Meet the Winners Readers Choice Awards 2000

Communications Technology

Official Trade Journal of the Society of Cable Telecommunications Engineers

August 2000

EXPO 2000

A Cable Smorgasbord, Vegas-Style

Pages 60-108

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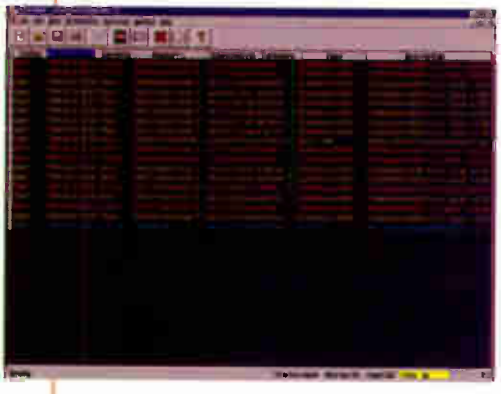

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August 2000 **volume 17 number 8**

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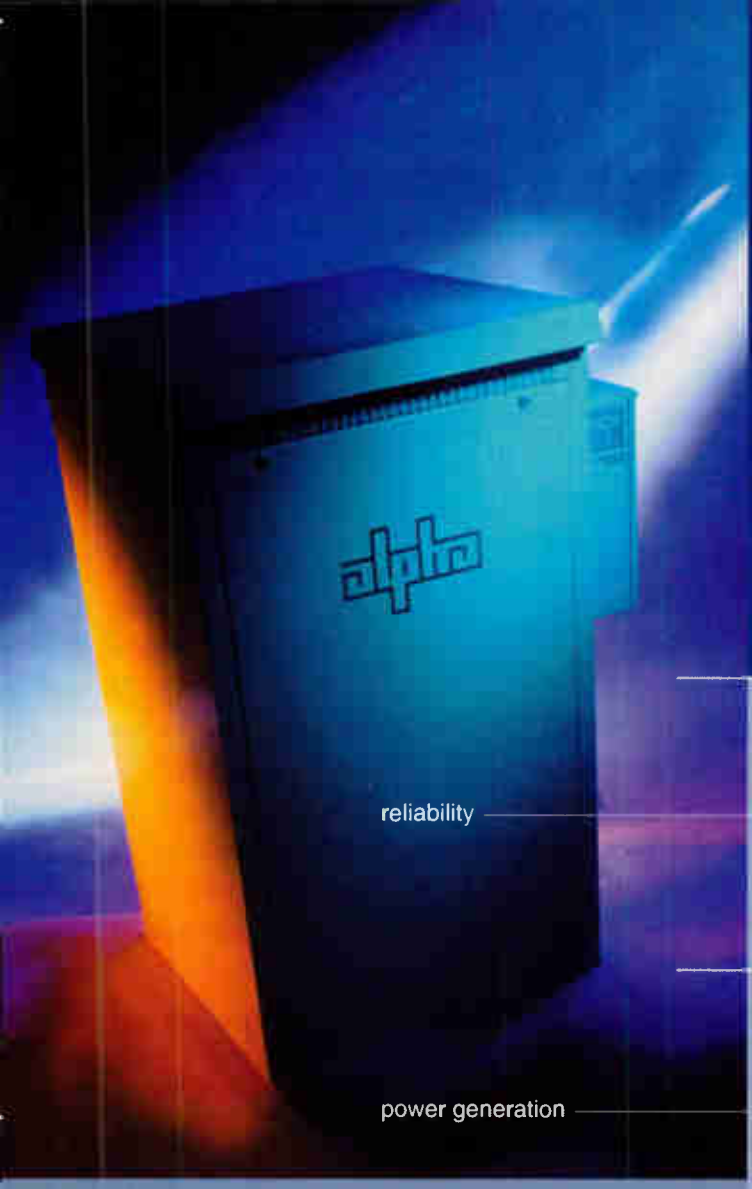

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August 2000 **volume 17 number 8**

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NEWS & OPINION

REFERENCE

COLUMNS

Innovation in Video?

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Cable-Tec Expo 2000: Technology, Camaraderie Unite

Well, it's over. Another outstanding Expo, and they just keep getting better. Sure there were some early housing problems, but I give the SCTE staff high marks for its efforts in making sure each Expo is better than before.

It wasn't all technology at Expo. In addition to numerous SCTE committee meetings, I attended most of the show events off the convention floor. Wavetek again welcomed everyone at its Arrival Night Reception on Monday. At the awards ceremony that day, our old friend Mark Millet of Cisco Systems was surprised with his 2000 Member-of-The-Year plaque.

Adelphia accepted a well-deserved Service In Technology Award, and *Communications Technology* donated $2,500 in Adelphia's name to the SCTE Scholarship Fund. Then the very first winner (1996) of the Milt Shapp Scholarship Award, Joshua Butters, came on stage to present the 2000 scholarship to Debra Jean Gemme. I thought this was handled with real class. I was especially glad to see HBO's own Les Read again acting as master of ceremonies.

After a day of convention activities, buses lined up to take everyone to Expo Evening/Cable-Tec Games at the All American Sports Park. Cox Communications took the gold medal in every event, then won the gold medal for "overall" competition. Surely the other operators are planning to change the standings in 2001 in Orlando.

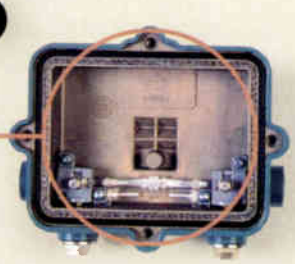
I understand the SCTE bookstore had record sales, and one of our "original" engineers, Archer Taylor, was there autographing his latest book, *History Between Their Ears*.

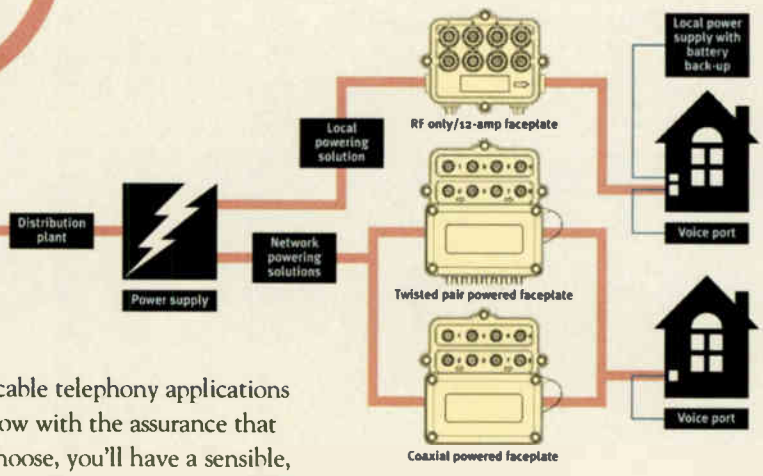
On Tuesday night, the very first Circle of Eagles dinner took flight. In the past, this was known as the Charter Member dinner and only those engineers could attend. Last year, we enlarged the group by inviting all (past and present) SCTE presidents and SCTE chairmen to become members of the Circle of Eagles. We gave special thanks to Charter Member Wayne McKinney for his tireless service to the Society since its inception and his personal donation to purchase plaques for all Circle of Eagle members.

On Wednesday evening, I visited the Closing Night Reception, the Amateur Radio Operators Reception, the SCTE List Reception and the Loyal Order of the 704. I was asked to leave the Amateur Radio party because I inadvertently called Ron Hranac, "Good Buddy." I chatted with the List members and headed on to the 704 Club meeting where we partied 'til the wee hours.

But the fun wasn't over. On Thursday, SCTE held its Ninth Annual Golf tournament at the Paiute Golf Resort. The wind blew so hard that playing was almost impossible. I actually saw golf balls blown off the tees (One was blown farther than most of my drives —in excess of 50 yards). Now, we can look forward to the 2001 Expo in Orlando and it continuing to be "better than the last one."

3 faces 1 body 0 worries





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Livin' Large, Expo Style

Seven weeks ago, many of us got off the plane in Lost Wages, grabbed a cab and headed downtown to settle in for five days of technology, training, meetings, product demos, deals, golf, gambling, and...beverages. Lots of beverages. It was bigger, louder, and more fun than it's ever been, and *CT* was proud to be a part of it.

Think this industry hasn't changed? Take a look at the exhibitor list. Companies like River Delta, Interactive Enterprises, and Ceon weren't even on the radar screen only a year ago. Then, to top it off, their booths were mobbed.

CMTS? Think anyone back in '96 or '97 knew that acronym? How about DWDM? Or "e-logistics." (Note to Broadband Services: nice golf tournament. The photos were a touch of true class.) Want more examples?

Can you say "acquisitions"? The winds of innuendo were blowing at hurricane level through two large network testing and monitoring booths. In fact, those players are making it official early this month. Since when was Cable-Tec a mergers-and-acquisitions show? I am sure that there were happy campers singing "Viva Las Wavetek."

A Class Act

Nicest bunch of people I have ever met, you broadband folks. And smart, too. People willing to hear an opinion, tell you theirs, and agree to disagree sometimes. I love it. There are a lot of class acts in this business. The SCTE is one of them. John Clark and his team have done an amazing job creating a new image for the Society. It's easy to create a vision—much harder to implement it. The SCTE seamlessly brought together a show devoted to technology, training and career growth for the engineering broadband professional. The technical sessions were excellent (big kudos to Alex Best and the conference committee). And the exhibit hall, well, it rocked.

The Readers Choose

Popularity contest? Nah. Valuable exposure? You betcha. Legitimate recognition? Sure. A headache to implement? Ten-four, good buddy. Kudos to the 13 vendors, seven nomination panel members, and over 800 readers and attendees who made the Readers' Choice Awards such a success at Expo. After careful review of the 30 products submitted this year, 13 were chosen as finalists by the nomination review panel. Voting at Expo was heavy, and the counts were close. You can find write-ups of this year's winners and finalists on pages 82 and 130.

Oh, Orlando!

So, SCTE...can you top it next year? Will the exhibit floor be even bigger? Will the sessions be even more educational? Will more deals be done? More attendees on the floor and in the sessions? More vendors to schmooze, more golf balls to lose? I have no doubt. Here's to fun in O-town.

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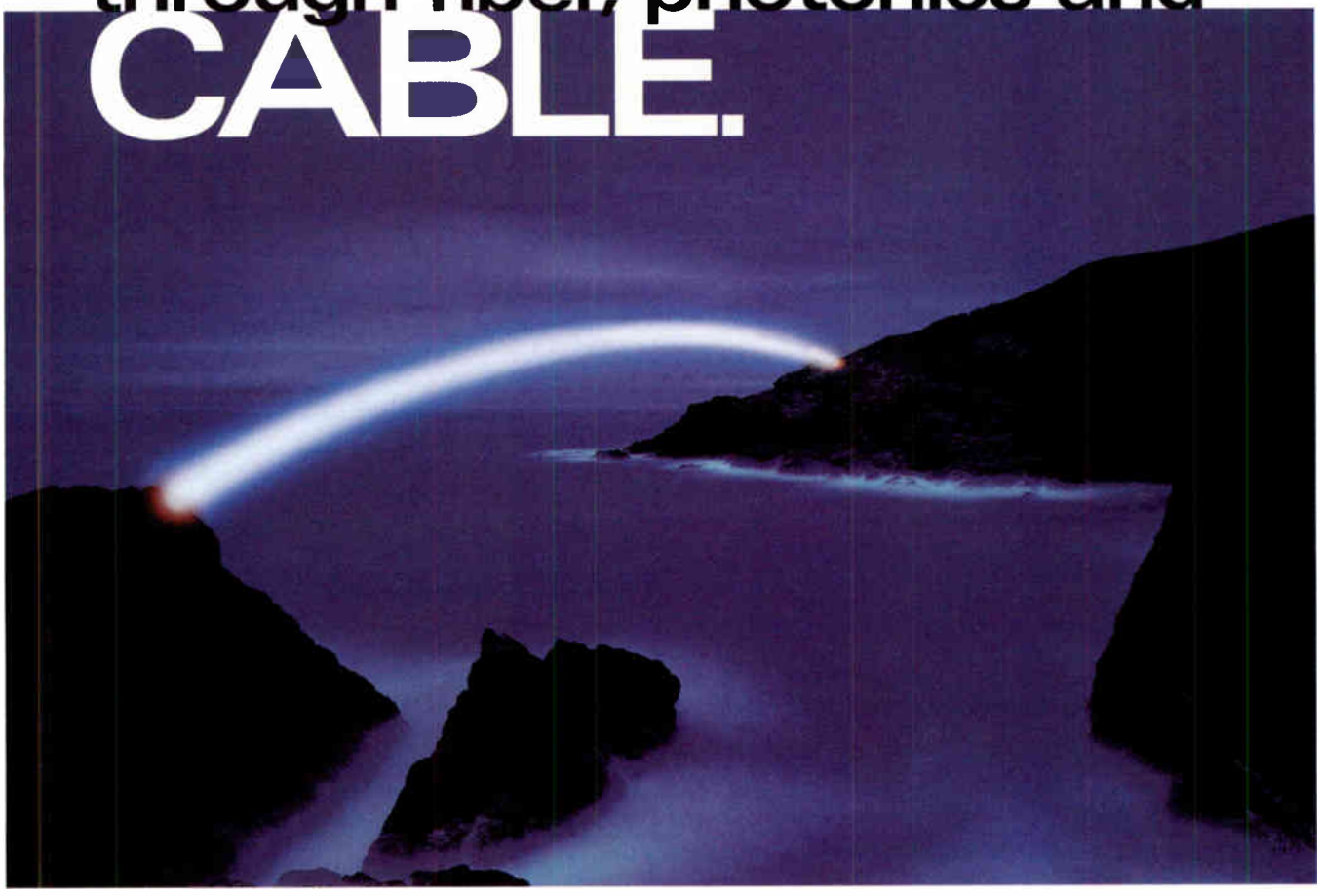

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LETTERS

> Troubleshooting Data

Bruce:
I read your article "High-Speed Troubleshooting" (May 2000, page 70), and am interested to know where the software you described is available.

Kenneth S. Wilkinson
Network Engineer
Community Antenna Service, Inc.

Editor's Response: The software you're referring to is available for download from my Birds-Eye Web site (www.birds-eye.net/scripts.htm), and consists of a collection of Perl scripts/modules. The software is intended for use with the DHCP server that MediaOne uses for high-speed data service that is distributed by Join Systems (www.join.com). With a little tweaking, you could use it with other vendor DHCP servers.—BB

"Power"ful Reading

Ron:
I enjoyed your article on power ("The 'Powers' That Be," June 2000, page 55). After completing many professional and home courses as well as corporate in-house training programs over the years, I would have to say I never had powering explained in such a concise and accurate way as you did in your article. Thank you.

Tim Johnson
Project Manager
INT-2/MediaOne

Return Rewards

Ron:
I just read your interesting article on fiber link alignment ("Mystified by Return Path Activation?," March 2000, page 40). Thank you for explaining the topic. Could you also provide some articles explaining how to troubleshoot unwanted noise and ingress on our return path?

Eric Quimson
Engineer
Skycable
The Philippines

Editor's response: You may be interested in my article on unity gain ("Seek Balance in All Things: A Look at Unity Gain in the Upstream Coax Plant," June 2000, pg. 162). Also, watch for my upcoming article on troubleshooting ingress later this year.—RH

Acronyms Galore

CT:
Following are a few acronyms related to niche technology that is frequently overlooked, at least initially, when adding two-way services to a cable system. These acronyms are derived from the latest issue of ANSI T1.101-1999 that covers Synchronization Interface Standards.

ANSI: American National Standards Institute
BITS: Building Integrated Timing Supply
DSn: Digital Signal level n
DSX-n: Digital Signal Cross-Connect level n
Hz: Hertz
kbit: kilobit
ms: millisecond
MTIE: Maximum Time Interval Error
ns: nanosecond
PRS: Primary Reference Source
s: second
STS-N: Synchronous Transport Signal level N
TIE: Time Interval Error
TDEV: Time Deviation
TVAR: Time Variance
UI: Unit Interval
us: microsecond

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CT:
Here are some more acronyms for your collection:

WAP: Wireless Application Protocol
WML: Wireless Mark-up Language
UMTS: Universal Mobile Telephone System
GPRS: General Packet Radio Service
SMS: Short Message Service
USSD: Unstructured Supplementary Services Data
HSCSD: High-Speed Circuit-Switch Data
CSD: Circuit Switch Data
I hope the above is useful. Regards.

Stephen Chor

Compression Kudos

Jim:
I have enjoyed your articles on video compression. The last one finally made clear to me how DCTs actually work. I missed the first installment in this series and would like to know how to obtain a copy of it.

Mark Vogel
System Architect
3Com

Editor's response: Glad you enjoyed the article. You may e-mail Supriya Nayalkar at snayalkar@phillips.com if you'd like to receive a CT article that you missed. For reprints, e-mail Darla Curtis at dcurtis@phillips.com.—JF

> Write to Us

What do you think of this month's issue? If you agree, disagree, or have comments on what you've read, please let us know. Simply e-mail *Communications Technology*'s editors at tvrex@earthlink.net or snayalkar@phillips.com. *CT* may edit letters for clarity and space.

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Harmonic Demos NODEcmts

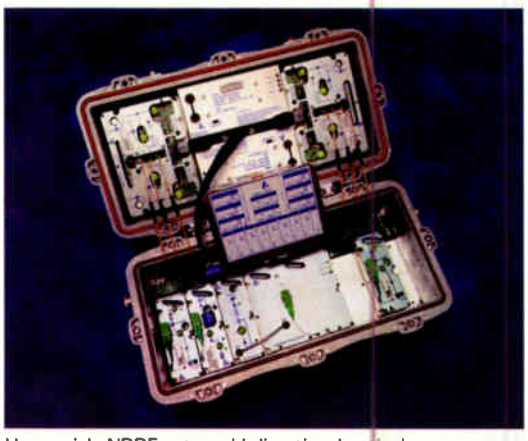
By Jonathan Tombes
Deployment Editor,

Harmonic is pushing functions of the cable-modem termination system (CMTS) further into the hybrid fiber/coax (HFC) network.

Its NODEcmts offers Ethernet over HFC capability, all the better to manage Data Over Cable Service Interface Specification (DOCSIS)-based traffic.

Demonstrated in its proof-of-concept stage at the Cable-Tec Expo, the NODEcmts leverages competencies acquired in DiviCom's Internet protocol (IP) networking group with Harmonic's own HFC optical node capabilities.

"The idea is to bring the lower level of the CMTS down into the node, so you actually have the physical and the media access control layers down in the node, addressing the quadrature amplitude modulation downstream and upstream," said Clem Auvray, Harmonic product marketing manager. "And then you have a very efficient Ethernet transport through the hub to the headend, where you keep all your routers and servers, as a usual CMTS activity."



Harmonic's NODEcmts: a bi-directional optical transmission technology

Aggregating return traffic

The technology is bi-directional, but especially affects the modest upstream frequency band. "The whole purpose is really to help aggregate the upstream traffic, and by aggregating the upstream traffic, you have a more cost-effective way of delivering more bandwidth to the customers, both upstream and downstream," said Auvray. Then, boomerang-like, by requesting more, subscribers get more.

One key is baseband Ethernet transmission, which makes different use of available spectrum. "Instead of modulating (the signal), you're using the digital bits directly, so you have a lot more bandwidth available for backup," said Matthew Goldman, a senior engineer who comes to Harmonic via **DiviCom**.

The conventional methods of digital return remain crucial for interactive set-tops and cable telephony. "But if you know it's DOCSIS traffic, go for it," said Auvray. "Go for a CMTS, and begin at the baseband level."

Harmonic's technological preview addresses concerns about burgeoning IP traffic. Its timing partly reflects the gestation period for network architectures. "The last thing we want to do is show up and say 'Here we are!'" said Patrick Harshman, Harmonic vice president of marketing. He said that the demonstration at Cable-Tec "put some meat behind the use of 'what if' discussions we've been having with our customers."

"Everybody and their brother...is looking at pushing more intelligence down to the end stations."
—Craig Johnson, PITA Group

Harmonic appears to be in the leading role for now, but others may be waiting in the wings, and with predictable economic results.

"Everybody and their brother, from **3Com** and **Cisco** on down, is looking at pushing more intelligence down to the end stations," said Craig Johnson, principal with the **PITA Group**. "If everyone's going after the same space, then that by definition brings price points down."

Moreover, the larger integrators have the potential advantage of being able to offer more of everything. At that point the discussion goes beyond pure technology.

On the other hand, first movers have their advantage. "If it's a hot box, and it's DOCSIS-compliant, then they still should be able to win some business," said Johnson.

NEWSBYTES

> ***Charter Uses Belden and TVC***
> **Charter** agreed to purchase more than 5 million feet of specially designed coaxial cable from **Beldon** electronic's division. Both companies will use **TVC Communications** as a distribution arm to help with delivery of the cable and for supply of other products. Last April, Charter announced a major headend and hub build program.

> ***Road Runner to Celebrate***
> Broadband service provider **Road Runner** expects to install its millionth subscriber this summer. The company plans to award prizes of $10,000, a year's free service, and a trip for two to San Francisco to 44 customers, one from every Road Runner market. The company predicts it will have 1.5 million subscribers by year end.

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Videotele.com's Twisted Pair Strategy

By Arthur Cole, Contributing Editor

Cable companies have made a lot of noise invading the telephone companies' home turf, namely voice service. Now it looks like some telcos are seriously pursuing the same tactic using regular phone lines.

"Telcos are in danger of being pigeonholed in a niche market.
—Lee Rainey, VideoTele.com

A new technology from **VideoTele.com**, a Beaverton, Ore., subsidiary of test and measurement company **Tektronix**, has developed an MPEG-based platform that it says allows multichannel, broadcast quality television service over twisted pair networks. So far, the company has installed the full platform in regional competitive local exchange carriers (CLECs) and independent operating carriers (IOCs) in the Midwest, but it also has installed an encoding system for public, educational and government (PEG) channels in a **US West** experiment serving 3,000 homes in Phoenix.

Don't pigeonhole me

"This is a counter offensive," said Lee Rainey, vice president of marketing at VideoTele.com. "Telephone companies are in danger of being pigeonholed in a niche market. Cable owns home entertainment and is now offering premium data and additional voice lines in many areas. Phone companies are finding themselves providing basic phone service where there's not a lot of growth or revenue."

VideoTele.com has forged an alliance with **NextLevel Communications** to jointly market and distribute the service to the telephone industry. Clients need to have some sort of full service network-type of architecture in place, with most customers delivering it via very-high-rate digital subscriber line (VDSL).

"We gather the content from satellite, off-air antennas, local feeds, and prepare that for delivery over the phone company network," Rainey said. "Analog material is encoded and packetized, while pre-encoded material is bit-rate adjusted. Then we turn the material over to the switch at the phone company central office. We can turn it over to a variety of switches."

The company's hardware lineup consists of a series of encoders, demultiplexers and "video edge" equipment that goes by the M2 moniker. The M2-VMX and M2-AMX are the company's flagship audio and video demux units.

Competitive threat?

Rainey said the system can deliver "a hundred or more video and audio channels" to three separate TV sets in the home, each of which can receive different channels simultaneously.

"Over traditional cable, our quality is vastly better," he said. "Over digital cable, we are still superior."

Should cable operators be worried by this development? Not yet. It's still unclear how many users will be able to tap into the system. Rainey said most NextLevel systems call for copper drops of 4,000 feet or less, putting most customers fairly close to the digital loop carrier. There is also a question of how much interactivity a DSL-based cable service can offer. Copper is still copper, after all, and broadband services can only be delivered using substantial compression and bandwidth-squeezing technology.

But it is significant that the telephone companies are at least looking into branching into cable without having to overbuild coaxial plants. If the technology has some legs, things could get sticky for the cable operator.

NEWSBYTES

> **Pace Sells Set-tops**
Pace Micro Technology sealed a three-year contract to supply Comcast with 350,000 digital set-top boxes. The contract includes at least 300,000 high specification digital interactive set-tops incorporating Motorola's DigiCipher II conditional access, and 50,000 "Pegasus-compliant" Di5101 digital set-tops to work on Comcast's Scientific-Atlanta-based networks.

> **PODs Pass Test**
Cable Television Laboratories verified the interoperability of digital removable security devices from Motorola and Scientific-Atlanta. These devices, called point of deployment (POD) security modules, were to be made available immediately to cable operators. This completed testing phase helps cable operators to meet the government-imposed July 1, 2000, deadline for POD availability. (See story, page 22)

> **C.COR.net Wins with Comsource**
Ontario-based independent cable operator SouthMount Cable is using C-COR.net's 862 MHz-based Navicor quadrant nodes and line extenders as well as Flexnet Series 900 trunks in a rebuild project. C-COR.net's Canadian distributor, Comsource Broadband Technologies, is providing local support for the product line. The Southmount contract is one of six recently won by the two partners.

> **Com21 Deals with Microtune**
Com21 plans to purchase Microtune's RF 4734 tuners for use in its DOXport cable modems. Com21 also has committed to an equity investment in Microtune, and the two companies are planning to collaborate on Microtune's next generation of tuners.

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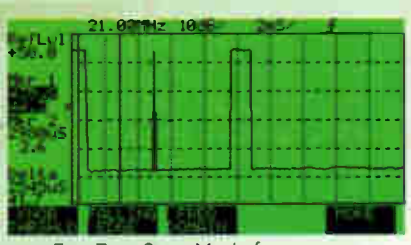

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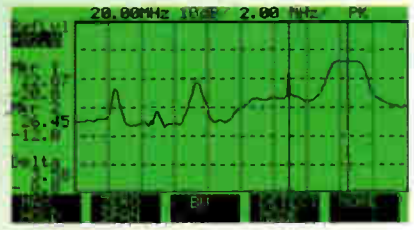

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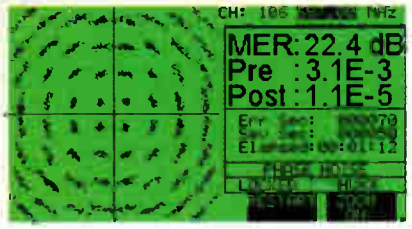

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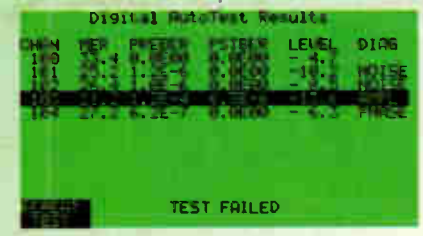

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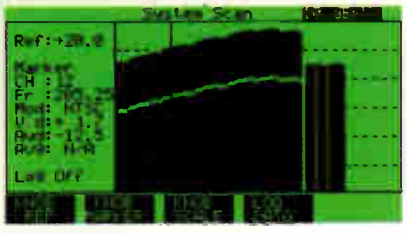

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Wavetek Snares Cheetah

By Natalia A. Feduschak, Senior Editor

In a move that will integrate leading companies in field testing equipment and network management systems, Wavetek Wandel Goltermann/TTC (WWG), a subsidiary of Dynatech Corp., plans to acquire Cheetah Technologies.

> **"What we decided to do instead was ... merge the companies together and really link marketing and engineering tightly."**
>
> —Joe Budano, WWG

"What has happened in the industry is our customers have basically demanded that we make our field instruments communicate and interoperate with [monitoring] systems," said Joe Budano, group president for the new company.

Budano said WWG opted for a merger over a potentially unwieldy alliance. "What we decided to do instead was to couple systems with field instruments, and the way you do that is to merge the companies together and really link marketing and engineering tightly."

Cheetah, based in Sarasota, Florida, makes monitoring systems for the cable industry and has about 200 such systems deployed worldwide. Cheetah will be merged into the new company's cable network division based in Indianapolis. WWG has over 100,000 field meters deployed today.

The combined businesses will focus on creating broadband solutions that are designed to streamline and unify the network operations process.

Unleashed power

"What this combo is going to do is unleash the power of the field maintenance organization to the network operations center (NOC)," said Budano. "It will unleash a lot of the power that hasn't been able to be utilized, because the NOCs in the field don't have a strong communication link."

The Cheetah acquisition comes on the heels of WWG's February merger with TTC, the communications test industry's then third-largest company.

The new company, which combines WWG/TTC and Cheetah, will be named in September. It will remain a wholly owned subsidiary of Dynatech Corp., whose business focuses on network technology solutions. The new company will be based in Germantown, Maryland.

Synergies—and jobs

Brett Price, president of Cheetah, said in a statement, "The combined resources of WWG and Cheetah will accelerate the evolution of our products and services to new levels, assisting cable companies in their challenge to continue to offer highly available, converged services."

WWG envisions that the new company will be able to streamline operations, lower costs, simplify staff training and improve network reliability. Customers will have one team of experts that can provide installation, consulting and technical assistance services. Budano said as a result of the acquisition, more than 100 positions in engineering and marketing need to be filled.

DEALS

> **Adelphia Adds Subs**
>
> **Adelphia Communications** paid $836 million to acquire **GS Com** and another undisclosed Virginia system, thus boosting its subscriber count by 155,000 in the state to 700,000. The purchases are expected to close in the first quarter of 2001.

> **Broadcom Likes Bluetooth**
>
> **Broadcom** intends to acquire **Innovent Systems**, a developer of **Bluetooth** integrated circuits and low-cost radio frequency (RF) wireless technologies.

> **Mediacom Grows**
>
> **Mediacom Communications** acquired the cable TV system owned by **Spirit Lake Cable TV** for $10.8 million. The ninth largest cable operator in the United States, **Mediacom** has so far this year purchased four systems serving approximately 17,000 basic subscribers.

> **HSA Nets NetPerformance**
>
> **High Speed Access Corp.** is buying **Digital Chainsaw**, a Web hosting and systems integration company doing business as **NetPerformance**.

> **Into Secures Funds**
>
> **Into Networks**, a provider of software-on-demand over broadband networks, has secured $36.6 million in private equity financing with distribution partners. Investors include **Cox Communications**, **Adelphia**, **Morgan Stanley Dean Witter** and UK-based **NTL Inc**.

> **Nortel Goes ASP**
>
> **Nortel Networks** is buying **EPiCON** for $275 million. The deal will advance Nortel in the application service provider market.

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FCC Weighs POD Waivers

By Jonathan Tombes, Deployment Editor

The **Federal Communications Commission** gave itself another 45 days to evaluate requests from eight multiple systems operators (MSOs) seeking partial relief from FCC efforts to require removable security for all but analog-only set top boxes.

Scientific-Atlanta's point-of-deployment (POD) module

"We just need more time to see if these waivers should be granted," said FCC cable services bureau spokesperson Michelle Russo. The FCC is suspending enforcement of its competitive set-top rules, but only for those MSOs that submitted waivers.

The FCC set July 1 as the deadline for retail availability of removable security devices, or point of deployment (POD) modules, which are designed to enable set-top interoperability. On June 30, **Cable Laboratories** announced that digital-only POD modules from **Motorola** and **Scientific-Atlanta** were interoperable, clearing the way for cable operators to meet the lion's share of the FCC's requirements.

By that time, however, the FCC had received waiver requests from eight operators: **Adelphia Communications**, **AT&T Broadband**, **Cablevision**, **Charter Communications**, **Cox Communications**, **GCI**, **Insight Communications**, and **MediaOne**. (MediaOne is now part of AT&T Broadband.) Three requests came in the week prior to the July 1 deadline.

The FCC responded by giving itself more time in an order released June 30. That order characterized the petitioners as seeking a waiver "for some of their cable systems that utilize hybrid navigation devices."

The cable industry had early on flagged the separation of analog security functions as a complicating factor. The FCC agreed with the industry in excluding from the requirement for POD modules on equipment employing an analog-only conditional access function, but it argued that excluding hybrid devices could interfere with competition in the marketplace.

