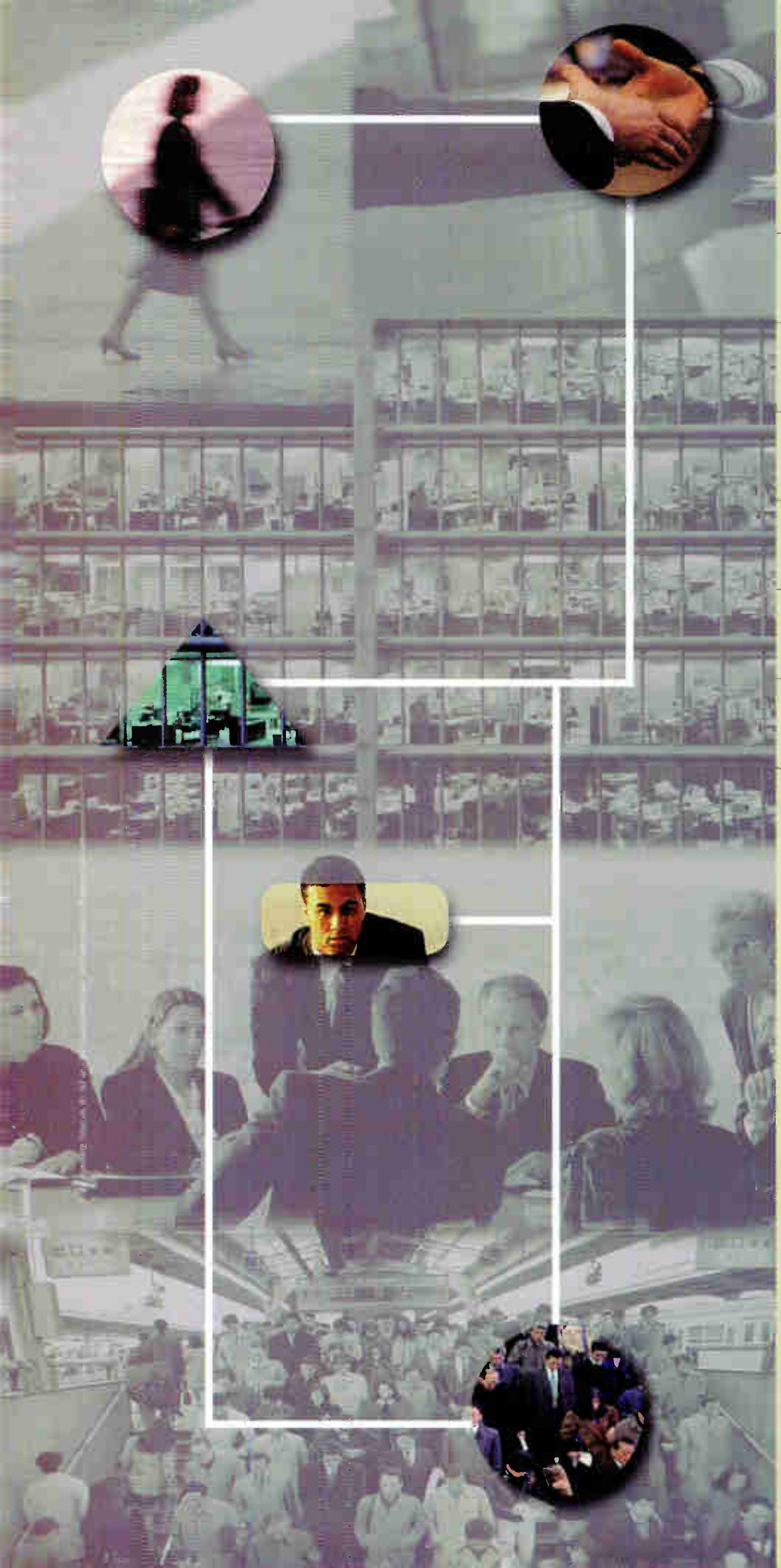

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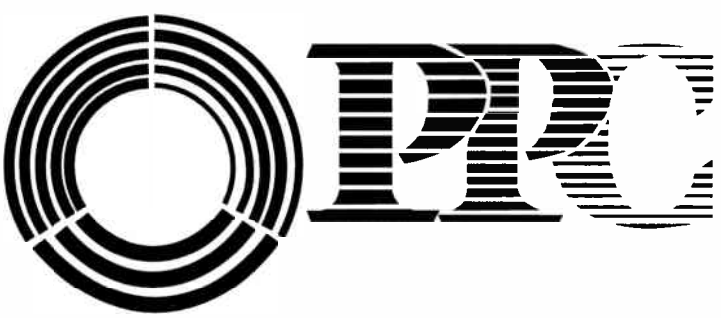

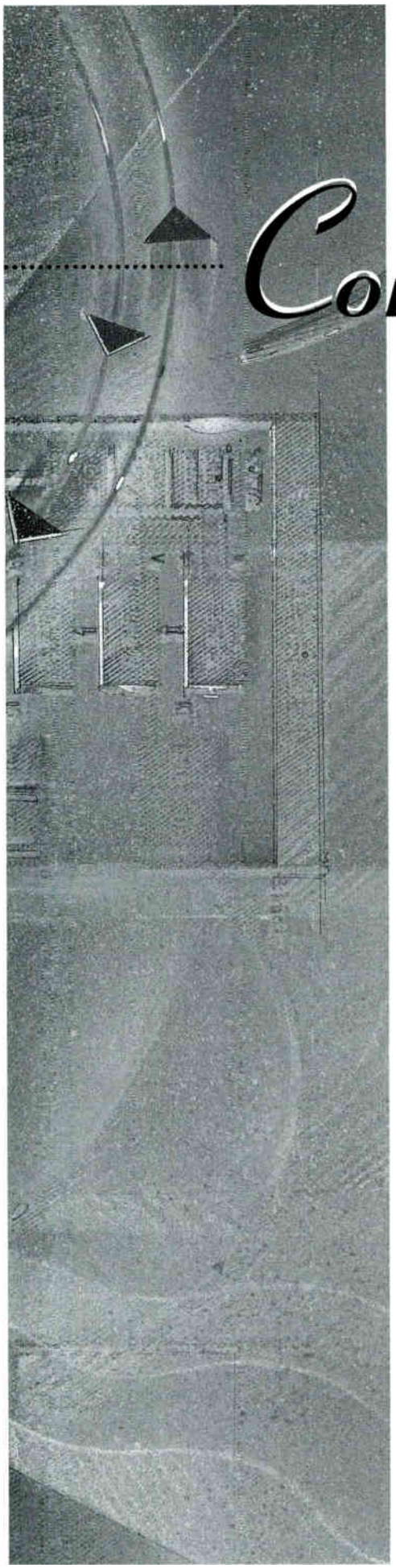

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Alex Best

CED's Man of the Year

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Alex Best
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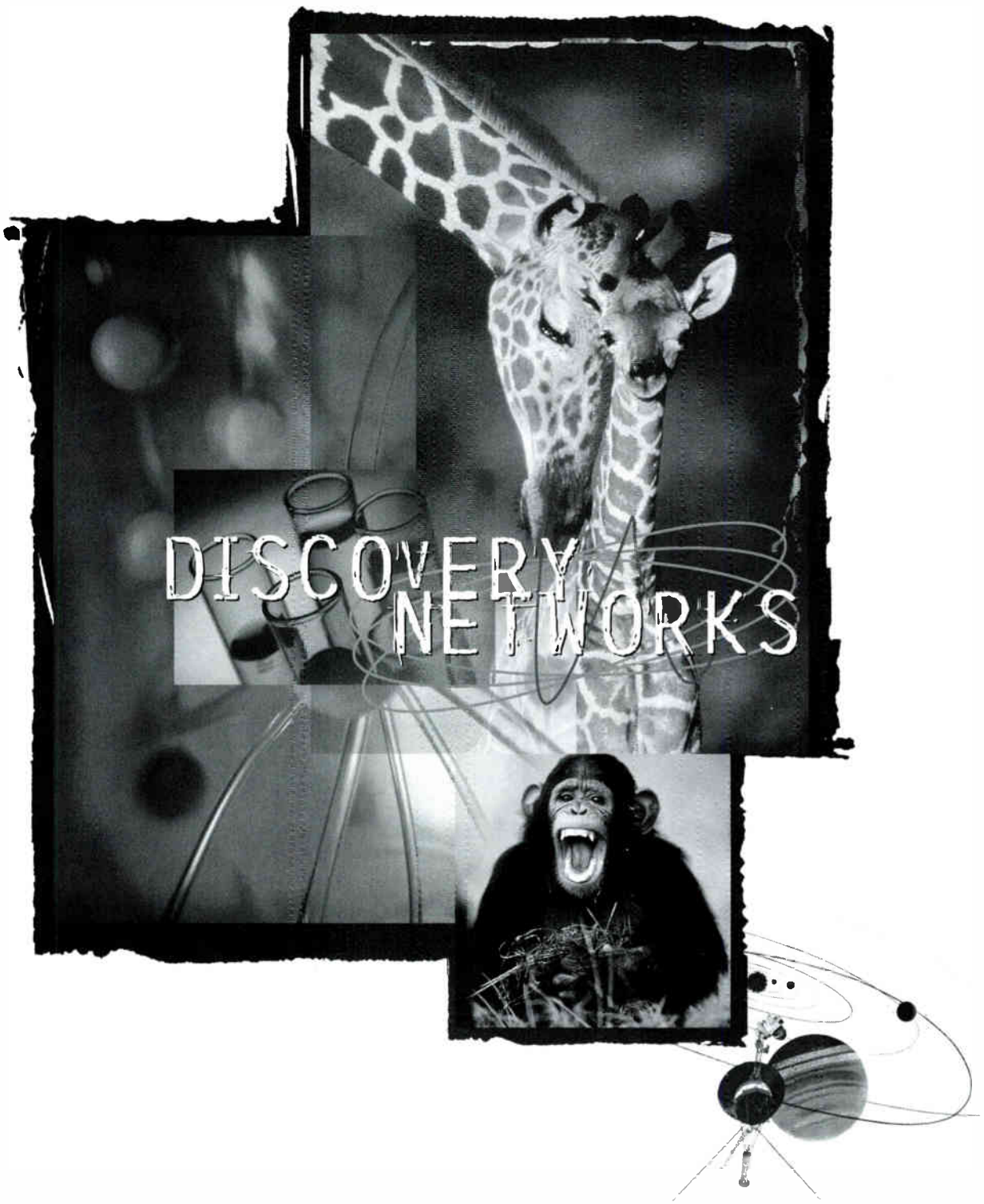

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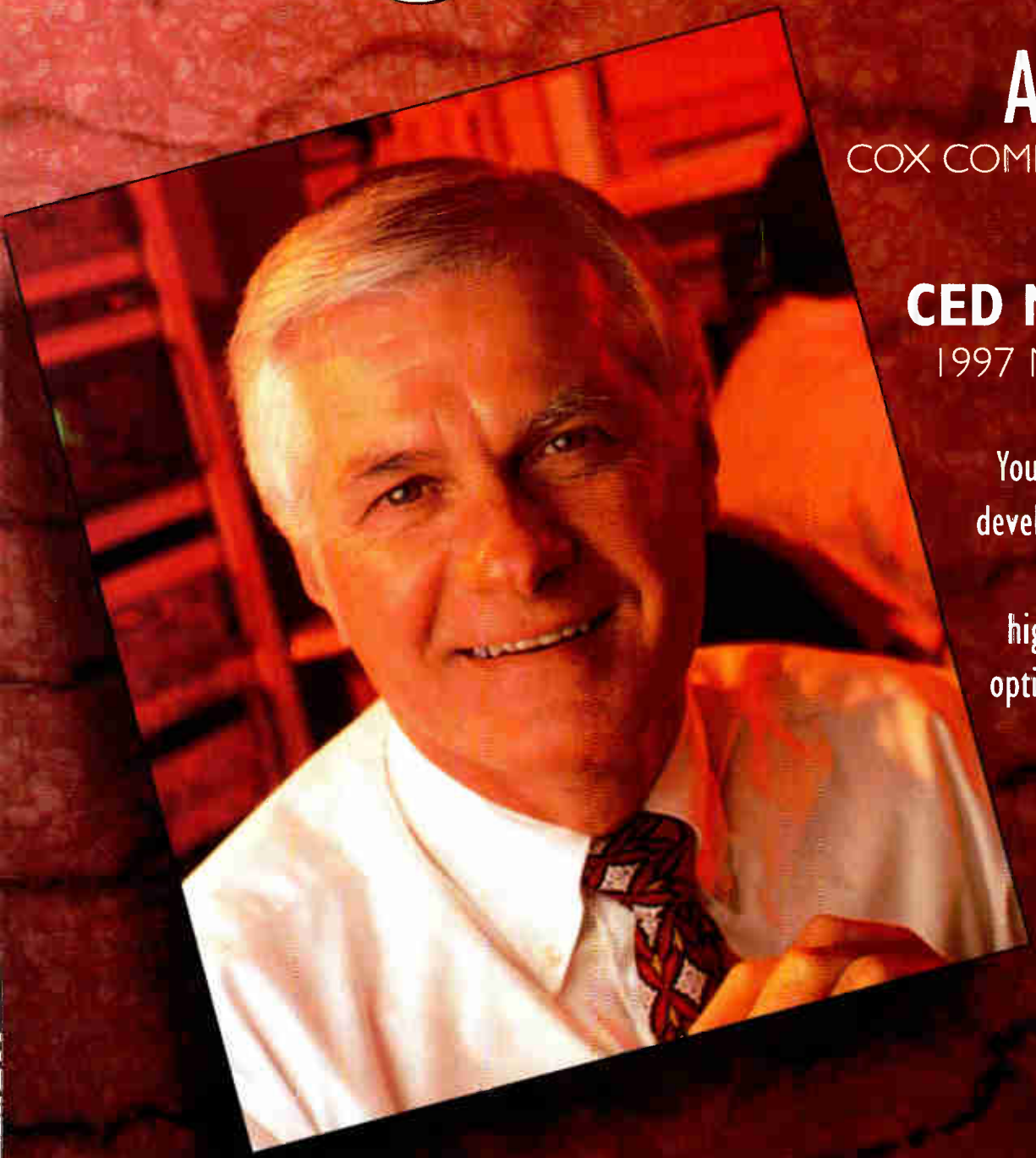

Alex Best
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High-Speed Data WOWS *The* Western Show

New Modems Make Their Debut; Interoperability Demonstrated

Living up to pre-Show promises, interoperable high-speed data modems and the high-bandwidth content that runs on them dominated Western Show floor activity, with the best one-stop compatibility area being the CableNET portion of the Anaheim Convention Center.

The 28,500 attendees heard about new modems from ADC Telecommunications (in an OEM arrangement with Phasecom Inc.), Bay Networks Inc., Integrity Communications, Motorola Inc., Philips Broadband Systems, Samsung Electronics America, Terayon Corp. and Toshiba Corp. Under the chassis, silicon suppliers Broadcom Corp., Rockwell Semiconductor Inc., California Eastern Laboratories, Stanford Telecom and Libit Signal Processing were on hand touting chips that will comply with the cable industry's MCNS (Multimedia Cable Network System) standards.

Plus, NextLevel (which has since changed its name back to General Instrument Corp.) joined Cisco Systems Inc.'s growing list of modem vendors, bringing to six the number of suppliers promising to ride on Cisco's router.

Speaking of routers and termination gear, a new chord of harmony was struck during a press briefing in Anaheim that showed eight data vendors–3Com Corp., Bay Networks Inc., Cisco Systems Inc., Harmonic Lightwaves Inc., NEC America, Phasecom

BY *CED* STAFF

PHOTO BY ELLE SCHUSTER/TIB

Inc. and Toshiba Corp.–that were willing to work together on interoperable cable modems. The companies will conduct joint interoperability testing, they said, of cable modem and headend products.

Modems

Some vendors arrived with new products already in hand, while others were there promising to be interoperable with MCNS devices in the future.

ADC showed its "Asymmetrical Cable Engine" system, which allows cable operators to provide 250 simultaneous users with 100,000 bits per second as a minimum. The product is squarely aimed at small office/home office (SOHO) users that require high speeds in the downstream direction, and lower speeds upstream.

Motorola, which announced its new, second-generation cable modem late last month, has developed an MCNS upgrade strategy for cable operators who have already deployed the company's proprietary router. Motorola will be developing a set of four line cards that perform the termination functions and can co-exist in the router along with Motorola's current technology.

ADC's ACE

Motorola's CyberSURFR Wave

Operators can either swap out the old cards for new MCNS cards, or simply add the MCNS functionality. A single Motorola router can support up to nine MCNS card sets and more than 10,000 modems.

Also, during a press briefing, Motorola announced that it has deployed "infrastructure" to support more than 2 million cable modems worldwide, making it the leading company in that product category, according to Dick Day, a Motorola corporate vice president.

Bay Networks also announced a migration strategy for MSOs who plan to implement MCNS gear. Bay said its plan allows cable operators to begin or to continue to deploy new data services with existing broadband products, while providing a trade-in for MCNS products. Products received as trade-ins will be offered through the Bay Networks Remanufactured Equipment Program.

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The subscriber receives the equivalent of one or two ISDN B-channels without expensive ISDN equipment. The link can be integrated with the company's Crystal Line telephony system, which provides connections for two phone lines and one data line, enabling subscribers to receive phone calls on either phone line without dropping an active data session.

Phasecom Inc. added a telco return model to its line of cable modems, reasoning that MSOs will need an interim product while outfitting plant for two-way signal flow. Branded "Speed-Demon-Telco," the new Phasecom device uses 64-QAM (quadrature amplitude modulation) downstream to serve up to 27 Megabits-per-second (Mbps) of data throughput. The modem can be remotely configured for full two-way operation when available, said Shaul Berger, president and CEO.

Terayon's TeraPro

Terayon Communication Systems announced its new "Universal Cable Modem" would support the MCNS standard, giving users an option of using one of three modes: Terayon's proprietary S-CDMA modulation protocol, full MCNS compliance, or as a symmetrical 30 Mbps modem offering flexible quality of service controls.

Terayon officials said the modem, which will be available in late 1998, can be manufactured cost-effectively by integrating all three modes on the same chip.

In the interoperability demo area, Toshiba America Information Systems, Panasonic and Harmonic Lightwaves reportedly demonstrated, for the first time, interoperability between two independently-developed products that are based on different chipsets. The demo, which was done at CableLabs' headquarters in Colorado, was between Harmonic's Cable Modem Termination System and Toshiba's cable modem.


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Both products were developed based on the MCNS data-over-cable specification, but on different silicon in separate labs. The CableLabs initiative was undertaken to develop a universal standard to which vendors can develop modem and headend products.

Under the hood

Broadcom Corp. has introduced its first controller chips for the MCNS cable modem standard and has delivered cable modem and cable modem termination system reference designs based on the same standard to its strategic partners.

The company's single-chip devices implement the entire MCNS MAC protocol required for cable modems and cable modem termination systems. The reference designs allow manufacturers to immediately begin developing and testing devices that use the company's silicon platform. Both support telco return and two-way RF return and incorporate a real-time operating system for supporting simple bridge functions.

Broadcom also said its complete MCNS chipset is now down to three, after collapsing from seven to one the number of chips needed to handle the MAC (media access control) portion of the standard, said Rich Nelson, director of cable TV marketing for Broadcom.

Rockwell Semiconductor's Digital Infotainment Division also said its first cable modem ICs based on the DOCSIS (Data Over Cable Service Interface Specification) are ready, and that it is also pursuing a three-chip cable modem set within the next three months, followed by a headend chipset that will follow in the third quarter, said A.C. D'Augustine, vice president and general manager for Rockwell.