CableLabs issued an optional analog interface specification for hybrid boxes, but focused on digital set-tops. MSOs facing this problem, meanwhile, have duplicated scrambled analog programming on the digital tier, a solution that some have found costly or otherwise prohibitive, given the July 1 deadline.

"There's no technology on the hybrid side that would not reduce offerings or require additional customer premise equipment," said David Morris, a spokesperson for the Alaska operator GCI.

Morris said that GCI was unsure of what to tell subscribers. "One thing we'd like is more guidance on how to do this," said Morris. "On the technology side, that would help, too."

The FCC's decision should come no later than August 15. Retail availability of set-tops—the point of this elaborate coordination between MSOs, vendors, retailers and regulators—may take longer.

"Realistically, they probably need six to nine months before they get everything nailed down," said Mike Paxton, a senior analyst with **Cahner's In-Stat**.

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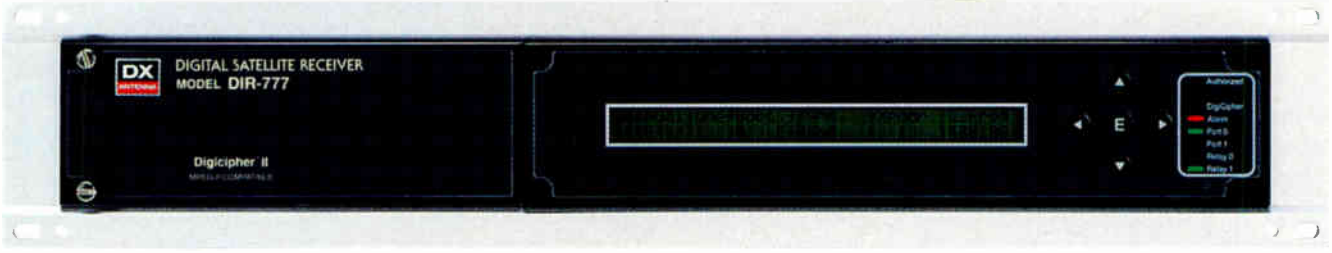

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Data-Over-Satellite Services Get Real

By Natalia A. Feduschak, Senior Editor

After a few fitful starts, satellite is poised to give cable a run for its money in providing high-speed Internet access to businesses and residences.

"I think more companies are taking advantage of (satellite), or in some cases are becoming aware of it," said Michelle Abraham, a senior analyst with **Cahners In-Stat Group**. Abraham said that companies are trying to make very small aperture terminal technology (VSAT), which has long enabled two-way communication, more affordable for business.

ISP deals

There have been a slew of deals recently between satellite and Internet companies that ought to make delivery of data to the business and residential market quicker and easier. One of the most prominent is between **Akamai Technologies Inc.**, a provider of applications for the delivery of Internet content, and **Loral CyberStar**, a provider of satellite and broadband data services.

The two companies are partnering to allow Loral to offer free Usenet news feeds to all Internet service providers (ISPs) within Akamai's Accelerated Network Program. In addition, Loral will provide transport on its global satellite network for brand-rich content, including live audio and video streaming.

Benefits of hybrid structure

"ISPs are kind of a distribution point for Internet content services," said Dave Fuente, executive president at Loral CyberStar. "If you view ISPs as competing against cable companies for the delivery of media to the home or business, then we are enabling the delivery of content from those ISP locations...much better than they would have gotten if they were just connected to the Internet directly." He described cable as "a last mile solution."

To maximize existing bandwidth, both companies have agreed to grow the footprint of each other's networks by co-locating Web servers and satellite dishes in mutual ISP points-of-presence. Loral will place its satellite broadcast dishes across Akamai's distributed network of over 4,000 servers.

Fuente said a hybrid fiber structure allows for a better match between distributed traffic and specific applications. In other words, fiber for interactive delivery, but satellite when feasible, as in multicasting.

Internet broadband

Mahmoud A. Wahba, president of **AlphaStar International**, said one of the beauties of satellite is that it can reach many locations that cable can't.

AlphaStar recently announced the deployment of a high-speed Internet and Intranet broadband network called TeleCrossing. The company introduced a hybrid technology that integrates two-way satellite global coverage with a network of wireless local access hubs. To work, the subscriber needs a radio antenna connected by a small modem to desktop computers, laptops, set-top boxes, printers, fax machines or scanners.

TeleCrossing provides Internet broadband access that is always on, dedicated and fully interactive with high speed up to 32 megabits per second (Mbps) in an increment or fraction of 2 Mbps, symmetrical or asymmetrical.

"Of the numerous advantages in satellite, one of those is to go from satellite to household," said Wahba. "What we're saying is no more dish."

He admitted the application of broadband is still fairly new, available only in the last six to eight months.

Other companies have gotten into the satellite game. For instance, **DirectTV** has partnered with **Microsoft**

PEOPLE

> **Pientka Named COO at Viasource**
John M. Pientka, formerly vice president and general manager of **Motorola's** Advanced Systems Division, is the new COO of broadband outsourcing specialist **Viasource Communications.**

> **Digital Nabs Rabbitt**
Stephen J. Rabbitt was named as president and COO of **Digital Access.** Rabbitt had served as senior vice president for consumer telecom services for **Cablevision's** New York metro area.

> **New Veep at Interspeed**
Digital subscriber line access provider **Interspeed** named Joseph E. Massery as vice president of engineering.

> **HSA Gets New COO**
Gregory G. Hodges was tapped as COO of **High Speed Access Corp.** Previously, he was COO at **Hardy Petroleum.**

> **Vartanian New Veep**
John Vartanian is the new senior vice president of technology and operations at **iN DEMAND.** His responsibilities include overseeing all technology for the network's digital, near video on demand (NVOD) pay-per-view platform.

> **Baldo Becomes General Manager**
Seiko Instruments USA Inc. tapped Steve Baldo as general manager of the optical fiber components group of the electronic components division.

> **Pike and Riker Inducted**
The Cable Center and Museum's Bill Riker and **Prime Cable's** Dan Pike were inducted into the **Society of Cable Telecommunication Engineers'** Hall of Fame.

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to offer Web and interactive services using **Thomson Multimedia** set-tops.

"We'll soon see residential customers for that as they're looking to attract areas that are not likely to ever be wired," said Abraham.

FONS Gets Funds, New VP

By Evan Bass, Editor, *Fiber Optic News*

Northboro, Mass.-based **Fiber Optic Network Solutions**, a provider of passive fiber optic components and interconnect products, raised $15 million in equity funding from **Morgenthaler** and **Intel Capital**.

The Northboro, Mass.-based company will invest 35 percent of its forecasted revenues into expansion and development projects, says CEO Michael J. Noonan.

FONS also announced that David Stowe has joined the company as vice president of research and development. Stowe previously served as vice president of fiber technology at **Thomas & Betts**.

Founded in 1992, FONS designs, manufactures and supplies optical components and fiber optic connectivity products to service providers such as regional Bell operating companies, cable TV companies and competitive local exchange carriers.

FONS also manufactures connectivity products for local area networks for data applications and develops fiber management products, optical components and customized optical sub-assemblies to networking equipment manufacturers on an OEM basis.

FONS customers include **Bell Atlantic**, **21st Century** (recently acquired by **RCN**), **Marconi** and **Avanex Corp**.

FONS' product line includes fused technology-based optical components and packaged modules including splitters, taps and dense wavelength division multiplexers.

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ROVING REPORTER

Fun and Familiarity at Breckenridge Show

By Natalia A. Feduschak, Senior Editor

The **Society of Telecommunications Engineers'** annual expo might be the Grande Damme of cable shows, but if it's a bit of humor and familiarity you want, the place to find those are the SCTE's regional shows. There, one can learn about events closer to home and who dominates the local market.

That certainly was the case with the 2000 Cable-Tec Symposium sponsored by SCTE's Rocky Mountain/Wyoming chapters at the end of June in Breckenridge, Colo. Nestled in a sweeping valley sporting a deep blue mountain lake and miles of bike trails, Breckenridge's many cafes and alluring ski runs—now prime for summertime alpine hiking—competed for the attention of the 200 or so attendees.

Still, cable faithful forsook mountain magic to attend tutorials ranging from technical training to BCT/E testing, as well as to inspect the latest in splicing materials to fiber optic cable on display on the show room floor.

Wendell D. Woody, executive director of broadband technology at **Sprint**, showed off his company's traditional cable wares, but was really proud of his cowboy-style hard hats. "Those cable guys like the choice," he joked.

Cheri Kettler, cable TV sales manager for MK Battery, offered a full line of powering products at the Colorado Cable Show in Breckenridge.

Lora Radicke, associate director of the **California Cable Television Association**, made the journey from her home state to chat cable politics with Colorado colleagues, while privately sharing a penchant for sardines with show attendees. Cheri Kettler, cable TV sales manager for **MK Battery**, did a fine job explaining the benefits of her company's powering products, after having reached under the table surreptitiously offering an over-loaded-with-pamphlets visitor a canvas bag.

Thomas G. Elliot, an at-large member of the SCTE board of directors and executive consultant to CableLabs, outlined the contributions made by their industry: With some 70 million viewers, cable employs one million people, has $30 billion in operation revenues, and adds $55 billion to the U.S. economy.

Still, someone needs to remind those in attendance next year to turn off their cell phones and to keep mini-conferences out of doors: The constant ringing and murmur drowned out part of Elliot's speech.

By far, **AT&T** dominated this show. Not only was everyone sporting AT&T name tags, but AT&T cable techs swept the show's cable games: Bill Dennis was the overall winner, while Todd Lubers and Robert Gephardt went home with second and third places.

NCTI and Times Fiber Communications set up their shard tabletop at the 2000 Colorado Cable Show in Breckenridge.

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AT&T's Open Access Trial Pushes Envelope

By Natalia Feduschak,
Senior Editor

AT&T Broadband's engineers aren't afraid of open access. They are preparing for an open access trial in Boulder, Colo., that will give 500 residents free high-speed Internet access from a host of service providers. Beginning in the fall, the technical trial holds a world of unknowns for the telecommunications giant.

"The technology we're going to use is source-based routing," said Carl Smith director of advanced products for AT&T Broadband. "The big issues in the test are how does it perform. It's a relatively new form of routing in comparison to the other ones. It hasn't ...been really stress-tested yet."

The six-month trial, slated to begin in November, will be the first step toward competition for high-speed Internet access over cable lines and comes at a time when the debate over open access has been brewing across the nation.

The challenge for AT&T will be figuring out how to conduct the technical test while giving consumers a choice of 10 ISPs.

Smith said the telecommunications giant envisions using AT&T's point of presence (POP) in downtown Denver. Each ISP will bring its backbone into the AT&T facility, then interconnect with regional data networks. The regional data networks will be hosted at the national digital television center at the former **TCI** facility in Denver. From there the traffic will go to a headend in Boulder.

Source-based routing

Source-based routing is essentially policy-based routing, and requires nothing different technically from the participating ISPs, said Smith.

"Each ISP in the trial will hand to AT&T a block of IP addresses that represent their network. When a subscriber says, 'Okay, I'd like to use AOL,' we then hand them an AOL IP address for that session so that we can route the traffic to the appropriate connection point," said Smith. Packets need to know not only the

source and the destination, but also which network to travel across.

Trial participants will be able to use whatever service provider they want. As part of the trial, however, AT&T will carry out a series of iterations that will allow the company to determine the network's behavior when consumers switch from one service provider to another over a given period of time.

"We are going to try to simulate all the different iterations that may occur on the network, and the only way to do that is to force it," said Smith. "We will flip all the switches, put the network through the ringer, push all buttons and flip all switches."

Depending on how the trial goes, AT&T plans to carry other tests from a market research standpoint, to determine consumers' Internet usage habits.

How much choice?

Ted Henderson, a telecommunications analyst for **Janco Partners** in Denver, welcomed the trial, but noted that probably the most likely outcome is that companies like AT&T will continue to carry a preferred ISP, and let others ride their cable networks for a fee.

"We are not going to an environment where I see cable operators saying, 'Here are five ISPs we have available, which one do you want?' I see them going...'**Excite@Home** is the best product we've got, and we can hook it up and its content and access.' And you say 'What about Mindspring?' And they say, 'Well, Mindspring is paying us to ride on our service, but we don't know much about that service, you ought to call them.'"

Henderson said cable companies received a boost when the **Ninth Circuit Court** in Portland ruled in June that the **Federal Communications Commission** (FCC) alone may assign common carriage regulation to cable broadband. So far, the FCC has shown that it does not want to regulate or mandate carriage issues, but would rather let the market place determine such issues.

The Boulder trial, however, will level the playing field for smaller ISPs, like **RMI.net**, which has 110,00 subscribers in the Rocky Mountain region.

"I think it is to the benefit of every ISP to fight for and cooperate with AT&T to get open access to the cable system," said Henderson. "I take the position and have taken it for years that you need to segregate content and services for cable systems."

SCTE Members Discuss Voting and Tests

By Jonathan Tombes,
Deployment Editor

At its annual membership meeting at the Cable-Tec Expo in Las Vegas, the **Society of Cable Telecommunication Engineers** (SCTE) announced new officers to its board of directors and considered ways to increase participation and improve the certification-testing process.

The SCTE board officers elected for the 2000-2001 term are Chairman Jim Kuhns (Region 7), Eastern Vice Chairman Wes Burton (Region 10), Western Vice Chairman William Davis (Region 6), Secretary Keith Hayes (Region 9), Treasurer Don Shackelford (Region 8), and Additional Executive Committee Member Ron Hranac.

The good news on membership is that is that it has reached an all-time high, reported SCTE Chairman Jim Kuhns, who also serves as operations committee chairman. Outreach has played a role in that success. The SCTE Web site (www.scte.org), for instance, is now a secure site that can process membership dues.

The popular SCTE-List, an electronic forum for technical issues that concern SCTE members (and others), appears to be another way of "getting the word out." Kuhns announced to members that the board has decided to keep the list open to non-SCTE members.

The Bad News

The bad news on membership is that participation, at least as measured by voting, is stagnating. "Once again this year, we had a record low 14 percent of eligible voting members participate in the election," Ron Hranac, planning committee chairman, said. The issue struck a nerve with some members and generated several ideas.

One member suggested chapter incentives. Informally seconding that motion was a member from the Penn-Ohio chapter, who had won a drawing among voting members to attend this year's Expo.

Others raised the idea of Internet voting. Kuhns said that the costs, which would triple for a secure Internet voting solution, were currently "prohibitive."

Testing, Testing

On the testing front, Training Committee Chairman Keith Hayes said that new candidates in the certification program were up from 201 to 366 from the same time last year. Year-to-date exams are up to 1,179, from 752 last year.

Concerns among members over testing included timely posting of results and changing technology. E-mailing results has until now been ruled out for privacy concerns. Electronic test-taking faces similar technical and policy issues, but Marvin Nelson, SCTE vice president for technical programs, called that an "ultimate goal."

Hayes said that the SCTE is currently reporting an average exam turn-around time of 2.3 days. Whether there are delays on the front-end or with the U.S. postal return is another matter, he suggested. Steve Allen, director of Region 1, also pointed to speed bumps that candidates create for themselves when they submit sloppy paperwork. He said that proctors carried responsibility on that point.

Increased communication among proctors had been proposed previously, and Hayes announced at the meeting that an electronic proctor reflector list would be up-and-running within several months.

As for keeping tests current, Kuhns noted that several years ago the SCTE had a telephony program ready to go when the technology shifted, requiring the organization to start over. Hayes said that the broadband communications engineer (BCE) certification fills a void in higher education, but added that the training committee wants another curriculum revamp, especially for new digital and fiber/coax technologies.

DEPLOYMENT WATCH MONTHLY UPDATE

Provider/Operator	Service/Feature	Communities	Vendor/Partner
Bell Atlantic	Digital subscriber lines	Buffalo, Tonawanda, Niagara Falls, West Seneca, Williamsville, Amherst, Lancaster, Lockport and Hamburg	Hughes Electronics Corp.
Blue Ridge Communications	WorldGate's Internet on Every TV Service	Stroudsberg, Ephrata, Lehightown, Penn.	Scientific-Atlanta
Com21, Inc.	Cable Modems	Massillon and Wooster, Ohio	Massillon Cable TV
Comcast	Digital cable, Internet service	Anne Arundel County, Md.	@Home
Cox Communications, Inc.	Video-on-demand	Phoenix	Concurrent Computer Corp.
High Speed Access Corp.	High speed data services	Long Beach, Calif.	Charter Communications
MDU Communications	High speed Internet access for multi-dwelling/multi-tenant units	U.S. and Canada	3Com Corp.
Sprint Broadband Direct	Wireless Internet access	Phoenix, Tucson	Best Buy
Time Warner Inc.	High speed Internet access	Southeastern Wisconsin	Road Runner

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Time Warner Launches Seachange

By Jonathan Tombes,
Deployment Editor

As further proof that video on demand (VOD) is growing up, **Time Warner Cable** has graduated **SeaChange International's** technology from trial to a phased rollout in its Austin, Texas, system.

Using **iN Demand's** iControl VOD turnkey marketing platform, Time Warner initially launched service in the cities of Round Rock, Hutto and Taylor. Additional service will follow SeaChange's ongoing installation of its interactive TV (ITV) MediaCluster video server technology in Austin's network hubs.

"Austin is a perfect site for looking at the distributed network."

—Yvette Gordon, SeaChange

Time Warner Cable of Austin serves more than 289,000 customers in the Austin and Central Texas area and expects to complete this rollout by the end of October.

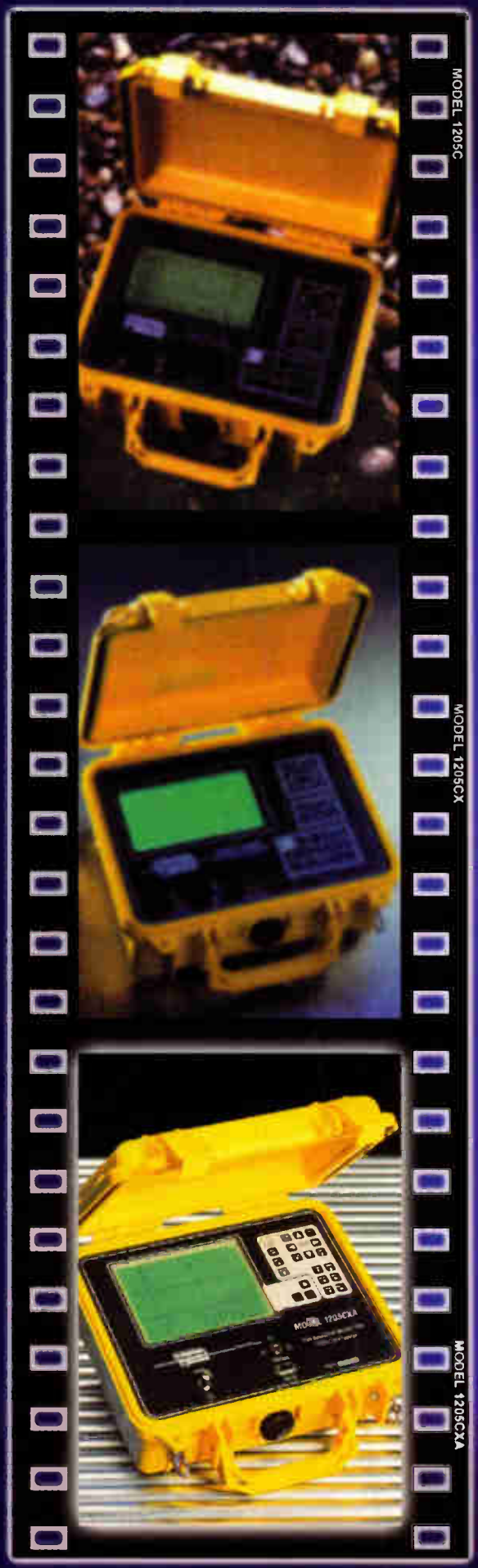
"Austin is really a perfect site for looking at the distributed network," said Yvette Gordon, SeaChange's vice president for interactive services. "The network from the **Scientific-Atlanta** deployment has been built to have this full connectivity from between headend and all the hubs already, so it was a real nice plug-in."

SeaChange plans to deploy 14 servers in the Austin network's hubs.

Its ITV MediaCluster technology promises full-fault tolerance through storage of parity information, rather than installation of redundant systems. A single MediaCluster rack enables 1,500 video streams and 4.5 Gbs throughput.

The ITV system is compatible with a range of digital architectures, including **Motorola**, S-A, and open systems, such as **Harmonic**.

Coincident with the launch in Austin, SeaChange and Time Warner cable announced a nonexclusive agreement that suggests further col-



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laboration. Terms weren't disclosed. The two companies have been working together for three years.

"We're committed to using SeaChange technology for a portion of our VOD rollout," said Time Warner Cable spokesperson Mike Luftman. Time Warner also has deployed VOD using technology from **Concurrent Computer** in its **Oceanic Cable** system in Hawaii. He said Time Warner, like other cable operators, is taking a multivendor approach to VOD.

Gordon, who was engineering director with Time Warner's subsequently discontinued **Full Service Network** in Orlando, Fla., emphasized that VOD's test phase is over. Austin, she said, is a matter of running VOD as a business, not as a trial.

The author of a widely cited 1998 white paper, "Video-On-Demand: The SeaChange Model," and holder of several related digital patents, Gordon said that her model still largely applies. Recent digital video deployments in Yun Nan province, China, and Santiago, Chile, suggest an even wider application of SeaChange technology. SeaChange also has worked closely with European operators, such as **United Pan-Europe Communications**.

Further VOD questions

As for VOD (itself a specific kind of digital technology), while the technology is now tried and tested, ongoing deployments raise further questions.

"I think that (Austin) will be a real interesting test bed for people behavior," said Paul Palumbo, analyst with **DFC Intelligence**. He also noted the question of whether cable can market programming as effectively as direct broadcast satellite (DBS).

Content licensing is another VOD variable. While the ITV MediaCluster is geared to deliver from a selection of thousands of digital video files, VOD service in Austin initially will offer about 100 titles. Studios represented in the iControl movie library include **20th Century Fox**, **Artisan**, **ASAP**, **Buena Vista**, **New Frontier**, **NewLine**, **Post**, and **Warner Bros.**

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Digital cable subscribers in Austin will be able to access to movies with VCR-like control, at prices ranging from $1.95 to $6.95 per four-hour rental period. And, as VOD proponents like to say, no late fees.

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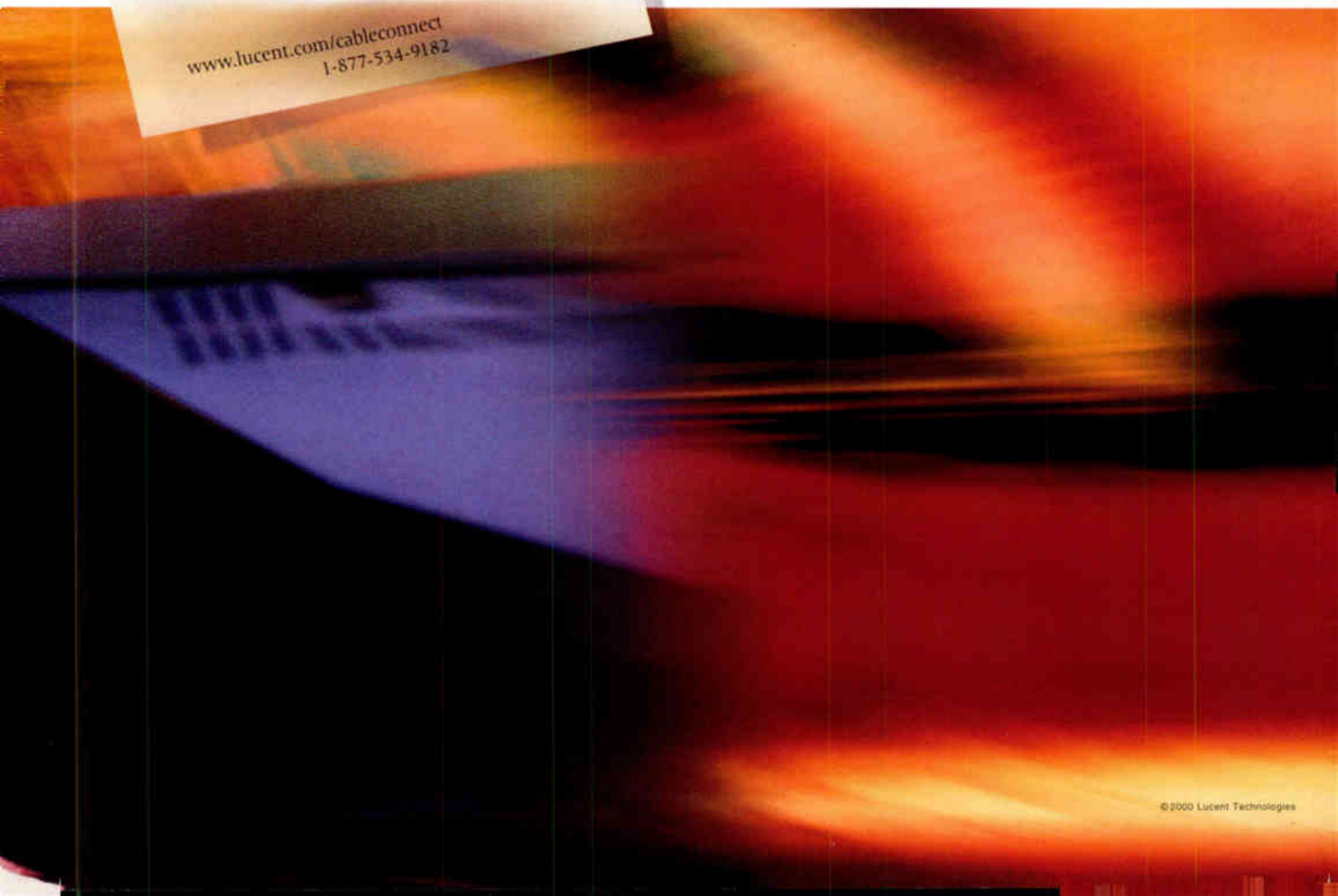

Expo 2000: The Only Safe Bet in Vegas

The Society of Cable Telecommunications Engineers' Cable-Tec Expo 2000 has come and gone, and to say this year's Las Vegas-based confab was a success is an understatement. By most accounts, Expo 2000 continued the trend of being the industry's number one—pick your favorite: engineering, hardware, nuts and bolts—trade show.

The good

As of this writing I have only unofficial attendance figures, but the numbers were somewhere around the 10,000 mark. SuperComm, held in Atlanta during the same week as Cable-Tec Expo, was for all intents and purposes a nonevent as far as Expo was concerned, unless you were among the companies that had to exhibit at both shows. The Las Vegas Convention Center aisles were always packed, even at the end of the last morning's exhibits. Nearly every vendor I spoke with couldn't say enough good things about floor traffic, and first-time exhibitors like Noise Com (www.noisecom.com) were wondering why Cable-Tec Expo hadn't been on their agenda before.

"Nearly every vendor I spoke with couldn't say enough good things about floor traffic."

The Annual Engineering Conference had excellent presentations, and the Expo workshops were top-notch. For the first time, Expo 2000 hosted an all-day workshop on the reverse path. Great venue for a hot topic.

The awards luncheon recognized a number of well-deserving companies and individuals for outstanding accomplishments, including Member of the Year Mark Millet, a good friend and colleague at Cisco Systems (www.cisco.com). Especially touching was having the first recipient of the Milton Jerrold Shapp Memorial Scholarship Award, Josh Butters, son of Gilbert Engineering's (www.gilbertconnectors.com) Alan Butters, on stage with this year's recipient, Debra Gemme, daughter of Time Warner Cable's (www.twcable.com) Paul Gemme.

Emcee Les Read gave the young Butters some good-natured grief about his 3.9 GPA (Butters just graduated from college) compared to Gemme's 4.0 GPA. The Shapp Scholarship pays $20,000 over four years toward college to the child of someone who works in the cable industry. For more information contact SCTE headquarters.

A tip o' the hat to Terayon's (www.terayon.com) Jim Kuhns, reelected to another term as SCTE chairman. The SCTE board of directors also expanded John Clark's title to president and chief executive officer. And John thought we kept him busy before.

I would be remiss if I failed to mention that Wavetek Wandel Goltermann (www.wwgsolutions.com) once again sponsored the opening night reception, where they brought back their famous glass beer mugs. Yes!

Expo Evening and the Cable Games, as usual, were a blast.

The not so good

Expo registration packages went out later than they should have, the housing pre-registration arrangements get a big raspberry (the hotels themselves were fine), and the busing to the off-site Expo Evening could have been better coordinated. This won't happen again, and I say this with my SCTE At-Large Director's hat on. Nuff said.

Expo trivia

Here's one that catches a lot of people: Where was the first ever Cable-Tec Expo held? If you answered Nashville, you obviously weren't at the first one. The correct answer is Dallas, Texas. Bonus question: What did it cost attendees to get in the door? You'll find the answer at the end of the column.

Goodies on the show floor

Each year I like to wander the exhibit hall aisles and look for interesting new technology or products. Here are a few of my favorites:

Broadband Innovations: These guys have some nifty ASIC-based RF upconverter technology, but what really caught my eye was their model 101 multicarrier-signal generator that can be used for active device and even overall system distortion tests. The unique thing about the multicarrier generator is its unusually small size-

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just eight inches high. Up to 101 carriers are generated using digital signal-processing (DSP) techniques. (www.broadbandinnovations.com)

Motorola and Scientific-Atlanta: Both companies exhibited newly designed subscriber taps that have provisions for reverse equalization. This is a clever way to balance the attenuation in the forward and reverse signal paths, which forces cable modems to operate at higher levels in order to achieve better carrier-to-ingress ratios. Think of it as a way to have stepped attenuators built into the tap port. (www.gi.com) (www.sciatl.com)

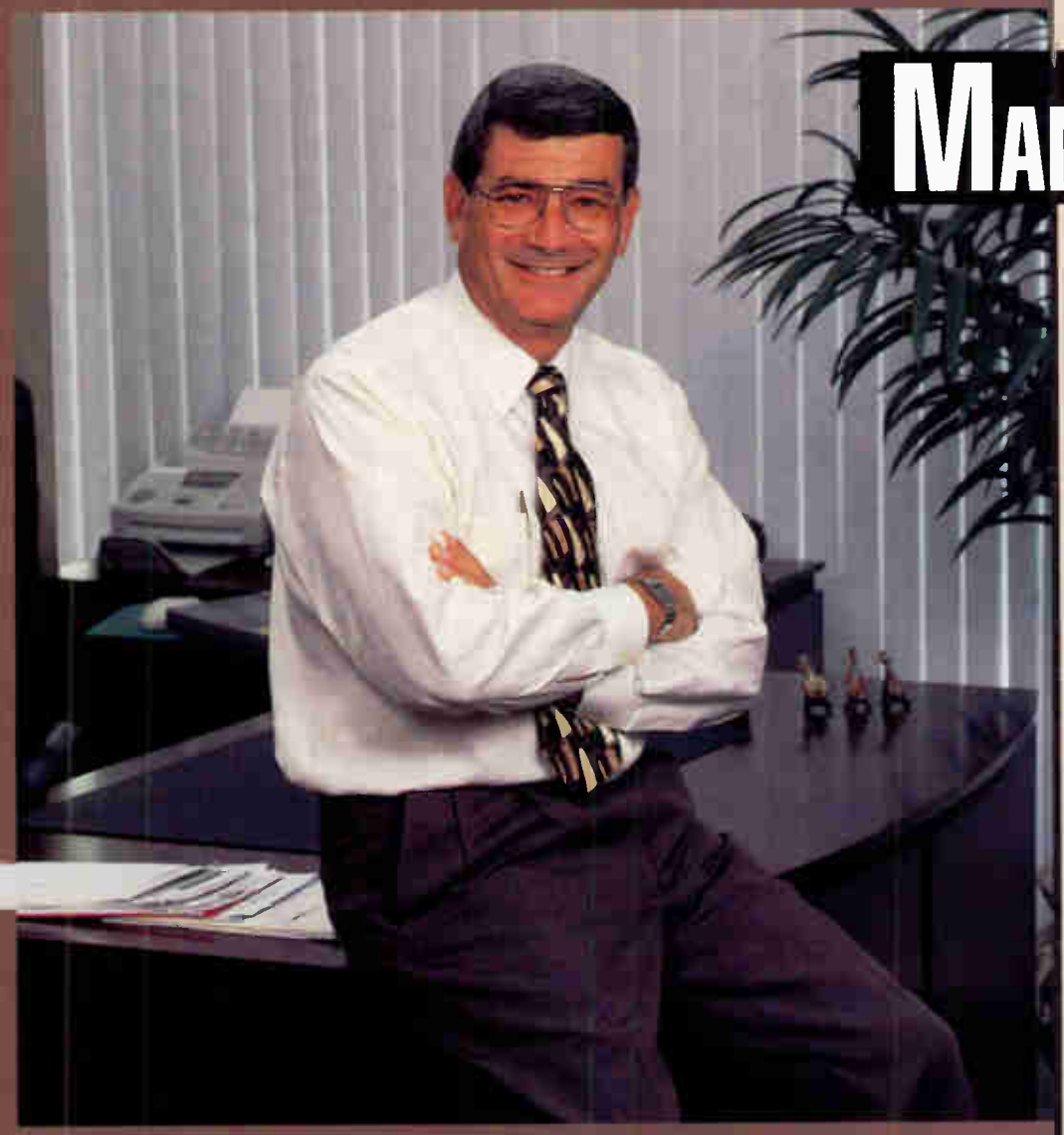
Wavetek Wandel Goltermann: Can't I just call them Wavetek? Old habits are so hard to change. Seriously, WWG introduced a new 64/256-QAM (quadrature amplitude modulation) measurement option for its Stealth Digital Analyzers. Measurement capabilities include constellation display, digital carrier average power level, bit error rate (BER), error vector magnitude (EVM), modulation error ratio (MER), equalizer stress, and a patented ingress-under-the-carrier view.