Rockwell officials said entry into the cable modem market was made possible by the acquisition of Hi-Media Products from Comstream Corp. The company already offers a QAM demodulator IC and an Annex B forward error correction IC. Rockwell has developed a prototype Media Access Controller that has been tested by CableLabs.

Libit Signal Processing demonstrated an integrated MAC and PHY (physical layer) chip, dubbed "LBT4040," at the Show. Jacob Tanz, vice president of

CEL's RF transceiver

North American sales and marketing for Libit, said the chip, which also houses baseline privacy, "will be a highly inte-

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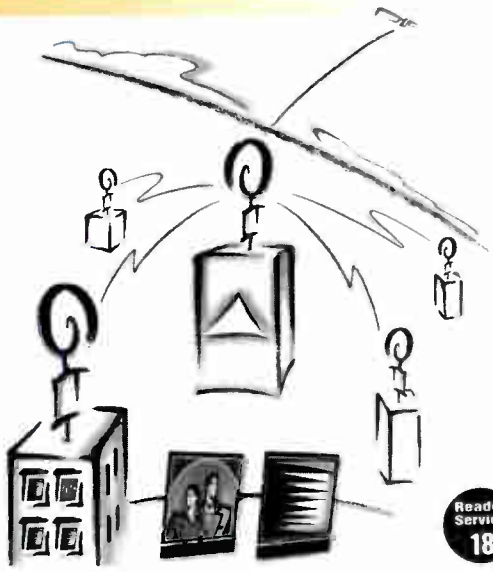

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California Eastern Laboratories' (CEL) Integrated Solutions Group announced the availability of a new, two-way RF transceiver for cable modems. The ISG 2000 is designed to interface directly with 64/256 QAM demodulator/modulator ICs.

Besides providing RF functionality, the ISG 2000 simplifies the interface between the RF and digital sides of a modem design. ISG 2000 transceivers are solid-state, eliminating the hand-wound coils found in other RF modules, and the hand-tuning they require.

Stanford Telecom demonstrated a new, single chip that handles the PHY layer. The chip, called "STEL-2176," couples with the company's headend burst receiver to provide "a complete end-to-end physical layer solution," executives said.

The chip combines upstream QPSK or 16-QAM, and downstream 64- or 256-QAM functions, in addition to on-board analog-to-digital and digital-to-analog conversions and mode selection between North American "Annex A" or European "Annex B" interpretations of QAM modulation.

RAD Data Communications introduced ChipRouter, a wire-speed IP router in a single chip that has been designed for integration into cable modems, satellite terminals, wireless local loop and xDSL access devices. Providing IPv4 and IPv6 wire-speed routing at rates up to 40 Mbps, the ChipRouter is a single-chip replacement for traditional integrated and stand-alone routers.

Cisco Systems Inc. announced its cable data product line, with the introduction of its uBR 7246 Universal Broadband Router and associated Multimedia Cable Network System (MCNS) modem cards. The standards-based uBR 7246 provides cable operators with benefits over existing bridging solutions, say Cisco officials, including increased network security, bandwidth efficiency and centralized management and control. The benefits enable cable operators to offer new services such as high-speed Internet access, streaming video, secure data services and virtual private networks.

Cable operators who plan to transport data signals over their networks—for a variety of applications—can now send those signals farther and potentially for a lot less money with a new Ethernet product introduced by ADC Telecommunications. Dubbed "EtherRing," the new switch enables network operators to dramatically increase the distance data signals are sent while avoiding costly data protocol conversion to frame relay or other formats, according to company officials. The result? Enhanced network efficiency through reduced overhead and potential savings of between 50 percent and 80 percent over ATM and Sonet-based systems, according to some analysts.

The Fast EtherRing Switch enables transport of data, IP video and IP telephony. Because it eliminates the complex format conversion between networks, the product eliminates central switches and distributed routers. Rainbow Advertising has already deployed the unit throughout the New York ad interconnect. The product is now generally available.

Set-tops and related technology

As a way to get around the pesky issue of installing a telephone jack for return communications from digital set-tops, Phonex Corporation has developed a wireless phone jack system to interface with the NextLevel DCT-1000 set-top box that makes pay-per-view phone connections possible from any electrical outlet in the home.

The modem jack transmits data signals on 110-volt electrical wiring using closed-circuit, FM transmissions. When plugged into any electrical outlet, it provides an instant connection to hundreds of impulse PPV cable channels.

WHEN IT COMES TO RETURN PATH MAINTENANCE

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According to company officials, the jack can be set up in less than two minutes by an installer, helping cable providers avoid hiring additional certified wire installers and the liabilities associated with drilling, pulling wire, and other dangers of telephone wire installation.

Zenith Electronics exhibited a new 750-MHz PM analog set-top and a Dolby-licensed digital box. The new Phase Modulation set-top has been upgraded from 84 channels to 116 and includes an option for audio scrambling, according to company officials. In addition, Zenith announced that Service Electric Cable TV of Allentown, Pa. will begin deploying the set-top by the end of this year.

Power TV displayed its Web browser, e-mail client and HTML engine at the Show. The browser is a downloadable application for set-tops that provides access to both Intranet (local) and Internet content using open standard protocols. The e-mail client enables subscriber connectivity on an existing television set. And when integrated with the PowerTV Operating System, the HTML engine provides an open, standards-based client platform for delivering compelling services and applications.

And Network Computer Inc., in Scientific-Atlanta Inc.'s booth, unveiled applications like electronic program guides and e-mail, created with HTML and JavaScript, then displayed on a TV linked with S-A's Explorer set-top.

Headend equipment

Philips unveiled its new single-channel digital system for cable headend interconnects. The system has been designed for applications including cable TV supertrunking, regional cable TV networks, distance education and corporate campus communications.

The uncompressed, digital, single-unit system offers broadcast-quality video, audio and data signal transmission, eliminating signal degradation associated with traditional analog transport solutions. Channel capacity is completely scalable, accommodating unlimited network expansion.

The system is suited for applications in which signals in the channel line-up gather at the master headend and are then distributed digitally to various remote headends where they are converted to RF and inserted into the AM fiber plant.

Video Data Systems has introduced a modular text-based messaging system that is capable of providing keyed text or billboard displays on up to 96 channels simultaneously. Using the system, displayed text can be unique to each channel, simultaneously displayed on all channels, or displayed on selected groups of channels. Display cards offer monochrome or full color displays from a single line message, logo, or crawl, to a full-page, two-region display with a crawl line.

Ward Laboratories displayed a new video noise reduction technology

Also new from Video Data Systems are two digital disk recorders, designed as VTR replacements, which offer the full functionality and capabilities of digital disk technology. The DDRs apply to a variety of applications, including storage, non-linear playback, off-line editing and audio post-production.

World Access Inc. has announced the availability of its new CablePLEX multiplexing system, which provides the ability to multiplex voice, video and data within the existing cable architecture, eliminating the extra telephony costs incurred when sending voice and data to and from remote cable sites. The system saves the cable operator the cost of making long distance calls to remote headends, or the cost of sending data updates to customer equipment.

Ward Laboratories displayed a new video noise reduction technology that consists of a number of patented algorithms that can be incorporated in set-top boxes, televisions and other consumer video products. The company has also developed the Ward CVX 100,

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Synchronous also unveiled a new digital erbium doped fiber amplifier (EDFA) for digital applications.

Also new from Synchronous is the Spectrum Series Digital Trans-mission System, which provides uncompressed digital transmission in "all of the major world standards," according to company literature. Key to the performance of Spectrum is its ability to carry any combination of baseband, TV-IF and QAM modulated signals.

Scientific-Atlanta also got in on the DWDM game by introducing a platform for high-capacity transport of video and two-way interactive digital services over a single fiber. It joins the company's Prisma Digital Transport Sonet/SDH system as another building block toward a total optical networking system.

The new DWDM platform will be an open-standards system to ensure interoperability with other standards-compliant systems. The eight-channel platform will multiplex to eight Prisma Digital Transport systems on the same fiber to increase network operators' per-fiber transmission to 128 video channels, with an aggregate data transmission rate of nearly 20 gigabits per second.

Harmonic's PWRBlazer node

Harmonic Lightwaves Inc. announced the PWRBlazer Scalable Node, which can be reconfigured and upgraded to meet future network demands, such as delivering Internet access, video-on-demand and other targeted services. Features include: each output port can be addressed by its own fiber pair, which enables the node to scale its output to provide dedicated bandwidth for delivery of data services to the home; support for redundant optical receivers, return transmitters and power supplies allows operators to configure the node for a high degree of fault tolerance for demanding network applications; and eight optical module slots can accommodate any combination of plug-in forward receivers and return path transmitters.

ADC Telecommunications Inc. introduced several new products, including an adaptable optical test access unit (OTAU) for remote fiber test systems. The OTAU is a 1XN optical switch that provides easy access to multiple fibers from a single port. Two new transmitter systems for supertrunking and distribution also were shown. The new 1550 nm Homeworx transmission system products include models for single and dual fiber supertrunking and single fiber distribution. The supertrunk transmitter provides high performance levels over a dedicated point-to-point or ring architecture, while the distribution transmitter provides high link performance on a single fiber for superdistribution applications where a large number of optical nodes are serviced directly.

And finally, two power levels of the HWX erbium doped fiber amplifiers are now available. The EDFA amplifiers feature a minimum noise figure and pump lasers that ensure reliability and performance.

Antec Network Technologies introduced its LL-470, the newest product in its Inter Link family of interconnectivity management products. The LL-470 has been designed for the interconnection and demarcation of optical fibers between two network providers using two individually secured compartments to provide separate access of terminating cables during splicing. The unit supports up to 36 optical terminations and splices. The cabinet has a NEMA 3 rating to keep the unit safe from severe weather conditions and has been designed for pole or wall mounting.

Philips' Diamond Link 1550 nm transport

Philips Broadband Networks showcased its new Diamond Link 1550 nm broadband transport sytsem, which features transmitters and optical amplifiers for long-haul trunking alternatives to digital transport applications. The unit also accommodates high-split ratio, wide area distribution architectures.

Transmission/distribution

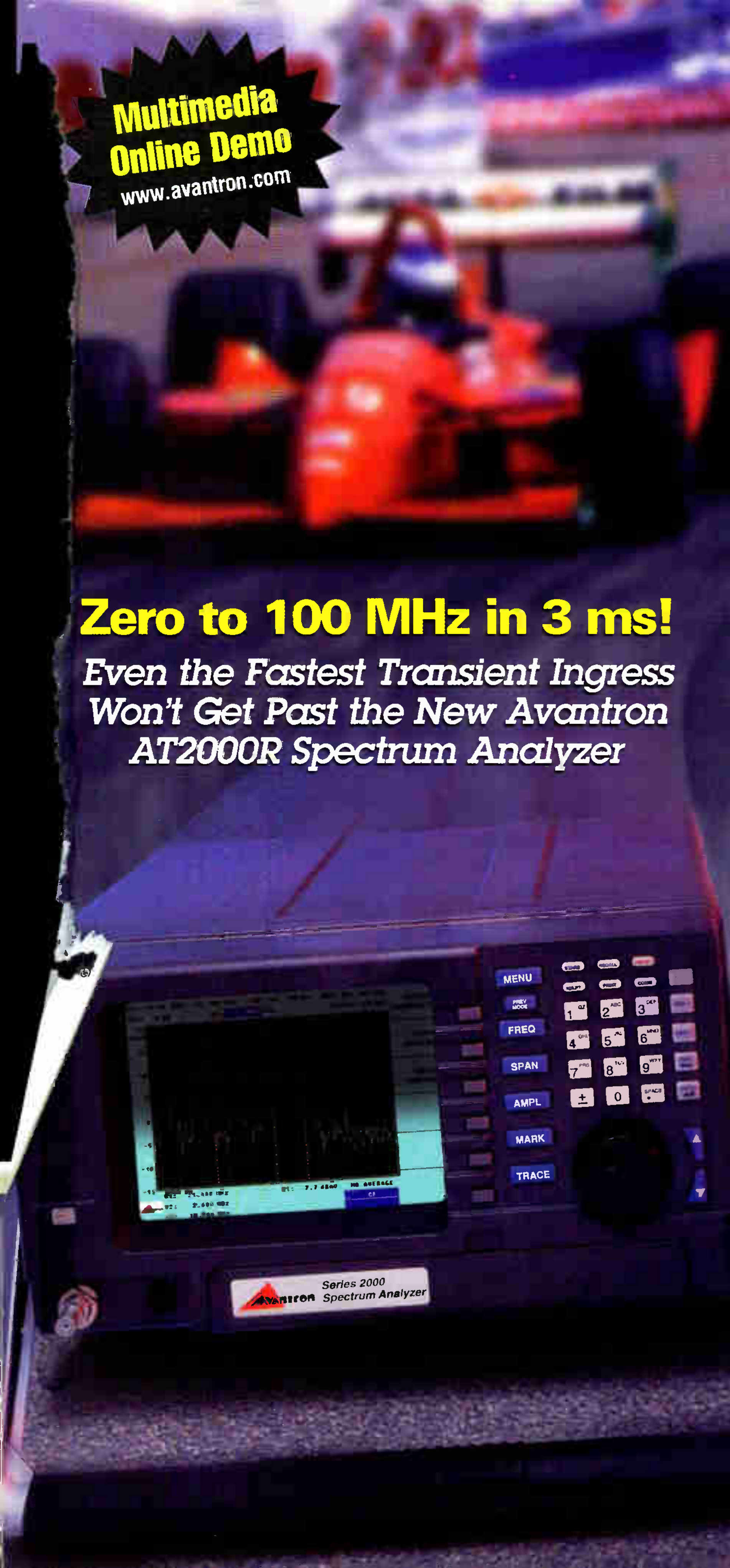
Using the new "RetroPlate" from Electroline Equipment Inc., cable operators can turn existing passive taps into addressable taps. With a swap of faceplates, the RetroPlate turns popular brands of passive taps into addressable devices, allowing cable operators to activate and terminate service on any tap port by typing a few keys on a computer keyboard from any remote location. The RetroPlate is a security solution for hard-to-reach areas, or areas of high theft and churn, and does not require the conversion of the entire plant.

Electroline's EAS Control Unit IV

Electroline also introduced a new controller for its EAS family of addressable taps and ClearPath ingress location systems. The new unit can support 1 million subscribers, "hot standby" redundancy, and "in operation" testing, as well as easier troubleshooting and maintenance.

CableServ introduced several drop-in upstream modules specifically designed for older amplifiers. Specifically, CableServ is touting an upgrade for Philips' 450-600 MHz amplifiers and line extender, as well as NextLevel's Jerrold Starline SJ-450 trunk stations, and Scientific-Atlanta Inc.'s Slimline and 6500/8600 trunk stations.

RMS Electronics Inc. introduced its new line of 1 GHz Plus house drop



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At less than half the weight of competing products, the AT2000R puts an end to the back breaking chore of lugging heavy Spectrum Analyzers to the site. The AT2000R's built-in battery makes inverters a thing of the past. Compact, yet mighty, this instrument is designed to withstand tough field use.

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Lots of on-board memory for measurement storage makes downloading data to Windows based PC's fast and easy.

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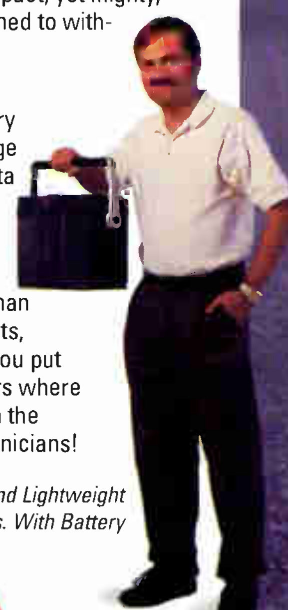
At one third less than competing products, the AT2000R lets you put spectrum analyzers where they're needed - in the hands of field technicians!



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amplifiers for use in network deployments utilizing multimedia devices which require high demands on signal strength. Featuring a double-sided printed circuit board, the house drop amp supports a forward bandwidth of 54 MHz and a passive return bandwidth of 5 to 42 MHz.

Eagle Comtronics Inc. introduced its new line of Eagle Elite Series filters and traps that feature performance to 1 GHz with selectivity for narrow bandwidth and low adjacent channel insertion loss. The series includes: single-channel notch filters, multi-channel tier traps and return band noise suppression filters.

Com21 unveiled a gizmo that blocks noise in the upstream path

Lindsay Electronics introduced a new, low-noise, high performance subscriber amplifier which offers 4 dB of cable equalization for in-home design flexibility. The new amp has 15 dB of gain with 5-42 MHz passive reverse filters and compensates for 4 dB of cable equivalent. In addition, the product is supplied with a full, two-year warranty.

Antec introduced its Extension Tap, which is designed as an alternative to nine-inch taps. The one-piece product eliminates the need for extension connectors, thereby providing better connectivity as well as a cost-effective solution to rebuilding networks, says Antec. The tap is compatible with all existing Regal wide-body faceplates and features screwless pin connector seizures.

C-COR Electronics announced major enhancements to its FlexNet family of amplifiers at the Show. The FlexNet 900 Series offers a trunk, terminating bridger and line extender amplifier suited for HFC networks and the addition of digital services.

Increased performance levels are most notable in the return path, test-point accuracy and location, and return loss performance features, says the company. For example, the amps utilize a high performance, push-pull device for reverse amplification. The device has a high compression point, and therefore, a greater tolerance for higher signal levels. Modems, set-tops and other network interface devices can transmit over the reverse path at higher signal levels to allow greater immunity to ingress and noise commonly found in the reverse.

Managing the return path

A number of manufacturers were on hand with solutions to conquer the often troublesome return path. Com21 Inc. unveiled a $15 gizmo that blocks noise in the upstream path. Working with Eagle Comtronics, Com21's new "Ingress Noise Blocker" is installed at the tap and listens for DTMF tones from Com21 modems to signal a switch to high-pass filter mode.

Ontario, Canada-based PCI Technologies Inc. debuted a new, rack-mounted system for splitting out various reverse path signals, then recombining them into one laser transmitter for an optical ride to the headend. PCI also displayed diplex filters and channel deletion filters.

The Holtzman Company demonstrated its "CableClothespin," targeted to test the integrity of in-home coaxial wiring. When the device is placed over the drop wire, a broadband test signal is launched toward the house as a sheath current. The test signal mimics burst noise, which is one of the most troublesome upstream impairments. Digital signal processing, running on a laptop PC, is used to analyze the returned signal. The system is also capable of measuring the frequency response of the return path from the tap back to the headend, including group delay measurements.

Wavetek Corporation debuted its new PathTrak Performance Monitoring System devoted to monitoring and analyzing multiple return paths. The PathTrak system has been designed to detect minor problems before major outages occur by providing an efficient, continuous and automated form of testing RF performance.

NextLevel Systems Inc. showed its newly-developed Frequency Stacking System (FSS-2000), which increases broadband return capacity. Comprised of four components, the system includes: a four-band upconvertor and a return path transmitter, which are housed in the NL StarGate 2000 optical node; and a block conversion optical receiver and a downconvertor, which are housed in the OmniStar headend platform.

Electroline Equipment Inc. introduced its Test Point Selector (TPS), a 16-to-1 intelligent switcher. The TPS can be used in four different manual or automated testing configurations, and speeds testing of up to several hundred optical nodes.

Electroline and Avantron Technologies signed an interoperability agreement at the Western Show making possible the use of Avantron AT2000HM Headend Monitor/Sweep Units with the ClearPath ingress detection and location system controller and transponders. The agreement aims to integrate Avantron's spectrum analysis capabilities with the ClearPath's ability to remotely test for ingress in the coaxial cable plant.

Alpha Technologies' power supply

Powering

Alpha Technologies Inc. is adding the XM Series 2 supply to its line of uninterruptible power products, including as standard features several items formerly available as options.

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Initial Set-up	Front panel inputs from 4 button keyboard or from 286 or newer PC	Front panel inputs from multiple button keyboard only	Front panel inputs from 4 button keyboard only
Number of internal radios	2	0	0
Total audio inputs	4	2	6
Total digital inputs	3 (one front panel mounted)	6	5
Telephone input for local franchise requirements	Yes via on-board RJ-11 jack	Yes (through extra cost modem)	No
Front panel microphone input	Yes	No	Yes
On-board uninterruptible power supply for all functions and protection against voltage spikes and dips	Yes	No	No
Pre-programmable weekly test for unattended operation	Yes	Yes (through extra cost modem)	No
Weekly & monthly test via telephone for remote operation	60 seconds	120 seconds	Optional 10 or 40 seconds
Separate audio storage for secondary (tune to) announcement	Yes	Yes (requires optional extra cost circuit board)	No
Control and communicate with in-home units via on-board narrowband RF modulator	Yes	No	No
Control downstream override equipment with digital control signals via on-board narrow band RF modulator	Yes	No	No
Custom control software for most cable override systems	Yes		

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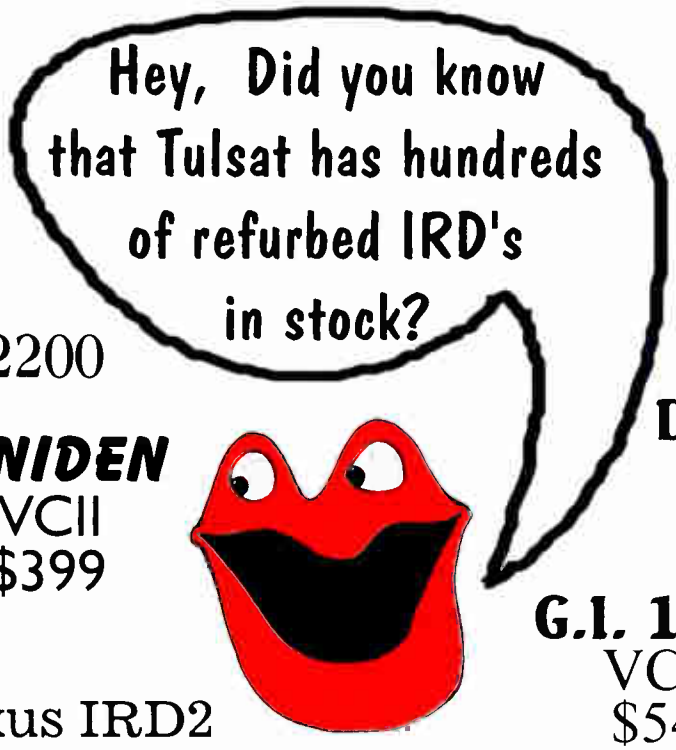

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Among them: Front access to all test points and connections, a standby data display counter that tracks the number of inverter operations and total inverter elapsed time, an automatic self-test mode, and a standby status relay contact for reporting critical system specifications.

New options for the XM Series 2 include dual outputs with a "programmable breaker" to isolate outputs, and a transfer that reduces audible noise while lowering operating temperature. Also new: an automatic tap switch that increases the AC input operating voltage from 15 percent to 30 percent.

Antec Network Technologies, the manufacturing division of Antec Corp., introduced its modular, network powering standby upgrade kit at the Western Show. The newest product of the Energy Link system of products, the kit allows operators to upgrade their 60-volt, non-standby power supplies to standby.

The kit is compatible with most power supplies, regardless of brand. Its compact size allows flexibility and ease of installation within a cabinet or mounted in outside applications.

The company also introduced its Pedestal Amplifier/Node, designed for flexible mounting in outdoor enclosures where space is at a premium. Features include multiple gain stages for high RF output, 870 MHz bandwidth with programmable reverse switching, a modular design that allows for various product configurations, and a simple upgrade from RF amplifier to optical node.

C-COR Electronics Inc. introduced a power supply management agent (PSMA) for cable operators who want to supplement their standby power supplies with a reliable management agent. Because of its compact design, the PSMA fits easily into standby enclosures.

The agent allows operators to remotely cycle the batteries in a standby power supply and detect problems before they lead to an outage. Because it's an intelligent management agent, it autonomously alerts the company's Cable Network Manager software to any problems without waiting to be polled. Standard product features include broad frequency agility in the forward and reverse paths and downloadable firmware.

Network monitoring, management

AM Communications Inc. has released three new monitoring products which support a range of headend and central office products. Developed as a result of industry requirements to extend AM's monitoring capability into headend specific devices, the new products are the Telemetry Applications Module (TAM), Serial Applications Module (SAM) and the Binary Applications Module (BAM).

The TAM is a rack-mounted transponder which is modular and configurable, and which communicates with AM's OmniMCU controller, either via the two-way RF data stream or via a direct digital interface. It consists of a Communications Control Unit chassis and up to eight SAMs.

The SAM modules are intelligent devices which plug into the TAM CCU rack frame. Each SAM is preprogrammed to communicate with a specific type of OEM equipment (i.e. receiver, transmitter, etc.). Alarm information is

WESTERN SHOW HIGHLIGHT

Digital is the buzz, but the challenge is deployment

Much of the Western Show buzz was about digital TV and the enormous impact it's having on the cable industry. And the digital parade will continue to roll, according to "digital pioneer" panelists during the show's "Report from the Front" session.

"Operators must go digital," stated Bill Goodwyn, senior vice president, affiliate sales and marketing, Discovery Networks. "The biggest dissatisfaction among consumers is the lack of quality programming all the time, and customers are migrating to DBS because of it."

Goodwyn noted several trends which point to digital as a key component in cable's future growth. They include:

- The number of channels will double very soon
- Digital TV will become a reality
- Many premium households will convert to digital by the year 2003
- By the year 2001, 50 million households will have PCs
- There will be more leisure time on-line and for digital services.

He also suggested that the quality of movies-on-demand will increase substantially, and there will be "not just more TV, but more convenient ways to access TV programs."

Deploying digital, however, is a daunting challenge, according to Colleen Abdoulah, assistant to the chief executive officer for Tele-Communications Inc. (TCI), which is leading the digital deployment charge. "There will be seven million customers with access to digital through 300 headends and 90 markets by year-end '97, and launching digital is an operational challenge, especially in marketing, training, technical operations and engineering."

Abdoulah announced that in March 1998, TCI systems will be adding more capacity and soft launching digital in a number of markets, focusing on increasing penetration by year-end '98. *–Craig Kuhl*

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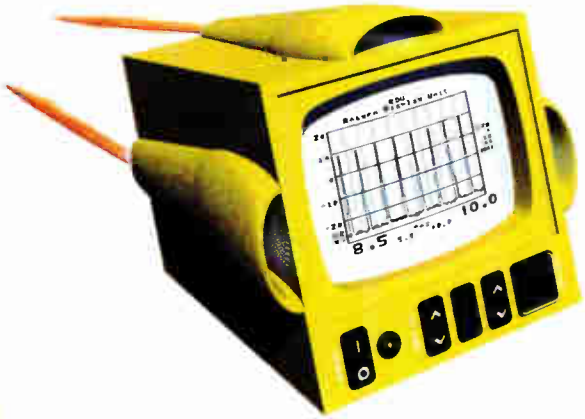

RDU patent pending
RDU © 1997, Cable Resources Inc.

The RDU is a new piece of test equipment. It allows technicians to monitor the return system from any point in the cable system without the traditional and cumbersome HE spectrum analyzer / camera setup.

The RDU allows system installers and technicians to view on any TV screen, the RF Levels, Ingress and Noise present back at the HE from a subscriber's home, system amplifier, feeder tap or fiber node.

The RDU processes the X / Y output data generated by an internal spectrum analyzer and converts it to NTSC video for input to a standard CATV modulator. A data output allows the analyzer screen to be viewed on a computer, same as video. Software is Windows 95 networkable so office possibilites are endless.

The RDU displays noise, ingress and RF carriers, the same as a spectrum analyzer with a video and computer screen refresh rate of just 350 milliseconds!

The RDU displays HE return levels on two user selectable test carrier frequencies in the 4-44 mhz. bandwidth. Test carriers and ingress / noise levels can be easily documented from every installation and service call. Simple and easy to implement.

RDU software monitors ingress / noise by recording RF energy, where you designate, in 200 khz. segments. The RDU averages the data and displays a ingress / noise number, real time. Response over time charts can be outputed for analysis and documentation.

The RDU is an efficient new tool to activate and maintain broadband networks creating benchmarks for return cable system operations.

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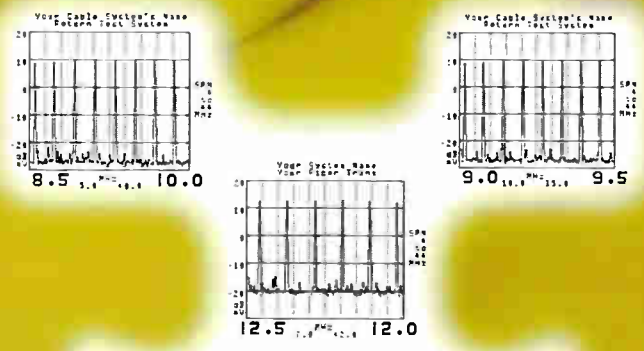

Above are samples of a TV screen that system installers or technicians would "see" in the field.

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extracted from the return data by the SAM, signaled back to the TAM CCU and the OmniMCU.

The BAM's purpose is to provide a flexible means to collect, at its input, the various alarms generated by different types of equipment in the event of an abnormal condition, to provide a local visual alarm system, and to provide a means to communicate with a centrally located status monitoring system or alarming system.

AM Communications Inc. has announced a multi-user version of its OmniVU Network Monitoring software that is being tested in several large cable networks around the world. The new release, Version 2.0, is a client-server application based on the Windows NT operating system.

The OmniStat system is an advanced platform that allows network managers to remotely monitor virtually every network element in the transmission path, all the way to the subscriber's home. With the multi-user version, a network enterprise can install monitoring workstations at multiple locations within the enterprise. In a typical installation, an OmniVU workstation could be installed at the network's headend, while others might be installed in dispatch offices, engineering offices and network managers' offices.

Tellabs is touting new features for its family of Element Management System products, which support the company's CableSpan telephony-over-cable system.

The CableSpan EMS Feature Package 2.0, new at the Show, provides greater automation and a graphical user interface. It also offers "auto discover" of plug-ins, configurations and cross-connects that can be tailored by network operators. It will be available in the second quarter of 1998.

The Broadband Communications Division of ADC Telecommunications has introduced its OsWorx Commander, a new element management system for broadband networks. The system has been designed to provide centralized, integrated monitoring, performance reporting, and fault analysis of multi-service, multi-vendor network components, managing all the data and video products from a single intelligent support system and interface.

The system monitors and reports both service interrupting and system degrading events for up to 512 network elements, analyzing notifications from network elements on a proactive, interactive basis. It operates on an industrialized rack-mount unit based on a SUN SPARCstation platform running the SOLARIS 2.5 operating system. In addition, the system is designed around an object-oriented database.

Siecor Corp. has announced the availability of its demonstration disk for the OptiCon Network Manager Release II software. The disk highlights the key features of the company's ONM software, which provides a way to maintain and track all fiber optic components in cable TV headends, telco central offices or in premises applications, regardless of the manufacturer.

NextLevel Systems Inc. demonstrated its newly-released NETsentry HFC Network Management System. The system handles remote management of all elements of an HFC telecommunications network, including analog, digital and satellite headends, as well as outside plant equipment.

NETsentry uses standard industry hardware and software products, as well as protocols such as NT, Unix, Oracle and SNMP, which enables a high degree

WESTERN SHOW HIGHLIGHT

Renewed confidence in cable modems, interactivity

Cable has renewed its confidence in cable modems, and interactivity will continue to permeate many of the key applications within the cable industry. Those were two of the more compelling arguments for technology's role as a driving force in the hatching of new businesses centered around cable, discussed during a Western Show session.

"The opportunity to buy pay-per-view from the couch is a valuable next step in mass market interactivity," said Maggie Wilderotter, president and CEO of Wink Communications. "And interactive experiments show that subscribers like to play on TV, but there must be pricing and compelling content. We learned that if you can do a little more with interactivity, niche it simple, and build habits over time, the business will grow."

Marketing, Wilderotter added, will be the tie-breaker for operators as they expand their services, including digital and interactivity. "There is a huge amount of delivery into homes, and marketing has become crucial. Customers will want choice, and the deliverer must be all things to all people. How operators set that up is critical."

Robert Pittman, president and CEO of AOL Networks Inc., agreed. "Interactive services like AOL do well because customers are on already. As the world gets more complicated, however, marketing becomes more important. We want to take things important to people and make them more convenient. That is the metric to this. It must be easier."

And cable, Pittman said, literally has the inside track. "Cable already has (a) pipe into homes. If you look at the economics, that's pretty compelling."

In addition, Brian Roberts, president of Comcast Corporation, cited PPV as having more volume than L.L. Bean and Bloomingdales combined, and has upped cable's confidence in both interactive services and cable modems. "Cable has renewed confidence in cable modems," Roberts said. *–Craig Kuhl*

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of cross-vendor integration.

C-COR Electronics has announced CNM System 2, a new generation of its Cable Network Management Platform, with capabilities operators need to manage advanced two-way networks. The system incorporates new paradigms; for example, support for open standards, expert system features and simple network management protocol (SNMP).

Test equipment

Tektronix Inc. showcased a broad line of test equipment for digital cable television, and demonstrated a picture-quality analysis system. On deck for digital testing is a field tool with a strong RF measurement set for return path troubleshooting; a high performance, metallic time domain reflectometer for cable television and broadband applications; and a technology demonstration of a new capability for making in-service performance measurements on digitally modulated 64-QAM video channels.

Sencore used the show as a forum to introduce a new line of signal level meters for 64-QAM signal analysis. The new meters are designed to be rugged, handheld, weatherproof units which make measurements on QAM modulated signals anywhere in the system. The meters tune by channel or frequency any 64-QAM or analog signal, from 50 to 860 MHz. They also provide full signal power measurements from -24 to +34 dBmV for taking power level readings throughout the system.

Avantron Technologies has enhanced its AT2000R Spectrum Analyzer to include measuring in-channel frequency response, carrier-to-noise, composite second order and depth of modulation, without taking the channel out-of-service. According to Avantron, the unit has a scan speed of 3 milliseconds for a 100 MHz span.

And Wavetek Corp. has introduced a new upgrade to its Stealth products. Stealth firmware (version 9.1) provides several new capabilities, including improved reverse sweep and spectrum display speed, self-calibration and new features for reverse noise and ingress troubleshooting. With the upgrade, Stealth units can now self-calibrate, allowing reverse sweep without adapters. The upgrade has also improved the Stealth spectrum display speed; 5 MHz span displays now update in less than a second.

To provide more information about the reverse path, the headend "noise" mode has been improved. Users can now view the entire headend reverse path spectrum, both at the headend and in the field. This allows field technicians to quickly switch between a view of the local reverse spectrum and the headend spectrum to find noise and ingress problems in the field. By comparing the local spectrum with the headend spectrum, a tech can see if a noise source is "upstream" or "downstream" from his current position.

Return path tester from Trilithic

Hukk Engineering has enhanced its CR1200 QAM monitor. In addition to Pre- and PostFEC bit error counts, constellation display, errored and severely errored second counts, spectrum display and signal-to-noise measurements of 64 QAM modulated signals, the CR1200 will now provide those same tests on 256 QAM signals.

New from Trilithic Inc. is its Guardian RSVP, a return path testing instrument designed for cable TV installers. The unit works in conjunction with the company's 9580 SST Sweep and Ingress Analyzer, mounted in the headend.

Trilithic's reverse leakage detector

At the push of a button, the RSVP verifies that the level needed to communicate with the headend is within the range of the set-top terminal, then automatically measures the carrier/(ingress and noise) ratio of the entire return path, from set-top to headend. The RSVP scores the results as "pass" or "fail," and displays the measurement data.

The Guardian IsoMeter is used with the Guardian RSVP to test the shielding effectiveness of in-home cabling. The RSVP injects a tone-modulated test signal into the subscriber's house cabling, and the installer uses the IsoMeter to track down leakage of the test signal due to broken shields, loose connectors or other sites that would admit ingress. The IsoMeter emits an audio tone that varies with leak amplitude, making it easy to track down any shielding problem.

ComSonics Inc. has introduced a new test equipment system called CyberTek, which will include signal level meters, a headend monitor and an upstream maintenance system. The lead product in the system, CyberTek Vision, is designed for field use, features hands-free operation and is voice-responsive. The product is equipped with a 5-1000 MHz frequency range, reads all HFC signals, reads CNR and hum non-intrusively and offers all basic measurements. ■

Catch a "Rising Star"

in CED Magazine's March issue

CED Magazine, Corning, Inc. & the Society of Cable & Telecommunications Engineers (SCTE) will proudly announce the winner of the **1998 Polaris Award** during this month's conference on Emerging Technologies.

The Polaris Award, symbolized by the "Rising Star," is the industry's highest individual achievement award recognizing an emerging leader in the cable TV engineering community who demonstrates a high standard of performance and a customer-driven approach to fiber deployment.

Read all about this year's winner in the March issue of

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Finding the right splice closure

Matching specs and craft-friendliness to the application

By Jerry Patton and George Steenton, Keptel

Fiber optic splice closures don't have a lot of sex appeal, but choosing the right type for your network can be a critical decision when it comes to keeping your plant running as efficiently as possible.

A fiber's journey from the headend to the hub or node housing is rigorous. It goes from the climate-controlled, fire-protected headend to being trenched underground or stranded from pole to pole, where it can be exposed to inclement weather conditions, tree limbs, chemicals, car accidents, backhoes, rodents, bullets and a variety of other dangers.

After the fiber cable sheath is broken and the fiber is spliced, each fiber may pass through as many as 25 fiber optic splice closures. Unlike the headend, closures do not have the space for climate control and fire systems, and typically are not locked up tight. However, closures are often expected to house and protect as many fibers as a typical headend, thereby making the splice closure the most critical link in the fiber plant.

The growth of closures

The SCTE (Society of Cable Telecommunications Engineers) has not yet developed universal requirements for splice closures. However, through the years, the cable TV industry has learned much from the experiences of the telcos. Before fiber, internal standards for twisted pair required telco operators to use encapsulated closures at splice points. Initially, these standards were also applied to fiber, however, they soon proved ineffective for fiber applications. The downfall of encapsulated closures contributed to the birth of pressurized closures.

During the onset of competition, the pressurized closures were viewed as a place to reduce costs. Soon the telcos began to employ sealed closures without encapsulants or pressurization. The advent of this technology led to Bellcore's TR-771 specification, one universal requirement for all splice closures, which has been adopted by the cable TV industry. In 1993, aerial closures (weathertight breathable) were introduced as another cost-effective alternative, enabling telcos to save 30 to 50 percent in parts and labor. Today, aerial closures comprise approximately 10 percent of the closures that are deployed annually in the telco industry.

Environmental requirements

The variety of closures that are available today can be attributed to the surge in fiber applications. In 1994, Bellcore modified its universal TR-771 specification to test closures in accordance to environmental requirements of specific applications. For example, the new GR-771 specification groups closures into six deployment families: buried, underground, pedestal, outdoor wall, aerial pole and strand and indoor wall. This specification is a useful tool to determine if a closure is suitable for a targeted application. While some closures fit into only one "deployment family," others may cross a few lines. Therefore, users should consult with closure manufacturers on their unique needs.