Thomas & Betts: How do you make a good F connector even better? Well, there's now a Super Premium Snap-N-Seal, featuring a pre-positioned plastic sleeve inside the connector body. Installation time is faster, and the sleeve can be temporarily removed, if necessary, for tough jobs. It's one of those things that makes you wonder why they didn't think of doing this before. (www.thomasandbetts.com)

RDL, Inc.: As I wandered, I saw a piece of test equipment with a classic phase noise measurement display. Intended for the lab or perhaps a manufacturing environment (this is, after all, a $45K box), RDL's NTS-1000B phase noise analyzer does not require phase locking to the signal being measured. Typical measurement speed is but a few seconds, making it possible to perform near-instantaneous adjustments on equipment or devices being tested. (www.rdl-instrumentation.com)

Hukk Engineering: The CM1000 Cable Modem System Analyzer was easily my show favorite. It should be in production by the time you read this. The CM1000 is a handheld instrument that basically simulates a cable modem plus a whole lot more.

It's capable of performing most of the same downstream measurements as the company's CR1200R, including MER, pre- and post-FEC bit error rate BER, signal power and constellation display. What's really neat, though, is the ability to do upstream BER testing from out in the field! It works in conjunction with your existing headend



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cable modem termination system (CMTS) by pinging the CMTS with a special packet that's immediately retransmitted back downstream.

The CM1000 looks at the received "round robin" packet and can determine the upstream BER because it already knows the downstream BER. The special packet is, of course, protected by forward error correction when it's retransmitted downstream, so if no errors exist in the forward path, any errors that are present in the special packet had to occur in the upstream. (www.hukk.com)

The competition

You know the stacks of show-related literature that await you each morning when you open your hotel room door? I have to say thanks (really!) to the folks at Cablevision (www.cablevisionmag.com) for their "SCTE Blue Book." This is the second year they've produced this handy reference that includes market statistics, forecasts, and other quite useful data. However, an open note to the publication's editor, Simon Applebaum, is in order.

Ahem.

Dear Simon: Your SCTE Blue Book introduction notes that Expo 2000 is the "first Expo of this millennium," a technically incorrect statement that does not belong at a convention of engineers, especially one where I'm bound to read said statement: We engineers know better. Please turn in your honorary pocket protector, get some new batteries for your calculator, then refer to my January 2000 *CT* column for a concise explanation about counting the years, centuries, and millennia of our Gregorian calendar. That column accurately describes when the second millennium ends and the third one begins. Cable-Tec Expo 2000 was the last Expo of the 20th century and second millennium.

I was just kidding, Simon. You can keep your honorary pocket protector.

And the answer is...

The attendee registration fee for the first ever Cable-Tec Expo was just $50. That's not a typo. It really was $50.

See you next year in Orlando!

Ron Hranac is consulting systems engineer for Cisco Systems' Service Provider Engineering group and senior technical editor for CT. He can be reached at rhranac@aol.com.

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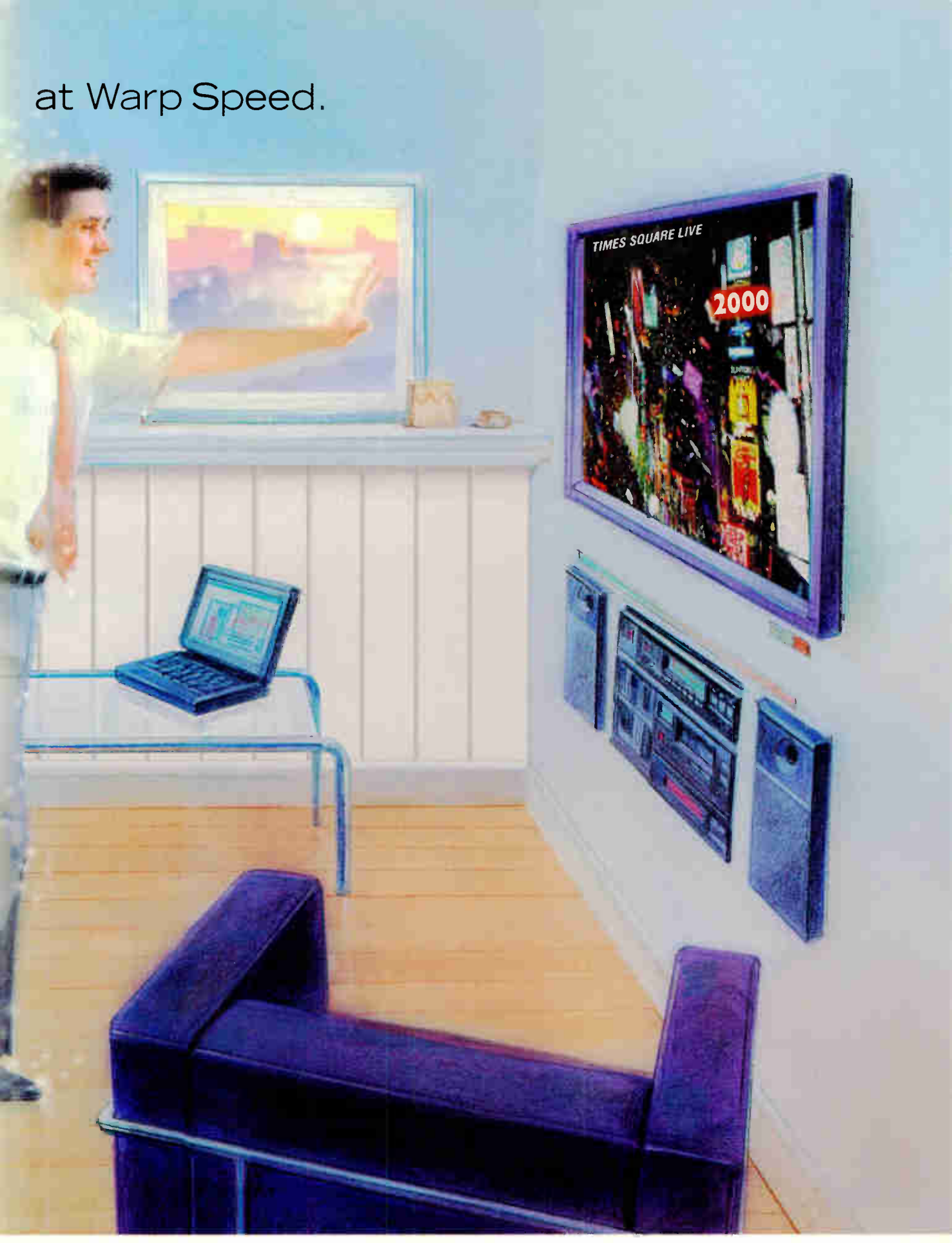

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What's in an NID? IP Telephony's Customer Link

Since spring, I've become more impressed with the new products that have become available to build a system delivering Internet protocol (IP) telephony service. This year's SCTE CableTec Expo and the NCTA Cable 2000 shows included products or announcements for single-family residential IP network interface devices (NIDs) by five major vendors—more than double the number from last year.

To add to the momentum, this month we'll review those available or announced IP NIDs. First, we'll look at features that are common across most vendors. Then, we'll point out differences in how vendor architectures accomplish the technology evolution to IP telephony.

NIDs dissected

Before we start, however, let's review how the NID fits into the overall IP telephony picture. It's important to remember that IP telephony is a service that provides subscribers feature-rich, carrier-grade-quality telephony over a packet network using IP as the set of rules for transport.

The NID is only one component of the system providing that service. Cable modem termination systems (CMTS) are another component, as are feature or call servers, gateways, and operations systems. None of the components can individually provide IP telephony, and it takes a complete system to provide a service that is more than simply voice over IP (VoIP). NID features are, therefore, only part of the delivery mechanism for telephony.

"To avoid the hassles of telemetry monitoring and battery maintenance, most vendors recommend system powering."

All the major IP NID vendors are providing units with four telephony lines, one high-speed data line, and video. They all include built-in cable modems and media terminal adapters that accept analog voice input and generate IP packets.

The telephone lines thus provide plain old telephone service (POTS) for subscribers with standard telephone sets. The advantage to both the cable company and the subscriber is that existing in-home wiring can be reused, as can most existing residential customer premises equipment. That makes it easy for the subscriber to make the cable company his or her telephony service provider.

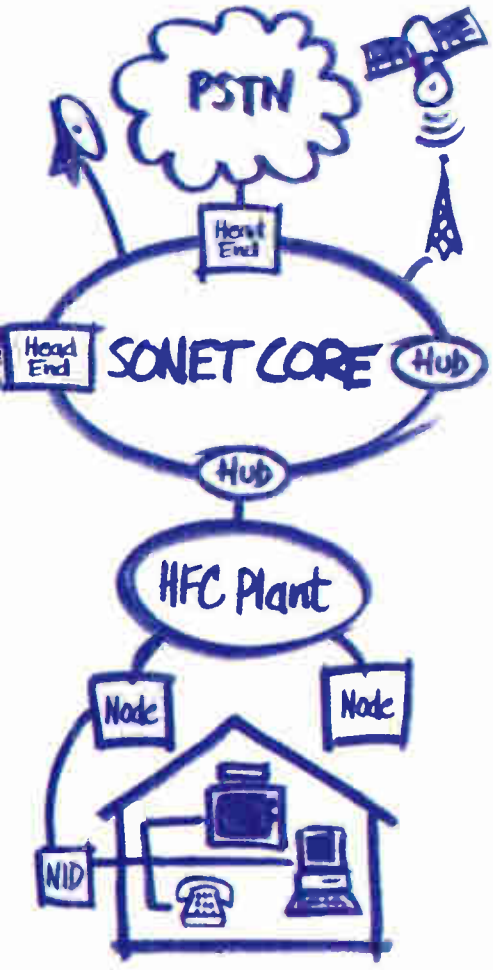
Having a built-in cable modem and a termination for a high-speed data line is also a nice feature. Category 5 wiring can be used to extend the connection from the NID to the subscriber's Ethernet-capable computer, router, or hub. There's no coax or external box in between to confuse the sub.

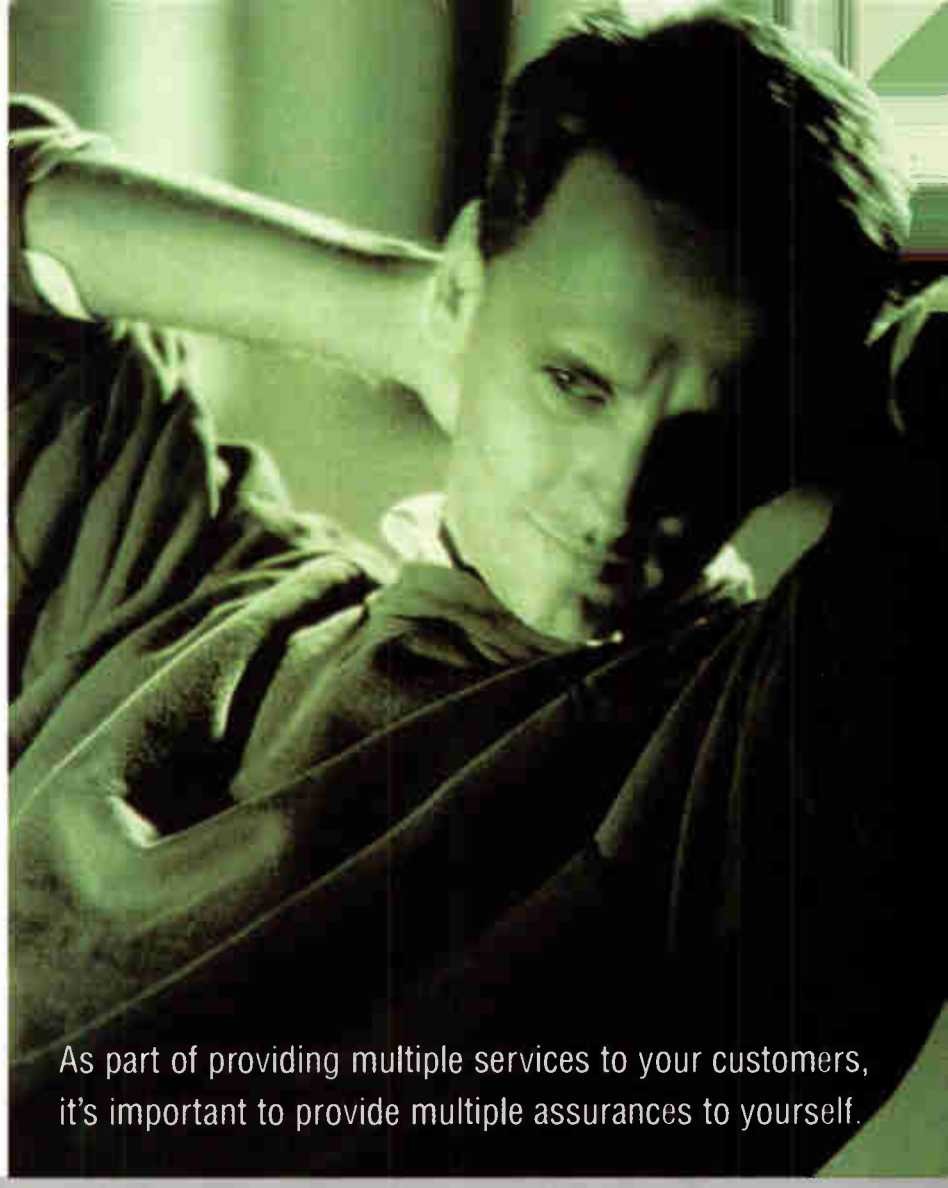
That doesn't mean that coax won't carry any data inside the sub's house. Don't forget all those interactive video applications that still will be available for those who see the TV set as the subscriber interface.

Home networking: A standard feature

Home networking capability at 10 Megabits per second over twisted pair per the Home Phoneline Networking Alliance (HPNA) spec 2.0 is also part of most basic NID feature sets. Although HPNA is the technology of choice for today, the vendors appear to be thinking about other technologies for future home networks. Motorola's CentriQ boasts a network interface module that can be changed in the field, allowing the operator to provide an alternate home networking technology or other capabilities later as field upgradeable options. Arris Interactive's "Broadband of the Future" show video included a possible future NID that used wireless technology, rather than HPNA, for home networks.

Every vendor with product or prototype claims DOCSIS 1.0 compliance, and "DOCSIS 1.1-capable" hardware. Until certification tests are





convergence

As you move quickly to upgrade your plant and to satisfy user demands for converged services, there's one important fact to keep in mind: your customers have well-defined ideas about quality of service. If it's faulty in one way or another, they'll switch their access provider faster than you can say "churn rate."

In this environment, it's imperative to have the tools you need to anticipate, prevent and solve network problems. That includes everything from go/no go field-portable hand-helds that let your installers reduce the truck roll time to fast, reliable headend equipment that helps your network managers diagnose and eliminate trouble spots up and down the line – from the PSTN to the set-top box.

One thing's for sure. It's better to have the ability to identify and correct problems yourself rather than hearing about them from your customers.

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completed, however, vendors cannot guarantee complete compliance. They are promising, however, that upgrades will be via software releases.

"All the major IP NID vendors are providing units with four telephony lines, one high-speed data line, and video."

Powering possibilities

Three powering options are generally offered: center conductor, separate system power feed (such as provided by a Siamese cable) and external power. To avoid the hassles of telemetry monitoring and backup battery maintenance, most vendors recommend the system powering options. This implies plant upgrades have been completed.

Vendors are asking their customers to believe that chip manufacturers will repeat the power reduction feats of the circuit switched products before massive service implementations. Because the chip sets in a DOCSIS cable modem typically need eight or more watts of power, using system power currently means a hefty power plant and careful power engineering for early implementations.

Size matters

Physical sizes for the NID are similar across vendors. Roughly 3 in. by 8 in. by 9 in. is typical, with the exception of Com21's larger DOXgate unit. (Com21's representatives indicate they will shortly have their unit in a size package similar to others on the market.)

Like the circuit-switched versions, each vendor's NID has two access doors: one for the subscriber, and one for the cable tech. The savvy subscriber can thus still verify availability of dial tone at the NID, in the event of faulty house wiring or a phone left off-hook. That could save a truck roll.

How do NIDs differ?

So what are the differentiating characteristics between the vendors? One part of the answer is in how they connect to the IP network.

ADC's IP ISU, for example, is based on the philosophy that IP telephony is a separate offering from circuit-switched telephony. This unit, although it looks similar to the ADC HISU used for its circuit-switched offering, connects to the network more like a cable modem. It does not interface with the existing ADC host digital terminal, but depends upon a partner vendor's CMTS for connection to the network.

Although both a circuit-switched and an IP telephony-based service could co-exist in the same headend, they are essentially separate systems, in a headend architecture similar to one that provides circuit-switched telephony and high-speed data.

The Arris Cornerstone Packet Port, on the other hand, can be connected to the IP network via a new card on the existing host digital terminal frame (renamed the Cornerstone Converged Host Terminal), allowing both IP and circuit-switched access technology to interface with the same headend equipment. The Cornerstone Packet Port also can connect to an IP network via the Cornerstone CMTS 1000. Adding a partner vendor's gateway to the architecture allows the operator to connect to a local

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circuit switch for feature capability. This design provides a way for operators to continue using existing headend equipment as they move from circuit-switched telephony service to an IP telephony offering.

The Com21 DOXgate has no circuit-switched access cousin. It is a pure IP telephony offering, and interfaces with an IP network via the DOXcontroller 2000 CMTS. The offering will most likely appeal to operators willing to maintain a dual vendor, dual access technology telephony offering, or those that are entering the telephony business with IP access only.

The Motorola CentriQ similarly has no circuit-switched counterpart. Motorola's CableConnect alliance with Lucent Technologies, however, was a big part of the spring show display theme, and both companies presented architectures that connect an IP access network to either an IP network complete with call servers for feature access, or to a circuit switch via a gateway.

Tellabs, although it has not displayed its newly announced RSU-P, iterated an architecture philosophy similar to that of Arris' Cornerstone. It's new host digital terminal modem—the MRF-P—allows dual mode VoIP and data services to co-exist with circuit-switched telephony, providing a way to reapply equipment installed for circuit-switched access. An integrated PSTN gateway is part of the MRF-P design.

Next month, we will discuss the other part of the answer to differentiating the vendors of IP NIDs—operations systems support. CT

Justin J. Junkus is president of KnowledgeLink, and applications engineering director for ANTEC. He can be reached at jjunkus@knowledgelinkinc.com.

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Road Runner "Connects" With Self Installation

Staying number one is hard work, and Road Runner understands that. The cable Internet service provider (ISP) has launched an innovative self-installation program that it believes will increase both the quality of cable modem installs and the number that can be done. Meeting both goals is essential if cable hopes to maintain its lead over digital subscriber lines.

So far, 20 of Road Runner's 41 systems are using a new CD-based software tool called Road Runner Connect. Developed by BroadJump, the software automates many qualification and configuration tasks done by installers and customer service reps.

The Road Runner Connect CD can be used by either the installer or the subscriber for self installation. When run, the CD will automatically:

- Prequalify the computer to make sure it meets minimum requirements.
- Install software such as Internet Explorer, Outlook Express, etc.
- Configure the software including user name and password, computer settings, proxies, etc.
- Verify that both the connections and applications are configured properly and working.
- Update a backend database as to what was done, when, and by whom.

"We are attempting to standardize on an installation process that can be accepted by all of our affiliates," explained Dave Temlak, vice president of customer care for Road Runner. "Whenever there's a peak in installation or when running a promotion, [affiliates] tend to bring in contractors.... When that happens, the national help desk pays the price in terms of additional call volume, more complicated calls, a wider range of calls that we should never be hearing at the national level." Standardized installation will eliminate those calls.

Plus, the software will help Road Runner push past the 1 million customer mark that it hopes to hit this summer. At the end of the second quarter, the cable ISP had over 900,000 subscribers. "Today a one person install team, which does both the RF and the PC, work can install between three and four customers in an eight-hour day. With Road Runner Connect, those numbers have jumped to six to seven," Temlak reported.

Preventing problems

Road Runner believes the software eliminates preventable installation problems. About 5 percent of installs fail because the customer's PC doesn't meet the minimum requirements.

"Customers will either not know what their computer system is, not care, or won't tell us the truth because they want the service so bad," explained Temlak. The installation may go successfully, but then performance on the PC can slow when surfing the net. "Customers view that as a performance issue and call into the national help desk."

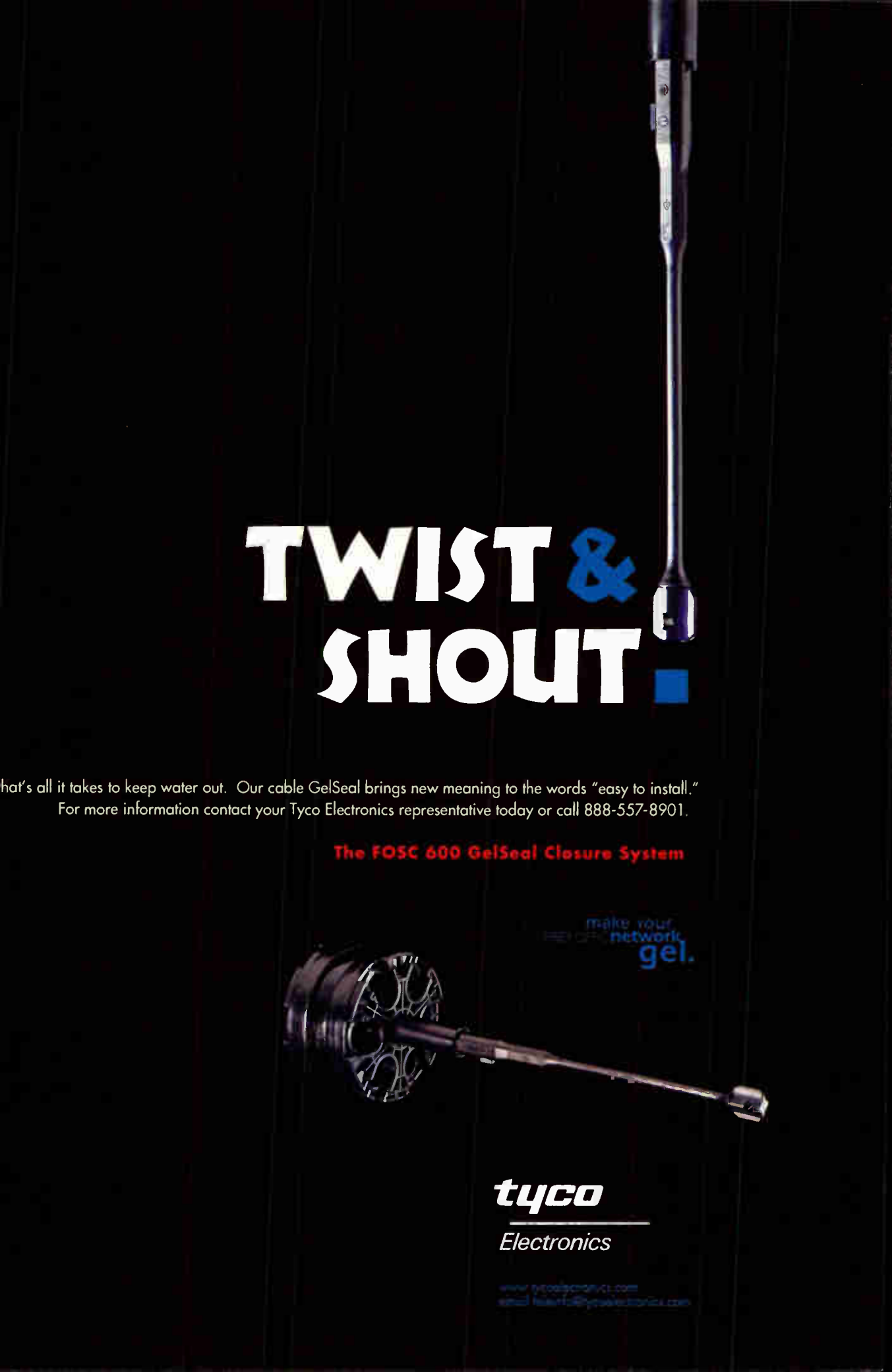
Also, installers may think they've loaded the software properly, but they haven't verified that the applications work. "This is the single biggest fault we have with installers today without this product. They do the configurations, but don't make sure the service is working the way it's supposed to....Later that night, the customer tries to access e-mail only to find that it wasn't set up properly."

Self-installation

Road Runner's Austin, Texas, affiliate has been testing the software for about 10 months, and roughly 55-60 percent of orders are now self installs, reported Temlak. Across the entire network, self installs are running about 25 percent with the Road Runner Connect CD, because the major affiliates haven't launched yet, or are using the CD to train their technicians. "My guess is that will jump to 50 percent fairly quickly," Temlak said, predicting self-installs could eventually be as high as 70 or 80 percent.

Road Runner also wants customers to be able to solve problems that occur after service is provisioned. So it's launching a self-help customer care package dubbed Road Runner Medic. Also developed by BroadJump, Medic enables users to monitor connection status and availability of applications; diagnose problems between the PC and Road Runner service; perform repairs to the system and connection; receive communications from customer care; and link to both online and off-line help areas.

Jennifer Whalen is editor of Communications Technology. She can be reached via e-mail at jwhalen@phillips.com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Marrying IP And Fiber Optics

While several cable operators are contemplating the benefits of distributed networking within the hybrid fiber/coax (HFC) network, standards groups and consortiums are trying to agree on the best way to marry Internet protocol (IP) and fiber optics. The connection between these two topics may not be readily apparent, but the combination of their outcomes could have a profound impact on the competitive posture of the cable industry in the not-too-distant future.

Distributing the switching/routing function of a data service access methodology—for example, the Data Over Cable Service Interface Specification (DOCSIS) cable-modem termination system (CMTS) function—is not a new concept. In fact, at least one patent has been filed on an approach to distributing the switching/ routing function for data services over HFC networks as long ago as April 1996.

Distributed networking

This patent—the Spectrum Parallel Routing, or SPRouter—was subsequently issued in November 1998, and is now an intellectual property owned by C-COR.net. The essence of the SPRouter' patent, aside from locating the switching/routing function in the fiber node, is the direct mapping of individual RF coaxial feeder network segments to optical wavelengths in the fiber trunks of HFC networks.

The architecture was established in anticipation of the cable industry's success in deploying high-speed data services, and establishes a technique for maximizing the amount of network bandwidth available to each data service subscriber over the shared HFC infrastructure. It also mitigates the problem of noise funneling that plagues traditional node-splitting approaches, as well as the rising noise floor associated with high penetrations of cable modem users.

Distributed switching/routing architecture in HFC networks was too costly to deploy in 1996, but the emergence of the DOCSIS standard, and the equipment industry's support for it, as well as more advanced software development has drastically reduced costs so that it may now be considered seriously. Other benefits include maximizing subscriber bandwidth availability, enabling a limited form of transport redundancy (service reliability), enabling enhanced security techniques, and reducing the granularity of service areas for more targeted service marketing.

The jury is still out on if, when, and how distributed switching/routing architectures might be deployed. Coming up with an approach, though, is a central topic of discussion among equipment vendors.

A contentious marriage

On the marriage of IP and optics, the central debate among standards groups and industry consortiums is on two distinct approaches for linking the packet world of IP with the optical switching fabric that will increasingly constitute the core transport of the Internet cloud. The debate has the Internet Engineering Task Force (IETF), the International Telecommunications Union (ITU), the Optical Interface Forum (OIF), and another fairly recently formed consortium, the Optical Domain Service Interconnect coalition, attempting to agree on the interface between IP and optics. The central issue is whether this interface would best be accomplished via a peer-to-peer or client-server approach.

The peer-to-peer approach is similar to the structure inherent within the cloud today. Such an approach suggests that nearly all virtual connectivity intelligence resides within packet processors (routers) located at the edge of the cloud. This approach would require future routers to maintain dynamically detailed information about not only the routing domains, but also every optical cross-connect scheme within the optical-switching fabric. Not only are the long-line transport providers reluctant to share this level of information (optical cross-connects) with the outside world (they fear competitors would exploit it), there are also performance implications at the router level with this approach. With a peer-to-peer approach, the underlying optical-switching fabric is essentially a slave configured to accommodate the needs of the external packet world.

The client-server approach to marrying IP with optical transports would have the optical transport providers "serving" circuits and bandwidth to requesting clients (routers), where requests are granted or denied based on

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the operational state of the switching fabric. This approach allows the optical transport players to maintain the privacy of circuit-creation details, as well as eliminate the need for "all-knowing" routers.

Other considerations

A variety of other related and interesting issues hang in the balance of which approach is adopted (e.g., end-to-end quality and class-of-service capabilities enabled by MPLS, DIFFSERV, IEEE 802.1q, and so on). Of course, how "cloud-resident" quality-of-service (QoS) techniques interface with DOCSIS-specified QoS capabilities defined in DOCSIS 1.1 also hang in the balance of which of these approaches is finally adopted.

The connection between the potential of distributed HFC switching/routing architectures and the IP-optics marriage should be evident. It only takes a little imagination to assume that someday fiber could be deployed directly between the existing switching points-of-presence (POP) from the long-lines transport providers at the core of the Internet cloud, and cable headend facilities (i.e., by-passing the incumbent carrier).

Under this scenario, with CMTS functionality residing at the fiber node (i.e., the end of HFC network fiber), fiber could exist from the core of the cloud to the neighborhood, establishing a considerable thickness to the "edge" of the network—from the POPs to the neighborhoods.