Following is a cursory review of four environmental categories: aerial, pedestal, combined buried and under-

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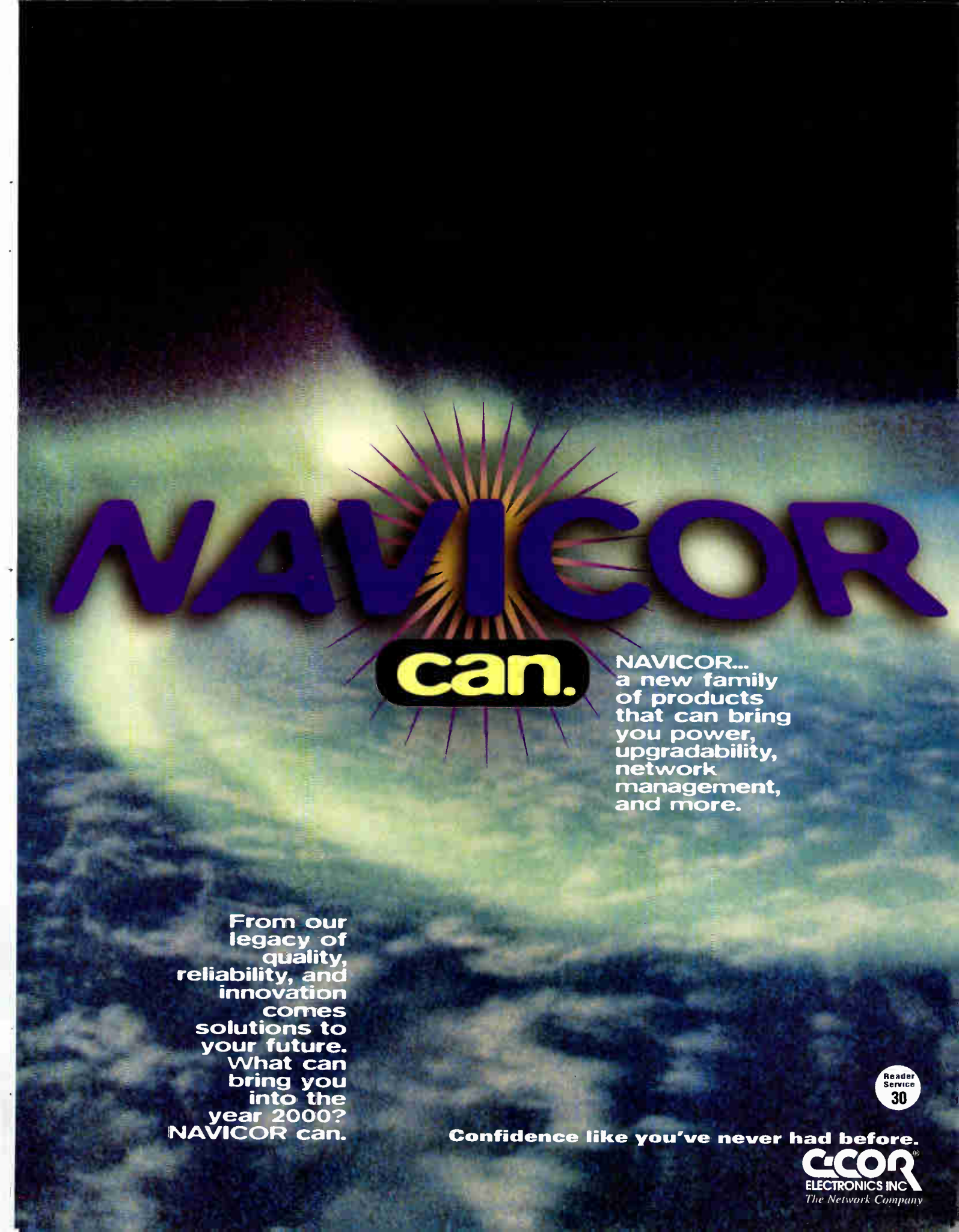
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ground, and universal. The following recommendations address both typical and unique needs and highlight areas where Bellcore specifications should be exceeded. For more detailed information on environmental requirements and the tests for certification, reference Bellcore GR-771.

Aerial. This group includes weather-tight, free-breathing closures that are required to pass a wind-driven rain test. Their tongue-and-groove design allows these closures to maintain weather tightness. Typically, breathable openings can be found on the bottom of the closure. A metal screen that is sonically welded to the plastic to prevent infestation by insects should cover these openings. Bellcore requires a 90-day salt fog test to identify corrosion problems. Bellcore also specifies a conditional bullet resistance test, if the unique need exists. This test requires a 12-gauge shotgun to fire from a 50-foot distance using 71/2 shot.

Pedestal. This group includes any closure that will be placed above grade in a pedestal type enclosure. Pedestal closures are designed to meet specifications lower than those for underground. A 10-foot water immersion resistance specification is necessary, because these closures are placed at ground level, and the pedestal will not always be flood-proof. Bellcore GR-771 allows pedestal-type closures to be free breathing or sealed. Therefore, a GR-771 pedestal rating may not suffice in a flood plain. Because these closures are protected by a pedestal, the specifications for impact, compression and corrosion resistance can be lower. Bellcore does not require freeze/thaw tests for pedestal closures.

Splice closures should be designed to keep the plant operating for at least 20 years


Universal closure

Buried/underground. This group includes any closure that will be placed below ground, such as a direct bury or in a manhole/handhole. These closures must meet a 20-foot water immersion resistance specification. Also, steam resistance should be required for manhole applications. Bellcore considers steam resistance a conditional requirement for its buried deployment family. Buried/underground closures feature greater impact, compression, corrosion, and chemical resistance specifications than other outdoor closures, thereby making them better suited for harsh environments. However, Bellcore does not require fire, UV, bullet or rodent resistance for this group, mainly because these closures will not be exposed to those dangers in their specified environments.

Universal. This group includes closures that meet all specifications for all six of Bellcore's deployment families. A truly universal closure will meet all of the rigorous requirements for buried/underground closures. Universal closures will also pass the UV test, allowing them to be used in aerial applications, as well as Bellcore's conditional fire, steam, rodent and bullet resistance tests, which ensure that they also address unique requirements. The main advantage of specifying a universal closure is that it is likely to meet the technical requirements of an application, thereby reducing the risk of a closure failure.

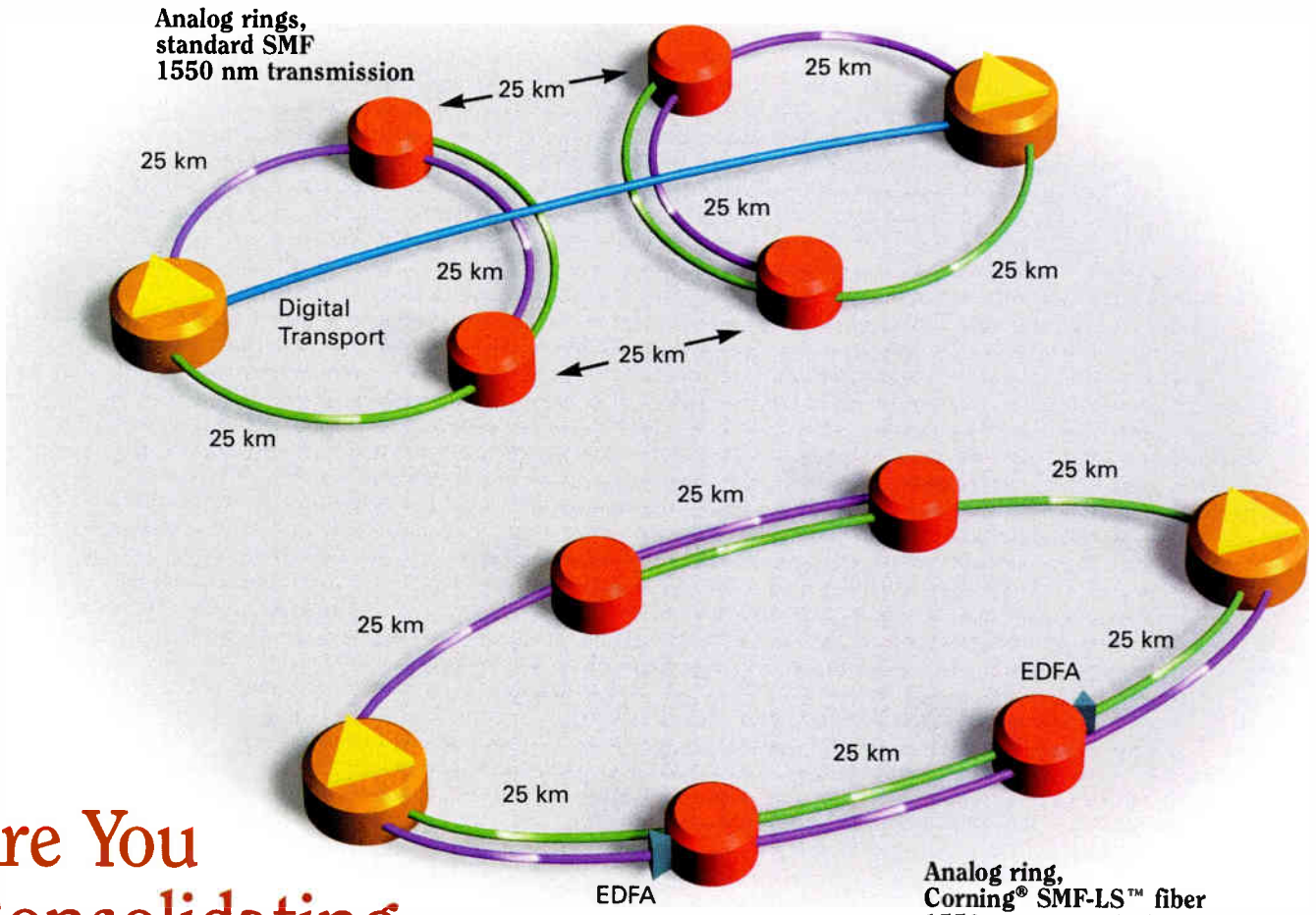
Expect more from your closure

Splice closures are designed to do a lot more than simply meet application/environmental requirements. For example, they should also be designed to keep the plant operating for at least 20 years by allowing re-entry, re-configurations and a high level of craft-friendliness. To get the full benefit, there are several factors to consider when selecting and comparing closures.

•Closure technical specifications. All closures, regardless of technical features or price, must meet minimum specifications for the application. Bellcore GR-771 has six different deployment families; therefore, it's important to ask manufacturers which deployment family or families its closures fall into. Generic testing categories include: fiber routing; cable clamping and sheath retention; compression resistance; impact resistance; water immersion; wind-driven rain; thermal aging; temperature/humidity cycling; freeze/thaw; chemical immersion; bonding; corrosion resistance; and resistance to bullets, rodents, steam and/or fire. These specifications offer some insurance that the closure will perform as promised.

•Purchasing the closure. Look for closures that are easy to order, require few ancillary parts and are packaged in one box for most applications, with one part number (i.e., three cable kits, two trays and hardware for sealing, gripping and grounding). Sound purchasing decisions can dramatically reduce inventory hassles and ensure that everything is intact when the technician arrives at the job site.

Most manufacturers divide their line of closures into a few tiers to fit different fiber counts, such as <18, <36, <96, <216 and >216-F. Once the tiers set has been identified, it's important to determine how the closure in each tier must be configured for typical applications. For example, the base closure for tier



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Environmental requirements to consider for closures*

	Underground	Pedestal	Aerial
Water resistance	Yes (20 ft.)	Yes (10 ft.)	Yes (Wind-driven rain)
Sheath retention	Yes (100 lb. axial)	Yes (100 lb. axial)	Yes (100 lb. axial)
Vertical drop	Yes	Yes	Yes
Compression	Yes (300 lb.)	Yes (100 lb.)	Yes (100 lb.)
Impact	Yes (100 ft.-lbs.)	Yes (50 ft.-lbs.)	Yes (50 ft.-lbs.)
Thermal aging	Yes	Yes	Yes
Temp./humidity cycling	Yes	Yes	Yes
Freeze/thaw	Yes	**	**
Chemical resistance	Yes	Yes	Yes
UV resistance	**	**	Yes
Corrosion resistance	Yes	Yes	Yes
Bullet resistance	**	**	Yes
Rodent resistance	**	**	**
Steam resistance	**	**	**
Fire resistance	**	**	**

*This table presents generic guidelines, not necessarily those of Bellcore. For detailed explanations of standard Bellcore requirements, please acquire a copy of Bellcore GR-771.

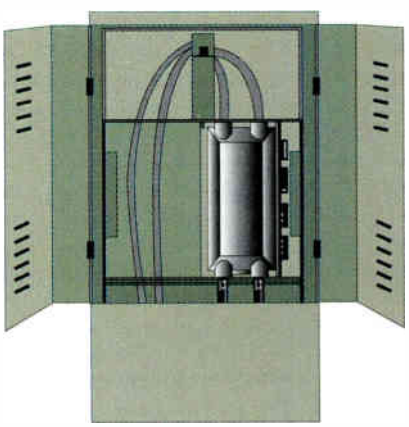
**These requirements are more application-specific and/or conditional, thus dependent upon unique needs.

<96-F may be configured with enough cable kits and trays to handle three cables and 48 splices. After choosing a few basic configurations to fit most of the applications, the closures can be compared according to the base cost, as well as other expenses, including: parts and tools; additional cable and splice trays; re-entering; grounding; maximum fiber and cable capacities; and labor. This procedure requires a minimal amount of time and is the only method that proves the real cost of owning a closure.

•Installation. Closures should be easy to install. Therefore, find out if power sources are required, and what special tools are needed. Also, does the installation require additional tapes and cements that are not included with the closure? Does the installation of small or large cables require special kits? Simple installation reduces labor costs and eliminates the cost of special tools.

•Midsheath installation. As new services and customers arrive in cabled areas, splice enclosures will be installed onto fiber optic cables that contain active fibers that cannot be cut. Before standardizing on a closure, find one that allows easy midsheath access and also handles everyday splicing needs. Midsheath installations can be complicated when a fiber cable must be doubled over and pushed through a port hole, or if there's not enough storage for uncut expressed fibers.

•Re-entry. In today's changing network, it is likely that technicians will have to return to the closure to re-direct signal distribution, re-splice or add connectors or a cable. Therefore, the closures should be easy to get back into. Re-entries are often unplanned and on short notice, so it's best if the closure will not require a re-sealing kit, a power source or special tools for re-entry.



Pedestal closure

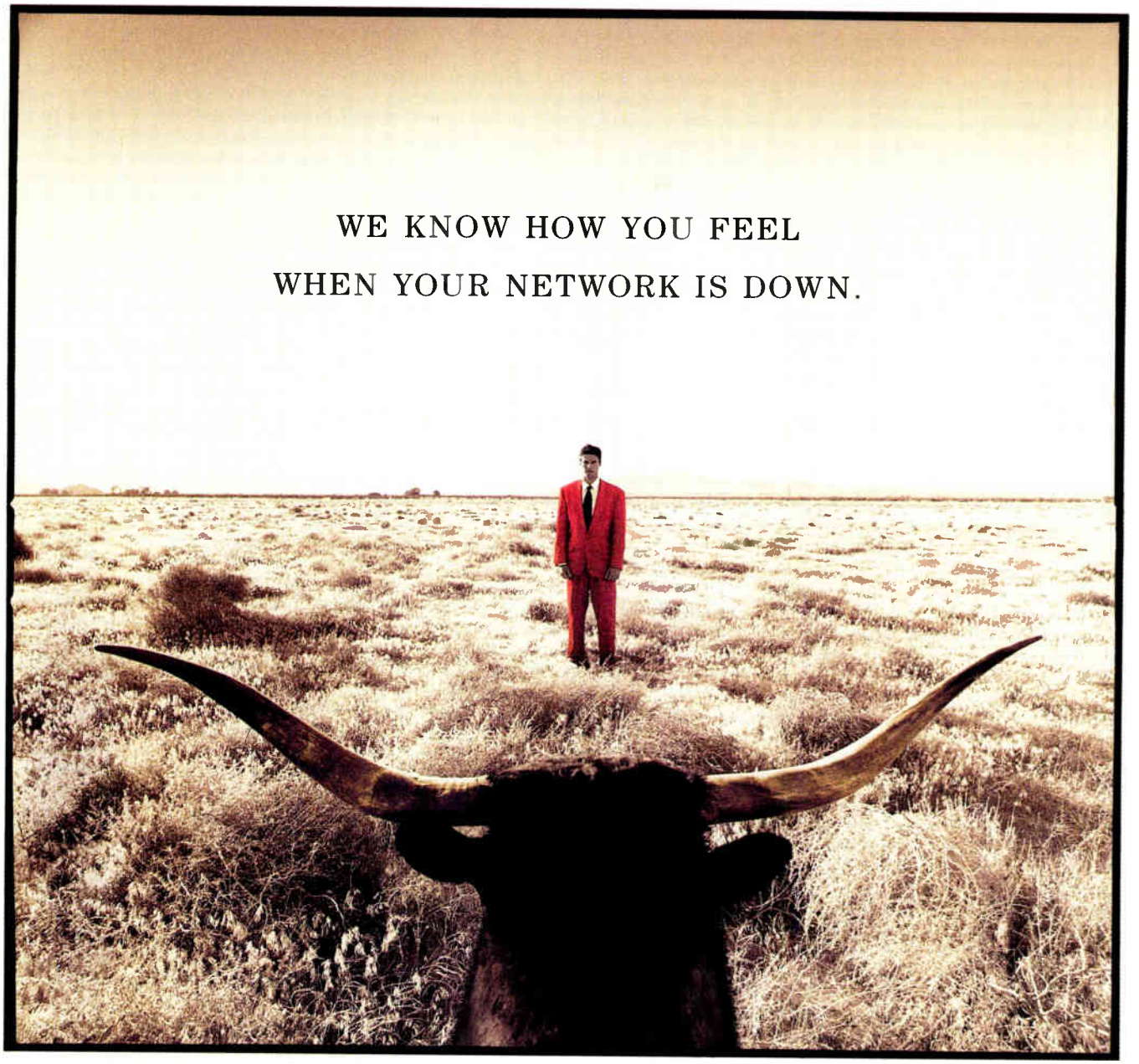
•Adding a cable. Factors to consider include disturbance of the cable grip and ground, as well as the seal integrity of the other cables. Also, make sure that previously installed cables are not being endangered with flames, heat or hacksaw blades. During the initial installation, be sure that any port adapters for future cable entries do not limit the closure to smaller cable ports. Also, try to find a closure that does not require a costly and cumbersome midsection to be added for cable entries beyond the fourth cable.

•Other considerations. Determine if the closure is fire rated, thereby allowing it to be used in a building. Local code will determine which of the four levels of Bellcore GR-771 fire ratings need to be met. Also, the weight of the closure will determine clearance or load problems on the strand. Additionally, Bellcore requires sealed closures to feature an air valve to test the integrity of the closure seal. An internal pressurization of 8.5 p.s.i. is a good approximation of an external 20-foot waterhead. Also, use 4.25 p.s.i. for a 10-foot waterhead.

In today's competitive telecommunications industry, your fiber plant is your channel to market. It is necessary to do your homework before choosing your fiber optic splice closures. By taking the time to match the closure's technical specifications and craft friendliness to its application, everyone will benefit, from your technician, to your subscriber, to your bottom line. ■

About the authors

Jerry Patton is a product specialist, and George Steenton is director of product management for Keptel, an Antec company.



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Business applications over cable networks

Evaluating technologies for business broadband access

By Jian Zhang and Tim Hall, Terayon Communication Systems

The Internet is not only changing the way we communicate in our daily life, but it is also fundamentally changing the way we conduct business. Information exchange today extends well beyond communication within a building or business campus, and the applications go well beyond e-mail and corporate Intranet. Rather, we swap engineering designs with remote offices, share inventory databases with suppliers, get proofs from our vendors, let employees work at home, take orders and ship products to customers—all over a private network or the Internet. These new business practices create a tremendous demand for high bandwidth access to the networks. A new class of bandwidth-intensive applications, such as videoconferencing, heightens demand even further, as these become the mainstream business practices.

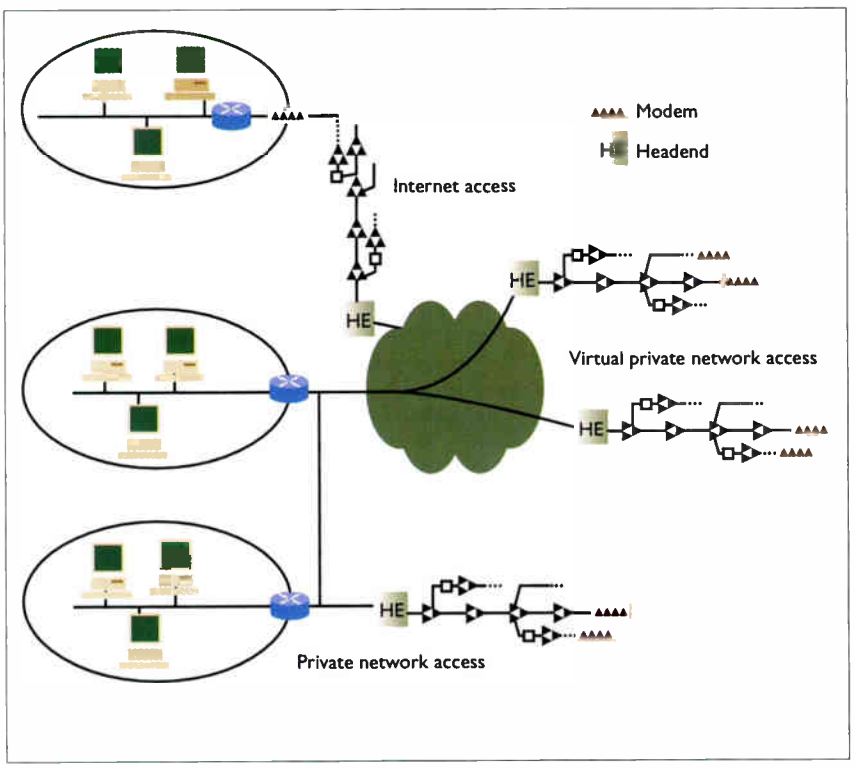

Figure 1: Three types of access supported by the cable infrastructure: the Internet, private network and virtual private network—all of which connect end users to the respective networks through their headends. The virtual private network is represented by a private network and secured "tunnels" within the public Internet.

How does modern networking and access technology meet these demands? At the low end, today's telephony-based remote access is inexpensive, but too slow. At the high end, dedicated leased lines offer fast digital access, but at a cost that is prohibitive for small- and mid-sized businesses—a group that constitutes 60 percent of the business market.

The proximity of their cable infrastructures puts cable operators in an excellent position to deliver high-speed access to small- and mid-sized businesses. By leveraging their cable assets and the economics of the coaxial cable network, cable operators are poised to be formidable players in the local access market.

Market opportunity

Traditionally, local telephone operators have monopolized the local telecommunications market—today, a market approaching $100 billion. However, the Telecommunications Act of 1996 changed all that, and opened the market to competitors, including competitive local exchange carriers (CLECs) and long distance carriers.

Dedicated data access, which provides business users with a constant, full-time connection to the Internet, is a small, yet fast-growing, segment of the local telephony market. Driven by the explosive growth of the Internet and private networks, dedicated access has been growing at a rate of more than 20 percent per year—today at nearly $10 billion. CLECs have been effective in capturing a segment of this market from the telcos.

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tion to offer a suite of economic broadband access solutions for small and mid-size businesses. While CLECs target large businesses in major cities, cable networks cover primarily residential areas, where small- and mid-size businesses are located. Their all-coax and hybrid fiber/coax (HFC) architectures are likely to offer better economies than all-fiber networks, when deployed in these residential areas. All of these factors provide cable operators unmatched competitive advantages in the business market.

Cable-based access networks

Cable operators can target two distinct access opportunities: Internet access and private/virtual private network (VPN) access (see Figure 2). In Internet access, the cable network is used to connect businesses to the Internet through the headend. The headend acts as a traffic concentrator for a point of presence (POP) on the Internet. The businesses' internal network is connected to the cable network through a cable modem via a hub or a router.

As an access to a private or virtual private network, the cable network connects vendors, business partners, customers, branch offices and employees' homes to a corporate network. Users are connected to the headend via the cable network, which connects to a private backbone with a dedicated leased line, in the case of a private network, or with secured "tunnels" through the Internet, in the case of a virtual private network. Such tunnels, implemented by network layer encryption of Internet Protocol (IP) data, allow transmission of mission-critical data across the Internet without compromising its security. Virtual private networks have the advantage of lower cost and higher flexibility over private networks, because VPNs don't require leased lines.

Business applications over cable

In general, business applications over cable are differentiated from residential applications by: (1) providing productivity enhancements as opposed to the entertainment focus of residential applications, (2) running over a wide area network (WAN), and (3) requiring high bandwidth, two-way connection. Figure 2 provides a framework for describing business applications over the cable access network. The underlying technologies supporting these applications include the cable modem, the coaxial cable network, virtual private network, and voice-over-IP.

Three categories of horizontal business applications can best be supported by a cable access network: collaborative applications, real-time broadband applications and commerce-related applications. Collaborative applications include groupware, workflow and whiteboard applications, which allow multiple users in disparate locations to share the same information concurrently. The information exchanged in these collaborative applications includes documents, images, business forms, chained discussions or video and audio streaming. The real-time applications include videoconferencing and IP telephony. Commerce-related applications include Web site hosting for advertising or electronic commerce and financial transactions such as point-of-sale, inventory control and credit verification.

Collaborative applications include groupware, workflow and whiteboard applications

Multiple vertical business applications can be supported by cable access. Figure 2 includes a list of eight vertical applications, including K-12 education, college campus access, telemedicine, real estate, work-at-home/telecommuting, retail and community and government access. All of these share a common characteristic: they are accessible to cable networks.

Design requirements

Because business applications provide productivity enhancements, there are spe-

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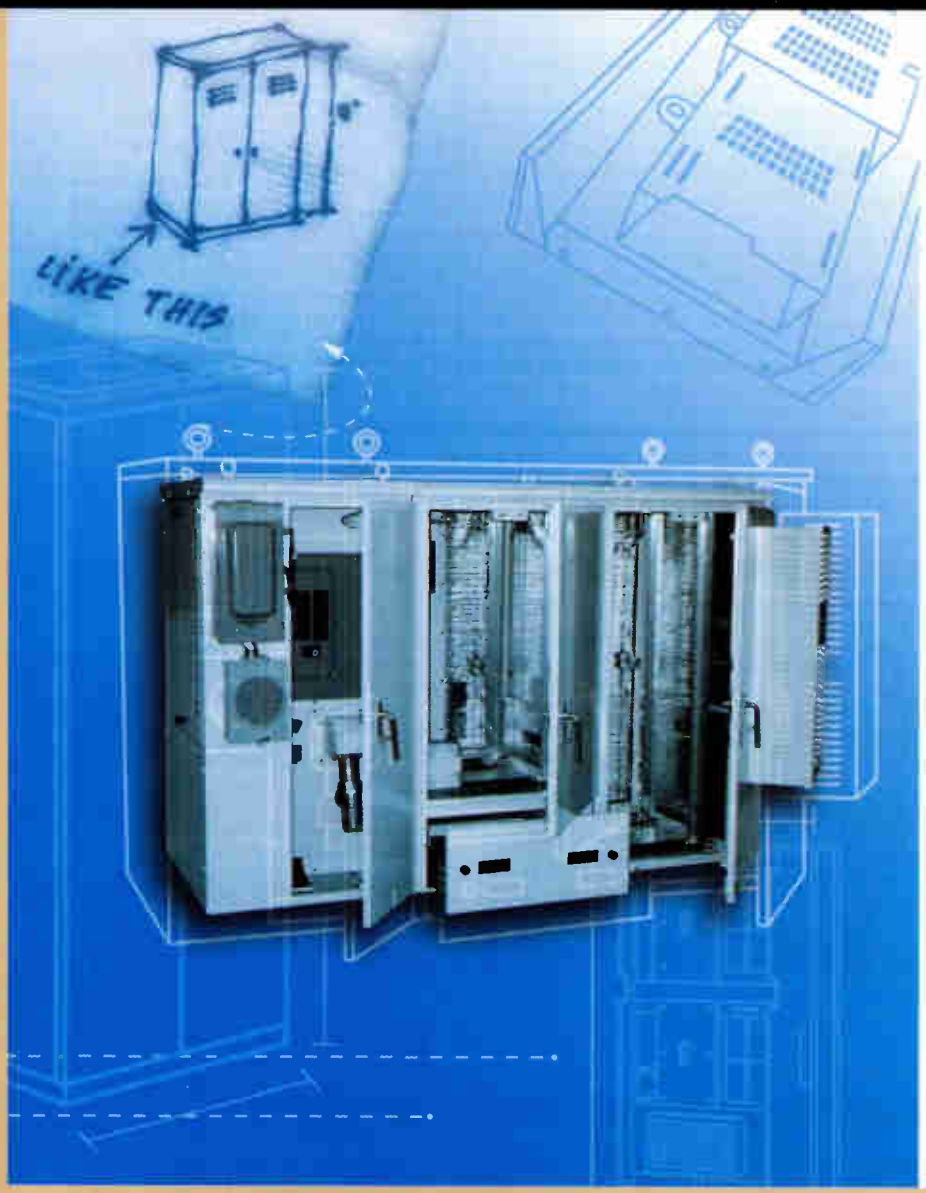

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available for other applications. Such symmetric applications demand a cable modem access system which supports true, two-way interactivity.

Quality of service. In addition to the general requirements for reliability, security and bandwidth symmetry, a cable access system must support business applications that require various levels of quality of service (QoS). QoS can be offered in three dimensions: bandwidth, latency and latency variation. Latency refers to the time delay in transporting information from its source to its destination, whereas latency variation denotes the variation in such time delays. It is essential to minimize latency variation in delivering real-time applications, because the relative timing among information components must be preserved to ensure data integrity. Video streaming applications, for example, require the relative timing between two video frames to be constant in order to deliver high-quality video. Interactive applications also demand minimal latency as a result of their two-way interactivity. In telephony, for example, round-trip channel latency of more than 25 milliseconds produces echoes [3]. Applications vary significantly in their bandwidth demands. Some applications require constant bit rate (CBR), while others demand variable bit rate (VBR) or unspecified bit rate (UBR).

Figure 4 shows bandwidth and latency requirements for various business applications. As shown, a cable access system must provide the flexibility to offer bandwidth ranging from 8 kbps to 15 Mbps, and latency as low as 25 milliseconds, in order to deliver high-quality business applications.

In addition to service quality considerations, the flexibility to offer various classes of QoS is important for competitive considerations. Some access products offered by local telephone companies carry with them specific QoS characteristics. For instance, T-1 or fractional T-1 leased lines support constant bit rate at various bandwidth levels. In order to offer competitive products, cable operators should have the flexibility to set specific QoS parameters to match the offerings of local telephone service providers.

Lastly, the capability to provision the bandwidth to support multiple levels of service is also essential to ensure cable operators a solid financial return. Such capability enables the operators to offer multiple services to better meet the needs of various business applications, and thus price the services effectively. Such bandwidth provisioning capability improves the operator's profit margins and results in better financial returns.

In order for a cable modem to deliver QoS control, it must incorporate a flexible and efficient media access control (MAC) layer design. With their ability to allocate spread spectrum codes dynamically, S-CDMA-based cable modems provide a flexible and efficient MAC layer. S-CDMA-based cable modems guarantee subscribers low-latency, constant-bit-rate service by dedicating a group of codes to the subscriber. Alternatively, an unspecified-bit-rate service can be implemented by allocating a pool of commonly-shared codes for multiple subscribers. CBR, UBR, and other classes of services can coexist simultaneously in the same channel of an S-CDMA modem system.

The most important requirements in designing a cable access network for business include: reliability, security, symmetric bandwidth capability and the capability to offer various QoS levels of service. By building systems to address these network considerations, cable operators can ensure that they will be competitive in entering the local dedicated access market. ■

	Reliability	Security	Bandwidth symmetry	Quality of service		
				High bandwidth	Low latency	Isochronicity
Telemedicine	x	x		x	x	x
Retail	x	x	x	x		
Work at home	x	x	x	x		
Videoconferencing	x	x	x	x	x	x
Voice over IP	x	x	x		x	x
Real estate	x			x		
Education	x		x	x		
Web hosting	x		x	x		
Community access	x		x	x		

Table 1: Business application requirements

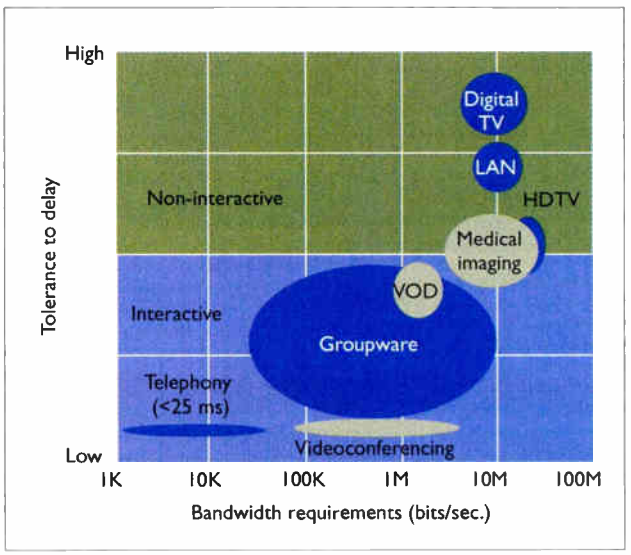

Figure 4: Bandwidth and latency requirements for various broadband services. (All numbers are after data compression.)

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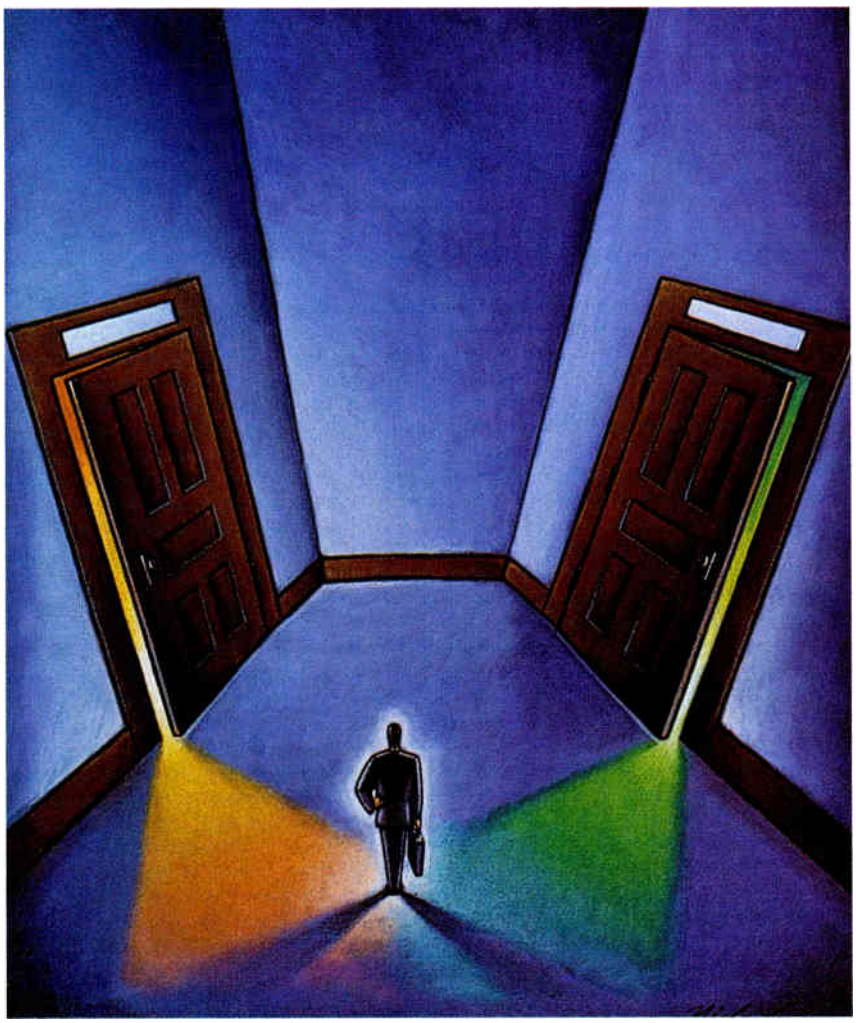
Which way to the data bonanza?

Operators faced with technology, marketing choices



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BY FRED DAWSON

The cable industry exits '97 with an impressive head of steam and a tremendous burden of proof looming for '98 when it comes to capitalizing on the promise of high-speed data services.

Much was made at the recent Western Show of demonstrations showing interoperability among modems compliant with the emerging Multimedia Cable Network System (MCNS) standard, and even more was made of the vast improvements in the look and feel of high-speed data services recently enhanced to take advantage of the graphics, audio and video potential of broadband access. But a closer look at the state of affairs suggests MSOs must commit to a much more aggressive push on the data front in the year ahead than they appear to have planned so far, if they are to establish cable access as an off-the-shelf option in network computing.

The Western Show came and went without anyone announcing orders for MCNS modems for good reason, notes Richard Green, CEO of Cable Television Laboratories Inc. "It's a little early for big orders for MCNS modems, because there are questions surrounding interoperability that we still have to work through," he says. It took CableLabs technicians six weeks to get the data systems on display at CableNET to work together, Green adds.

"The (MCNS) process is well defined," he says, "The next goal is to make sure it works."

If the issue of when MCNS modems will enter the mainstream of MSO deployments and, from there, find their way into retail distribution were pegged strictly to the final resolution of the interoperability challenge, there would be little cause for concern, because it's likely that these technical details will soon be worked out. But the real question concerns what happens once everyone can be sure the modems they're buying will work with everyone else's modems.

"That's hard to call," Green says. "There are several forces at work which will help push MCNS modems into the mainstream and eventually to retail distribution. Probably the most significant is the OpenCable (next-generation set-top standardization) process, because those boxes will all come with MCNS modems built in."

However, while orders for OpenCable set-tops could soon materialize in quantities as high as 25 million—a figure cited by Tele-Communications Inc. CEO John Malone as an outside possibility at the Western Show—dependence on Open-

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Cable as the driving force would not produce the expeditious drive to retail that MSOs and MCNS modem vendors are looking for. Malone, talking with reporters at the Western Show, made clear TCI doesn't expect to move to "significant" deployments of OpenCable set-tops until "late '99."

And even this timeframe for massive quantities of MCNS-equipped set-tops depends, in TCI's case, on the completion of at least one of the major deals it was working on at press time to ensure subsidization of the set-top purchases by a big software company such as Microsoft Corp., or a long distance company such as AT&T. "It's as though we're building a big building," Malone said. "Like the building owner, we need that first big tenant to give us some assurance that we'll succeed in getting the required occupancy once we've completed construction."

Clearly, it's going to take something more than OpenCable to drive MCNS modems into the marketplace if the goal is to achieve retail distribution starting in late '98, as some MSOs and their suppliers have indicated, or even in '99, as virtually everyone expects. But a look at the current state of high-speed data service deployments and the pace of rollouts anticipated for '98 suggests industry plans may be inadequate to the task at hand.

At first glance, the numbers are impressive. Based on MSO reports of service launches so far, there appear to be about 5.4 million North American households passed by networks equipped to deliver data at anywhere from 10 to 40 megabits per second over 6 MHz cable channels on a shared access basis. That's from a standing start of close to zero a little over a year ago.