Whether a peer-to-peer or client-server approach is adopted for the IP-optic interface, the "edge" of the cloud would be defined by the fiber-node level of HFC networks. A peer-to-peer IP-optics interface approach could have substantial cost implications for distributing switching/routing functionality to the node level, whereas a client-server approach would simplify and reduce the cost of the already performance-constraining packet-processing functions resident in routers.

If the cable industry is serious about deploying advanced distributed switching/routing architectures to maintain and enhance performance levels for its subscribers, it may want to seriously consider weighing in on the IP-optics debate.

Terry Wright is chief technology officer for C.COR-net. He can be reached at tlwright@c-cor.net.

Did this article help you? Let us know. Send an e-mail to snayalkar@phillips.com.

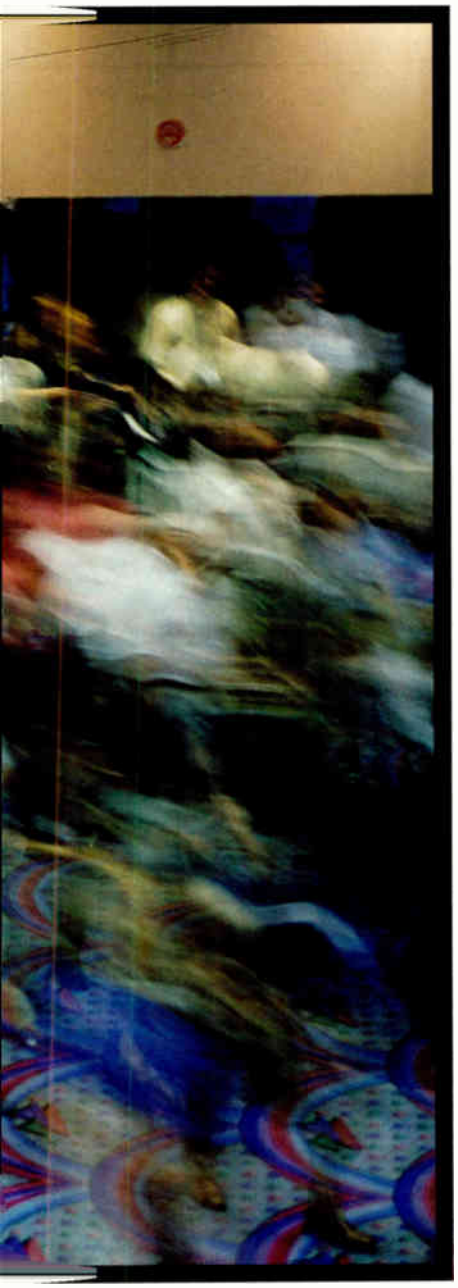
Expo

Photography by Vince Cowan

2000

A Cable Smorgasbord, Vegas-Style

By the CT Editorial Staff



Tourists may flock to Las Vegas and hold their breath in awe as they watch the dancing fountains at the glamorous Bellagio hotel or play clanking slot machines at the foot of the Paris hotel's Eiffel Tower, but the 11,000 engineers who attended this year's Society of Cable Telecommunications Engineers' Cable-Tec Expo were treated to their own smorgasbord of heavenly delights.

A showroom floor previewing cutting-edge technology beckoned engineers, and a menu of technical courses covering everything from home networking to Internet protocol (IP) telephony satisfied their hunger for knowledge.

Cable-Tec is the Society's biggest annual technical get-together. Held this year at the sprawling Las Vegas Convention Center, the show dished up conference staples that have drawn engineers back year after year—preconference tutorials, high-tech sessions, a sprawling exhibit hall and evening parties.

The technical aim of this year's Expo was seen as combining and focusing the industry's many broadband services over an IP platform. In addition, the global proliferation of cable and methods for breaking communications barriers were visibly on the agenda, as industry representatives from around the globe visited Expo to discover more about new technologies that may have applications in their home countries.

The following pages detail some of the highlights from this year's show. The Engineering Conference, featured on page 62, covered everything from home networking and new-age gadgets to unknown variables in launching innovative services.

The Annual Awards Luncheon once again honored dedicated Society members and outstanding chapters. See page 88 for specifics on this year's accolades and awards.

An overview of workshops, spanning topics from IP telephony to network operations centers, is available on page 98. The Society's proceedings manual provides valuable, in-depth information and can be ordered from the SCTE.

The winners of our Readers Choice Awards can be found on page 82. You voted for your favorite new products, so check out the results.

Evening fun and other diversions that personalized the Expo, like the Cable Games, are outlined on page 104.

The international element in this year's Expo is discussed on page 92.

Also, check out Ron Hranac's Broadband column on page 40 for his post-show impressions.

This wrap up is a joint effort on the part of the following members of the *Communications Technology* editorial staff: Rex Porter (editor-in-chief), Jennifer Whalen (editor), Supriya Nayalkar (executive managing editor), Natalia A. Feduschak (senior editor), Jonathan Tombes (deployment editor), Ron Hranac (senior technical editor), KnowledgeLink's Justin Junkus (telephony editor), John P. Ourand (executive editor, *International Cable*), Arthur Cole (contributing editor) and Monta Monaco Hernon (contributing editor). Unless otherwise noted, all photographs are by Vince Cowan.

Engineering Conference 2000

John Clark, SCTE president and CEO

Master the Technology—and all Related Issues

By Jonathan Tombes and Natalia A. Feduschak

The slogan for Cable-Tec Expo 2000, "Touch the Technology," reflects the hands-on nature of many floor booths and technical workshops. But the presentations at this year's Engineering Conference emphasized that technology also needs to be within the reach of consumers, and that before anything gets into their hands, engineers must first answer more than just technical questions.

It's a perennial issue: how to stay both cutting-edge and consumer-friendly. The latest gadgets generate press coverage, but how quickly home networking and other new-age consumer products take off depends on how well cable companies sell the benefits of those technologies for customers' everyday lives, as well as how easy they are to use.

"Consumers have indicated they are interested (in home networking)," said Julie Shimer, vice president and general manger of 3Com's residential connectivity group. "Consumers are (also) telling us, 'We really hate technology. We really resent technology. It's brought benefits...but it's breaking up our family life.'"

Keeping technology friendly...

Alleviating that feeling—that technology somehow works against the consumer and complicates rather than eases their lives—is one of the challenges facing the cable industry today.

Speaking at Expo's first session "Three Views Into the Same Crystal Ball," Shimer said home networking will be a hot commodity in 10 years, when young people who are currently in their twenties start purchasing homes. Until then, the industry must find ways to make products and services friendlier.

Currently, consumers are faced with a barrage of choices, said Shimer. They have too many products to learn about, devices are too hard to set up, use and manage, services are not integrated with each other to build broader solutions and, perhaps most importantly, they don't address life's issues.

Thus, it is important that companies keep in mind the so-called consumer food chain as they roll out products.

...and useful

"People don't buy technology; they don't buy infrastructure; they buy what meets their needs," said Stuart Lipoff, v.p. of communications for Arthur D. Little. In other words, companies need to look at who are their consumers and how their needs are going to be served through the products they buy.

"People are now looking for an integration of users," said Lipoff. "That has to be part of the vision."

Lipoff said consumer devices of the future will have to do more than just entertain their users. A video presentation featured some of the devices that may become a part of Americans' everyday lives, including voice recognition gadgets that allow women to design their own wedding dresses as they speak or husbands to send messages to their wives while they are shopping.

"If anyone has any doubts how the future is going, think back five years," Lipoff said. "Then you'll get a real sense where you're going."

A known quantity...

Meanwhile, one of the products most likely to get an upgrade is the TV set. It's a known quantity, something consumers understand and see as friendly. To that end, the cable industry has taken steps toward achieving a compatibility agreement with the Consumer Electronic Association for digital television.

"It is absolutely essential that we have solid standards," said George Hanover, consultant and past vice president of technology and standards for the CEA. "It is important that cable operators know about boxes and what they do."

Outlining the measures that have been agreed upon that would allow for increased connectivity—testing, agreements and standards—Hanover said several outstanding issues still needed to be determined. Those include interoperability, maintenance and two-way performance.

...and unknown variables

If the panelists in the engineering conference's second session were aim-

Photography by Vince Cowan

Above: InterTech's William Bauer, MediaOne's Keith Hayes, and Time Warner Cable's William Spies discuss new services during the Engineering Conference. ***Left:*** Alex Best, Cox Communications, kicks off the opening session.

ing to give attendees things to worry about, they succeeded. Unfamiliarity is a part of all new technologies. But attendees also got to hear how these leading industry engineers have faced down those worries.

Titled "Making the Rubber Meet the Road," the session raised operational questions related to deployment of new services, including data, cable telephony, and digital TV. To some extent, however, there are questions prior to operations. Before hitting the highway, after all, you generally need a roadmap. This is especially the case for data.

Bill Bauer, president and CEO of the startup InterTech, made that point in emphasizing that "data is a new service, not a new channel." Appropriately enough, Bauer's new company is creatively solving the potential data bottlenecks through satellite-delivered Internet services.

The challenges are varied. Bauer said that data delivery requires extensive training, new applications of the radio frequency plant, knowledge of cable modems, and coordination with Transmission Control Protocol/Internet Protocol (TCP/IP) structures in local area networks. >

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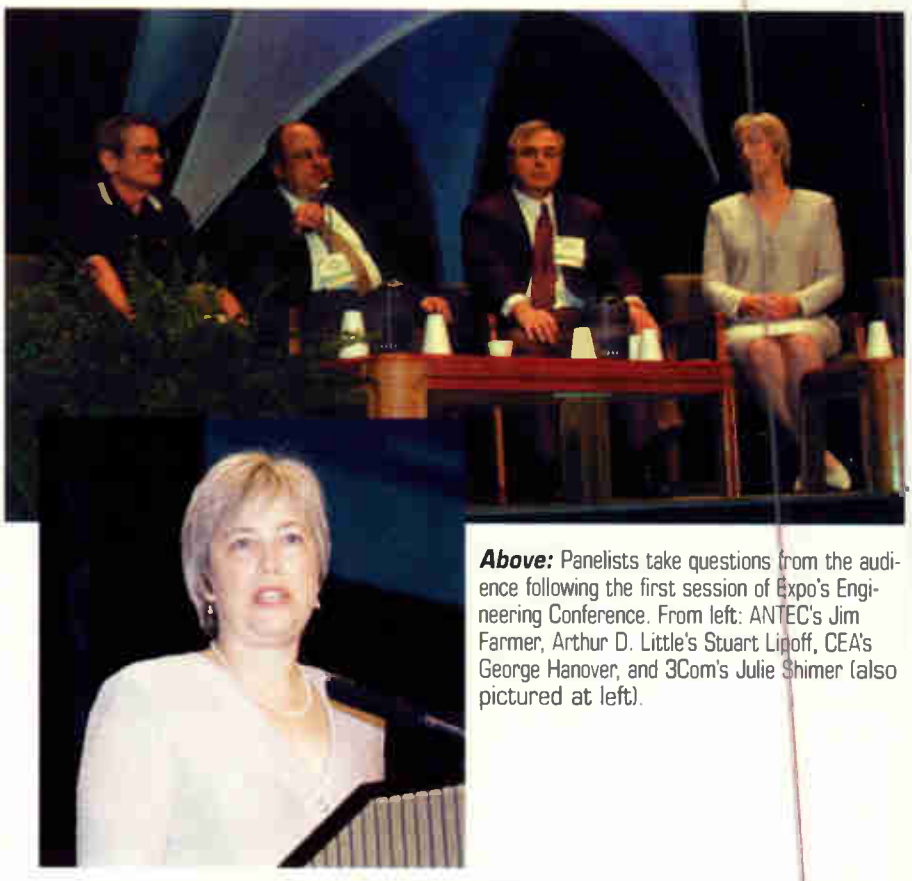
But some variables are unknown—or unknowable. As examples, Bauer cited the bandwidth-hogging program Napster, which converts personal computers into virtual servers, and the popular ICQ chat program, which exposes customer's IP addresses. The difficult question operators need to ask, he said, is "What will they think of next?"

Constraints, And a secret weapon

A tight labor market is an industry-wide constraint, but Keith Hayes, director of technical operations in MediaOne's Atlanta, Ga., system brought the numbers into frightening focus. The prospect of winnowing 10 applicants to one employee, who then has a 30 percent chance of leaving within the first few months, is only the beginning of the overall labor question.

Hayes said the telephony questions that intrigue engineers are "typically a one-time effort." The ongoing opera-



Above: Panelists take questions from the audience following the first session of Expo's Engineering Conference. From left: ANTEC's Jim Farmer, Arthur D. Little's Stuart Lipoff, CEA's George Hanover, and 3Com's Julie Shimer (also pictured at left).

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William Spies, vice president engineering, Time Warner Cable's Cincinnati division, during part 2 of the annual engineering conference.

tional challenges are keeping your workforce fully staffed, up-to-speed and committed to service.

Only if those challenges are met can operators deploy cable's secret telephony weapon: its comparative intelligence over the twisted pair. He sketched this scenario: cable telephony providers are capable of knowing that a phone line is down—and proactively repairing it—even before the customer is aware of a problem.

Teamwork wins

Attendees concerned with deploying digital cable got a detailed roadmap from Bill Spies, vice president engineering at Time Warner Cable in Cincinnati. Looking back on his division's progress to date, he described four distinct phases: planning and organization, installation, launch and ongoing operations.

One particular challenge facing digital cable providers is that the new technology is likely to be more integrated than the personnel surrounding it. That raises the urgent question of how to get everyone on board. The strategy of cross-functional teams worked for Spies.

Spies anchored the deployment with the residential account coordinator (RAC), a sort of technical sales position, but also built technical task forces that forced personnel to work together.

"A layer of fog was removed by having these people working together," said Spies. Even though engineering had a controlling hand in the task force structure, he said that the nonengineering members were just as exacting. CT

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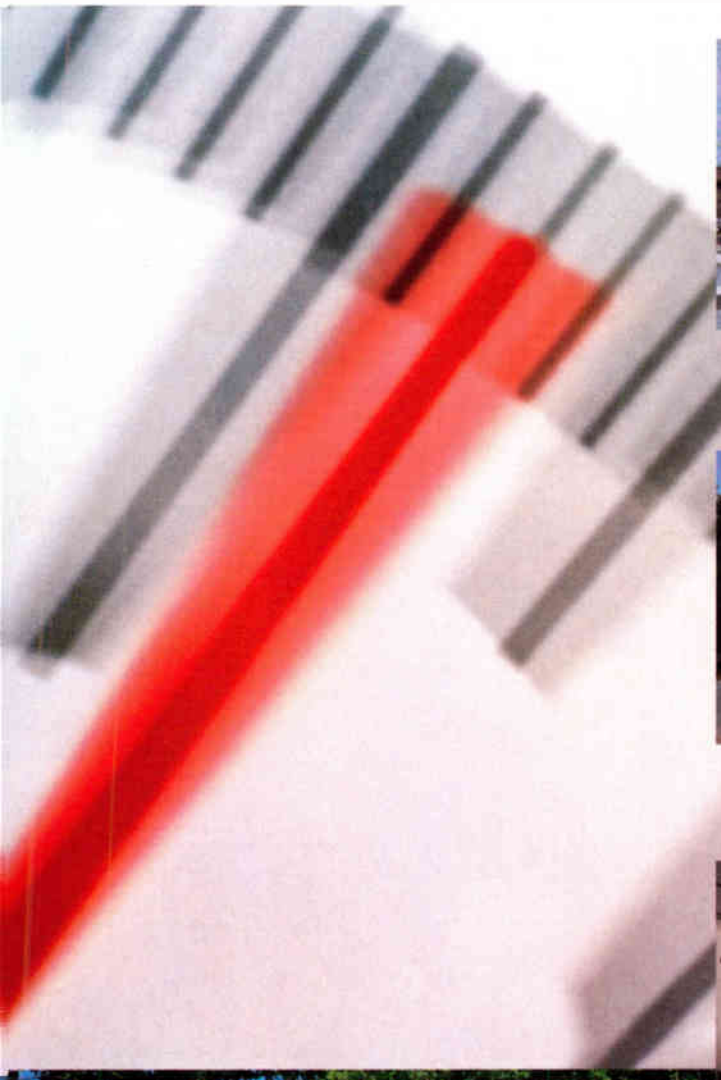

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The Exhibit

Giving Customers What They Want

For system operators in search of a solution, the SCTE's Cable-Tec Expo was the place to be. Innovation, customization, and quality customer service stirred up the high demand for cutting edge products and services. Here's a peek at some of the buzz we heard on the show floor.

SCTE President/CEO John Clark and Chairman Jim Kuhns at the ribbon-cutting ceremony that officially opened the exhibit floor.

Floor

Photography by Vince Cowan

By the *CT* Editorial Staff

Vendors fine tune amps

The amplifier industry is demanding reliability as operators are trying to expand into services like telephony and high-speed data, vendors at Expo told *CT*. New products debuting at Cable-Tec, therefore, highlighted features like power source redundancy, thermal management, overdrive survivability, and crash points.

Ken Poirier, CableServ manager, special projects, said his company sought a way to make its CHAS Modular Headend Amplifier System heat-resistant because fans can get clogged with "dust, ice, and dead snakes."

What CableServ came up with is expanding the radiation surface, using 18 square inches—nearly double the industry standard—for every watt of power. In addition, the fins on the device are vertical so that air can easily flow through, and nearly 85 percent of the frame is open.

Clients also are interested in redundant power sources and amplifiers that can operate with -48 VDC, which often is used for telephony, Poirier added. CableServ incorporated this concept into its system, which can handle four different power source types.

The newest addition to this CableServ product family is the CHAS-SRU, which is a single-rack unit headend that can handle a single- or dual-hybrid or two individual amplifiers. It has the same thermal resistancy and also a redundant power source capability.

Another way to cut down on the need for repair and maintenance is to increase the gain and allow for a longer distance between actives, said Richard Bay-Ramyon, vice president sales and marketing for ISG Broadband. To that end, the company introduced a new hybrid to its family of return path amplifiers. The ISG56535 offers 35 dB and promises to help overcome line losses sometimes caused by the use of home electronics.

In the great silicon vs. Galium Arsenide (GaAs) debate, the issue of reliability always comes up. California Eastern Laboratories, which just introduced a new GaAs hybrid integrated circuit, the MC-7842, said there no longer should be any concern.

"When tested, it was found to be as rugged as silicon by customers," said Steve Morris, new business development manager for CEL.

His company's new CATV Power Doubler Amplifier offers better distortion, a lower current draw, and higher gains. The gain currently is listed as being between 22 dB and 23.5 dB, but Morris said the company expects the high end will rise to 25 dB.

Aside from reliability, customers also are worried about space. When PCI Technologies decided to add amplifiers to its product line, one of the things it focused on was density, reported Ben Newell, PCI product engineer. Five of its new 860 MHz forward amps can fit into two rack units, while eight 200 MHz reverse amps fit into two units.

Others on the show floor, like John Dunevant of Jones Broadband International, said that clients are looking for amplifiers that are fiber-ready.

"The traditional RF products are going to the wayside. They are becoming harder to move," he said. "People want the newer stuff with higher gain."

Spotlight on digital set-tops

Digital cable is in full swing in many systems across the country, but

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there are still many cable operators who have yet to ramp up. That's why it was no surprise that advanced digital set-tops were front and center on the show floor this year.

Scientific-Atlanta showcased its Explorer set-tops, starting with the Explorer 2000 that is currently in mass deployment. The 2000 allows cable operators to provide fewer truck rolls because the company's Digital Network Control System provides advanced troubleshooting. The 2000 also supports quicker initial boot in the field via a data broadcast that typically requires only five minutes regardless of how many simultaneous installs are taking place. Operationally, the 2000 supports two-way interactive applications like e-mail, Web browsing and video on demand (VOD). It provides a 108 MHz CPU and 16 MB of memory.

The Explorer 3000 provides all the features of the 2000, except that it has a faster bus speed (108 MHz) and more memory (24 MB). The 3000 can also display high-resolution graphics while decoding Moving Picture Experts Group (MPEG) video.

The top of the line Explorer, however, is the 6000, which is 25 percent smaller than the 2000 and cuts down on maintenance time and expense because it doesn't require a separate controller. The 6000 also supports high definition television and provides a dual processor architecture that runs both PowerTV and MicrosoftTV Pak operating systems. In addition, the 6000 supports Data Over Cable Service Interface Specification (DOCSIS) and Digital Audio Visual Council (DAVIC)

"We expect retail to be huge for the modem market."
—Chris Boring, Toshiba America

> Observations from the Show Floor

A bustling show floor revealed that vendors at this year's Expo were kept on their toes. Following is a cross-section of observations from engineers roaming the hall.

"The questions we are getting now about cable-modem technology are much more informed than they were just one year ago."—*Buck Gee, Com21's vp, marketing*

"I am seeing a much more educated industry in terms of interactive TV and middleware solutions."—*Jim Slade, Canal+ Technologies' vp, sales*

"Despite the apparent smaller size of this show, I've been impressed with the caliber of the attendees."—*Joe Zaller, Mindport's director of marketing*

"There is no misunderstanding with CableLabs. There never was a misunderstanding with CableLabs. We're shipping DOCSIS modems today along with our proprietary SCDMA modems. Things are fine."—*John Hamburger, Terayon Communications Systems' group director of corporate communications*

"There is a good amount of distributors and end-users here, and that is good exposure for us. Traffic has been very good."—*J. Mark Burroughs, Bekaert Corp.'s key accounts manager*

The show is "informative and timely in view of our expansion plans in the Philippines. Most of the subjects being discussed are things we are on the verge of launching, such as IP telephony and cable modems, or that we need to learn, such as techniques in return path management."—*Jose Rizalde M. Umipig, Central CATV's vp, research and development, quality assurance, Diliman Quezon City, Philippines*

Congratulations

To the Winners of Lode Data's 3rd Annual World's Greatest Designer Contest

1st Place

Kellie Mehre
Mehre Designs
Austin, TX

Designed 2.00 miles in 17 minutes with an overall effciency of 3.9 actives per mile.

2nd Place

Jason Wllcox
Hal Tec Engineering
Lakewood, CO

3rd Place

Bryan Kennedy
Ervin Cable Construction
Birmingham, AL

4th: Gary Smith
Ervin Cable Construction
Birmingham, AL

5th: Frank Hines
GLA Network Technologies
O'Fallon, MO

6th: Doug Coverdale
Broadband Services
Lapel, IN

7th: Jim Chartre
Cable Constructors
Iron Mountain, MI

8th: Clint Mills
Walker Cable Specialties
Phoenix, AZ

9th: Duane Hansen
Cox Communications
Atlanta, GA

10th: Keith Ballenger
Communications Cad
Cumming, GA

for data applications and provides a front-panel universal serial bus (USB) port to connect to consumer devices. The box also lets users write e-mail or browse the Internet while watching TV.

Motorola lead off in the set-top arena with its DCT2000, which delivers real-time interactive services, such as VOD, e-mail, Web browsing and e-commerce. It offers 64- or 256-QAM operation, providing MPEG 2 digital video and Dolby digital audio. Motorola demonstrated the box, operating with Pioneer, Cablesoft, Wink, Interactive Channel, Concurrent, OpenTV, Excite@Home, Harmony, Liberate, TV Guide and WorldGate services.

Motorola also showcased the DCT5000+, which features 32-bit true color, 3-D graphics and animation. It has a built-in, DOCSIS-compatible modem that supports IP telephony, and the Triple Tuner architecture to allow users to watch TV, chat and surf the Web simultaneously.

Meanwhile, Philips displayed a new integrated DOCSIS 1.1 modem in its advanced digital set-top. The set-top, outfitted with TriMedia processors was shown working with the TiVO service and the MicrosoftTV platform. The box also features MPEG-4 media streaming.

"This is the transformation of the set-top into a home gateway for multimedia broadband services," said Jim Brady, spokesman for Philips. "Our partnerships with technology players and service providers will help further innovation in this category."

Pace Micro Technology showed its prototype 80 Mips set-top that Time Warner has ordered for its Pegasus service. The set-top is specified with Broadcom's BCM 7100 single-chip set, an integrated DAVIC modem and an electronic program guide.

Pace also demonstrated the Di4100 set-top outfitted with a DOCSIS modem by Cisco. The box is powered by Hitachi's super SH3 chip and Broadcom's integrated front-end transmission chip. It runs Liberate software for remote control Web browsing and e-mail.

Logging on to modems

Not surprisingly, cable modems sizzled at Expo. Leading companies showed new DOCSIS-compliant models and universal serial bus (USB) devices. Internal modem cards for the PC and set-top boxes with integrated modems were also on display.

Why all the interest? According to Paul Kagan Associates, the number of cable-modem users is expected to climb from 3.6 million this year to nearly 19 million in 2004. What's more, research from Kinetic Strategies shows that in the first quarter of this year shipments of DOCSIS-based modems outpaced sales of proprietary modems for the first time.

Not only are the new devices on the market plug-and-play, making them ideal for retail stores, but many are shipping with self-installation software. Once online, users will easily be able to tap into a cable operator's portal sites to download all manner of self-provisioning software and other tools.

Here is a brief overview of some of the cable modems we saw on the show floor:

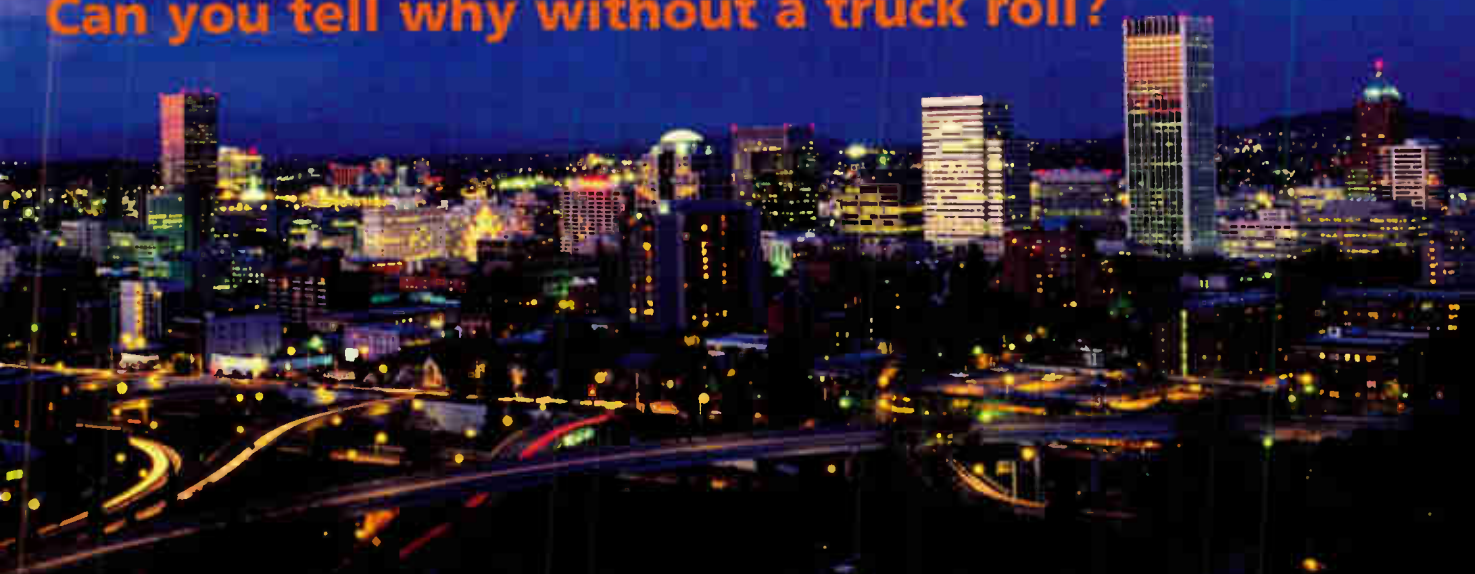
- Toshiba America debuted its latest USB modem, the PCX1100U. With two ports that can be used simultaneously, the PCX can connect two PCs—one via Ethernet, the other via USB—without the need for a network hub. Toshiba is shipping the device with a self-installation CD for the retail market. The company also had on hand a new PCI card-based internal modem.
- Motorola displayed a veritable raft of cable modem products, headlined by the brand new DM100 device. Also on tap were the SB3100 advanced two-way external modem, the SB3100D dual return unit, the

The power just came back on and so did every DOCSIS modem in the city.

Can your provisioning system cope?

It's 3am and another modem on node 14 just went offline for the third time this week.

Can you tell why without a truck roll?



CoreOS contains a custom-built, high performance TFTP server. Designed specifically for the high volume demands of cable modem networks, the server can handle thousands of file requests per minute. Static files can be served from disk or dynamically generated files can be built "on-the-fly". The CoreOS IP Address Manager tracks and assigns IP addresses to subscribers and provisions DHCP servers, making IP address management headaches a thing of the past.

CoreOS brings all data service functions together under one umbrella. It monitors RF levels as well as packet loss and provides real-time modem level probes. Management documents, like the Out-of-Spec Modem Report, detail modem level variances by street and node. Capturing all aspects of cable modem service delivery, CoreOS allows technicians to troubleshoot problems before they ever roll a truck.

Core Networks Inc.
36 Topple Drive, Dartmouth
Nova Scotia, Canada B3B 1L6
Tel: (902) 481 5750
www.CoreNetworks.com

From the headend to customer premises, CoreOS is a total broadband provisioning solution, offering you greater reliability and flexibility with these features and benefits:

Features

- DOCSIS cable modem activation and DOCSIS self-activation
- "On-the-fly" DOCSIS configuration file generation
- High performance TFTP server
- IP Address Management and DHCP server provisioning
- RF Monitoring

Benefits

- High volume automated modem activation
- Easily supports multiple qualities of service (QoS) under DOCSIS
- Improved management tools such as graphical and statistical reporting
- Web-based interface for rapid deployment and low cost training
- Improves measurement and management
- Decreases install and call center time

CoreOS Broadband Provisioning System

SB4100 next-generation two-way external modem and the proprietary CyberSURFR device. All of the devices are ready for retail distribution.

- Scientific-Atlanta was out in force touting its new DOCSIS-compliant modem, developed with the same chip technology that's in the new Explorer 6000 set-top. Charter Communications already has lined up as one of the first customers for the new modem.
- Terayon also had a strong presence at the show with the TeraPro S-CDMA-based cable modem and the TeraJet DOCSIS modem. The company demonstrated how both devices can be provisioned using software from Portal and Imperative.

If you were looking for a set-top with an integrated modem, as mentioned earlier, Pace, Philips, and Motorola all had models on hand that sported both modem and set-top functions.

Operators seek IP telephony solutions

Vendors involved in Internet protocol (IP) telephony found themselves swamped at Expo. An informal *CT* survey of cable operators found the application near the top of their wish lists.

A typical example was John Zepnick, the engineering manager for Time Warner Cable's Green Bay division. Zepnick said IP telephony and video on demand applications are in a race to see which one will launch first on his system of 150,000 active subs (about 15,000 of which have converted to digital since its February launch). Zepnick said IP telephony would be the one to launch first.

Zepnick was one of many cable operators who wandered the halls of the Las Vegas Convention Center looking closely at the timetable for an IP telephony launch. "We're looking for the industry and vendor comfort level as to its deployment," he said. "How close are they? I am hearing that it is happening, but it is not widespread yet."

Vendors tout Telephony wares

Zepnick had plenty to look at, and many vendors displayed telephony products. Some offered components of a residential end-to-end, carrier-grade IP telephony solution. A few vendors came close to providing it all.

ADC Telecommunications provides the subscriber connection to IP telephony, though an operator would have to look to other vendors for the bulk of a carrier-grade IP telephony platform. ADC demonstrated its IP Integrated Service Unit (IP ISU)—a network interface unit (NIU) that supports four telephone lines and one high-speed data line, with several hooks to detailed element management.