Every one of the top 10 MSOs, some of the smaller ones in the U.S., and all of the major Canadian MSOs are now in the high-speed data business. Services, typically priced around $40 per month, are available in about 72 franchise areas, ranging from small townships such as Ridgecrest, Calif., where Mediacom passes 17,500 homes, to major clusters, such as Time Warner's 330,000-home Northeast Ohio and MediaOne's 400,000-home Jacksonville operations.

Yet, for all that has been accomplished, the jury is still out as to just what the high-speed data business is going to mean to the bottom line in cable. Overall, judging from subscriber numbers reported by the major suppliers and extrapolating from there to the rest of the market, there appear to be about 100,000 subscribers actually signed on to services at this point, representing just under two percent of total

'A year-and-a-half ago, it took 46 steps to do the software installation'

passings. In systems that have been marketed for a year or better, which offer a fairer gauge of penetration, numbers are typically running at three to six percent, with a few operations, such as Rogers Cablesystems' year-and-a-half-old Wave service in Newmarket near Toronto, pushing close to eight percent.

Few are satisfied with these numbers as reasonable targets for the long haul. "1998 is the pivotal year in terms of moving up on all the curves," says Dean Gilbert, senior vice president and general manager of @Home Network, reflecting a widely held view of what the immediate challenges are.

Where @Home is registering in the three-to-six percent penetration bracket among the handful of systems that have been up and running a year or so, the goal now is to get to 15 percent, Gilbert says. But it remains to be seen how fast the subscriber base can be expanded, even with the stepped-up marketing efforts and higher-level content inducements @Home and the other service providers have slated for '98.

@Home, claiming close to 50,000 subscribers out of 2.6 million homes passed, is anticipating that the total subscriber base for cable data services offered by all suppliers a year from now will only be about 500,000. This is 200,000 fewer than projections made earlier this year by Paul Kagan Associates.

Such caution rests on several realities of the business that have become apparent as cable operators push forward with the marketing of services, starting with the fact that the state of the technology is such that installing cable modems remains a costly, time-consuming task. By most accounts, it's still taking an average of two hours per customer to get the job done.

"Installation can take anywhere from 20 minutes to four hours, depending on what conditions you're dealing with in the individual user environment," says @Home CTO Milo Medin. "There are three or four markets where we have month-long installation backlogs."

Much has already been done to reduce installation time, he and others note. For example, says Gilbert, "A year-and-a-half ago, it took 46 steps to do the software installation; today, it takes three."

The company is focusing heavily on cutting installation time further, Medin says. Some measures, such as reducing the Netscape browser installation to a one-step vs. five-step process, amount to a time savings of five minutes or so, while others, such as making use of new Universal Service Bus specifications being developed for the PC for broadband connectivity by Intel Corp., in cooperation with @Home, promise to cut installation time for PCs so equipped by as much as 80 percent.

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because trying to avoid generating more demand than the installation pace can handle necessarily means keeping a lid on marketing efforts, which makes it hard to gauge just what the true demand level is.

"There's huge pent-up demand for high-speed data, but we just can't afford to be getting ahead of ourselves," notes Wilt Hildenbrand, vice president of engineering for Cablevision Systems Corp.

Like many MSOs, Cablevision, which recently became an affiliate of @Home, has largely limited the marketing effort for its Optimum Online service in Long Island and Connecticut to mailings, though it has now begun using local newspaper ads as well. Two other @Home affiliates, Cox Communications and Comcast Corp., have even begun running low-key TV spots, often linked to retail computer outlets where people can go to see demos of the cable data service.

But, in most areas, the risks are too high when it comes to running high-profile promotions. "We're using more aggressive tactics where appropriate, but we're still limited by the size of our service areas within any given geographic area," notes Don Apruzzese, spokesman for MediaOne Express.

MediaOne has begun using radio in some markets, including the Boston area and Jacksonville, Apruzzese says, but it's hard to put together a message in non-video media that resonates with the casual on-line users who comprise the next market segment targeted by service providers. "It's very hard to communicate what 50 times faster means, because the customer doesn't have a frame of reference," he notes, adding that getting across the value of "constant connectivity" is also a challenge when dealing with people less on-line savvy than the early adopters.

The 'wow' factor

The need to demonstrate what a difference cable makes to the on-line experience has driven most of the leading high-speed data operations into partnerships with local computer store outlets. "We see the use of kiosks in computer stores and shopping malls as an extremely effective means of getting people acquainted with what the Road Runner service has to offer, not just in speed, but in content as well," says Scott Opiela, marketing specialist at Time Warner Cable's Albany, N.Y. system.

"There's a 'wow' factor to seeing this service in operation that has strong appeal in the retail store environment," @Home's Gilbert says, noting the benefits cut both ways. "There's a great opportunity for partnerships involving manufacturers, retailers and cable operators to take shape in advance of actual retail distribution of the modems themselves, just because the opportunity to get a service like @Home's is a driver behind the sale of PC hardware and software."

MediaOne is finding the tactic can be valuable to the on-line supplier not only in promoting service awareness, but in encouraging potential customers to purchase PCs and related gear, especially Ethernet network interface cards, that are best suited for connection to high-speed data services, Apruzzese says. However, he adds, the retail relationship can be a mixed bag.

"We have some excellent relationships where the salespeople understand what we're doing and see it as offering them opportunities to sell hardware and software," he says.

"But there are other stores where that level of interest just isn't there."

Beyond serving as a marketing ploy at this early stage, operators hope the tie-in with retailers leads to retail distribution of consumer-friendly modems that would eliminate the time-to-install barrier. The customer base for high-speed data won't "get into the multimillions of subscribers

in North America until modems are available at retail stores, and the software interfaces are in place to support simple user installation," Medin says.

Of course, before MCNS modems, due on the market starting this quarter, can reach retail, MSOs must begin using the new modems in the current mode of distribution, renting them as part of the basic service charge. Their ability to do this rests in part on costs and in part on finding ways to seamlessly integrate MCNS units into service areas already connected via non-standard modems.

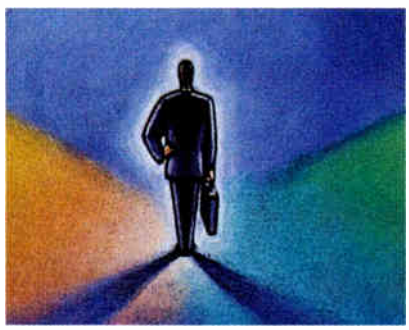
Adding MCNS modems in service areas already served by proprietary systems will require adding another 6 MHz for the new data feed, though not necessarily more headend equipment to support the new channel. Many data system suppliers will soon deliver headend gear for proprietary systems that come with built-in support for adding the MCNS channel at a later date, avoiding the need to add equipment racks.

Perhaps more significantly, proprietary systems have a huge headstart on the cost curve, with some shipping in volume at under $300 per unit, while prospects for hitting the $300 mark with MCNS modems remain uncertain. "Our estimates are that probably not even 30 percent of the market will migrate to MCNS modems next year," says Dick Day, corporate vice president and general manager of Motorola Corp.'s multimedia sector.

Uncertainties about demand at this point make it difficult to set initial MCNS unit prices or to plan manufacturing schedules for supply of modems that would be suited for retail distribution, notes Sam Nalbone, vice president and general manager of Toshiba American Information Systems Inc. "People are talking about getting modems into stores by next Christmas," he says, "but, at this point, I haven't received enough information to know whether that's practical next year or whether it won't be until the year after."

Even if MCNS support is high among MSOs, expectations of only five percent penetration could cool retailers' ardor, Nalbone adds. "If you're looking at splitting a market base of 100,000 potential customers in a given region among many retailers, the handful of buyers any one retailer might expect to see could make it difficult to justify allocating shelf space to the equipment," he says.

The answer to when cable data suppliers can really expect to see mass market numbers sufficient to make retail distribution of MCNS modems a reality rests with the MSOs' capitalization programs. Beyond the need to expand marketing, speed the installation process, offer jazzier content and move to standardized modems, the key issue is the pace of network upgrades to accommodate rollout



The industry's window of opportunity is finite

of the services, Gilbert acknowledges.

"We really only need one thing–homes," he says. "This is all about getting services in front of enough people to allow this thing to build momentum in the marketplace."

The good news is that operators are no longer sitting on the fence with regard to an appreciation of how vital data services and the upgrades that go with them are to the future of the industry, Gilbert notes. "I definitely see from all our discussions with operators that they recognize this is the platform that uniquely leverages their infrastructure to get them into the markets that are exploding, including new TV services as well as PC services, and business services as well as consumer services."

Moreover, adds Medin, the industry now understands that the upgrade cost is nowhere near as high as once thought, with fiber to node serving areas of 1,200 or even 2,000 homes, and coaxial capacity of 550 MHz or even as low as 450 MHz sufficient to support good quality data service and reasonable levels of penetration. While the cable system must be swept clean of noise leaks, and return path modules must be installed for two-way activation, this is a long way from having to build to 750 MHz capacity and 500-home fiber node specs, he adds.

"We're not talking about spending $200 to $300 per home passed anymore," Medin says. "It's more like $50." By @Home's reckoning, close to half of all cable systems in U.S. metropolitan regions are suited to upgrading for cable data services at this cost level.

But pushing the upgrade pace as well as hiring more installers and spending more on marketing means MSOs will have to make a bigger commitment to being in the PC on-line market than they have so far. "Waiting for OpenCable to drive MCNS penetration is the wrong approach," says a senior cable data service executive, asking not to be named.

"Sooner or later, this industry must recognize that there's a huge upside in the on-line business that comes with broadband access that has nothing to do with the TV set."

DSL is getting better

Whether or not this attitude prevails is the key to whether the industry wins recognition in the retail computer market as the supplier of broadband connectivity to the on-line community. As Green notes, the industry's window of opportunity as the lone supplier of high-speed access is finite, especially in light of telcos' growing preparations to enter the fray via DSL (digital subscriber line) technology.

"DSL is getting better," Green says. "Now is the time to really push ahead to build the subscriber numbers and provide the incentives manufacturers and retail companies need to make this platform widely available." ■

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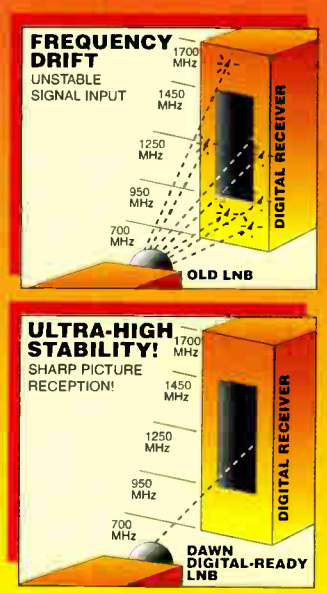

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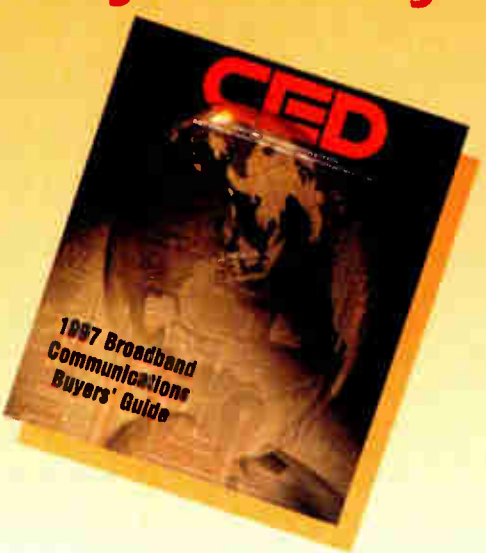

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RS# 43

Cablephone flies in the Netherlands

A2000 signs $100M contract to build network

BY DANA CERVENKA

Reports of cable telephony's demise may have been greatly exaggerated, especially outside of the U.S., where different dynamics are at work, making the service an attractive offering in cable operators' multi-service arsenal.

One case in point is cable operator A2000 Cable Television and Telecommunications, a Netherlands-based joint venture between United & Philips Communications (UPC) B.V. and US West International formed back in July of 1995. Making news for contracting with equipment supplier Tellabs for $100 million worth of telephony gear and associated equipment and services over the course of five years, A2000 is offering an unspecified number of subscribers not only telephony, but also a full package of basic services, impulse pay-per-view, and Internet access service, all riding on the same hybrid fiber/coax network.

Though the MSO declines to reveal how many telephony subscribers it has, all totaled, the company has 550,000 cable TV customers in the greater Amsterdam area, of which 120,000 are currently capable of receiving the full menu of services. A2000 is currently offering telephony in the Purmerend, Zaandam and Hilversum franchise areas, and plans to launch commercial service in Amsterdam proper early in 1998. For telephony only, the published rate for a one-party, residential service is about $12.25 U.S. per month.

Upgrading for reliability

The HFC network providing these services is a three-layer cake, says A2000's Managing Director, Jack Methven. The first layer is a backbone, self-healing, 14-hub SDH (synchronous data hierarchy) and analog supertrunk ring structure; below that is a fiber ring structure that connects 16 fiber nodes, each of which passes 800 homes. As for the RF portion of the network, the forward path is a full 860 MHz; the reverse is 5 to 65 MHz.

Methven estimates that the cost of upgrading the network to prepare for telephony comes in at less than $100 per home passed. "We replaced a dual 450 MHz trunk with fiber; the coaxial plant was left fundamentally intact. And then there was an amplifier platform replacement–we replaced all of the active elements in the network with Philips Broadband Networks' Diamond Net product."

While Tellabs was not on A2000's original "short list" of cablephone equipment suppliers, according to Methven, after conducting a technical trial of the manufacturer's Cablespan 2300 Universal Telephony Distribution System, the MSO was impressed enough to purchase the hardware, as well as Tellabs' Cablespan EMS element management system.

Some tweaking was necessary to customize the equipment to a European market. Because of the unique nature of the subscriber environment in the Amsterdam area, Tellabs and A2000 worked together to modify the manufacturer's RSU (remote service unit) into a unit more suited to the planned service environment. To an uninformed observer, the market in Amsterdam looks as if it's composed of dense, three- and four-story apartment blocks. But unlike in the U.S., where there is often a common terminal in the basement that connects all the residents in a building to phone service, in Amsterdam, each apartment is more like a free-standing home, in that each has its own television, its own telephony, and its own power services fed from a location out on the street. Because of that, the

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Time Warner Hawaii chooses VisionTeq

CORAL SPRINGS, Fla.-Oceanic Cable of Hawaii has chosen VisionTeq to supply customized hub and headend combiner/divider networks which will allow routing of individual fiber node inputs and outputs, as well as provide signal insertion/deletion capabilities. This system-wide upgrade, which uses active forward and passive return units, will minimize customer service interruptions when future planned expansions, or new, two-way services are introduced, says VisionTeq.

RELTEC breaks ground

WARRENVILLE, Ill.-RELTEC Corp. has broken ground on a 40,000-square-foot, build-to-suit facility for its Outside Plant Products business at Cantera, a 650-acre mixed-use development. The company expects to employ about 150 people in engineering, marketing, administration and financial disciplines at its new facility, and anticipates jobs will be added as its business expands.

Warrenville Mayor Vivian Lund, and RELTEC's Richard Schwob and W. Michael Corkran at the groundbreaking ceremony.

RELTEC's Outside Plant Products business designs, develops and manufactures more than 3,000 individual products under the Rainford and Reliable Electric brand names at existing plants in Georgia, Illinois, Mississippi and Wisconsin in the U.S., as well as in Canada, China, Japan and the U.K. Products include electronic enclosures for broadband communications, wireless, and wireline networks, as well as pedestals to connect television and telephone networks to the home.

3Com sends modems to Suburban subs

SANTA CLARA, Calif.-3Com Corp. is supplying cable modems and other high-speed data-over-cable products to residential customers of Suburban Cable. The company began shipping its 3Com External Cable Modem to domestic and international cable companies in August.

The solution purchased by Suburban Cable includes 3Com External Cable Modems and associated headend controller equipment, EtherLink III network interface cards and Cable Ethernet Installation software.

Suburban has tested and purchased 3Com products for its Internet Cable Access business and will begin offering the complete data-over-cable solution initially to about 100,000 residences served by its two-way enabled systems. The operator is using Sonet (Synchronous optical network) technology across the majority of its operating area, providing customers with reliable transmission of data-over-cable services.

In addition to providing links to existing local and global content, Suburban is creating a variety of content, including shopping, community and educational activities.

The 3Com Cable Modem, based on ATM technology, is manufactured and sold by 3Com. The product is the result of a licensing agreement and joint development activity between 3Com and Com21.

CableData, Rifkin pact

RANCHO CORDOVA, Calif.-CableData Inc. and MSO Rifkin & Associates Inc. have extended their long-standing relationship. The contract extension is for six years, under which Rifkin will continue utilizing CableData's DDP/SQL customer management and billing system to manage its 325,000 cable TV subscribers. For 10 years, Rifkin has used CableData's solutions to support operations such as order processing, collections, charging and billing, as well as transaction management and marketing support functions.

CSG renews contract with Summit

DENVER-CSG Systems Inc., a subsidiary of CSG Systems International Inc., has renewed its contract with Summit Communications. Under the renewed contract, the cable operator extended its usage of Communications Control System, CSG's transaction processing system, and has purchased software licenses for CSG Advanced Customer Service Representative, a customer care graphical user interface that works in conjunction with CCS.

Marcus Cable signs TSI

ANAHEIM—Marcus Cable has signed with Telecommunications Security Inc. (TSI) to examine and develop management security programs for its new system acquisitions.

TSI has completed the first phase of the security program with an evaluation of the operations' practices relative to cable signal security and related security risks. Additional aspects of the program will include a complete review of warehousing and distribution procedures, analysis of current theft of services procedures, and a review of general security policies.

US Cable rolls out data service

MONTVALE, N.J.—US Cable Corp. has jumped into the high-speed data-over-cable fray, committing to roll out the service in its Wild Dunes system outside Charleston, S.C. The system will use "Homeworks Universal" modems manufactured by Zenith Network Systems. ■

In the loop

Have a comment? Contact Tom by e-mail at: ctrobinson@worldnet.att.net

Putting Your Money Where Your House Is

By Thomas G. Robinson, Director of Regulatory Affairs and Technology Development, River Oaks Communications Corp.

Wow, 1998! Only two years to go until the new millennium. (Or is it three? I guess 2001 is the official start, but there sure are a lot of high-powered parties set for New Year's Eve 1999.)

I recently attended the 1997 Congress of Cities, sponsored by the National League of Cities, which is one of the largest annual gatherings of local officials in the nation. At the conference, there was much talk about the challenges and opportunities facing cities as we move toward the new millennium, and they were many, including the effects of electric utility deregulation, environmental concerns, housing and community services initiatives, telecommunications issues, and a host of others.

I participated in a session entitled, "Telecommunications: Opportunities and Challenges of Deregulation," where we discussed some of the telecommunications-related problems and possibilities facing local governments. The common theme that emerged is that the current hot issues are mainly infrastructure-related. On the challenge side, there was a lot of debate and dialogue related to tower siting concerns and long-standing right-of-way management problems. On the opportunities side, there was a large focus on advancement of infrastructure (especially a fiber optics backbone, digital transmission architecture) that could contribute to economic development.

As part of the panel presentations, the mayor of Farmington, N.M., the largest city in the "Four Corners" area of the Southwestern U.S., talked about how the plans of incumbent carriers for his locale projected considerable timelines before advanced infrastructure and services could be brought to his area. In light of this, the city and representatives from three economic development districts, three Native American tribes, four electric utilities and two non-profit development groups formed a Regional Telecommunications Committee to develop ways to spur both public and private sector initiatives to bring advanced infrastructure more quickly to the Four Corners.

According to the mayor, the Committee is pursuing the implementation of a fiber-optic link from Farmington to Durango, Colo. (the closest current fiber infrastructure is in Albuquerque, N.M. and Grand Junction, Colo., both hundreds of miles from Farmington) as a first step in the process of providing Farmington residences, businesses and institutions with high-capacity, redundant, affordable network connections to each other and to the rest of the world.

My discussion centered on the relationship between the advancement of telecommunications infrastructure and services in a market and economic development. The pace of economic development depends on a multitude of factors, including affordable housing, an efficient transportation system, a high quality of education (and the corre-

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RSUs, designed to be mounted on the outside of the dwelling, needed to be mounted in each home. Now called an RiSU (or remote in-home service unit), the box underwent a series of modifications in size, aesthetics and functionality, and facilitates the now-integrated delivery of cable TV, FM radio and telephony.

The RiSUs also have battery backup capability, so that if there's a failure in commercial AC power, the unit can run off the battery inside the unit. Because of regulatory and cost issues, A2000 decided to go with local powering off of the AC mains, which capitalized on inexpensive battery backup, as well as the high reliability of the local power grid.

And by next summer, Tellabs will be adding a data port capability to the RiSU so that in-home access to the Internet and other on-line services will be available through the unit, making it an integrated approach for data, voice, video and multimedia applications.

One-step provisioning on horizon

One of the biggest challenges cable operators face when deploying a service like telephony from scratch is managing the network and the service itself. A2000 is using a single network operations center to provision, monitor and control all of the active network elements for all of its services, as well as to perform "change management," or to manage any activity in the network to ensure that service is not interrupted. The NOC also performs the scheduling and completion of all preventive maintenance, and is responsible for the analysis of all service, technology and customer issues, says Methven.

One of the operator's challenges was to tie its operational support of the cable plant in with that of the telephony service, says Tellabs' Wayne Partington, group manager of product marketing and customer management. "A2000 was able to effectively define what its operational procedures were going to be, from the standpoint of, how do they take a service order, how does that translate into provi-

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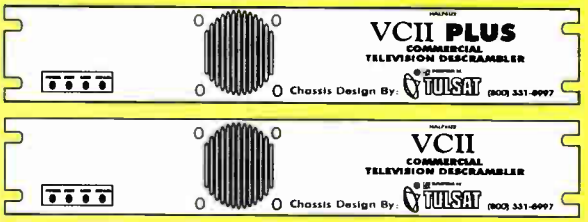

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In the loop

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sponding availability of a trained workforce), attractive sites for office/plant locations, the availability and affordable cost of a diversity of services, a reasonable overall cost of living and a high overall quality of life. Telecommunications can play a significant role in a number of these factors through employment of such infrastructure and services as:

- Intelligent transportation systems–which can lead to better traffic flow for workers in both cars and trucks.
- Interactive distance education–which can enable services such as teletraining/continuing education at the workplace or the home for workforce enhancement, workforce re-training, placebound instruction, etc.
- Telecommuting–which can assist greatly in promoting employee flexibility, enhancing productivity after hours and during severe weather conditions, improving physical transportation conditions and decreasing pollution levels.

Cable can directly affect economic development in its own backyard

- Backbone infrastructure–which can provide the redundant networks, alternate access to long distance carriers, high-speed LAN interconnections and competition in the local loop that employers, large and small, need.

Studies indicate that the availability of critical telecommunications infrastructure to spur and expand economic development may be especially problematic in the next few years for "third-tier" markets (less than 250,000 population). Consequently, cities in those markets could have trouble attracting new businesses or keeping some of the businesses that they have.

As a major infrastructure player in local markets, it is crucial that the cable industry continue to push the infrastructure envelope in the marketplace, because it can be both a factor in, and a beneficiary of, a corresponding expansion in economic development.

There are three key reasons why such a move can be fruitful:

- The industry is currently positioned well–With an ever-increasing amount of glass in the ground, more reliable networks being built and planned, and an escalating level of technical, marketing and other expertise in providing non-traditional services, the industry has the momentum to increase its telecommunications service provider role.
- Subscribers are receptive to cable's involvement–Contrary to the once-held view of the average sub as the "Joe Six-Pack" model, recent studies indicate that the more technically adept subscriber base places a higher level of importance on the presence of the cable provider.
- Cable operators have a direct influence on the advancement of their own community –The cable industry is like any other in certain respects–it needs a well-trained workforce, its employees want their kids to have the best education, the highest caliber of employee is attracted to growing, vibrant areas, etc. Unlike many other industries, though, it has a major ability to directly affect economic development in its own backyard by its own advancement of telecom infrastructure and, correspondingly, directly affect the overall quality of life for the company and its employees.

I recently had a very frustrated businessperson tell me that his local phone company could not even spell ISDN, let alone provide it to him and his employees. That, I think, is a giant cue for his local cable provider to show him that it can do far more than spell HBO.

Cablephone continued from page 102

sioning of the switch, the Cablespan equipment, and then the actual installation of the RiSU in the home," he says.

"I think the process going forward will be to try to integrate their higher order OSS with our Cablespan element management system to provide one-step provisioning and maintenance of the entire telephony service," adds Partington.

Being able to key in one command to handle complete one-step provisioning of the service is a model other MSOs should strive for, he notes, in that the number of personnel required to operate the network can be significantly reduced, thus lowering overall service costs.

So, what makes cablephone work in the Netherlands, when results in the U.S. have been less than hoped for? There are a number of factors that make the market there more friendly to cable telephony, says Partington, including a high penetration rate for cable (A2000 has about a 95 percent penetration rate), and perhaps even more important, a regulatory climate which encourages competition.

Methven cites some additional factors. "The business fundamentals are strong, the capital costs and the demographics of the market, and subscribers' willingness to switch. And therefore, the revenue that is generated made it an attractive business opportunity. Also, there was a focus on the part of A2000's management to truly be an MSO."

Encouraged by its success thus far, A2000's momentum is not slowing down. "A2000 continues to look at competing broadband technologies in order to deploy the best range of services to our customers," says Methven. "We are aggressively expanding the number of homes passed by a thousand a day, and we have plans in 1998 and '99 to increase our product offering breadth. We went into the market in July of '97 with a (telephony) product defined to attract the high-end user and the early adopter, to establish our name in the marketplace, and now, we'll come back into the market next year with products that are attractive to a broader range of the marketplace." ■

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PRODUCT REVIEWS

Status monitoring

CHESWICK, Pa.–Tollgrade Communications has announced the Lighthouse System, an "open architecture" status monitoring system for hybrid fiber/coax networks. Lighthouse includes status transponders, headend controllers and status monitoring software that enables cable operators to monitor networks from a central location, identify and eliminate network reliability problems and reduce the need for costly dispatches of repair personnel. The transponders offer low power consumption (less than 1.5 watts), remote configuration capability via downloads from the host system, and dynamic frequency agility between 5 and 40 MHz (return path) and 50 and 750 MHz (forward path), based on commands from the host system. Versions of the new transponders can be adapted for status monitoring applications with a range of industry-standard power supplies, line amplifiers and fiber nodes. Based on a dedicated headend design and single-board circuitry, the headend controller provides speed and reliability in polling network transponders and managing the acquisition of network alarm information. The Lighthouse HEC communicates directly with the system host or with third-party network monitoring systems using SNMP (simple network management protocol).

Circle Reader Service number 75.

Line extender

STATE COLLEGE, Pa.–C-COR Electronics Inc. has introduced the I-Flex Line Extender and the I-Flex Network Management Agent to its family of 862 MHz global RF transmission equipment. The I-Flex Line Extender is tailored to address the needs of the European cabinet-mount cable TV market for RF transmission equipment capable of carrying signals that provide Internet access, premium pay services and telephony. The amplifier offers the operational performance standards of C-COR's two-and three-active output I-Flex and FlexNet amplifiers in an efficient, one-input/one-output model. The unit uses PHD technology for increased performance and can carry 60 PAL channels, as well as digitally-compressed video signals. A high performance push-pull return amplifier allows for two-way operation. For maximum installation efficiency in cabinet, pedestal or wall-mount applications, all connections are located on the bottom of the extender's die-cast aluminum housing.

The network management agent fills operators' needs to monitor, manage and inventory I-Flex technology in C-COR's

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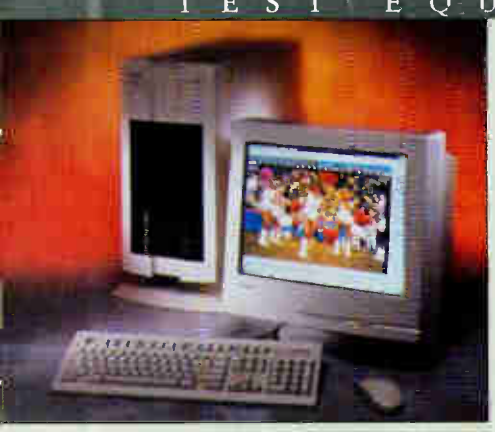


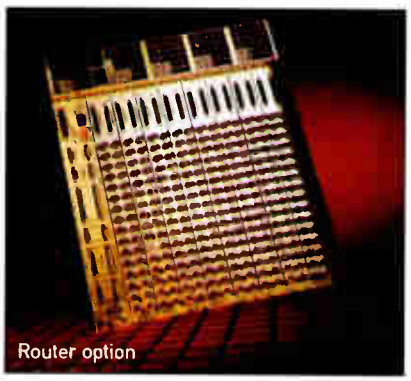
Picture-quality measurement system

ANAHEIM, Calif.–Tektronix Inc. has announced the PQA200, a picture-quality analysis system. With the new unit, those involved in the deployment and daily operation of compressed television systems, as well as those engaged in the design and development of TV equipment and the creation of content, can quickly, automatically and objectively measure the quality of video images.

Previously, says Tek, those working with compressed digital video had to use ad hoc methods or costly and time-consuming human viewer trials to measure picture quality. The PQA200 delivers practical, repeatable results quickly (typically, in less than a minute) independent of the types of impairments present, the compression system used, or the video material itself. The unit is useful for applications ranging from bit-rate optimization to end-to-end system testing. The unit also provides a single, numeric value representing picture quality, called a picture-quality rating (PQR). The PQR methodology yields results that strongly correlate to those obtained from human viewer trials. Circle Reader Service number 76.

CNM network management system. Frequency agility (5-15 MHz reverse, 50-135 MHz forward) makes the agent flexible and highly suitable for a wide variety of channel plans. Downloadable firmware will allow the agent to be upgraded for compatibility with the upcoming CableLabs' standard for outside plant management. An optional reverse path switch will enable operators to isolate and eliminate subscriber ingress.

Circle Reader Service number 77.


Router option

Fiber option for router

NEWBURY, U.K.–A new option for fiber optic inputs and outputs is now available with MetaWave's MX256 and MX32 SDI routers. As fiber optic transport becomes more common for moving video over greater distances, the simple plug-in ability which the router has will make system setup easier and reduce costs, according to the company. Also, the adoption of HDTV will call for the routing of higher bandwidth signals, making fiber the logical replacement for coax cabling when moving HDTV video signals within facilities. The MX256 selectively combines both fiber optic and coax cables as inputs and outputs, according to MetaWave. Both routers are 360 Mbit compatible for use with HDTV technology. The router is compact–the basic 128x128 building block of the system occupies only 11 rack units. Expansion to 256x256 is possible in 44 U without the need for additional DA and combiner rackframes. The MX series also features automatic input equalization and output clock regeneration to ensure high picture quality, along with full compatibility with both digital components and digital composite in the same chassis.

Circle Reader Service number 78.

Cable modem

SANTA CLARA, Calif.–Bay Networks Inc. has announced a high-speed cable modem which can support from one to 16 users. Designed for multiple PC small office/home office (SOHO) users, the Bay Networks LCP cable modem provides 10 Mbps data transmission over existing hybrid fiber/coax cable systems, and adapts to users' requirements for high-speed, low-cost access to the Internet and other on-line services without added network complexity. The 16-user LCP modem represents a new breed of intelligent network devices, says Bay, that operate at LAN-like speeds. Features include plug-and-play operation, SNMP management and an operational systems support/business systems support provisioning server. The modem also offers built-in authentication algorithms and other integrated security functions to ensure that only authorized personnel can access the network.

Circle Reader Service number 79.

QAM modulator

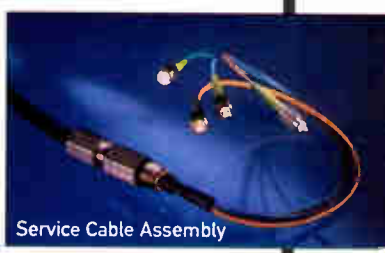
SUNNYVALE, Calif.–Harmonic Lightwaves Inc. has announced the availability of its TRANsend QAM (quadrature amplitude modulation) modulator, which supports the MCNS standard. QAM modulators perform the forward error correction coding and modulation necessary to transmit digital signals over broadband networks to cable modems, set-top boxes or digital televisions. The QMM 8000 modulator also supports the Digital Video Broadcast (DVB) standard adopted in Europe. In addition to the modulator, the company's TRANsend product line includes an MPEG-2 encoder and a video transmission platform for the headend.

Circle Reader Service number 80.

Cable assembly

HARRISBURG, Pa.—AMP Inc. has introduced its new Service Cable Assembly which enables users to branch from a splice enclosure on an overhead fiber optic line to an active fiber termination point, such as a fiber node or optical network unit.

The fiber at one end of the cable is exposed and terminated with single-mode connectors and a feed-thru device. The other end of the cable is left unterminated so that it can be spliced for its implementation within a splice closure. The assembly's patent-pending feed-thru device provides complete enclosure of all o-rings after installation to protect the fibers from hazards such as cable movement.


Service Cable Assembly

Circle Reader Service number 81.

On-screen monitor

POTTSTOWN, Pa.—Videotek Inc. has introduced the latest member of its VTM-200 family of on-screen monitors. The VTM-180 Multi-format On-screen Monitor accepts two composite analog video inputs, either NTSC or PAL.

Optionally, it receives up to four analog stereo pairs and four AES/EBU stereo pairs. The monitor displays picture, waveform, vector and audio for


On-Screen Monitor

each in a full view or in a quadrant of standard SVGA display. Waveform functions include selectable filters, sweeps and magnifications, as well as a full-frame line select.

The VTM-180 also features a new viewing concept—zoom view. The zoom feature magnifies the display, and the graticule is expanded along with the video. The waveform zoom is around black for pedestal set, and around white for white balance set. Vector functions include phase control, and the zoom feature, which allows for viewing the center region and then each quadrant of the vector display.

Circle Reader Service number 82.

Termination system

HICKORY, N.C.—Siecor Corporation has developed the FuseLite Termination System which allows direct fusion splicing of factory-polished connectors to fiber optic cable. The new termination system has been designed for system maintenance and restoration, broadband applications, aerial splicing and new construction.


Termination System

The system provides a connectorization option at no additional cost, and conveniently converts from a connector splicer to a fiber-to-fiber micro splicer. Its special ferrule design—a connector with a fiber stub installed in the ferrule and polished in the factory—allows fusion splicing within the connector housing. Each multimode or singlemode connector is available in SC, FC and ST-compatible versions.

Circle Reader Service number 83.


Oscilloscopes

Oscilloscopes

PALO ALTO, Calif.—Hewlett-Packard Company has introduced its Infinium family of oscilloscopes, with bandwidths ranging from 500 MHz to 1.5 GHz, maximum sample rates per channel of 1 Gsa/s, 2 Gsa/s, 4 Gsa/s and 8 Gsa/s, and memory depth of 32 K to 64 K per channel.

This new line of oscilloscopes provides users with an analog-like front panel, because research showed engineers wanted to keep basic controls simple. As a result, front panel characteristics include separate scaling and positioning controls for each channel; clear, highly visible trigger-setup information; and easy-to-access marker and measurement functions.

The oscilloscopes also feature a Microsoft Windows 95-based graphical user interface (GUI) and a built-in information system. For those who will use the equipment in a shared lab environment, the oscilloscopes feature default setup keys for users who don't know who last used the equipment.

The Windows 95-based GUI provides intuitive access to advanced features such as new ways to interact with waveforms. For example, users can grab a measurement icon and drop it on a selected waveform feature. Zoom boxes allow users to draw a box, click inside to expand a waveform and zoom in on a particular portion of it for a detailed view.

Circle Reader Service number 84.

Transmission link

CHRISTIANSBURG, Va.—Force Inc. has announced the availability of its new Model 2792 ExcelLinx, an FM fiber optic transmission link designed to provide contribution/distribution-quality baseband video and unbalanced stereo audio transmission.


Fiber optic tx link

The link provides video and stereo audio more than 90 km (approx. 60 miles) over singlemode fiber, and 15 km (approx. 9.5 miles) over multimode fiber. The link is available in 850 nm, 1300 nm and 1550 nm wavelengths.

Circle Reader Service number 85.

MPEG-2 decoder

ST. PETERSBURG, Fla.—Vela Research Inc. has released its new Four-Channel MPEG-2 SCSI Decoder for ad insertion and near-video-on-demand applications.

The new decoder features a SCSI-2 fast/wide interface (including an optional Ultra-SCSI) with NTSC or PAL video outputs. Each video channel is independently configurable with separate genlock inputs to allow for the locking of video outputs to external video sources. In addition, each video channel operates independently to allow playback of different stream types, video resolutions, compression types (MPEG-1 or MPEG-2) and start/stop times.

The decoder decodes MPEG-1 and MPEG-2 system, program, transport and video-only streams at resolutions of MPEG-1 SIF, MPEG-2 Half D-1, MPEG-2 D-1 (FOE) and MPEG-2 D-1 (AFF). It also has stereo audio outputs with the option of left-audio or right-audio only on both outputs, as well as options for four-channel audio.

Circle Reader Service number 86.

DWD multiplexer

SAN JOSE, Calif.—E-Tek Dynamics Inc. has debuted its Dense Wavelength Division Multiplexer, an eight- or 16-channel module for increasing fiber capacity in a WDM network.

The multiplexer's ITU channel wavelengths are spaced at 200 GHz apart with a low typical insertion loss of ≤ 4.5 dB and high typical adjacent channel isolation of ≥ 30 dB. The company guarantees a low polarization dependent loss (PDL) less than 0.1 dB.

The module uses thin-film interference filters that are extremely stable with 0.003 nm/°C thermal wavelength drift and 0.005 dB/°C thermal stability.

Circle Reader Service number 87.

Advertising software

SALT LAKE CITY, Utah—FrameRate Corp. has announced the release of Version 2.0 of its AdTrak Photo Advertising software for its Millennium products. Integrated with Microsoft Office 97 and Microsoft Backoffice, AdTrak is designed to simplify and expedite the publishing of advertising content to cable TV channels and Internet Web sites.

The AdTrak system uses a forms-oriented database approach where users enter ad copy into forms, rather than having to create content in a graphics environment. Content is built using graphics templates that can be customized for each client. Error checking software catches problems such as missing audio, video or graphics files.

Circle Reader Service number 88.

UHF bandpass filters

EAST SYRACUSE, N.Y.—Communications & Energy Corporation has introduced two new UHF bandpass filters—Type TT4001-BPU(4) and Model 4001WBP-626(152)(30)F.

Type TT4001 incorporates a notch to suppress strong carriers near a desired UHF television channel. It is available for any UHF television between channels 14 and 69. Passband insertion loss is 1.5 dB (maximum). Notch suppression is 25 dB (minimum) for carriers at least 1.5 MHz below the visual carrier. The filter comes with two notches for use on above-band carriers and below-band carriers. VSWR is 1.23:1. Power handling is 50 watts. Connectors are 50-ohm Type BNC.

Model 4001 passes a segment of the UHF spectrum at cable TV headends, while suppressing adjacent spectrum segments. Passband is 550 MHz to 702 MHz. Insertion loss is 1.5 dB (maximum) and stopband rejection is 30 dB (minimum) from 5 MHz to 536 MHz, and 726 MHz to 860 MHz. Connectors are 75-ohm Type F.

Circle Reader Service number 89.