The Arris-Interactive/Antec/Nortel Networks team claimed that deploying a system based on their products would enable "five nines of reliability."

ANTEC exhibited its Arris Cornerstone Super Access System, which includes the PacketCable-based Cornerstone Packet Port network NIU, the Converged Host Terminal, and the Cornerstone IP Access System with the Cornerstone CMTS 1000 Modular Redundant Chassis and Nortel Accelar router. Nortel Networks had the remainder of the system, with its Succession Call Server for IP networks, and its DMS switch for interim circuit-switched solutions.

Broadband Access Systems showcased its CUDA 12000 CableLabs-qualified, carrier-class IP access switch, which includes a high reliability cable-modem termination system (CMTS) that supports DOCSIS wire-

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rate forwarding on a maximum configured chassis with 11 CMTS cards.

Cisco Systems showcased its uBR7246 CMTS that uses a proprietary protocol to achieve one-to-one backup without lost calls. At customer sites, Cisco also offers the uBR924 router that includes two IP telephony ports, as well as high-speed data interfaces. On the network side, Cisco offers the 3640 router with a voice card and IP gateway. IP telephony features are provided by Telcordia call-agent software running on a separate platform.

Com21 announced its IP NIU called the DOXgate BTI. The unit provides four voice lines, a high-speed Ethernet interface, and Home Phoneline Networking Alliance capability. Availability is expected by early 2001. The company also offers a DOCSIS 1.1-compliant CMTS, without a backup architecture.

Lucent Technologies was joined by Motorola under their CableConnect alliance. Motorola offered an IP network interface called the CentriQ 1000, with four telephony lines and one high-speed data line. Lucent provided the telephony features via its a PathStar Access Server. Both offer GR-303 gateways to a digital telephony switch for migrating to IP telephony from a circuit-switched environment.

River Delta demonstrated its BSR 64000, a wire-speed router for DOCSIS environments with 1:1 processor redundancy, and 1:N DOCSIS module redundancy. The product is an integrated platform for routing, CMTS, and switching, moving three million packets per second for each network interface module, and over 42 million packets per second for each chassis.

Tellabs announced the CABLESPAN system's new DOCSIS 1.1 and Packet Cable-compliant NIU called the Remote Service Unit-Packet (RSU-P), along with a new host digital terminal modem (MRF-P). The products allow dual mode voice-over-IP and data services to coexist with circuit-switched telephony, CMTSs, and cable modems.

The bottom line: pieces of end-to-end, carrier-grade IP telephony are appearing, but it's still the operator's job to decide the best way to deliver the service.

More from the floor

For a look at other products making their debut at Cable-Tec Expo, check out *CT*'s Marketplace on page 130. CT

Arthur Cole, Monta Monaco Hernon, John P. Ourand, and Justin Junkus contributed to this report.

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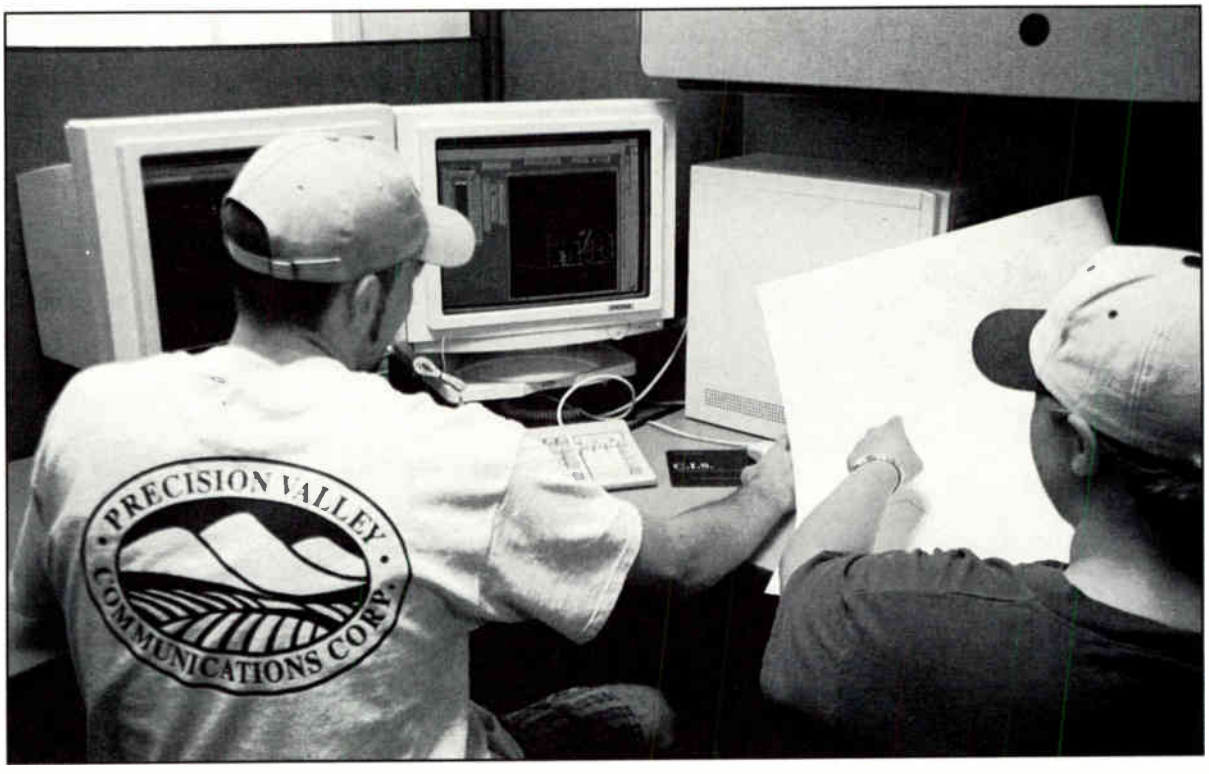

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Readers Pick Favorite Expo Products

PDI, Alpha, Intera &

Communications Technology's Readers' Choice Awards 2000

Winner

CT's editors launched the Readers' Choice awards to honor new products that significantly benefit the broadband telecommunications industry. We accepted nominations in four product categories: customer premise, network diagnosis, distribution/line and transmission, and headend.

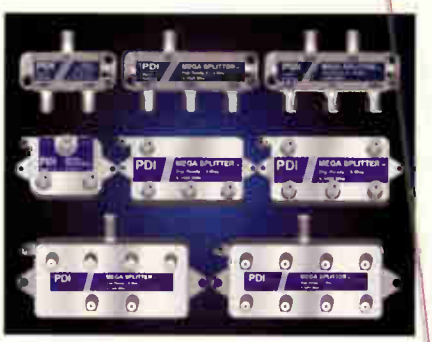
A panel of engineers then narrowed the nominations down to 13 finalists. But it was you, our readers, who made the final choices at this year's Cable-Tec Expo in Las Vegas. Let's meet the winners.

PDI's Mega Splitter Innovates

Innovative design and attractive specifications made Passive Devices, Inc.'s Mega Splitter S1 a leading contender in the Readers' Choice competition.

Several judges who selected PDI's Mega Splitter as one of three finalists in the customer premise category highlighted its intermodulation reduction technology. "Any measures that can be taken to reduce ... intermod gets high marks," wrote one judge. "This splitter appears to offer ... improved ferrites for intermod reduction," wrote another.

PDI credits the low intermodulation distortion and high isolation between ports to its ferrite design and quality control. "At the factory level, they cherry-pick only the best ferrites to ensure a 40 dB isolation spec from 15 to 42 MHz," said Len Edelman, vice president of PDI's Broadband Division.



PDI's Mega Splitter S1

Other key features are Mega Splitter's four-prong, 360-degree, gold-tipped insert and its 6 KV surge protection. The surge protection helps preserve splitter parameters and maintain a low bit error rate for digital applications. The Mega Splitter also sports a unique cantilever mount.

"A typical splitter sits flush against the wall," said Edelman. "Our splitter sits out about an eighth of an inch. So there's a little air pocket between the wall and the back of the unit, which helps prevent rust or wood rot and allows for better handling."

ctive Enterprises Motorola Win

By Jonathan Tombes, Deployment Editor

Products from Passive Devices, Inc., Alpha Technologies, Interactive Enterprises and Motorola claimed *Communications Technology's* inaugural Readers' Choice awards.

Mounting and ground screws are all stainless steel and the housing is glass-beaded and highly resistant to corrosion. These and other features reflect the close attention of PDI's Director of Engineering Mel Gray, among others.

PDI's CEO Don Edelman gives credit to people both "within the company and at the factory level."

Real solutions from Alpha

Alpha Technologies not only resuscitates downed networks but is reviving that over-used term of art: "solution." Several judges who nominated the Alpha Powernode as a finalist in the distribution/line and transmission category zeroed in on that.

"Power loss is one of the key reasons for system downtime," wrote one judge. "This power source should go a long way toward solving that problem."

System downtime is a problem that always needs solving, but as delivery networks become increasingly advanced, the solutions need to be quicker, stronger, and more efficient.

"Preparing the network for greater than 99.99 percent transmission availability requires affordable, extended standby powering," wrote another judge. The Powernode's high-density rating answers the affordability objection; and the "smart start" delay and status monitoring capability help extend its powers.

A higher density rating means more output from a smaller package.

The "smart start" delayed-starting circuitry allows the AlphaCell extended-life batteries to provide backup power for short outages, and the integrated 5.0 KW natural gas or propane generator to be brought on for extended outages.

Alpha's standing as a solutions vender has a two-fold basis: the company listens, and it invests.

"The higher output rating and a larger generator system are things that the industry has really keyed into, and it's really been a response to customer need," said Eric Wentz, Alpha vice president of marketing. Then the company puts its money where its ears are.

"Alpha plows a ton of money back into a very aggressive R&D program every year," said Wentz. "The company is honored to have the industry recognize its ongoing and aggressive commitment to development of new powering technologies."

Alpha Technologies' Powernode

Interactive Enterprise Connects

New kid on the block, Interactive Enterprise, nabbed the prize in the network diagnosis category for its Conexon mediation and provisioning platform.

As one judge noted: "Network provisioning is a new skill for cable." Fitting, then, that this new skill should have a new champion.

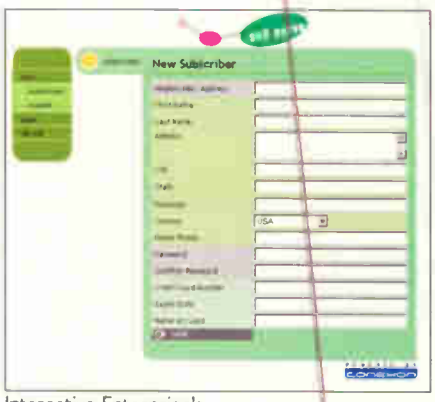
Conexon is a software platform that allows cable operators to quickly deploy high-speed data, voice over Internet protocol, and interactive and transactional services across multiple platforms and devices. The system manages interactive services by providing interfaces to DOCSIS and proprietary modems, set-top boxes, network management systems, operational support systems, and content services. Plus, it enables autoprovisioning and customer access to accounts via a Web-based interface.

"The network as far as we're concerned is not an issue for us," said Tom Higgins, chief of the Irish start-up. "We deal with complexity. We deal with these complex devices, accessing complex services, and we deal with the complex integration."

Higgins got the news of *CT*'s award while in Berlin to inaugurate a partnership with Telint Global, a London-based provider of broadband services for small- to medium-sized enterprises. Other partners in this planned rollout to 1 million subscribers are Cisco Systems Europe, Deutsche Telekom AG, and IBM Deutschland.

Next to those European endorsements, how did *CT*'s Reader's Choice award stack up? "We're absolutely delighted," said Higgins. "The timing of this is perfect."

On this side of the Atlantic, Interactive Enterprises has cut deals or allied itself with C-COR.net, Cable Atlantic, River Delta Networks and Motorola.



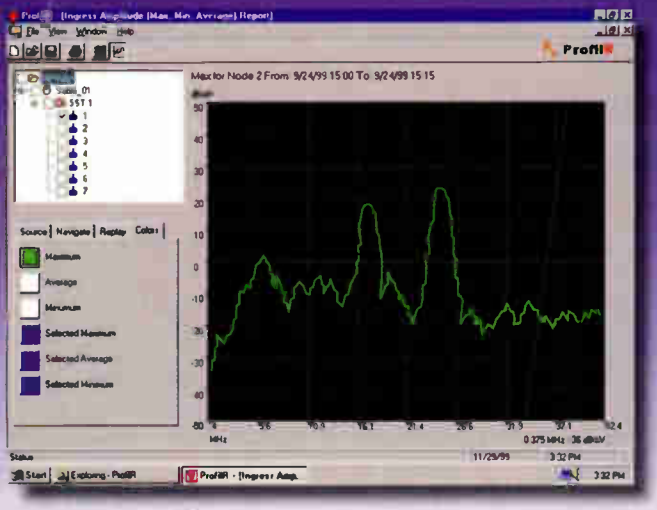
Interactive Enterprise's Conexon provisioning platform

Motorola wins at headend

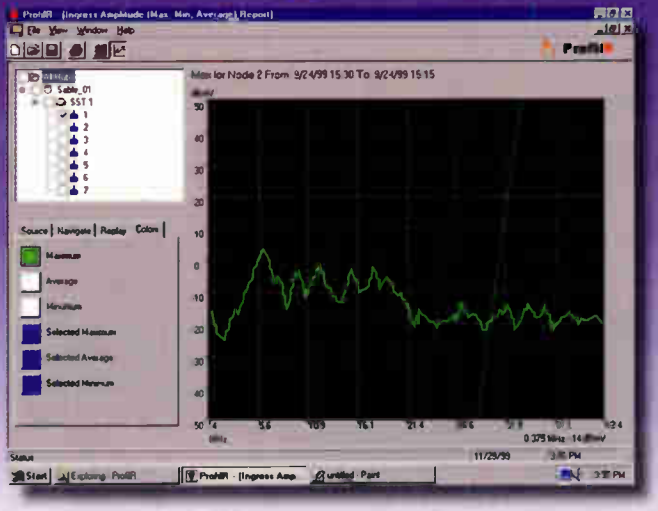
Engineers designing Motorola's CAS-2000 cable modem termination system (CMTS) considered the market and their present lineup, and came up with something new.

Opting against full redundancy and centralized processing, they instead

Crisis. Management.



Without TraffiControl™, ingress events remain hidden under return traffic



TraffiControl™ measures and plots ingress spectra of bands fully occupied by return traffic

New *TraffiControl™* lets you see the ingress inside your system's return traffic

TraffiControl™ Now Available On Trilithic's Guardian™ 9580 SST Return Path Analyzer

No doubt about it: where the return path is concerned, ingress is a big problem. Left unchecked, ingress outbreaks can prevent your system from delivering the Internet and other premium services your subscribers have come to expect. It's tough enough now to catch ingress outbreaks and fix them before the phone starts ringing. It'll be even tougher as new services fill your return spectrum, because the majority of ingress will be hidden by the increased return "traffic."

YOU CAN'T BEAT THE SYSTEM

How will you detect ingress when it's hiding in your occupied bandwidths? Fortunately Trilithic, the leader in digital return path maintenance technology, has engineered a solution – a solution that will quite literally change the way you look at ingress. It's called *TraffiControl™* and it's a new feature of the Trilithic Guardian 9580 SST Return Path Analyzer.

TraffiControl is an advanced Digital Signal Processing (DSP) technology that identifies and removes all the legitimate signals from your scanned return spectrum. What remains is the once elusive ingress spectrum of your entire return band, which the system analyzes against user-set ingress limits. The best part is that *TraffiControl* can be programmed to work automatically. Then, when ingress occurs, the system will tell you about it, giving you time to respond before it causes problems.

TraffiControl is the newest addition to the Trilithic Guardian System, the only fully-integrated, fully-digital family of return path maintenance products on the market. With the addition of *TraffiControl*, the Guardian System takes you from the subscriber, through the distribution system, all the way to the headend for complete ingress detection and, most importantly, resolution.

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MOTOROLA

chose an N + 1 design and a distributed layout, with central processing units (CPUs) in each of its DCM-2000 DOCSIS modules.

"We looked at our current product and said 'This is fine for a data system,'" explained Kevin Keefe, a Motorola director of marketing and business development. "But when looking at trying to provide something that can be used for primary line services in the telephony business, we knew we had to do something else, and that's what drove us to the CAS design."

The design impressed many. "Excellent flexibility and much-needed N + 1 redundancy for maximizing life-line service availability," wrote one judge. "Significant improvement," wrote another. "Prior models did not have hot-swappable modules, which are essential for voice over IP," wrote a third.

The N + 1 design supports the elusive 99.999 percent availability for telephony, and its modular design—with CPU's for each CMTS blade—generates high throughput and scalability. "It can fit really any system architecture," said Keefe.

Motorola's CAS-2000

"Having been selected by the *CT* readers, and originally by the very distinguished members that you had on your panel, was very rewarding for us here," Keefe added.

Reader's Choice panel

CT thanks the panel of engineers who reviewed the nominations for their technological innovation, feature set, adherence to industry standards, and contribution to broadband telecom's growth and advancement:

- **Alex Best**: executive vice president of engineering, Cox Communications
- **Walter Ciciora**: executive vice president, EnCamera Sciences
- **Paul Gemme**: vice president of plant engineering, Time Warner Cable
- **Nick Hamilton-Piercy**: vice president and chief technology officer, Rogers Cable
- **Dave Large**: principal, Media Connections Group
- **Jim Luddington**: president, INT-2-com
- **Archer Taylor**: co-founder, The Strategis Group

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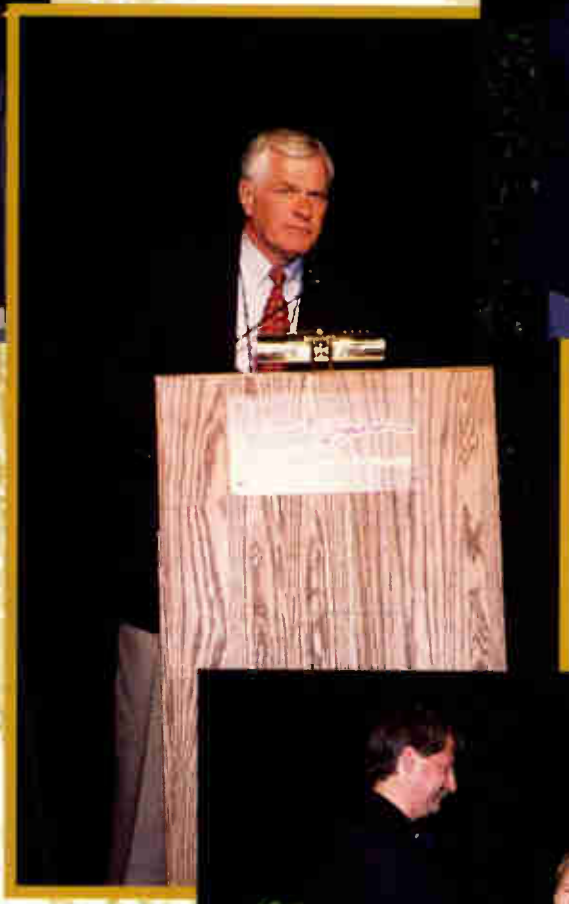
SCTE Honors

Photography by Vince Cowan



Top Left: SCTE Membership Director Melissa Hicks presents the Chapter of the Year award to Tom Garcia, president of the New England Chapter, who accepted on behalf of his chapter's members.
Top right: HBO's Les Read serves as Master of Ceremonies at the Awards Luncheon.
Center right: Adelphia Chairman and CEO John Rigas accepts the 2000 Service in Technology Award.
Center: Cox Communications' Alex Best accepts the Chairman's Award for his company's commitment to the SCTE.
Bottom right: SCTE Director of Membership Melissa Hicks presents Region 12 Director Bob Foote with the Leadership Circle Award for his accomplishments as recent past president of the New England Chapter.

Dedicated Members; Outstanding Achievers

By Monta Monaco Hernon,
Contributing Editor

The SCTE Annual Awards Luncheon may not be as flashy as the Oscars—no spiffy song and dance numbers, no borrowed $5 million necklaces, no stolen statuettes—but it does the trick, allowing an industry to recognize outstanding work and dedication to cable engineering.

Member of the Year

The Society acknowledges leadership, technical prowess and dedication, but also singles out those who tangibly forward the organization's goals such as certification and training. In other words, it looks for individuals like Mark Millet, a broadband engineer from Cisco Systems who was named SCTE Member of the Year.

"This man's efforts have significantly contributed to the success of the Society and the furtherance of its mission of training, certification and standards," said Les Read, HBO's vice president of special programs.

Given that the Internet and high-speed data are on the top of the priority lists of many SCTE members, it is only fitting that Millet, a Data Over Cable Service Interface Specification (DOCSIS) expert, received the award. He was not recognized for his knowledge, per se, but for his willingness to share it with others. According to Read, Millet always is ready to help other members and colleagues understand the spec and its ramifications, and find the training they need.

Chapter of the Year

On a group level, the New England chapter snared the Chapter-of-the-Year designation for the third year in a row. Its efforts at promoting membership and certification propelled it to the forefront of the industry. Tom Garcia, current president, accepted the award.

"The New England Chapter serves over 850 local members from six states," noted Read. "It promotes SCTE to the cable operators throughout New England and can boast over 100 attendees at each technical session." The chapter also hosts an annual Vendor's Day, which attracted 66 vendors and 200 attendees this year, and it holds certification testing at least every other month.

Leadership Circle

One reason the New England Chapter is doing so well is due to the efforts of Bob Foote, who served as president from 1996 through 1999. Foote, who is a regional vice president for Antec, won this year's Leadership Circle Award. Foote organized a variety of training talks that appealed to a wide span of members, and developed a strong board of directors comprised of system personnel, contractors, and vendors.

Personal Achievement Award

SCTE also recognized Keith Hayes, director for MediaOne in Atlanta, for personal achievement. Hayes, who won SCTE Member of the Year in 1998, was nominated for the Personal Achievement Award for developing a tool called the Atlanta Digital TV Distance and Beaming Calculator to help technicians install multiple high-power microwave

transmitters in BellSouth Entertainment's wireless cable digital TV system.

Field Operations Award

Sponsored by Telecrafter Products, the Field Operations Award actually comes with cash prizes for the most innovative solutions. This year's winner, Brian Frazier of Cox Communications, received $500 and a free trip to Cable-Tec Expo. Frazier developed a prototype transmitter that can test an existing direct-buried underground coax drop for telephony readiness in cases where a new twisted pair/coax drop cannot be installed. The device also helps operators determine how many drops they need to budget for.

Alan Bergman of Time Warner Cable in Desert Cities, Calif., took second place and $300 for designing a drop ring to secure an overhead messenger drop. Bill Michitsch, of B&K Communications in Neenah, Wisc., captured third prize and $200 for the amplifier probe he developed to measure an amplifier's draw on cables.

Service in Technology Award

Communications Technology magazine, the official trade journal of SCTE, presented Adelphia Communications with the Service in Technology Award. On hand to receive the award were John Rigas, Adelphia's chairman and chief executive officer; Mike Rigas, executive vice president; and Dan Liberatore, vice president of engineering.

Adelphia won the award for successfully integrating its competitive local exchange carrier operations with its traditional cable business; for its aggressive launch of new services including digital cable, telephony, and high-speed data for both residential and commercial customers; and for its ambitious upgrade and nationwide backbone construction efforts. In recognition of Adelphia's success, *Communications Technology* donated $2,500 in Adelphia's name to the SCTE scholarship fund.

Shapp Scholarship

For the past five years, General Instruments (now Motorola) and SCTE, have awarded a four-year, $20,000 scholarship to a deserving graduating senior of an SCTE member. This year's winner is Debra Gemme, daughter of Judy and Paul Gemme of Time Warner Cable.

Debra graduated from Smoky Hill High School with a 4.0 grade point average and numerous academic and athletic honors. She will be attending Princeton University to pursue a degree in engineering.

Chairman's Award

This year SCTE's Chairman Jim Kuhns

Below: Peter Mangone (l), president of Telecrafter Products, presents Brian Frazier (r), Cox Communications, with the Field Operations Award.

Above: Adelphia wins Service in Technology Award. (l-r) Dan Liberatore, vice president of engineering; Mike Rigas, executive vice president; *CT* Senior Publisher and Founder Paul Levine; John Rigas, chairman and chief executive officer, Adelphia.

Above: Terayon's Jim Kuhns is acknowledged for his work as 1999 SCTE Chairman. Kuhns was elected for a second term at Expo.

presented Cox Communications with the Chairman's Award. Cox received the award for its outstanding support of the SCTE and commitment to deploying advanced, feature-rich broadband networks.

"This company's leadership quality extends well into our Society where its engineers and technicians serve as leaders in many of our chapters," said Kuhns. "Two of its engineers are currently serving on the national board of directors and one has even served as chairman of the society."

Safety Awards

Each year, SCTE also honors those operators with outstanding safety records as well as an individual who has made significant contributions to fostering a safe work environment in the industry.

This year, receiving the Gold Safety Award for maintaining Occupational Safety and Health Administration (OSHA) reportable incident levels at or below 50 percent of the industry's national rate were: 21st Century Telecom; Comcast Cable of Delmarva; Comcast Cable of lower Merion, Pa.; MUCIP, Inc.; and Time Warner Cable.

Silver Safety Award winners for OSHA incidence rates at or less than 25 percent were: Comcast Cable of Alexandria, Va.; Comcast Cable of Chesapeake Bay, Md.; Comcast Cable of Delmarva; and Comcast Cable of Prince William County, Va.

Ray Lehr of TCI in Englewood, Colo., won the 2000 Outstanding Safety Efforts award. Ray is the former chairman of SCTE's safety subcommittee and has worked tirelessly to promote good work practices and safety training.

New Hall of Fame Members

SCTE inducted two new members into its Hall of Fame this year. Dan Pike, a 30-year cable veteran and currently senior vice president, science and technology for Prime Cable, and Bill Riker, past executive vice and president of SCTE and current chief technical officer a the National Cable Television Center and Museum, were this year's honorees.

One of SCTE's highest tributes, "The Hall of Fame is reserved for SCTE members who have made extraordinary contributions to the society and industry over the course of many years," said Read. "The Hall of Fame recipients are truly the leaders who have ensured the continued vitality of SCTE through the decades." Individuals need at least 12 years of active SCTE membership and 20 years of industry experience to be eligible.

Pike has been a member of SCTE since 1975, and in the cable industry for 30 years. He's involved in training and has written numerous papers. He sits on CableLabs board of directors, and in 1991 he received the National Cable Television Association's Vanguard Award for Science and Technology.

Under the leadership of Bill Riker, the SCTE saw stellar growth and a revitalized mission. Membership increased from 2,500 to over 15,000. The Society received accreditation from the American National Standards Institute as a standards-setting body. Riker also has won numerous industry awards, including: NCTA's Vanguard Award for Science and Technology, *Communications Technology*'s Service in Technology Award, induction into the Cable TV Pioneers, and honorary fellow of the UK SCTE.

If you see any of this year's honorees at your next chapter meeting or technical session, be sure and give them a round of applause. CT

Above: Debra Gemme accepts the 2000 Milt Shapp Scholarship from Joshua Butters, the 1996 recipient.

Above: Cisco Systems Mark Millet (l) accepts the 2000 Member of the Year Award from 1999 winner Antonio Huerta (r).

Left: Bill Riker (l), former president of the SCTE, is named to the SCTE Hall of Fame by charter member Bill Karnes (center) and current SCTE President John Clark (r).

International Growing at

Vendors look, learn, and share

By Natalia Feduschak, Monta Monaco Herron, and John P. Durand

Presence Expo

It was hard not to notice the growing international flavor of this year's Expo. In additional to the *International Cable*-sponsored preconference sessions reviewing developments in the cable industry in both Europe and Latin America, a bevy of international broadband executives were found on and around the show floor.

On one hand, companies such as Pace and Canal+ Technologies brought their wares to Las Vegas, hoping to sell them in the U.S. market. Canal+'s MediaHighway system drew particular interest from several attendees. Several more were disappointed that Canal+ Technologies did not show at its scheduled technical training seminar.

On the other hand, international operators were walking the show floor, looking to see what kind of advanced services are being offered in the U.S. market. One such operator, Grupo Clarin (Argentina) Analyst Hernan Donnari, was wide-eyed in looking at the new technologies available on the show floor.

Donnari planned to spend a lot of time at the booths of Power TV, Open TV, Web TV and Canal+ Technologies (for its Media Highway). "I am looking at these companies not because we want to launch now, but to see how they are developed. Maybe in a couple of years, we will have enough systems in place to launch such systems."

As for now, Donnari was looking and learning, trying to figure out which interactive services are working ... and why.

Realistically, Grupo Clarin will not be able to launch such services for at least three years, Donnari said. The slow pace of development in Argentina does not frustrate Donnari, who says that he expects interactive development to mirror that of the United States.

"There are two faces to digital development in the United States," he said. "The first face is the one where consumers want digital TV only to improve the way of watching television. It is only about more channels. The second face is the more lucrative

face. That is where consumers are more educated to digital TV and what it offers. As a result, they will be prepared to receive all kinds of digital services, including interactive services."

Digital makes strong European showing

While vendors came from all parts of the globe to learn about American technology, they also shared experiences from their homelands. In the international arena, Europe has made significant strides in cable, particularly in deployment of digital. And although cable is still relatively new, the United Kingdom has been pushing the drive.

"The UK has the most successful and aggressive digital satellite launch in the world," said Graham Williams, vice president of engineering for Pace Micro Technology Americas. "Because of the heavy competition, companies are forced to be aggressive. People are giving boxes away just to get subscribers."

Speaking at an *International Cable*-sponsored preconference tutorial, "Opportunities for Digital and Interactive Services Deployment in Europe," Jos Vancoppernolle, general manager of Barco Communications Systems said challenges facing European cable operators are similar to those facing U.S. companies—training, lack of manpower and customer service.

"The challenge is in the field," and companies are having to provide special training for installers, he said. The continent also is suffering from a lack of engineers. At one time all his company needed was three engineers to come up with a set-top box in six months, while now it needs 50 engineers a year, noted Graham.

Unlike in the United States, Europe faces a number of competing standards, such as EuroDOCSIS and DVB. Still, while both speakers said one standard would be less complicated, they also saw several standards as a benefit to the European consumer. "I see this more as a silicon issue," said Graham.

Noted Vancoppernolle: "Using open standards, we see customers like that." The challenges in going digital mean that companies have to diversify. "Cable companies used to make their own systems, assembled their own headends in what was needed in digital," said Vancoppernolle. "That's not possible anymore."

Competition between analog and digital also varies on the continent. Belgium, for instance, has only recently begun to make a push into digital because 95 percent of the population has cable, said Vancoppernolle.

European consumers, however, are becoming more savvy, like their American counterparts. Video-on-demand (VOD) is expected to take off next year, as is greater use of the Internet. E-commerce, however, is not yet expected to have the same impact in Europe as in the United States.

The next generation of products in Europe will be based on Internet protocol (IP), said Vancoppernolle. Headends will become little hubs for deploying new services and digital subscriber lines will be competing for cable.

Speakers relayed a warning to Americans who want to break into the European market, however. That is the continent is made up of many markets, not one country.

"Europe isn't one country, it is several countries," said Vancoppernolle. "You have to understand the local culture. If you think that you'll open an office in Munich and manage all of Europe, forget about it."

Customer service key In Latin America

Latin American countries vary in infrastructure and penetration, but the top challenge for hardware manufacturers trying to enter any of these countries is making sure they can provide adequate customer service and quick repair, according to Pablo Kagloglu, director of systems engineering TNS, Latin America, for Motorola. He spoke at the second preconference tutorial on the region.

Kagloglu advised that companies should have as many points of presence as possible in an effort to replicate the model that exists in the United States.