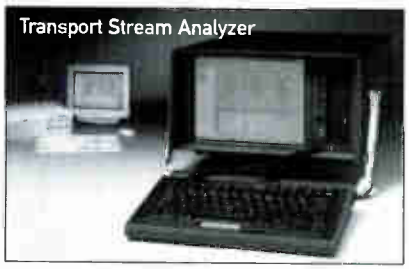
Laser Light Source

Laser light source

EVERETT, Wash.—Fluke Corp. has released its new laser light source, the Fluke LS-1310/1550, for testing singlemode fiber links. The handheld unit emits calibrated wavelengths for both 1310 nm and 1550 nm.

The Fluke LS-1310/1550 works with Fluke cable testers and digital multimeters, as well as any meter that measures optical power or power loss at the standard singlemode wavelengths. The unit has an output power of -10 dBm. It comes complete with two ST-ST singlemode fiber optic patch cables and ST-ST singlemode fiber optic adapter. Other patch cables are also available, including those for systems that utilize SC and FC connectors.

Circle Reader Service number 90.



Stream analyzer

SAN DIEGO, Calif.—Digital Transport Systems has announced hardware and software improvements to its second generation MPEG-2/DVB Transport Stream Analyzer. Now available in desktop and portable configurations, the analyzer can also be delivered with single- or dual-channel MPEG-2/DVB transport stream generation capabilities, or upgraded with these capabilities as user needs expand.

Circle Reader Service number 91.

ReaderService

Advanced Networking

C-COR Electronics, Inc. RS# 30
C-COR's RF amplifiers, AM headend equipment, digital fiber optics, and customized service and maintenance provide global solutions for your network. p. 79

Passive Devices Inc. RS# 14 p. 57

Construction Equipment

Keptel RS# 19 p. 62

Telecrafter Products RS# 5, 23
Supplies drop installation products for CATV, DBS, and wireless operators, single and dual cable fastening products, identification tags, residential enclosures. p. 10, 67

Datacom Equipment

3Com Corporation RS# 37 p. 93

ISC Datacom RS# 40
Manufactures frequency-agile RF modems and translators. Modem speeds to 64 kbps. Builds electronics to specifications. p. 96

Terayon Communication Systems RS# 8
Terayon Communication Systems delivers high-speed, two-way cable modem systems — based on S-CMDA technology — that operate over any cable plant and support both business and residential services. p. 17

Toshiba RS# 39 p. 95

Distribution Equipment

Alpha Technologies Inc. RS# 3
World leading manufacturer of power conversion products, widely used in cable television, telecommunications, and data networks around the world. Offer a complete line of AC and DC UPS systems. p. 7

Eagle Comtronics RS# 22 p. 65

Philips Broadband Networks RS# 28
A global supplier of broadband RF and fiber optic transport equipment, is also a leading provider of advanced systems used to access broadband telephony and data services. p. 75

Times Fiber Communications, Inc. RS# 16
TFC is an ISO 9001 registered manufacturer of coaxial cable for the telecommunications industry. Committed to quality, service and technology. p. 59

Distributors

ITOCHU Cable Services RS# 11
iCS, Inc. is a leading full service stocking distributor, operating ten sales offices and nine warehouses conveniently located in North and South America. p. 54

Power & Telephone Supply Co. RS# 13
Power & Telephone Supply serves the power and communications material distribution needs of the U. S. through 18 strategically placed stocking warehouses, including a specialized export facility in Miami, Florida. p. 56

TeleWire Supply Company RS# 10
TeleWire Supply is a leading nationwide distributor of products needed to build and service a broadband communications network. p. 19

Tulsat RS# 26, 46
Tulsat Sells, Repairs and Purchases Head-end and Line Equipment. We specialize in Traps, Taps, Connectors, Modulators, VCII, IRDs and Receivers. p. 71, 103

Fiber Optic Equipment

Corning Incorporated RS# 31
The Corning Optical Fiber Information Center gives you FREE access to the most extensive fiber-optic library in the industry. p. 81

Synchronous Group Inc. RS# 45
The Actair and Antares 1550 nm external modulation transmitters offer outstanding performance and the best specifications in the industry. Perfect for super trunks and direct distribution. p. 97

Headend Equipment

ADC Telecommunications, Inc. RS# 1
Leading global supplier of transmission and networking systems. The company holds a preeminent market position in physical connectivity products for fiber optic, twisted pair, coaxial and wireless networks worldwide. p. 2-3

Blonder Tongue RS# 18
Quality manufacturer of headend equipment (including pre-fabricated headends), reception, distribution, MDU interdiction products and test equipment. p. 61

Dawn Satellite RS# 43
Technical information and competitive prices on products such as: satellite "dish" antennas, satellite receivers, digital ready LNBs, modulators, processors and a wide variety of related products. p. 99

Harmonic Lightwaves, Inc. RS# 7
A worldwide supplier of highly integrated fiber optic transmission, digital headend and element management systems for the delivery of interactive services over broadband networks. p. 13

HollyAnne Corporation RS# 25
Builds a family of EAS products designed for use in cable TV. Also builds in-home device for warning cable TV subscribers. The patented MIP-921 is the only EAS Encoder/ Decoder specifically designed for cable TV. p. 70

Microwave Filter Co., Inc. RS# 42
Passive electronic filters, traps and filter networks for interference elimination and signal processing at the TVRO, headend and distribution equipment. p. 99

PCI Technologies RS# 17
PCI Technologies manufactures splitter/combiner networks, RF filters from DC to 1GHz, i.e.: deletion filters, diplex filters, banpass, etc., and an array of test signal generators. p. 60

Pico Macom Inc. RS# 36
Pico Macom offers a full line of quality headend components including satellite receivers, agile modulators and demodulators, signal processors, amplifiers, and completely assembled headends. p. 89

Scientific-Atlanta RS# 49
Scientific-Atlanta's new Continuum™ Headend System for analog and digital applications. This features a vertical pack-aging design which allows for up to forty front-loaded modules to fit into a standard 70" rack. p. 124

Standard Communications RS# 4
The industry's leading manufacturer of rebroadcast quality satellite reception and RF broadband products. Delivering programs to thousands of CATV and SMATV systems. p. 9

Spectrum RS# 21, 50
The Sub-Alert utilizes the advanced features of the Sage Endec for total automation and will interface with your headend by IF, baseband video or comb generator. p. 64, 14-15

Services (Billing, Contractors, etc.)

IMMCO RS# 41 p. 99

National Cable Television Institute (NCTI) RS# 38
National Cable Television Institute (NCTI) is the world's largest independent provider of

broadband industry training; both technical and non-technical. p. 94

Telecom Equipment

Chatham Technologies RS# 34, 35

Chatham Technologies is the world's largest integrated supplier of custom electronic enclosures, related products and value-added services. p. 86, 87

Fujitsu Network Communications RS# 9

Manufactures and markets advanced SONET transport and access equipment which mazimizes network operational capacity and services. p. 15

Test Equipment

AM Communications, Inc. RS# 48

OmniStat by AM is the worldwide choice for monitoring HFC telecommunications networks. It is the standard for ADC, NextLevel, Philips and Scientific-Atlanta. p. 123

Avantron Technologies, Inc. RS# 24

Battery operated, portable Spectrum Analyzers, forward and reverse sweep and ingress monitoring test equipment for the cable TV industry. p. 69

Cable Leakage Technologies RS# 15

With the FCC imposing stiff fines for leakage, CLT presents operators with the only sure, comprehensive method of locating and documenting the nearest street address of system faults/signal leakage. p. 58

Cable Resources, Inc. RS# 27

Cable Resources offers test equipment to maintain 5-40 mhz return networks. The RDU displays ingress, noise and carrier levels. p. 73

Hewlett-Packard Company RS# 6, 32

Hewlett-Packard offers a comprehensive range of test equipment to keep your entire broadband system at peak performance from headend to subscriber drop. p. 11, 83

P.K. Technology RS# 55 p. 91

Riser-Bond Instruments RS# 33

Manufacturer of TDRs with unique and exclusive features to locate and identify faults and conditions in metallic two con-ductor cable. p. 85

Trilithic, Inc. RS# 12, 20

Trilithic manufactures test equipment for the CATV and LAN industries and components for aerospace and satellite communications. Key products are SLMs, leakage detectors, and a comprehensive line of return test equipment. p. 55, 63

Wavetek Corporation RS# 2

Manufactures equipment for CATV, telecommunications, wireless, and general purpose test. CATV equipment includes signal level, analysis, and leakage meters, sweep and monitoring equipment. p. 4-5

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ADVERTISER INDEX

CompanyIndex

The following companies are cited in articles and features in the current issue. Page numbers refer to where the initial mention takes place in a particular story. Listings do not include some departments.

Calendar

JANUARY

6-8 Taiwan Broadcast and Communications '98. Location: Taipei, Taiwan. Call *Cable & Satellite Magazine* 011-886-2778-5818.

8-9 Telecommunications Fundamentals, produced by American Research Group. Location: Morristown, N.J. Call (919) 461-8600.

8-10 Caribbean Cable TV Association Annual Conference. Location: San Juan Marriott Resort, Puerto Rico. Call Margaret Dean, CCTA executive director (809) 776-3320.

21 Lincoln Land SCTE Chapter, Technical Seminar. Location: Bloomington, Ill. Call Kevin O'Neill (815) 433-1163 for more information.

26-27 Telecommunications Fundamentals, produced by American Research Group. Location: Chicago, Ill. Call (919) 461-8600.

26-29 ComNet '98. Location: Washington, D.C. Call MHA Event Management (800) 545-3976 for more information.

FEBRUARY

2-4 Wireless Cable International's Winter Show. Location: Singapore. Call the Wireless Cable Association (202) 452-7823.

4 North Country SCTE Chapter, Technical Seminar. Location: Anoka and Wadena Technical Colleges, Minn. Topic: Transportation and distribution systems. Call Bill Davis (612) 445-8424.

8-11 CompTel '98. Location: Las Vegas, Nev. Call the Competitive Telecommunications Association (202) 296-6650 for additional information.

8-12 1998 Western ComForum. Location: Dallas, Texas. Call the International Engineering Consortium (312) 559-4600.

10-12 Australasian Cable & Satellite Exhibition & Conference. Location: Sydney, Australia. Call AIC Conferences 011-61-2-9210-5700.

11 Delaware Valley SCTE Chapter, Technical Session. Location: Horsham, Pa. Topic: Competitive access. Call Chuck Tolton (215) 961-3882.

17-19 Philips Broadband Networks Mobile Training Center. Location: San Antonio, Texas. Call (800) 448-5171, or (315) 682-9105.

22-27 OFC '98 (Optical Fiber Conference). Location: San Jose, Calif. Call the Optical Society of America (202) 416-1980.

23-25 CTIA's Wireless '98. Location: Atlanta, Ga. Call CTIA (202) 785-0081.

24-26 Philips Broadband Networks Mobile Training Center. Location: Albuquerque, N.M. Call (800) 448-5171, or (315) 682-9105.

MARCH

2-5 Hands-On Fiber Optic Installation for Outside Plant Applications, produced by Siecor Corp. Location: Hickory, N.C. Call (800) 743-2671, ext. 5539 or 5560.

TRADE SHOWS

JANUARY

8-11 Consumer Electronics Show (CES). Location: Las Vegas, Nev. Call (703) 907-7600.

28-30 SCTE Emerging Technologies Conference. Call the SCTE at (610) 363-6888.

FEBRUARY

25-27 The Texas Cable Show. Location: San Antonio, Texas. Call (512) 474-2082.

MARCH

TBD SCTE Telecommunications Vendors Day. Location: Omaha, Neb. Call Riser Bond Instruments (402) 466-0933.

APRIL

20-23 COMDEX Spring '98. Location: Chicago. Call Softbank (617) 433-1500.

MAY

3-6 National Show '98, produced by the National Cable Television Association. Location: Atlanta. Call the NCTA (202) 775-3669.

JUNE

10-13 SCTE Cable-Tec Expo '98. Location: Denver, Colo. Call (610) 363-6888; Expo hotline (610) 363-3822.

7-11 Supercomm '98. Location: Atlanta. Call the U.S. Telephone Association (202) 326-7300.

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http://www.barco-usa.com

Bay Networks, Inc.
http://www.baynetworks.com/cablemodem/cm

Blonder Tongue
http://www.hometeam.com/blonder

C-COR Electronics, Inc.
http://www.c-cor.com

Chatham Technologies
http://www.chathamtechnologies.com

CommScope, Inc.
http://www.commscope.com

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http://www.corningfiber.com

Exide Electronics, Emerging Technologies Group
http://www.exide.com

Fujitsu Network Communications
http://www.fnc.fujitsu.com

Harmonic Lightwaves, Inc.
http://www.harmonic-lightwaves.com

Hewlett-Packard Company
http://www.hp.com/go/catv

ISC Datacom
http://www.fastlane.net/~isc

Microwave Filter Co., Inc.
http://www.ras.com/mwfilter/mwfilter.htm

National Cable Television Institute (NCTI)
http://www.ncti.com

NextLevel Systems, Inc./Broadband Networks Group
http://www.nlvl.com

P. K. Technology
http://www.pktechnology.com

Passive Devices Inc.
http://www.pdi-eft.com

PCI Technologies
http://www.pcitech.org

Philips Broadband Networks
http://www.be.philips.com/pbn

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EOE **M/F/D/V**

TIME WARNER CABLE

CHIEF TECHNICIAN, JOB#97-162T
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TIME WARNER CABLE has an immediate opening for a Chief Technician for the Raleigh Division located in Henderson, North Carolina. Responsibilities include overseeing, managing, and supervising the daily operation of the physical electronic plant at the system level of 665 plant miles (+15,500 subscribers). Supervises, interviews, selects, trains, promotes, schedules, motivates, evaluates, and disciplines technical personnel. Ensures a high level of system technical performance, quality of work, and customer satisfaction. Maintains or supervises inventory control records for testing, repair and installation equipment and materials. Prepares and maintains FCC logs, FCC proof tests, audit complaint reports, along with various weekly, monthly and quarterly reports. Prepares and/or reviews project and purchase authorizations and capital budgets. Handles difficult technical related customer complaints. Serves as liaison with outside contractors and utility companies. Supervises and develops procedures for preventative maintenance on system head-end equipment. May perform preventative maintenance on system head-end equipment. May design map of new construction areas and perform feasibility studies. May perform field tests and evaluations of new materials and techniques. Assists field personnel. On-call duties, during non-business hours, in the event of a system outage. Will support all Division EEO/AA GOals. Other duties as assigned. Qualified candidates should have a high school diploma or equivalent. College degree in engineering, electronics or other related field is preferred. Must have a minimum of three to five years experience as a system chief technician or senior technician, along with, advanced formal electronics education and training. SCTE Broadband Engr. Certification preferred. Experience with plant construction, microwave, satellite earth station, and human resource management is preferred. **(Experience with scientific atlanta addressability systems a plus).**

Qualified candidates may send resume with salary requirements and Job Number to: Time Warner Cable, JOB NUMBER 97-162T, Human Resources, 2505 Atlantic Ave., Raleigh, NC 27604. **Only correspondence with Job Number will be considered.** We are an equal opportunity employer and comply with the drug free workplace. Drug screening and background check required.

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JOB#97-158T • LOCATION: MORRISVILLE, NC

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Qualified candidates may send resume with salary requirements and Job Number to: **Time Warner Cable**, JOB NUMBER 97-158T, M. Wilder, Human Resources, 708 E. Club Blvd. Durham, NC 27704.

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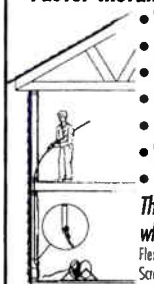

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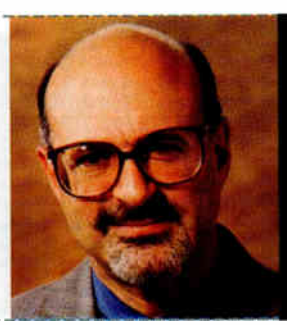
capital currents

Here comes the new FCC

Happy New Year, and welcome to a telecom world regulated by a new cast of FCC commissioners. In an unprecedented move, President Clinton appointed four new commissioners, including a new chairman, and they took office late last year. In past years, commissioners were replaced only one (or occasionally two) at a time, but more recently, the political landscape has created these "package deals." And most recently, we learned that the chief of the cable bureau plans to resign. Among other things, all of this change guarantees delays in decision-making. But considering some of the decisions made under the last FCC chairman, delay is just fine, thank you.

Once upon a time

There used to be seven FCC commissioners, but now there are five. Some years ago, Congress decided to punish the FCC



By Jeffrey Krauss, FCC watcher and President of Telecommunications and Technology Policy of Rockville, Maryland
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(for some long-since forgotten transgression) and cut the number of commissioners from seven to five. The main effect was to clear out some valuable office space on the eighth floor of the FCC headquarters building; there was no apparent thought given to improvement in FCC decision-making. And the commissioners' terms were cut from seven years to five years, staggered so that one expires each year.

The President appoints the commissioners and selects one of them to be chairman. No more than three of the five can be from a single political party. Senators from the opposition party (today, it's the Republicans) actually make the selection of the two commissioners from their party. The Senate must vote to confirm the appointees. These things are all worked out in advance. A political logjam a couple of years ago prevented new FCC appointments, so one commissioner whose term expired (Jim Quello) continued to serve as a commissioner past the end of his term, and another (Andy Barrett) simply resigned.

Now, finally, the logjam is broken, and (thank goodness) former Chairman Reed Hundt is gone. He managed to make enemies in nearly every industry that the FCC regulates. We have a new chairman—Bill Kennard—and three additional appointees—Michael Powell, Gloria Tristani and Harold Furchgott-Roth. The one holdover commissioner is Susan Ness.

The FCC sometimes acts like a judge and jury—adjudicating disputes between parties—and sometimes like a legislature—adopting new policies that have the force of law. Some of the issues that the FCC must deal with are very complicated, and it will take these new commissioners some time to get up-to-speed.

Bill Kennard has an advantage. He was the FCC's general counsel for the past four years, and before that, worked as a lawyer on telecommunications issues. Furchgott-Roth is an economist who worked most recently as a Congressional staffer, and wrote a book in 1996 that argues against rate regulation of cable TV systems. Tristani comes from New Mexico, where she served as a member of the state public utility commission. Tristani's reputation on telephone and electric rate regulation is pro-consumer, not pro-business. Powell comes from the Antitrust Division of the Justice Department, where he was chief of staff. Some have speculated that his Senate supporters are looking ahead to the time when his father, General Colin Powell, becomes the next President of the United States. Wouldn't it be nice to be able to go to the President and tell him that he owes you a favor because you arranged a nice job for his son?

The commissioners have staff to help them, and some of the staffers have quite a bit of experience at the FCC. But the staffers are simply advisors, not decision-makers. The point is that several of these commissioners have very little background in telecommunications regulation, and it will take them some time to feel comfortable making decisions.

Cable bureau chief

Meredith Jones, who has been chief of the FCC's Cable Bureau, has just announced that she will resign. That shouldn't be a surprise, because traditionally, every new FCC chairman has replaced some or most of the bureau chiefs. Unlike most of the FCC staff positions that are filled by career bureaucrats, these top-level jobs are filled by appointees who come and go. I would not be surprised to see changes in some other top FCC staff jobs.

The result of new FCC appointments is always a delay in decision-making. For the most part, the FCC sets its own agenda and timetable. Delay is easy, and there are no penalties. (There are limited exceptions when Congress passes a law that tells the FCC it must make a decision by a specific date. But even in those cases, even where the agency assigns a very high priority to the issue, the decision sometimes slips beyond the designated date. The penalty for breaking the law in this case is verbal abuse at the next Congressional oversight hearing.)

So major decisions on cable policy changes will probably occur later, than sooner. But that's OK with most of us. ■

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