"[Otherwise] in a country like Brazil, if something breaks it could take weeks to repair," he explained. It also is important to understand that the business model for a Latin American cable operator is different from a multiple system operator in the United States, Kagloglu added. >

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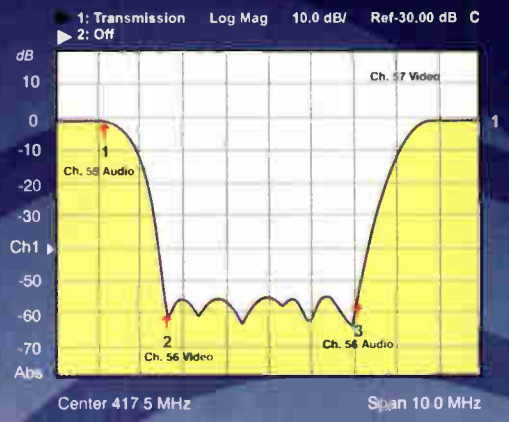

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"Manufacturers are used to dealing with operators that have very large pockets...This is not the mentality in Latin America. People are more driven by standards and are not prepared to pay $20 million for you to develop a solution specifically for them," he said.

The business plans of these operators also have to take into account the scope and depth of any new service roll out, weighing how large of an audience will be able to pay for the new technology.

"They have a sparser fishing area and have to use their nets where most of the fish are. Otherwise they are not going to make enough to get their investment back," Kagloglu said.

Don't forget training

In addition, he noted that operators in these countries might not be up to speed on all of the technical nuances, so hardware manufacturers can't just sell them a gadget, but have to be prepared to act as consultants as well. "You have to talk more about the whole system so the concept of what the technician brings to the table has [changed]," he said.

Latin America could benefit from more training sessions, even more SCTE involvement and perhaps having a regional chapter of the society located there, he added.

Kagloglu explained that, for those wanting to enter one of the Latin American countries, the key is in building relationships. Operators have to be confident of reliability, and so manufacturers have to "belly up to the bar," demonstrating a track record of success. Kagloglu said he believes subscriber-based products have the most short-term growth potential in terms of sales and that the Latin American market will follow the United States down the road to convergence. In other words, the industry eventually will see telcos merging with cable operators.

"They will not be able to stand alone because of the cost of the infrastructure," Kagloglu said, adding that when the time comes, vendors will be able to facilitate the process.

On the technology side, Kagloglu pointed out that operators are having to deal with severe grounding issues which can be problematic for any type of two-way service, like telephony or high-speed access via cable modems. Manufacturers need to take this into account, Kagloglu said.

As for the individual countries, he noted that Chile has the healthiest economy, while Brazil might have the largest potential in terms of access. Colombia has been one of the most politically tumultuous. As a result, the operators there are struggling to legitimize their businesses after spending years in an environment where everything had to be done under the table. And, Kagloglu said, they may like the full-service solutions presented to them, but have no cash. CT

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Expo Workshops

An Eye on the Future

By the *CT* Editorial Staff

Photography by Vince Cowan

Ready for IP telephony?

Are cable companies ready to compete with telephone companies in IP telephony?

"The technology is ready," Louis Rubin, director of solutions engineering for New Jersey-based Telcordia Technologies, said during the "Telephony Ready" workshop. "The real issue is are we ready to compete. The next year will tell us whether the competition will end with cable companies being part of the large provider network for telephony services or not."

Two of the principle issues that will determine how successful cable operators will be in the telephony race are

Once they had their fill of the sprawling showroom, droves of professionals headed for makeshift classrooms to listen to, and participate in, engaging lectures about the future of the broadband telecommunications industry. Following is a sampling of what went on at these workshops.

the Quality of Service (QoS) they provide and the cost of those services to the consumer.

Phone companies will find ways to lower prices as competition heats up, said Rubin. The question is how long they will be able to sustain a price war as cable companies are able to offer increased broadband services. Other issues that will play a role are billing, scalability, and the ability to manage millions of users.

Rubin said he would like to see cable operators offer a wider variety of services than they do currently, because many offerings parallel those provided by phone companies.

No matter what the challenges, cable operators should not wait before signing up subscribers if they want to be successful in the IP race, said Thomas C. Ruvarac, group manager, marketing, broadband media group for Tellabs Operations.

"The riskiest strategy is to wait," he said.

Certainly, operators will have to decide whether they want to use circuit-switched telephony or packet-switched telephony as they deploy, or plan to launch, voice services.

A number of factors must be evaluated as companies deploy cable telephony equipment, said Ruvarac. Those include ensuring that service is equal to or better than what is provided by the local phone company, reliability and QoS must be better, and ongoing operations and maintenance expenses of providing the service must be minimized.

Testing tools: weapons against DSL

While cable operators want to compete with telcos for telephony, those same telcos are going after high-speed data consumers with digital subscriber lines (DSL). One of DSL providers favorite things to hurl against cable-modem technology is latency. Fairly simple testing can help nip this problem in the bud, said Rick Jaworski, vice president of marketing and sales for Hukk Engineering.

Speaking at the "Trouble Shooting and Testing DOCSIS Cable Modem Installations" workshop, Jaworski said a network could appear to be working fine when really it is not. Indeed, it might be experiencing significant data resending which might be unnoticeable if there were only small numbers of modems on the network.

"Once loading increases, at some point the number of resends gets out of control and the system grinds to a halt," he said. "This all builds in latency problems, even on the upstream."

For the forward path, companies need to test the modulation error ratio, which must be better than 27 dB on 64 QAM and 31 dB on 256 QAM. Further, they need to make sure there are no post forward error connection (FEC) errors and low, or preferably, no pre-FEC errors as well, Jaworski said.

Among other things, the return path calls for ingress testing, Jaworski said, noting that a spectrum analyzer with a zero span can be used to accomplish this.

A zero span feature will focus on one frequency so that amplitude variations over time are displayed, he added, allowing the technician to see "extremely fast transients."

Dan Kahn, solution architect for Agilent Technologies, also advocated zero span. A company will need to know ingress when it is analyzing a future channel due to the requirements of certain advanced services, he said. >

Engineers brushed up on the latest in video-on-demand, telephony, network operations centers, testing tools and headend design at Expo's workshops.

Transport at the headend, hub

The freeway analogy that Jim Kuhns used to explain digital ad splicing in the "Headend/Hub Transport and Design" workshop fits broader topics. Kuhns, a manager at Terayon Communication Systems and SCTE's chairman, compared ad splicing to merging traffic, but the freeway motif also works for headend and multihub network design.

With the latest splicing techniques, though, come new problems.

"By far the most common problem that I have encountered in digital-to-digital ad splicing is people over-exceed their bandwidth," Kuhns said. The situation arises, he explained, when services running at variable bit rate crowd out those at constant bit rate.

A second, relatively low-tech but critical issue is cables that don't fit into rack equipment. Kuhns also raised the issue of powering and synchronization.

ADC Engineering Manager Jeff Brown said operators offering data services can break the network into smaller segments, add cable-modem termination system (CMTS) interfaces and routers in the headend, and reconfigure radio frequency combining, splitting and coupling to ensure top performance and speed.

Brown cited that standard variables for universal broadband router formulas—including the number of homes passed, node size, downstream and upstream data rates, percentage of users that are active at any one time, maximum downstream and upstream activity per user, and ports per chassis—can help you decide when to reconfigure your network.

Consolidation among cable systems raises the issue of high-powered headend interconnection in the metropolitan space. Joe Thomas, network consultant for Chromatis Networks, gave a high-octane presentation that tore through the protocols, managing and provisioning issues and scaling technologies that he considers critical for cable engineers.

"The reality out there is that the competitive local exchange carriers out there are having to buy fiber, build fiber or lease fiber," said Thomas. "Cable companies have all the fiber in the air that they need." They just need to understand their technological options, he said.

Browsers at the NOC

At the network operations center (NOC), the more intrusive the technology, the better. IP enables just the kind of monitoring and data collection that NOCs require.

"Once we are interconnected via the Internet, we have the capability of going right down into that cable modem, inside that house," said Rod Bennett, director of High Speed Access Corp.'s knowledge center, at the "Network Operations Center" workshop.

Bennett and Al Dawkins, senior RF network engineer of HSA's knowledge center, described numerous network management systems the company currently uses in its provision of data services to cable operators.

What's Up and Multi-Router Traffic Grapher (MRTG) were two Internet-enabled tools that these engineers highlighted. Other products reviewed were Wavetek Wandel Golterman's Path Trak, and Cabletron Spectrum.

"The whole purpose of this network operations center is to be proactive, independent of the types of software that are used out there in the system," said Dawkins. "Our ultimate goal is to be so proactive that we have nothing to do at the NOC," he added.

Karim Sidi, of ADC Telecommunications, agreed the Internet solves a problem facing cable and telco operators, namely: the need to monitor inside and outside plant and multinetwork products and to reduce status monitoring hardware required by these multiple efforts.

The VOD verdict

Video-on-demand (VOD) has broken through its final hurdle. With costs per stream dropping to about $500, cable operators will be able to make money on their VOD systems soon, according to each of the panelists at the "Video-on-Demand" workshop.

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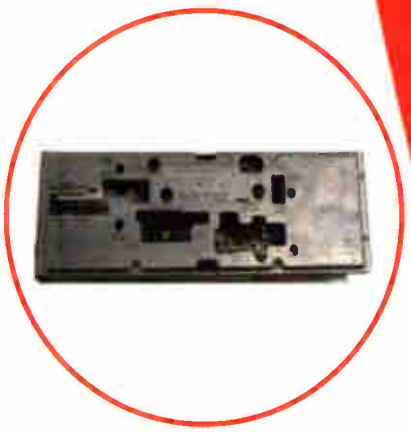

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said Dr. William Wall, Scientific-Atlanta's technical director for subscriber networks. "We really believe that extreme VOD is on the way."

The good news is that current HFC networks, as they are structured today, can support this application.

"VOD, in many ways, looks like a telephone call," he said. "Traffic engineering techniques that were developed for telephony can be used for VOD."

Wall cautioned that certain specifications need to be adhered to before VOD can be run effectively over today's cable systems. These include using larger nodes, learning how to deal with peak VOD usage, recognizing that glitches will happen, and dealing with them effectively.

Yvette Gordon, SeaChange International's vice president of interactive technologies, echoed projections that a maximum of 10 percent of subscribers would use VOD at the same time.

"(VOD's) biggest revenue generator will be interactive advertising," Gordon said. "It's not going to come from the subscriber at all."

VOD could be a much more lucrative business if it is part of an overall interactive TV plan, including Internet access and e-commerce, she said.

One of the biggest potential hazards to VOD take-up deals will be convincing Hollywood to sell its rights to VOD systems. To that end, Dr. John Markey, senior vice president of conditional access (CA) company Nagravision, has developed a CA system that he hopes will convince the studios to sell their rights.

Studios have been scared away from completely jumping into bed with VOD suppliers, mainly because of security issues.

Open access still problematic

With open across looming in the horizon, cable operators and Internet providers need to determine which method provides them with a secure end-to-end system that benefits both their businesses and customers.

At present, multiple system operators (MSOs) have several options that provide them with end-to-end solutions, said Jerry Goodrich, manager, broadband network engineering, Cisco Systems, during the "Open Access Architecture" workshop. These include Policy Based Routing and MultiProtocol Label Switching, he said.

"We're pushing that the MSO and the Internet service provider need to come up with an agreed-upon method that gives them end-to-end open access," said Goodrich. "Anybody can go ahead and throw in any protocol, CMTS, or whatever—and it could be any mixture—so the CMTS does one part and then the whole network does another part."

In theory at least, cable companies are now looking for ways to open their networks, especially as both Time Warner Cable and AT&T have pledged to do so. However, it doesn't appear operators are moving aggressively to implement open access on a practical level. When Goodrich polled audience members as to who had started to implement open access, no one in the audience raised their hands. When he asked who was forced to implement open access, the response was the same.

Worldwide, however, Brazil has mandated the open access process, and Canada is close behind, he noted.

Right sizing it

The deployment of fiber-optic technology into cable television systems has changed common video broadcast networks into full service communications platforms, Fred Slowik, director of systems marketing for Motorola's broadband communications sector, noted during the "Right Sizing the Network" workshop.

Networks today are able to transport complete complements of video, voice, and high-speed data services as long as the proper steps are taken to ensure appropriate forward and reverse bandwidth allocation. Interest in fiber intensive platforms within the industry has continued to grow.

The best way to examine the required level of fiber intensity in the network is to begin at the end and evaluate the bandwidth needs of the user, noted Slowik. Increasing network capacity to support greater service penetration rates and simultaneous usage provides substantial insurance against capacity obsolescence, he said.

In his talk, "Designing and Building a Flexible Broadband Network," Don Sipes, vice president of advanced technologies at Scientific-Atlanta, discussed digital reverse, the evolution of HFC networks and IP over fiber, and how these are useful elements in building a broadband system.

David Kozischek, strategic technology manager at Corning Cable Systems, spoke of positioning HFC system design for the competitive challenges ahead for the cable industry. MSOs must move beyond only providing video, and embrace voice and data services in order to remain competitive, even as system bandwidth capacity requirements continue to grow, with no end in sight, he added. CT

Natalia Feduschak, Monta Monaco Hernon, John P. Ourand, and Jonathan Tombes contributed to this report.

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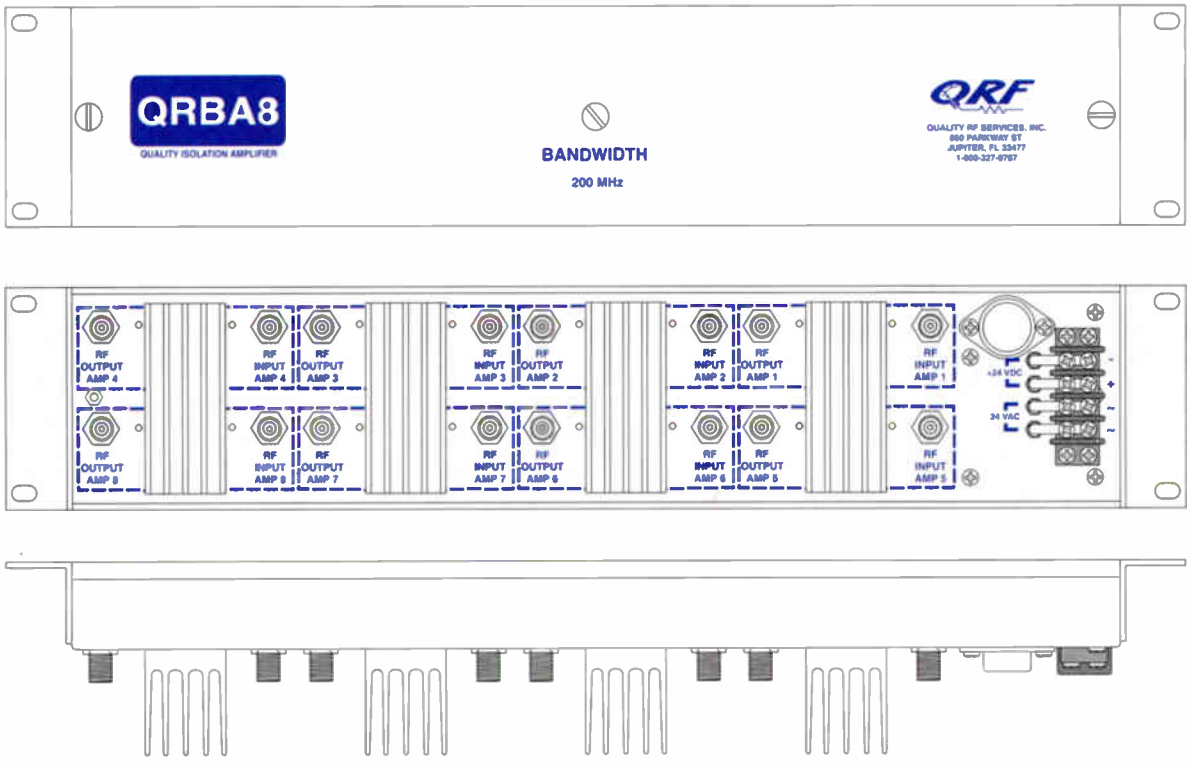

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Cable Games:

By Monta Monaco Hernon

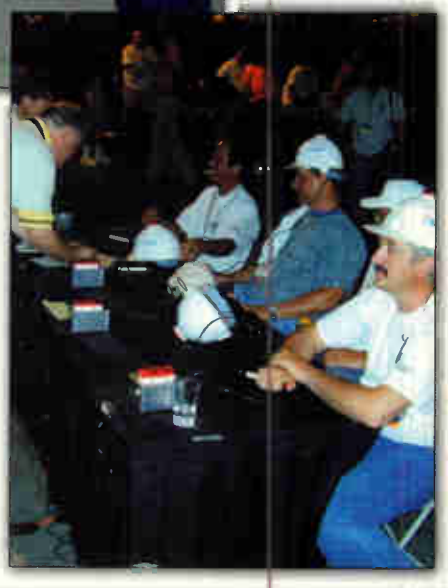
The Stanley Cup of Expo's Cable Games

Lady Luck Meets the Cable Guy

The show floor of Cable-Tec Expo was dominated by vendors and engineers, but the Cable Games was where the field operations guys showed off their skills. The creme de la creme, all regional chapter winners, competed in events that showcased their speed, accuracy and expertise.

Joel Hutchings with Cox Communications walked away the grand champion, a designation which earned him a free trip to next year's Cable-Tec Expo, where he will defend his title. His name was also etched alongside his nine predecessors on cable's version of the Stanley Cup.

It seemed that everywhere you looked this year, you saw Cox Communications on a participant's name badge, which coordinator James Fronk, district manager for Cox in Great Bend, Kan., said is due, in part, to the string of acquisitions the company has made in recent years.



Above: For those who found cable splicing too much like work, miniature golf scored high points at Expo Evening.

Right: You won't win a million bucks at Cable Jeopardy, but you can rack up the points.

"Our goal would be to have everything diversify, but we don't get as much involvement from some regions. We would like to see every region have at least one contestant in the Cable-Tec Games," he added.

Cable Jeopardy tests wits

Although *Who Wants to Be A Millionaire* is the leader on the airwaves, *Jeopardy* still is quiz show of choice at the Cable Games. Many of the competitors say this event is the most intimidating.

"You can end up in a hole really fast if you don't watch it," said Wayne Sudberry, senior technician for Cox Communications in Fort Smith, Ark.

This year, the pressure was on from the start because Cliff Salmond, project coordinator from Cox in Tucson, walked away with 900 points during the very first panel. He went on to win this event and to place third overall.

> Cable Games 2000 Winners

Overall:	Gold—Joel Hutchings, Cox Silver—Marshall Kurschner, Adelphia Bronze—Cliff Salmond, Cox
Routers:	Gold—Joel Hutchings, Cox Silver—Bill Dennis, AT&T Broadband Bronze—Kenny Murray, AT&T Broadband
MTDR:	Gold—Cliff Salmond, Cox Silver—Marshall Kurschner, Adelphia Bronze—Joel Hutchings, Cox
Splicing:	Gold—Joel Hutchings, Cox Silver—Marco Gonzalez, MediaOne Bronze—Marshall Kurschner, Adelphia
Go Fetch:	Gold—Tony Hernandez, Cox, and Robert Gebhardt, AT&T Broadband Silver—Marshall Kurschner, Adelphia
Jeopardy:	Gold—Cliff Salmond, Cox Silver—David Devereaux-Weber, University of Wisconsin, Madison Bronze—Ricardo Ortiz, AT&T Broadband

Left: Adelphia Communications' Marshall Kurschner (left), who placed second overall at Expo's Cable Games, applauds Cox Communications' Joel Hutchings who took home the trophy for overall performance.

No blood allowed

While *Cable Jeopardy* was the evening's most cerebral event, cable splicing was by far the most dangerous. Points are taken off for blood sighted at the end of a round, according to judge Ron Stoneburner, southwest regional manager for Gilbert Engineering Co. This criteria was added a few years ago after a contestant sliced a finger to the bone.

Cable splicing also was the most egalitarian. "Across the United States, it is the same [procedure] no matter what the cable is. It is one event that tests true skill level," 1999 grand champion Dennis Majors, field service manager for Cox, Edmond, Okla., explained.

Other events, like the one that uses metallic time domain reflectometers (MTDRs), might put people at a disadvantage if they normally do not use the brand of equipment provided, he added.

Below and across: While other visitors to Las Vegas were spending their time—and money—at the legendary casinos, many Cable-Tec Expo attendees spent their first evening at the gambling capital's All American Sport Park, matching wits with their peers, competing to find cable devices in messy piles, and testing their meter-reading and cable-splicing skills. Judges took their jobs seriously: "lose blood, lose points."

Above: Cable techies enjoyed the indoor pool at Expo Evening.

Marshall Kurschner, technical operation manager for Adelphia in Casevill, Mich., said the Riser Bond model supplied for the Cable Games, for example, was newer than the one to which he was accustomed. "I had to figure out where the buttons were," he noted.

Unfamiliarity with the equipment didn't stop Kurschner, however, as he took second in this event and second overall.

And the rule book stated that contestants can bring their own equipment. Majors didn't think this was feasible for those who had to travel a long distance, but Sudberry hauled a Tektronix TDR and other tools all the way from Arkansas.

Other hands-on events were meter reading, and "go fetch," which as the name implied, involved participants being asked to quickly spot appropriate devices in a messy pile.

"Most guys tell you they keep their truck clean, but most likely that is not the case," Fronk said.

Fun, yet educational

In the end, the most obvious benefit to winning the games was of course the free trip to next year's Cable-Tec Expo (to be held in Orlando), but contestants say it is also a learning experience.

Above: Loyal Order of the 704 member Skip Kraus, beside a Jerrold 704 field strength meter.

Malcolm Taylor, Antec's vice president and Adelphia account manager, honors Dan Liberatore and other Adelphia engineers for winning the 2000 Service in Technology Award.

"It makes people think, while at the same time it is supposed to be fun," Sudberry explained.

"The Cable Games are set up and designed to help a technician that is new, learn and push their way up through the technology ladder," Majors said.

"Winning has helped in my career in terms of the respect I get from other cable TV personnel," he adds.

More Expo Parties

Wavetek sponsored its annual opening night reception giving the thirsty and hungry crowd its fill of beer and hot dogs.

Antec sponsored the Service in Technology reception, which honored Adelphia Communications, the 2000 recipient of *Communication's Technology*'s annual engineering award. Dan Liberatore and other Adelphia attendees accepted accolades from Antec's Malcolm Taylor and *CT*'s publisher Tim Hermes.

The annual ham radio operators' reception was held the last night of Expo, and featured the usual opportunity to enjoy eyeball QSOs with other hams, some tasty refreshments (courtesy of SCTE), and of course, the ever-popular door-prize drawing. Cisco Systems' Ron Hranac, N0IVN, was once again the reception emcee. Sixty four of the reception's attendees took home a door prize of some sort, ranging from repeater directories to two-way radios. This year's grand prize winner was Jim Ferrone, K2IR, who was the proud recipient of an Icom IC-746 transceiver and accessories, courtesy of NCTI.

The Loyal Order of the 704 held its annual reception at the close of this year's Cable-Tec Expo. The Order's name honors a Jerrold Electronics field strength meter that cable veterans once lugged up poles. (see photo, page 106) The elite group of engineers inducted about 20 new members, voted as usual to disapprove last year's minutes, and discussed such matters as whether to use the pink flamingo as a mascot and what the Order's total caloric consumption for the evening might be. CT

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Coax vs. Who's Got the

Telcos Gaining in High-Speed Data Contest

Copper: Upper Hand?

By Arthur Cole

A year has gone by since we checked into the digital subscriber line (DSL) industry to see what the competition was up to. Alas, the news does not bode well for cable. New technologies are tackling two of the services' drawbacks compared to cable modems: data rates and distance limitations. Meanwhile, interoperability standards usher in the possibility of retail sales.

All this is leading some analysts to conclude that DSL is likely to win out over cable modems in the long run, not only in the business sector where telcos have a leg up to begin with, but in the all-important residential space as well.

Still, cable modems are dominating the high-speed market at the moment, and there is plenty of opportunity to build brand loyalty for those who are first to wire up the consumer. But cable operators are going to have to move fast if they expect to compete with the growing DSL juggernaut.

What the numbers say

First, let's take a look at some numbers. The most recent projections are on the pessimistic side. Cahners In-Stat Group predicts cable-modem subscribers will have climbed from 600,000 in 1998 to more than 12 million in 2003 (see Table 1 on pg. 116). During the same period, Cahners says DSL subscribership will have jumped from 345,000 to more than 36 million. The year 2000 is expected to be the break-even point for both technologies, with both garnering about 4.5 million new subs.

"We feel that DSL ultimately will win out," said Mike Lowe, senior analyst for In-Stat's Advanced Carrier Service. "We see more dissemination than that of cable modems. DSL will overtake them in the next year or so."

An earlier projection by a group called Computer Economics put cable modems in a more positive light. It predicted the cable-modem installed base will grow from 5.7 million at the end of this year to 27.6 million in 2003. DSL will grow from 2.4 million to 13.8 million during the same period.

Interoperability on the rise

One of the most significant advances in the evolution of the DSL market has been the development of a set of interoperability standards that allow a wide range of customer premise equipment to work with a variety of central office switching systems known as DSLAMs (digital subscriber line access multiplexers). At the SuperComm show in June, nearly 60 vendors took part in an interoperability demonstration presented by the DSL Forum. The companies successfully demonstrated the interoperability of technologies conforming to the G.lite and G.dmt standards published by the International Telecommunications Union (ITU).

Interoperability is a key development in any new communications technology because it removes much of the complexity in setting up the

service. If the DSL industry can successfully implement multivendor interoperability similar to that provided by the cable industry's Data Over Cable Service Interface Specification standard, customers will not only be able to purchase their own DSL modems off the shelf, but install and provision them as easily as they can current 56k modems.

"There are very few situations where we need to do a truck roll."

—Joan Rasmussen, Bell Atlantic

Plug and play, here to stay

At Bell Atlantic, the company has already virtually eliminated the need to send a technician to oversee new installations, said Joan Rasmussen, spokesperson for the company's InfoSpeed DSL service.

"There are very few situations where we need to do a truck roll," she said. "Only for the most high-end of services do we need technical expertise at the site."

"A great deal of attention has been focused on plug-and-play," echoed Jay Frausch, senior marketing director at Alcatel. "Most computers made after 1998 or 1999 are likely to have a USB [universal serial bus] port. If you're using Windows 98, simply plug the DSL modem into the USB port and attach the phone line to a small pigtail attachment on the cable. Then simply install the drivers, and you're up and running."

Breaking the distance barrier

DSL vendors also have taken steps to overcome the technology's distance limitation. Traditionally, DSL service only can extend roughly 18,000 feet along copper lines. Pushing it beyond that limit starts to cut down on the data rate to the point at which DSL service is no longer justified. But providers are implementing a variety of solutions to overcome this problem. Among them are wireless delivery systems such as multichannel multipoint distribution service and local multipoint distribution service (see sidebar, Wireless DSL: Coming to a Rural Area Near You, on pg. 114), the development of rugged DSLAM equipment that can withstand temperature extremes and optical amplification equipment.

"As more products are temperature-hardened and pushed closer to the home, the distance limitations go away," said Bob Laurent, marketing manager for Fujitsu's Access product line. "We're basically pushing the DSLAM from the central office to the customer."

Telcos eye residential subs

But probably one of the most significant changes in the DSL industry in the past year is one of perception. A year ago, most experts were predicting that DSL would dominate in the business-to-business space, where very few cable lines exist, while cable modems would take the lion's share of the residential market. Not anymore. Many experts are now saying DSL will make significant

BOTTOM LINE

> DSL Poised to Win Data Race

There's no doubt about it. Digital subscriber lines (DSL) have made tremendous gains in the past year, both in terms of new technologies and new subscribers. Although this does not auger well for the future of cable-modem service, there are a number of strategies that cable operators can employ to gain the largest possible market share.

First the bad news: According to some analysts, cable modem and DSL deployments will be roughly equal this year, with DSL pulling ahead from here on out. New standards and technologies are driving this trend. Interoperability is likely to take hold among modem- and network-equipment providers, ushering in the possibility that DSL could hit retail channels soon. The G.lite and G.dmt standards are gaining widespread industry acceptance.

Add to that the ease at which DSL users can now install and provision their new modems. Few customers require a truck roll to get connected anymore. And with new technologies allowing DSL providers to push the service further and further into their networks, DSL is not likely to remain strictly an urban business solution for very long.

But cable operators still have a number of distinct advantages. The first is throughput, which outstrips that of DSL even when multiple users are on the shared network simultaneously. Secondly, cable offers much more opportunity to bundle cable-modem service with other advanced features, like video-on-demand and interactive television. The best a telco can do is bundle DSL with call waiting and voice mail.

Will it be a tough fight from here on out? Absolutely. But by leveraging the head start that cable modems have over DSL and building brand loyalty, cable operators ought to be able to hold their own in the future.

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> Wireless DSL: Coming to a Rural Area Near You

DSL's distance limitation has been one of the chief drawbacks to the technology since it first came on the market. Try to push the service more than 18,000 feet along copper lines and the data rate degrades to that of a 56k modem.

To counter this, service providers are rolling out a number of innovative solutions, from extending the digital-loop carrier further into the network to developing a node-type architecture using rugged digital subscriber line access multiplexer equipment.

But to reach truly rural areas, many providers are looking into wireless DSL.

"There are many cases in which distance limitations get in the way or where copper won't support wired DSL," said John Lilly, senior director of marketing and business development for Alcatel's wireless access business unit. "Wireless is a way for service providers to extend their reach."

There are several different wireless services that are suitable for DSL. Entry-level approaches include multichannel multipoint distribution service (MMDS) and unlicensed national information infrastructure (U-NII) networks. U-NII offers a bandwidth of about 100 MHz, providing a throughput of about 20 Mbps upstream and downstream on the same channel. MMDS provides a 6 MHz channel than can deliver 12 Mbps to 19 Mbps using a 64 quadrature amplitude modulation approach.

These may seem like extremely high data rates compared to wired services, but it must be remembered that wireless DSL operates on a shared network.

"By nature, these are point-to-multipoint technologies," Lilly said. "One transmitter at a base station serves X number of customers."

The next step up is local multipoint distribution service, which offers a 30 MHz channel for 32 Mbps upstream and downstream.

Beyond that, DSL service can be provided on a point-to-point basis where data rates can approach 150 Mbps or more. However, this is fairly expensive and is likely to be strictly a business solution.

inroads into the home.

"The residential market has developed much more quickly than we expected," said Bell Atlantic's Rasmussen. "About 85 percent of our customers are residential."

It turns out that many business are, in fact, hesitant to invest in DSL until all office locations and subsidiaries are DSL-ready as well. And that will take time as the service providers upgrade their central offices with DSLAM equipment.

Cable modems still have one distinct advantage over DSL at the moment: throughput. Basic level DSL services—the lowest-cost service on the market and thus most likely to be adopted by residential consumers—has a top speed of roughly 640 kbps. That pales in comparison to cable's potential 1.5 Mbps. But remember, cable's shared network means that the more users online at the same time, the less bandwidth available to each user, resulting in slowing speed.

This presents cable modem providers with a dilemma: the more users that come online per node, the lower the potential data rate. To keep up with traffic demands, cable operators will have to add more nodes to the network, while DSL providers merely need to add more DSLAMs to the central office.

It is also important to remember that telephone companies do not

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TABLE 1 WORLDWIDE INSTALLED BASE OF CABLE VS. DSL SUBSCRIBERS (UNITS IN THOUSANDS)

	1998	1999	2000	2001	2002	2003	CAGR*99-03
Cable subs	600	2,210	4,530	6,814	9,515	12,696	54.8%
% change		268%	105%	50%	40%	33%	
DSL subs	345	1,447	4,386	10,163	20,419	36,112	123.5%
% change		319%	203%	132%	101%	77%	
Total subs	945	3,657	8,916	16,977	29,934	48,808	91.1%
% change		287%	144%	90%	76%	63%	

* Compound Annual Growth Rate Source: Cahners In-Stat

TABLE 2 GETTING THE GEAR

Provider	Service	Download	Upload	Price/month
Bell Atlantic	Personal Infospeed	640k	90k	$49.95
	Professional Infospeed	1.6M	90k	$99.95
	Power Infospeed	7.1M	680k	$189.95
BellSouth	FastAccess	1.5M	n/a	$49.95
Covad	TeleSurfer	680k	128k	Pricing varies
	TeleSurfer Pro	1.5M	384k	depending on ISP
SBC Global	Basic DSL	1.5M	128k	$39.95
Network	Enhanced DSL	1.5M	128k	$79.00
		6.0M	128k	$199.00
	Business DSL	1.5M	128k	$238.00
		6.0	328k	$328.00

consider DSL service as the final high-speed data solution available to them, particularly for business customers. Indeed, some observers give DSL a 10-year life span at best before the industry moves on to an even faster solution, such as direct fiber to the customer.

"For residential users, DSL will be the predominant high-speed solution for the next six to 10 years," said Fujitsu's Laurent. "On the business side, DSL is out to about four years. Somewhere in the next two to three years, you'll start seeing fiber take over and surpass DSL."

Innovative bundling Attracts customers

So what should the cable operator do now? The answer is simple: get aggressive. Push cable modem service into untapped areas as fast as possible. Launch marketing blitzes across your service area touting the faster speed and ease of use of cable-modem service. And most importantly, offer innovative bundling packages between cable modem, interactive television, voice and other services.

Bundling is likely to be a key weapon in the modem wars simply because cable television has so much more to offer the consumer. At best, the telephone companies can offer bundling packages between DSL service and things like voice mail, call waiting, call forwarding, etc. Ho-Hum. Don't even expect them to bundle DSL with regular voice service. Because most telcos already have a monopoly on local phone service, there's no reason to sweeten the pot to get new customers. Cable operators, on the other hand, can bundle data services with all kinds of exciting new products, like video-on-demand, high-definition television, digital tiers and all the rest.

Yes, DSL is going to be a strong competitor going forward. But by leveraging the inherent superiority of the cable architecture in general, cable operators will remain the broadband provider of choice for some time to come.

Arthur Cole is a contributing editor to "Communications Technology." He can be reached via e-mail at acole602@aol.com.

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Customer Inform
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Clued-in Clients Don't Need to Call

By Bruce Bahlmann

If you're offering Internet services, more than likely you've wrestled with what kind of network performance updates to provide, how much information to give out, and how? MediaOne's Bruce Bahlmann offers some solutions.

Why do airlines provide passengers with information on how to prepare for a water landing? As far as I know, no one has ever survived a water landing.

As a frequent flyer, however, I usually do appreciate the abundance of information (good and bad) available from the airlines. Their willingness to keep me updated on performance criteria—on-time arrival, customer complaints—as well as all the in-flight information eliminates my need to seek out that information from their employees such as customer service agents or flight attendants. Perhaps more importantly, by having this knowledge I'm less likely to draw my own conclusions in the event something is

wrong and more likely to deal with inconveniences as they occur.

Unlike airlines, businesses providing Internet service are less willing to volunteer such information to their customers. Perhaps Internet service has not yet grown up and out of its trial stages. With Internet service, you rarely get any guarantees. Furthermore, the principle detection of outages results from customers calling to complain about their service. Imagine airlines being dependent on passenger complaints for successful flights—"Pardon me Captain, you might want to check the wing—something's leaking."

Fortunately, the state of today's Internet service is not life-threatening, but it can certainly be business-threatening. It is crucial to keep customers informed while seeking all means necessary to maintain consistent, high-quality service. Other industries understand the benefits of keeping clients in the know, and the capability to do so has been around for years. Let's explore how to give customers Internet service status and performance criteria via a customer information center.

In 1997, MediaOne undertook an effort to provide customers with status information. This effort was met with great resistance from its operations group, which claimed that giving such information to customers would result in spiraling demands for more detailed

BOTTOM LINE

> **What Customers Need to Know**

The worst nightmare for a company providing a "service" to customers is failing to have several mechanisms for keeping customers up-to-date. Customers are like sponges—always seeking information. When they are having a problem with a service they're paying for, customers can easily overwhelm any call center. Thus it makes sense (as well as cents) to provide information about the health of your service to your customers. The three most important pieces of information that customers seek are:

- What is the current status—is everything working?
- If something is unavailable (i.e. down) has this been acknowledged—if so, how long until it will be available again?
- Are there any scheduled down times—if so, when exactly?

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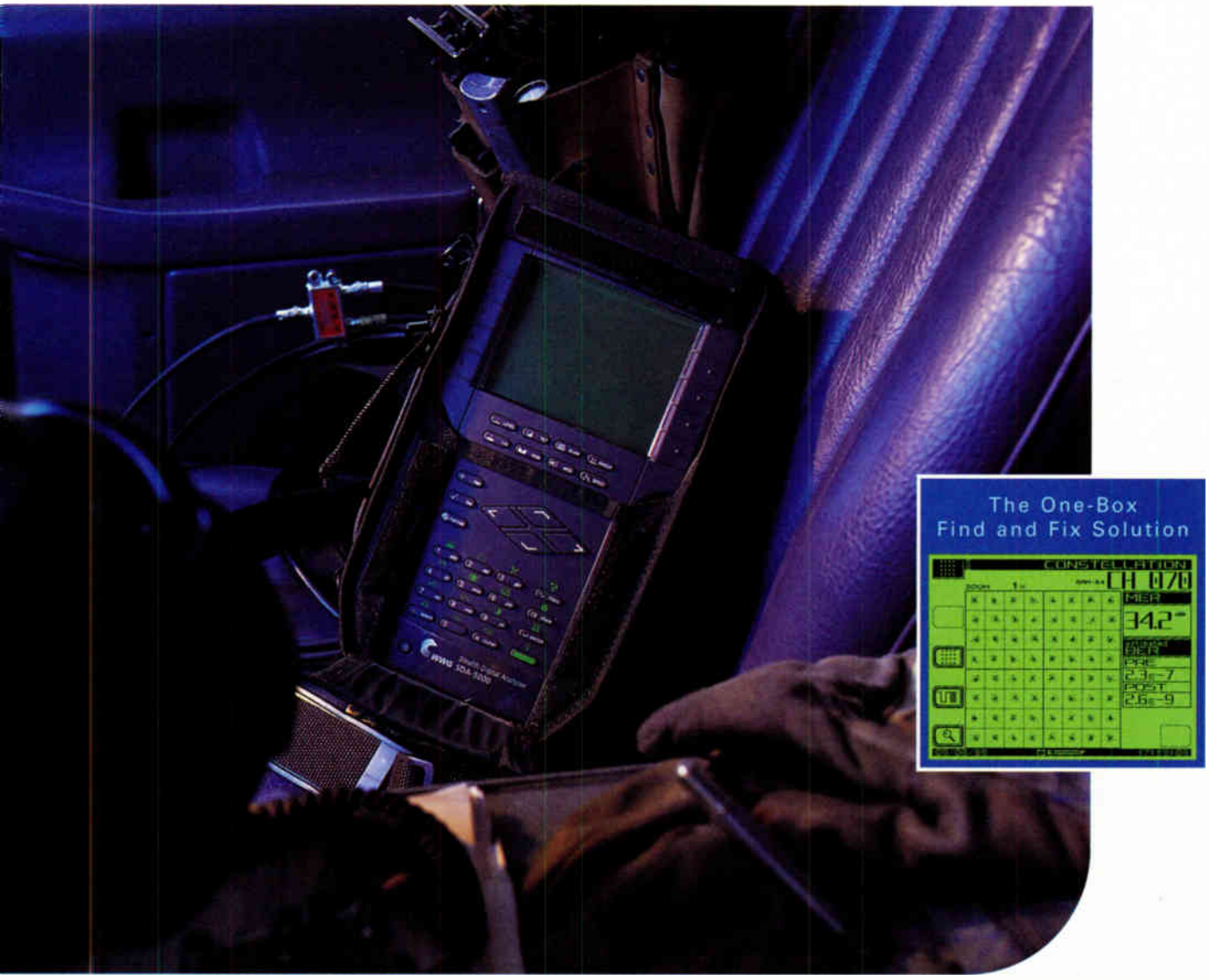

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FIGURE 1 SAMPLE OPERATIONAL STATUS DISPLAY

Current System Status:

DHCP (PC)	BUSY
DHCP (CM)	UP
DNS	UP
EMAIL	UP
NEWS	SERVICING
PROXY	DOWN

FIGURE 2 ACKNOWLEDGEMENT OF OUTAGES AND UPDATES REGARDING FIXES DISPLAY

Progress Updates (on reported problems):

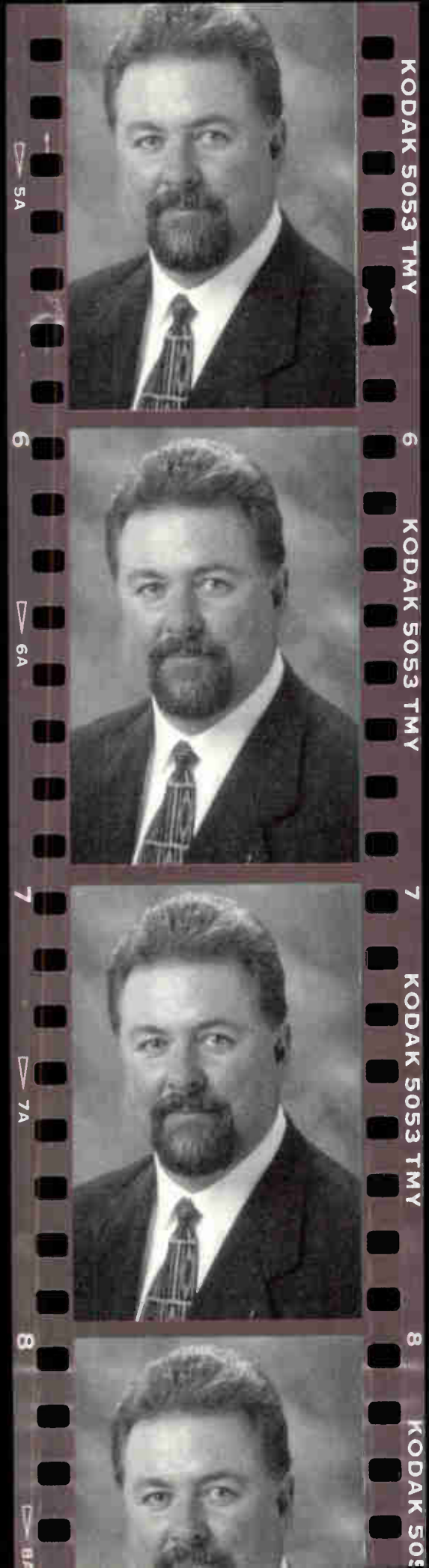
08/07/2000:1800 NEWS server reported/verified as being down
08/07/2000:1810 Attending to NEWS server problem -- projected fix time 45 min
08/07/2000:1820 DHCP (PC) reported down
08/07/2000:1825 Checked DHCP (PC) server problem -- is working only busy
08/07/2000:1825 Proxy server reported/verified as being down

information—not to mention possible requests for credits. However, these efforts continued and eventually prevailed. The initial response from customers was extremely positive, but the means of providing this service did not get deployed enterprise-wide. Today, this information is only provided in select areas where there is sufficient staff to maintain its content or where local staff has automated the means of keeping information updated.

Over the years, MediaOne's experience in this area shows that customers are most interested in operational status, acknowledgement of outages, updates regarding fixes, and the timing of planned outages. With this knowledge in hand, customers tend to deal better with the inconveniences "seemingly inherent" to the business of providing Internet service.

Operational status

The operational status component of the customer information center provides current status of various applications that collectively make up a fully functional Internet service (see Figure 1, above left). These applications include Dynamic Host Configuration Protocol (DHCP), Domain Name System (DNS), EMAIL, NEWS, and PROXY. DHCP serves out Internet



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protocol (IP) addresses to customer cable modems and computers that enable them to access the Internet. DNS is the next critical application that allows computers to resolve a name like www.birds-eye.net to its associated IP address. The remaining applications round out what typical Internet providers supply as part of the Internet services. A hyperlink could provide customers with a link to more specific information about each application as it relates to their Internet experience. This information is typically generated automatically.

Providing updates on Outages and fixes

When a customer reports or we detect a problem with an application, we update this information in the following scrolling field (see Figure 2 on page 122). Customers seeking information on an application can first look at its current status, then check for any updates on its recovery. For example, they can be assured that a problem they may be having with NEWS is due to a problem with the application and that it should be back up in 45 minutes. We typically enter this information manually as it tracks with updates being received by one's network operations center (NOC). This tells customers exactly what they want to know—what is wrong and when can they expect it to be back on-line.

Timing of planned outages

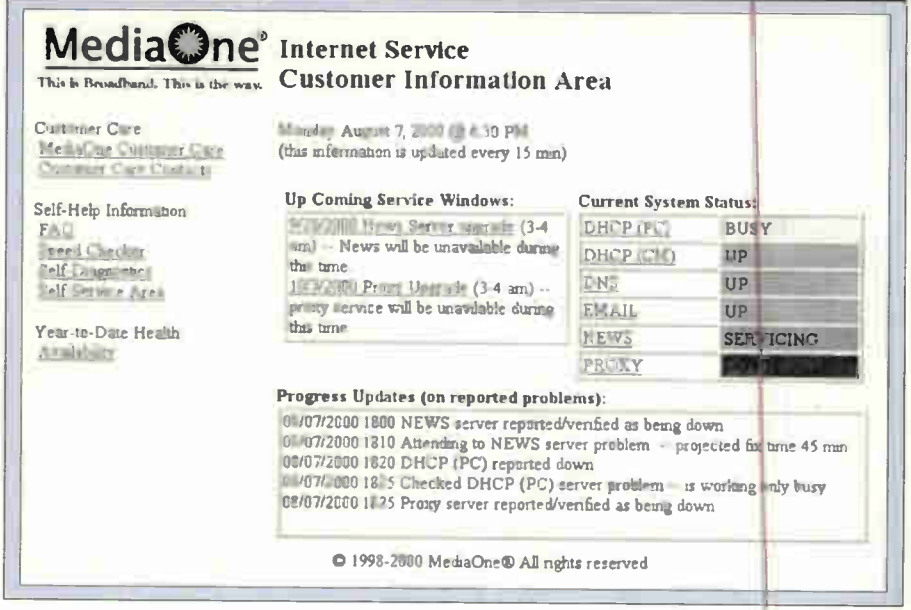
Periodically, you'll need to perform maintenance on various components of the system that supplies Internet service. This maintenance is usually performed during a service/maintenance window. A service window is a negotiated period of time that has been earmarked for a particular service-related event. Such events are scheduled well in advance (two to three weeks minimum) to allow customers to be notified. (See figure 3 on page

FIGURE 3 TIMING OF PLANNED OUTAGES DISPLAY

Up Coming Service Windows:

9/28/2000 News Server upgrade (3-4 am) -- News will be unavailable during this time.
10/3/2000 Proxy Upgrade (3-4 am) -- proxy service will be unavilable during this time.

FIGURE 4 CUSTOMER INFORMATION CENTER DISPLAY



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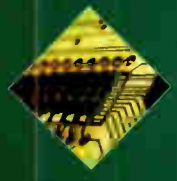

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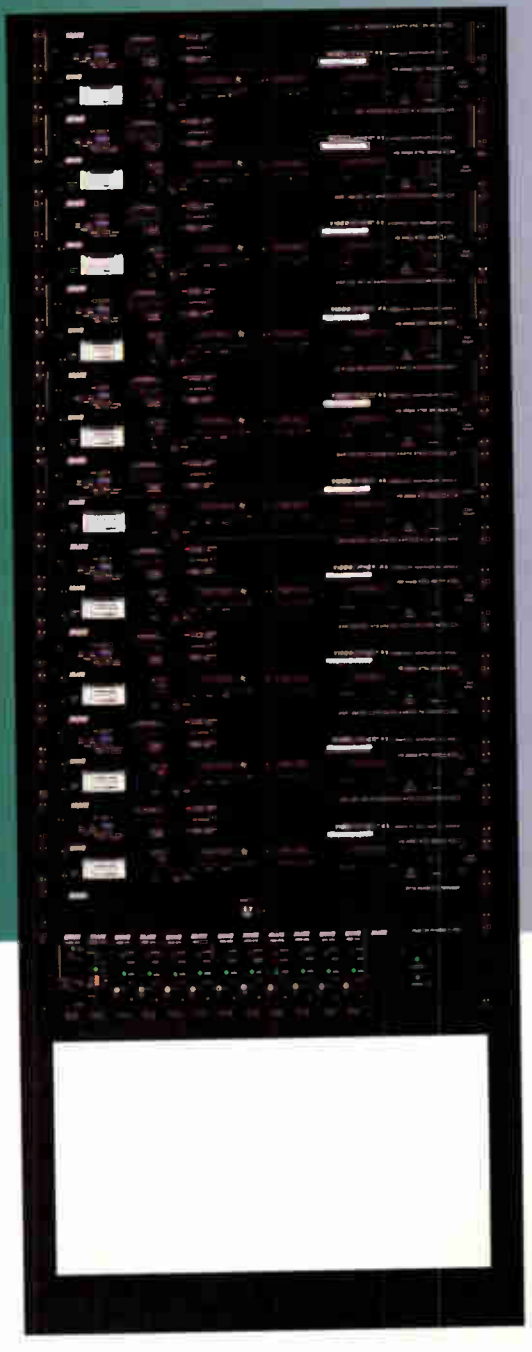

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124) We also update this information manually. Because service windows are infrequent, this is a manageable task.

If one were to consolidate all this information, the result might look like Figure 4 (page 124). The customer information center could be as basic as a single Web page about the health of your Internet service. A brief glance would tell customers what (if anything) was wrong with the service and whether the problem was right in front of them (perhaps a problem with their computer) or was something out of their control (such as a server or application failure).

A more elaborate version might allow customers to be on an alert e-mail listing of known outages or upcoming service windows. This would allow the capability to send service window updates only to customers who actually request them. Other enhanced services could incorporate more current information—such as up-to-the-minute status updates that could help your technicians in the field as well as your customers.

Commit the resources

There are many ways to provide customers with information on the health of your Internet system. By displaying this on a Web site, you give customers an alternative to calling in and a means to inform them when the system is back online. I'm unaware of any commercial software that does this, so this function would have to be developed within. However, depending on how elaborate you want to get, you can task in-house resources to generate a respectable-looking attempt until you are ready to expand the Web page. Giving customers access to such information will help you improve customer satisfaction and reduce service calls.

Bruce Bahlmann is senior systems engineer for MediaOne's Internet Services Group. He can be reached via e-mail at bahlmann@bigfoot.com.

Did this article help you? Let us know your thoughts. Send an e-mail to snayalkar@phillips.com.

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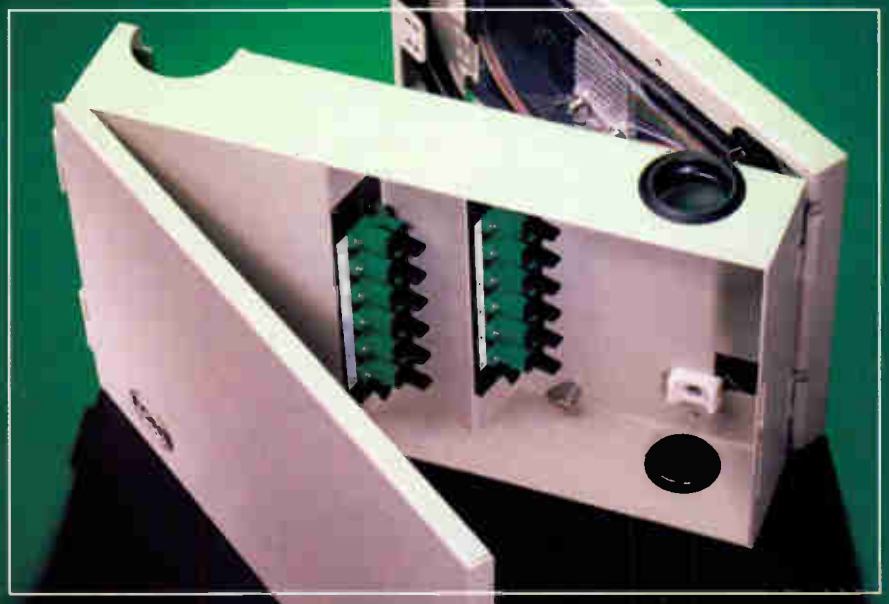

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Introducing Cable Modems, Part 4

This month's installment continues a series on cable modem installation. The material is adapted from a lesson in NCTI's new Digital Installer Course. © NCTI.

The previous installments covered the considerations encountered when determining equipment locations, provided a checklist for certifying drop-system reliability, discussed two options for connecting coaxial cables to a stand-alone cable modem and computer, and provided two configurations and their recommendations for connecting a telephone line to a cable modem using a phone return. Here we expand on the phone return wiring and discuss modem powering and the importance of front-panel status lights.

Installing a dedicated telephone Wire from the NID

With a cable modem using a telephone line for return, some companies require that any added telephone outlet wiring connect directly to the telephone network interface device (NID) for better reliability, rather than splicing into existing outlet wiring. The NID is a junction box where the telephone service drop terminates and the home wiring starts. The NID is often a small box mounted to the outside of the customer premises, as shown in the accompanying figure.

Connecting power cable to cable modem

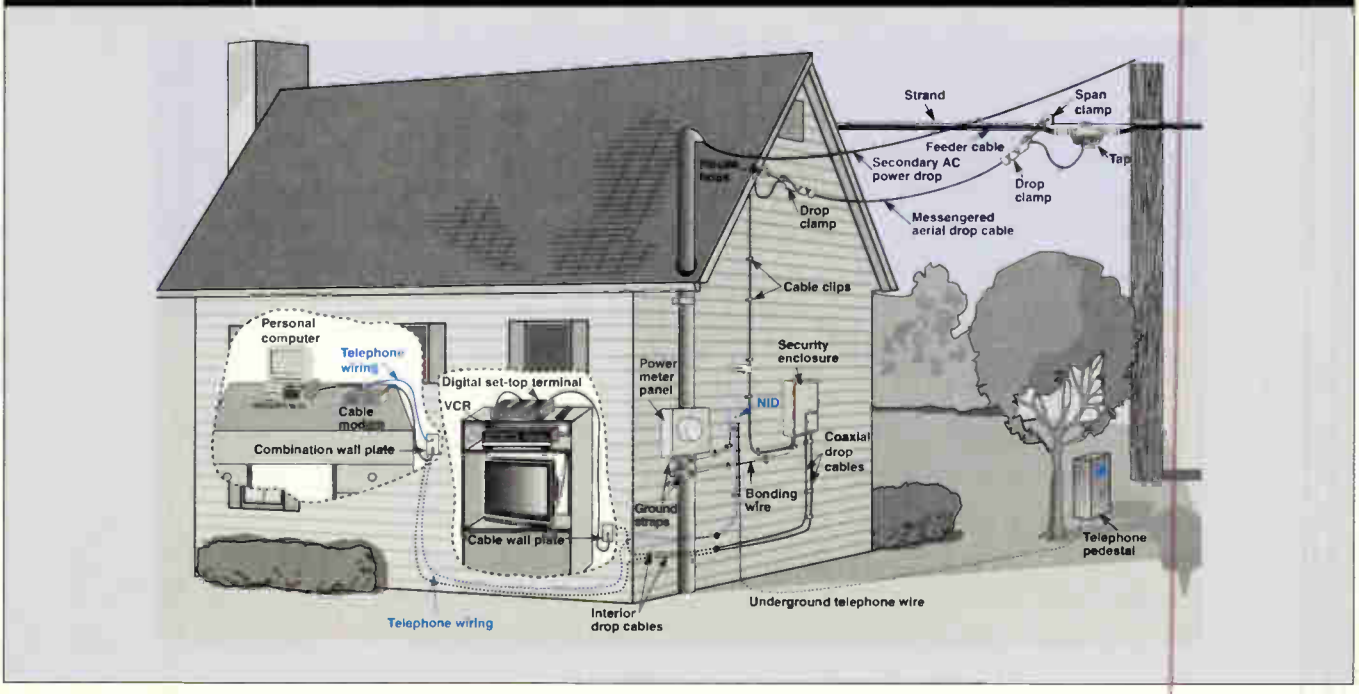
Most cable modems use an external transformer to convert the incoming AC voltage to one or more DC voltages. The power connector from the transformer to the cable modem is usually a locking plug to reduce accidental disconnection.

To connect or disconnect the power plug, slide the cover back away from the face of the connector to unlock the plug.

Reviewing meaning of Front-panel status lights

Before starting any modem setup and configuration, review and ensure you understand the meaning of the indicator lights on the front of your company's cable modems. Always refer to the latest information on the specific cable modem you are installing.

FIGURE 1 RUNNING TELEPHONE OUTLET WIRING TO A NETWORK INTERFACE DEVICE (NID)



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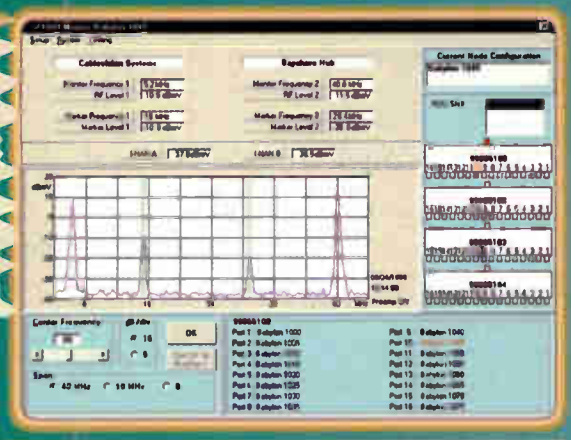

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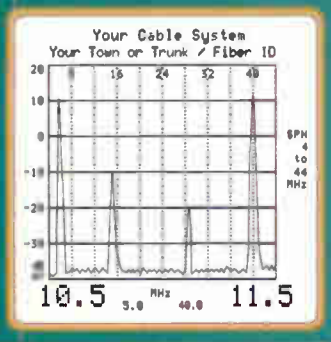
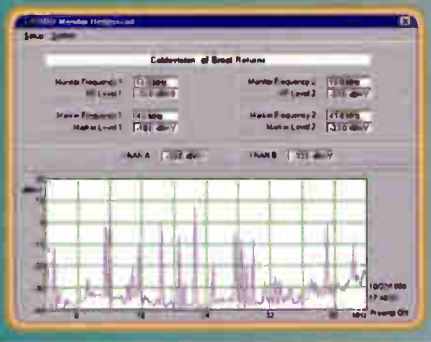
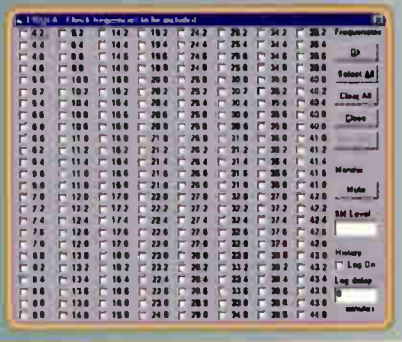


Video Output with Test Carrier Levels



Monitor Screen; Impulse Noise Present



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MARKETPLACE

SIGNAL DISTRIBUTION

Toner Cable's Total Tap enables the distribution of signal from one central location to up to 48 different locations. Total Tap features the TXMT-6H precision die-cast aluminum modular tap housing, with six tap cavities for the installation of six plug-in tap plates to provide service for 2 to 48 locations. The housing has two standard 5/8 inch, 24-thread entry fittings with a seizure assembly for the center pin. Internal circuitry then passes the RF signal from tap cavity to tap cavity.

The TXMT10 tap plates, available in several configurations, feature machined F-connectors protected from corrosion by bright tin plating. All F-ports are supplied with a 75 Ohm terminator with an internal O-ring for moisture protection.

For more information, contact Toner at (800) 523-5947 or on the Web at www.tonercable.com.

SIGNAL LEVEL METER

Jensen's new handheld digital level meter, with backlit, liquid crystal display (LCD) graphic, uses radio frequency (RF) signal processing techniques and microprocessor technology to produce quick and accurate signal measurements. The user has the choice of viewing individual channel power readings or single, multiple or an all-channel spectrum. Automatic calibration corrects variations due to frequency response, temperature changes, and internal attenuator settings. An FM demodulator provides audio output.

For more information, contact Jensen at (602) 438-1690 or on the Web at www.jensentools.com.

FIBER MANAGEMENT

The Proteus system of fiber distribution housings from Ditel allows installers numerous configuration, termination, capacity and fiber exit options. Proteus accepts new and existing 6- and 12-packs, including Lucent and Siecor. Ditel's own 6-packs are available in two styles: constant angle and the patent-pending falling angle, both of which offer dust and eye protection, plus angled terminations and natural bend radius enhancement. Proteus is made of high-impact, lightweight thermoplastic with built-in smooth edges and gentle radii for maximum fiber protection.

For more information, contact Ditel at (800) 553-4835 or on the Web at www.ditel.net.

ATSC RECEIVER/DECODER

Sencore's AT984 Advanced Television Systems Committee (ATSC) Receiver/Decoder is a 19-inch, 2U rack-mountable unit designed to support a variety of inputs and outputs. The unit is capable of tuning all VHF/UHF channels. The AT984 allows an operator to receive off-air 8 vestigial sideband (VSB) signals and convert them to a variety of transport stream formats including ASI, SMPTE310M and DVB Parallel that can be routed into other headend equipment for further distribution. Along with demodulation, the unit also provides a number of different decoded outputs for direct monitoring applications. The unit will decode transport streams at data rates up to 60 Mbps through its ASI and DVB Parallel inputs.

For more information, contact Sencore at (800) 736-2673 or on the Web at www.sencore.com.

COAXIAL LINE

Trilogy Communications is announcing its Perfectbonded 10 line of coaxial cables. Intended for system upgrades, the series of trunk and feeder cables is designed to be universally compatible with existing cables and connectors and to eliminate cold weather suckouts and water migration. The cables also are designed to exceed the mechanical properties of existing cables while matching their electrical properties.

For more information, contact Trilogy at (877) 292-3266 or on the Web at www.trilogy.com.

POWER SUPPLY

Quality RF Services' QPS48-24/2 power supply occupies one rack unit of space and provides dual -48 volt to +24 volts DC power conversion in a redundant configuration. Each power supply has a separate -48 VDC power input. The common output from the chassis provides up to 2 amps at +24 VDC or +28 VDC to power any QRF amplifier in the interactive headend or hub site. The power modules are hot swappable from the front panel. The new feature of the QPS48 chassis is programming of power supply module voltage by the chassis.

For more information, contact Quality RF at (800) 327-9767 or on the Web at www.qrf.com.

The SCTE
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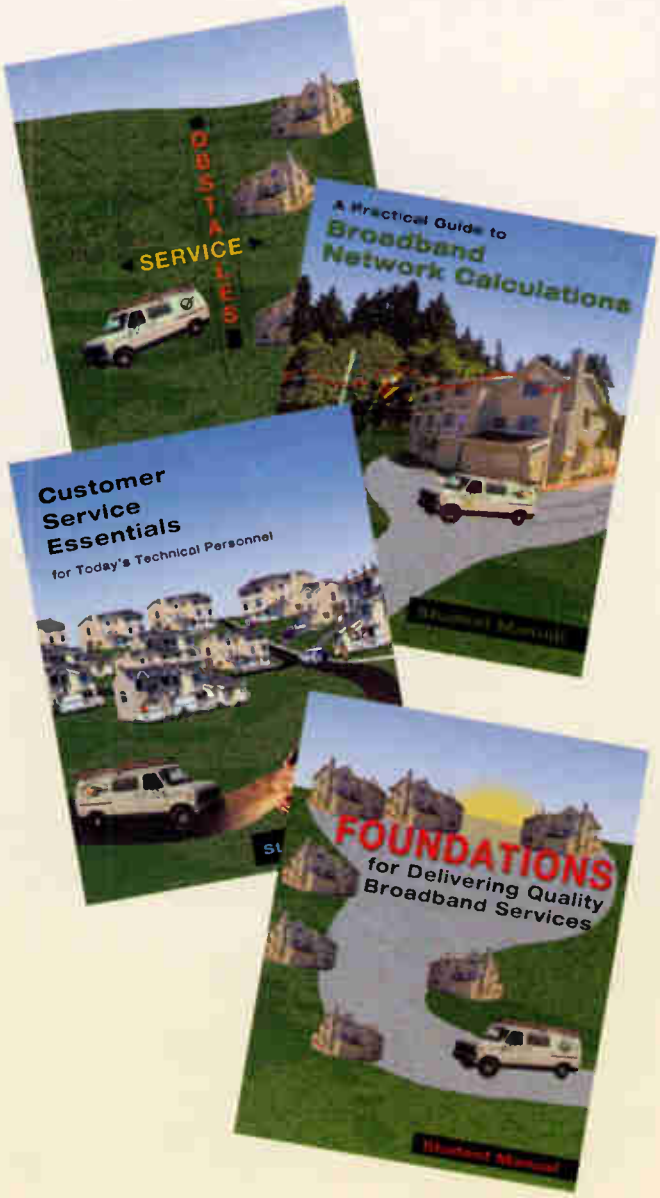
(BST) Program is:



- *Essential* to building a partnership with your customers.
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* Leader Guides available October 2000

RETURN PATH ANALYZER

Trilithic's Guardian 9581 SST 65 MHz return path analyzer extends frequency coverage to 65 MHz and raises the number of test points from 8 to 16 in the same 3.5 inches of rack space as the 9580 SST. The unit can be used in mixed installations with existing 9580 SSTs.

For more information, contact Trilithic at (317) 895-3600 or on the Web at www.trilithic.com.

SUBSCRIBER MANAGEMENT

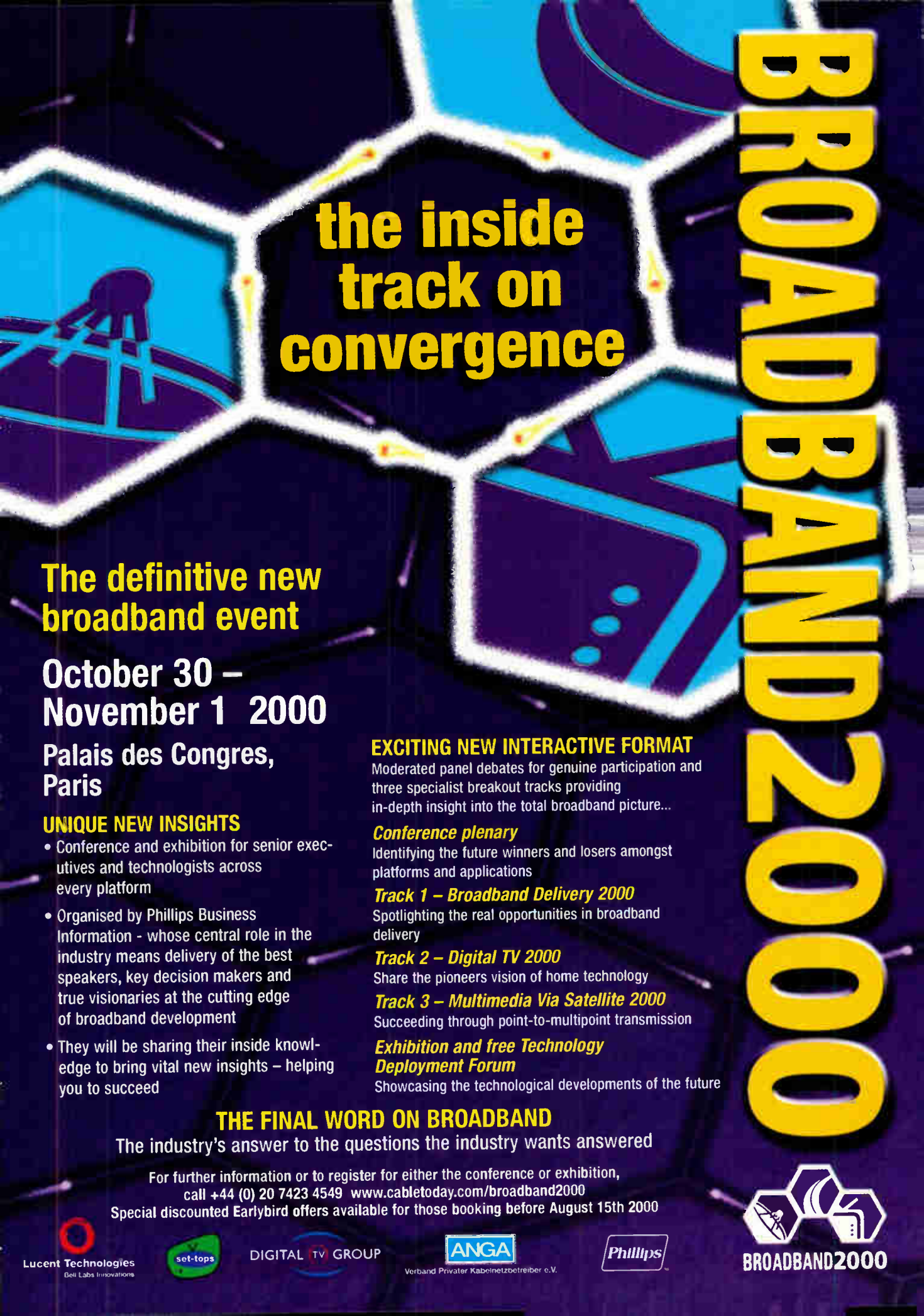
Redback's Subscriber Management System (SMS) 1800 aggregates thousands of broadband subscribers and enables the creation and delivery of services. Deployed at a service provider's points of presence (POPs), the SMS 1800 accepts a large concentration of broadband subscriber traffic from such devices as digital subscriber line access multiplexers (DSLAMs), cable modem termination systems (CTMSs) and wireless concentrators. The unit applies scalable user configuration and management to the subscriber data streams and delivers groomed traffic to providers' backbone routers.

For more information, contact Redback at (408) 548-3500 or on the Web at www.redback.com.

FABRIC CONDUIT

> TVC Communications' MaxCell is designed to maximize the number of cables that can be introduced into a conduit structure, all at one time. A flexible engineered fabric conduit, MaxCell uses up to 80 percent of conduit space without affecting cable-pulling tension. MaxCell takes the shape of the cable placed into the conduit and also can be placed into occupied conduit space with existing cable. MaxCell is lightweight and does not spiral.

For more information, contact TVC Communications at (800) 345-8454 or on the Web at www.tvcinc.com.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DROP AMP

Triple Crown Electronics' INET 7-15/4 Cable Modem Home Drop Amplifier consists of a passive telephony port coupled to a quad port GaAs Mesfet forward gain with selectable return path options: gain, passive or disabled. The INET Series of Home Drop Amplifiers provides 1,000 MHz bandwidth in various configurations to meet all low signal problems encountered in residential installations. Models are available in all international return diplex frequencies and powering standards.

For more information, contact Triple Crown at (800) 387-1064 or on the Web at www.triple-crown.com.

SOURCE BANK

ILX Lightwave's SSB-9200 high density source bank is designed in response to the increasing complexity and demands of wavelength division multiplexing (WDM) component, amplifier and system testing. The SSB-9200 can accommodate up to 48 individual distributed feedback (DFB) laser sources for high-channel count systems.

The DFB modules offer customer-specified center wavelengths between 1528 nm and 1610 nm with +/- 0.85 nm tuning. The SS-810 source shutter is available for applications where the light must be extinguished without turning off the drive current to the laser. The mainframe has a fast GPIB/IEEE488.2 communication platform.

For more information, contact ILX Lightwave at (800) 459-9459 on the Web at www.ilxlighwave.com.

Society of Cable Telecommunications Engineers

Since 1969, SCTE has provided educational resources and a forum for exchange to further the advancement of technical professionals and the industry. Today, more than 17,000 engineers, technical professionals, installers, managers and vendors depend upon SCTE to deliver the tools they need to maintain their competitive edge in a rapidly evolving industry. SCTE is proud to serve its members and the industry as an ANSI-accredited organization dedicated to developing the technical standards that will lead to global compatibility.

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BROADBANDROUTER

RiverDelta Networks' BSR 6400 broadband services router provides a modular, 16-slot, NEBS-compliant chassis, fully redundant, carrier-class IP routing engines and high-performance cross-connect switches. It also features high-speed optical network interface modules with wire rate packet processors and high-density DOCSIS 1.1 compatible radio frequency (RF) modules. An open standards-based service creation, provisioning and management environment is also included. The BSR 6400 can be combined with RiverDelta's patent-pending SmartFlow IP service flow technology to provide a wide range of interactive services over shared cable infrastructures.

For more information, contact RiverDelta at (978) 858-2300 or on the Web at www.riverdelta.com.

COMPACT TRENCHER

Charles Machine Works, manufacturer of Ditch Witch underground construction equipment, introduces the HT25, a versatile, compact, light-utility trencher. The HT25 is suited for replacing existing service lines and installing new service lines. At 35.5 inches wide and with zero-turn radius, the HT25 is designed to work in confined areas. Mounted on rubber tracks with hydrostatic ground drive and independent track controls, the HT25 features a 25 HP Kubota diesel engine. It can be equipped with various attachments and comes with productivity-boosting features such as electric-over-hydraulic digging chain engagement, enclosed self-lubricating gearbox and easy to identify controls.

For more information, contact Charles Machine at (800) 654-6481 or on the Web at www.ditchwitch.com.

RESISTANCE TESTERS

AEMC Instruments' third generation of clamp-on ground resistance testers feature a 0.01 ohm resolution and enhanced noise immunity. Models 3711 and 3731 measure ground rod and small system grid resistance without the use of auxiliary ground rods. Both meters measure ground resistance from 0.01 to 1200 ohms without disconnecting the rod under test. Models 3711 and 3731 also measure ground leakage current. Model 3731 includes both an alarm function and a memory function, which stores up to 99 field measurements.

For more information, contact AEMC at (617) 451-0227 or on the Web at www.aemc.com.

HARDLINE WEATHERPROOFING

Protex's molded black thermoplastic rubber weatherproofing substance is fully re-enterable and requires no torch or chemicals. It uses a special rubber compound that passes all industry standards for ultra-violet and salt spray testing.

The product was designed for cable operators who are re-entering hardline connector interfaces as part of system upgrades and rebuilds. It is also useful for quality checks after splicing. Unlike other weatherproofing, Protex does not require use of a knife or similar instrument, reducing the chance of damage to the cable and/or connector, as well as work-related injuries. Its re-enterable quality and quick application provide further efficiencies.

For more information, contact Protex at (601) 939-2299 or on the Web at www.protex-weathershield.com.

ENHANCED CABLE MANAGEMENT

Telect's CableLinks cable management system now includes 12-inch plastic straight troughs and junctions designed to protect and route large amounts of cable in the parameter of network fiber systems. CableLinks is a flexible, modular channel system that handles controlled environment cable management jobs. The new components offer fast installation and provide protection from having coupling and mounting hardware on the outside of troughs.

The 12-inch troughs and junctions were designed to accommodate the need for larger bandwidth within central offices and other facilities.

For more information, contact Telect at (509) 926-6000 or on the Web at www.telect.com.

CABLE LOCATOR

Tempo TR 4110 Buried Service Cable Locator locates buried service cables, sheath faults, and path/trace inside wire in walls and ceilings. It is equipped with a transmitter, receiver, search wand, grounding rod, cables, neck strap, operating manual with easy to follow instructions, and a carrying case.

Both the transmitter and receiver are powered by 4 "AA" batteries and weigh less than 16 ounces each. A speaker and analog meter in the receiver allow for visible and audible indication of the signal, which is ideal for noisy conditions. Use the lightweight search wand to correctly identify the signal, which peaks directly over the cable path.

For more information, contact Tempo at (800) 642-2155 or on the Web at www.temporesearch.com.

DVD CUT MACHINE

VITEC Mulitimedia's digital video disk (DVD) cut machine, the DCM, allows users to convert old and new video film to DVD format using a personal computer. The unit offers a suite of DVD creation tools for real-time encoding, authoring and editing for the entire range of Moving Pictures Experts Group (MPEG) 1 and 2 content, including VideoCD and DVD compliant video. The DCM combines VITEC's multimedia DVD toolbox software and a peripheral component interconnect (PCI) card that features a new high-speed proprietary chip, the VM2000. The chip acts as a specialized co-processor of the Pentium while the PCI card grabs and outputs all analog video standards.

For more information, contact VITEC at (408) 752-8453 or on the Web at www.vitecmm.com.

PROTOCOL ANALYZER

The Cuda protocol analyzer from Broadband Access Systems analyzes DOCSIS traffic in order to optimize network performance and diagnose and resolve faulty service.

Communications Technologies Readers' Choice Awards 2000 Finalist

The analyzer operates on multiple RF ports within a chassis and analyzes transmissions on a burst-by-burst basis. Multiple system errors can be tracked down without re-cabling diagnostic equipment. The device is remotely accessible and provides complete network coverage from a centralized office, allowing operators to cut down on the logistical costs of network service and support. The analyzer can be integrated into BAS's Cuda 12000 IP access switch, expanding the system from a high-class cable router to a full-scale DOCSIS and IP network management system.

For more information, contact BAS at (508) 366-8833 or on the Web at www.basystems.com

LOCATOR SOFTWARE

Electroline Equipment's Locator software allows multiple users to remotely monitor ingress in the return path of a cable television network via the Internet.

The Locator software, an upgraded version of Electroline's Cable Ingress Management (CIM) software, is among the four major components of the corporation's CLEARPath ingress management solution. The solution also includes a spectrum analyzer, a Test Point Selector (TPS), and CLEARPath Modules (CPM).

According to Electroline, Clearpath's Internet accessibility using Locator will facilitate return path monitoring and offer remote network management by multiple users from any location.

Electroline plans the release of the CLEARPath Locator software in the third quarter of 2000.

For more information, contact Electroline at (800) 461-3344 or on the Web at www.electrolineqiup.com.

CABLE MODEM ANALYZER

Communications Technology's Readers Choice Awards 2000 Finalist

Hukk Engineering's CM1000 Cable Modem System Analyzer enables testing of DOCSIS cable modem systems on both the downstream and upstream paths. Acting like a cable modem, the CM1000 communicates with the cable modem termination system (CMTS) to characterize the digital performance in both directions. In addition to conventional digital tests such as MER, BER, level and constellation on the forward path, it also allows BER testing on the return path without a headend unit. The unit's full color display lets technicians determine at a glance whether the connection meets minimum requirements. By checking the various points in the installation, the technician can quickly determine which components need to be replaced to ensure optimum performance.

For more information, contact Hukk at (888) 236-8946 or on the Web at www.hukk.com.

DROP DUCT

Dura-Line's Aerial Drop Duct is a high tensile strength high-density polyethylene (HDPE) duct with "Figure 8" construction incorporating a galvanized support strand for one-step aerial placement of duct and strand. The duct is available in 1/2-inch and 3/4-inch sizes. Designed to supply home and small business portals with faster Internet, telecommunications and coax connections, the product can be applied pole to house, building to building, and in highway or water crossings. It is designed for added defense against rodent damage and gun shot pellets.

For more information, contact Dura-Line at (631) 234-2002 or on the Web at www.jbn-duraline.com.

HOME GATEWAY

> Motorola's CentriQ 1020 network-powered communications gateway offers four lines of carrier-class voice over Internet protocol (IP) telephone service as well as an Ethernet high-speed data port. The unit provides lifeline telephone services using several powering methods: center conductor network powering, Siamese pair network powering or an external, DC uninterruptible power supply (UPS). Switching between any of these methods is automatic, allowing operators to deploy one type of powering initially and then switch over to another without rolling trucks. The CentriQ 1020 provides toll-grade call quality and all custom local area signaling services (CLASS) features, using DOCSIS 1.1, PacketCable and proprietary software and hardware architectures. An integrated home phone networking alliance (HPNA) home networking adapter provides data speeds of up to 10 Mbps, as well as additional telephone lines over existing twisted-pair wiring.

Communications Technology Readers Choice Awards 2000 Finalist

For more information, contact Motorola at (800) 523-6678 or on the Web at www.motorola.com.

CALENDAR

August

9: Central Florida Chapter Technical Seminar. Contact James George, (357) 351-1300.

12: Llano Estacado Chapter Technical Seminar & Testing Session, Cox Communications, Lubbock, Texas, Contact Bob Baker, (705) 763-4411.

12: Hill Country Meeting Group Technical Seminar, Paragon Cable, San Antonio, Texas. Contact Sherry Hefner, (210) 352-4211.

15: W.V. Mountaineer Chapter Technical Seminar, Ramada Inn, S. Charleston, W.V. Contact Charles Bradley, (304) 247-6231.

15: SCTE Seminar, Data Technology for Technicians, Sacramento, Calif. Contact Jessica Dattis, (610) 363-6888.

15: Northern New England Vendor Show, Double Tree Inn, Portland, ME. Contact Bruce Vines (207) 253-2255.

16: W.V. Mountaineer Chapter Technical Seminar, Holiday Inn, Bridgeport, W.V. Contact Charles Bradley, (304) 247-6231.

16: S. California Chapter Technical Seminar, Alahambra. Contact Chuck Harper, (310) 647-6645.

17: New England Chapter Vendor Show, Boxboro Holiday Inn. Contact Tom Garcia (508) 562-1675.

17: Wheat State Chapter Technical Seminar, Red Coach Inn, Wichita, Kan. Contact Joe Cvetnich, (316) 262-4270, x 139.

23: Cactus Chapter Technical Seminar, Tucson, Ariz. Contact, Brenda Hunt, (602) 332-2003

24: Central California Chapter Technical Seminar and Testing Session, MediaOne, Fresno, Calif. Contact Roger Paul, (559) 253-4685.

PLANNING AHEAD

> **Sept. 7: SCTE Board of Directors Meeting.**
> Orlando, Fla. Contact Kaye Keller, (610) 363-6888.

> **Sept. 27-28: Great Lakes Expo**
> Chicago. Contact Great Lakes Cable TV Association, (317) 845-8100.

> **Oct. 12: SCTE Seminar, Cable 101**
> Atlanta. Contact: Jessica Dattis, (610) 363-6888.

> **Nov. 28-Dec. 1: Western Cable Show**
> Los Angeles. Contact California Cable TV Assoc. (510) 428-2225.

SCTE

Women in Cable & Telecommunications

Communications Technology
Official trade journal of the Society of Cable Telecommunications Engineers

2000 WOMEN IN TECHNOLOGY AWARD NOMINATION FORM

Past Recipients:

1999	Sally Kinsman	Motorola
1998	Sheri Sharp	Cox Communications
1997	Yvette Gordon	Sea Change International, Inc.
1996	Pam Nobles	Comcast
1995	Pam Arment	Pamela J. Arment Consulting

Co-sponsored by the Society of Cable Telecommunications Engineers (SCTE), Women in Cable & Telecommunications (WICT), and *Communications Technology* magazine.

Objective:

The annual **Women in Technology Award** recognizes and honors leading women in technology positions within the cable and telecommunications community and creates visibility for all women in technical careers. Each year it identifies and acknowledges the achievements of one woman who has demonstrated outstanding personal and professional growth and has contributed significantly to the industry.

To Be Eligible:

- Open to all women in a technical field of cable television, broadband, and telecommunications.
- Current national SCTE member.
- Current national WICT member.

Factors of Consideration:

- Demonstrates meaningful contribution to the industry.
- Exhibits high level of knowledge, skills, and professionalism.
- Committed to community and/or professional activities that enhance the perception of the cable and telecommunications industry in general, and women in technology specifically.
- Broadband Communications Technician/Engineer (BCT/E) Certification.
- Exhibits commitment to professional development and continuing education.
- Attends SCTE and WICT conferences.

To nominate someone for this award, please provide the following information:

Name of Nominee: _____

Company: _____ Title: _____

Address: _____

Telephone: _____

Why are you nominating this person? (attach additional sheets if necessary.)

_____

_____

Name of Nominating Person: _____

Company: _____

Address: _____

Telephone: _____

Mail or fax to be received by August 25, 2000 to:

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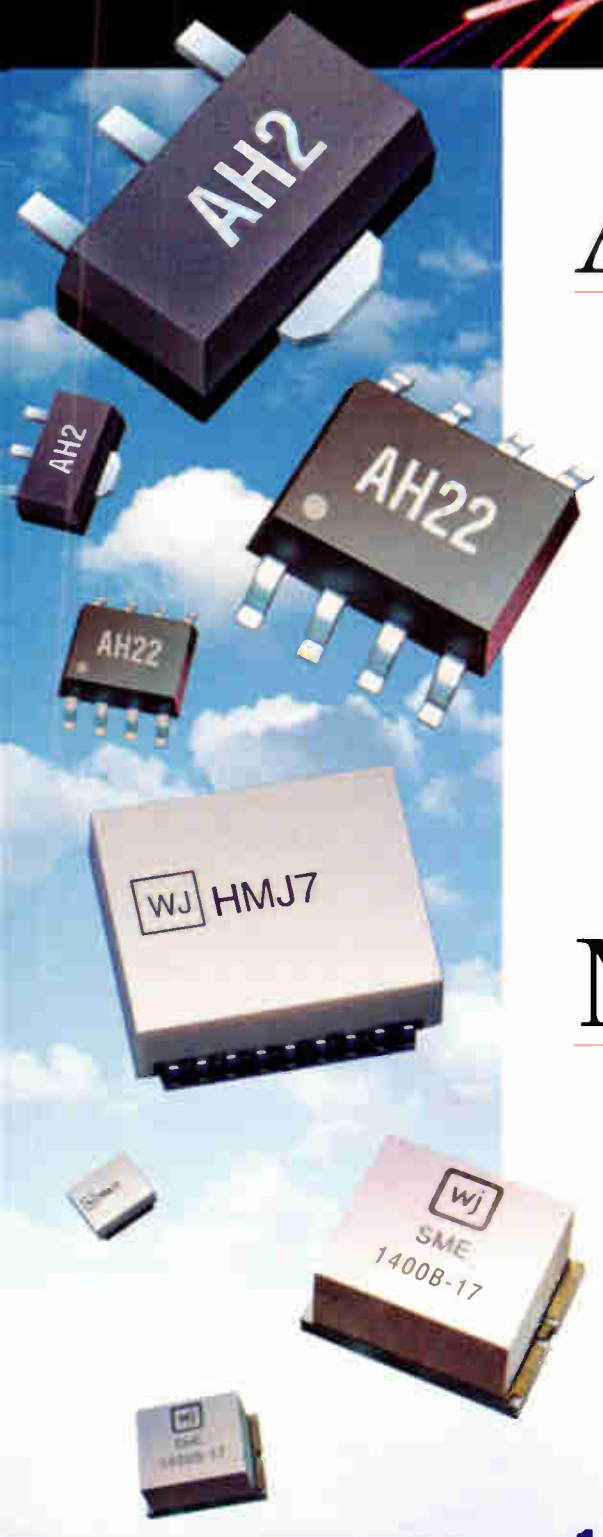

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Reporting directly to the Regional Director of Engineering, this individual will be the chief technical person responsible for the technical integrity of Adelphia's operations within the Virginia and North Carolina areas. Will participate in building and maintaining long range fiber loops, and in system rebuilds and interconnects. This professional will be responsible for implementing strategies and solutions outside plant including architectures, design specifications, and equipment selections. Motivated individual will direct the Area Technical Staff in training and design. Participate in budget preparation and cost control.

The successful candidate will have a Bachelor's degree in Engineering and at least 10 years of experience in engineering in a cable system. An advanced degree and 5 years experience in the cable industry is preferred. Must have a demonstrated ability to provide engineering leadership. Must be capable of critical thinking and possess solid analytical skills. Must be a talented communicator. Previous supervisory and research experience is also preferred.

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Beating Our Own Record

How could this year's Cable-Tec Expo in Las Vegas outshine the one that rocked Orlando last year?

Expo 2000 set several important records. Attendance increased to more than 11,000, and the 143,000 square feet of floor space from 400-plus exhibitors is a significant increase over last year. Expo exhibit space sold out early. By the time the ribbon across the entrance was cut, everyone had been accommodated.

The SCTE Bookstore was a popular place. Arch Taylor's *History Between Their Ears* sold out. Joining Arch as a book-signer at the bookstore was Antonio Huerta with *Televisión Por Cable*, his translation of William Grant's popular *Cable Television* textbook. Thirty-two people took certification exams this year at Expo, more than had been tested in recent history.

Visible growth

The exhibit hall was a marketplace, with buyers and sellers professionally and productively interacting. This focused market of hardware buyers and sellers sets Expo apart from other cable industry conventions and meetings.

As Expo has rapidly grown (Expo 2000 was 40 percent larger than Expo '98 in Denver), we have attempted to manage the growth while still being true to the unique aspects of Expo that has made it different. We continue to place the smallest booths—10'-x-10's—in front of the hall to ensure that small and new exhibitors receive a fair share of traffic. Also, we do not allow entertainers, bands, and other hoopla that might detract from the "no-nonsense" business atmosphere that has been associated with Expo.

The training side of Expo was equally strong. For the second straight year, we devoted a full day to a hot topic. This year, it was the reverse path that attracted a standing-room-only crowd.

Cable-Tec Expo is about what's new in a rapidly evolving industry. Expo started out with two new preconference sessions on international business and the introduction of the new SCTE Board of Directors at the Annual Membership Meeting. The membership meeting itself attracted about 140 individuals.

On the lighter side

Expo Evening, sponsored again by ANTEC, SCTE, CommScope, Motorola, Philips and Scientific-Atlanta, was a great success and a lot of fun. All American Sport Park in Las Vegas provided the setting for this year's evening, and the competitive sports atmosphere provided the perfect frame for the real-life, real-time Cable-Tec Games. We owe a special thanks to the contestants for taking the time to demonstrate their knowledge and craft for the curious group of spectators.

The Awards Luncheon recognized many for their outstanding efforts. The Hall of Fame Class of 2000—Bill Riker and Dan Pike—represent two well-deserved additions. Member of the Year Mark Millet showed that one person can make a difference. And for many, the emotional highlight was seeing the Milton Jerrold Shapp Scholarship Award presented to Debra Gemme by 1996 recipient Joshua Butters. Helping educate our future leaders is a process all of us can share in with pride.

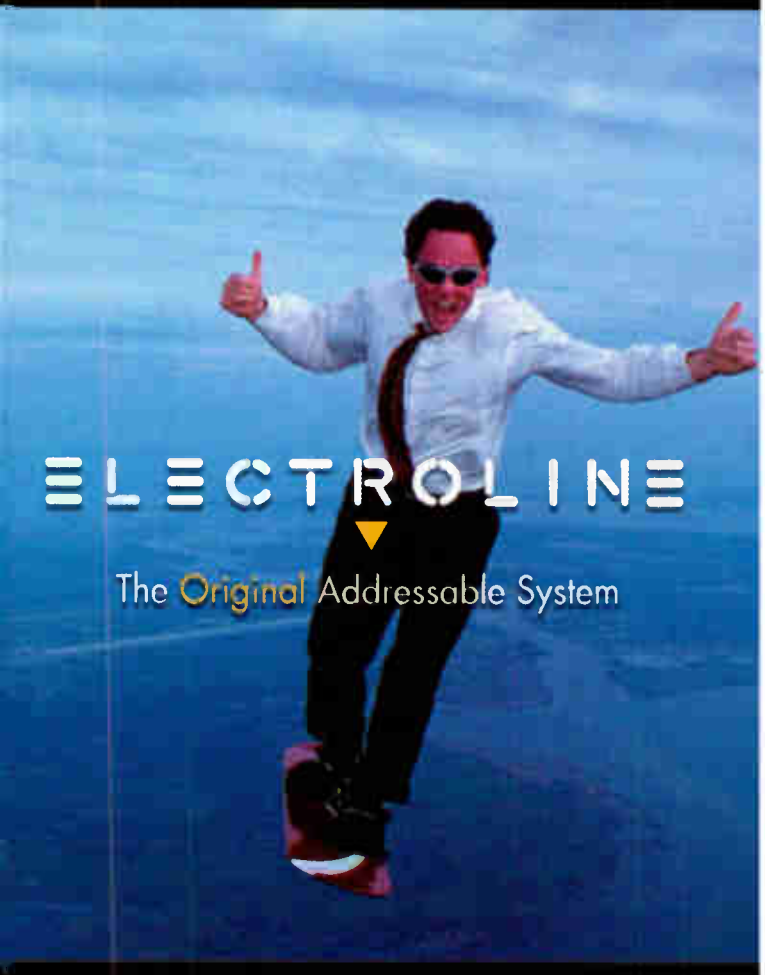
The sold-out Ninth Annual Golf Tournament attracted more than 300 golfers, and was so successful and well executed by Tony Finger, Hugh McCarley and Larry Stiffelman that it resulted in a profit that was donated to the SCTE Scholarship Fund.

Wavetek Wandel Goltermann again sponsored the Arrival Night Reception, with hot dogs, suds, beans and condiments. Other receptions brought together the Amateur Radio Operators, Women in Cable and Telecommunications, the Loyal Order of the 704, and the recently revised SCTE-List. One reception saw the end of an era, as the SCTE Charter Members spread their wings to include other cable veterans in the newly formed Circle of Eagles. To give another Expo a great finish, Electroline, Lindsay, Tellabs, and Tollgrade sponsored the Closing Night Reception.

See you in Orlando

Plan to show up at Expo in Orlando next year with oar in hand and life jacket strapped on, because once the show starts and the rapids begin flowing, you'll want to be seated and ready for a fast, furious, and positively thrilling ride to greater job skills, knowledge and personal career morale. I can't wait. See you there.

John Clark is president and CEO of the SCTE. You can reach him at jclark@scte.org.



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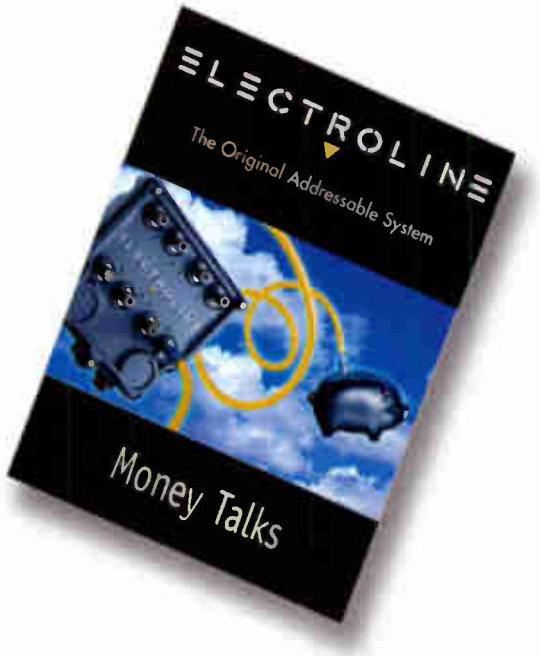

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