



# Communications Technology

OFFICIAL TRADE JOURNAL OF THE  
SOCIETY OF CABLE TELECOMMUNICATIONS ENGINEERS

AUGUST 1999

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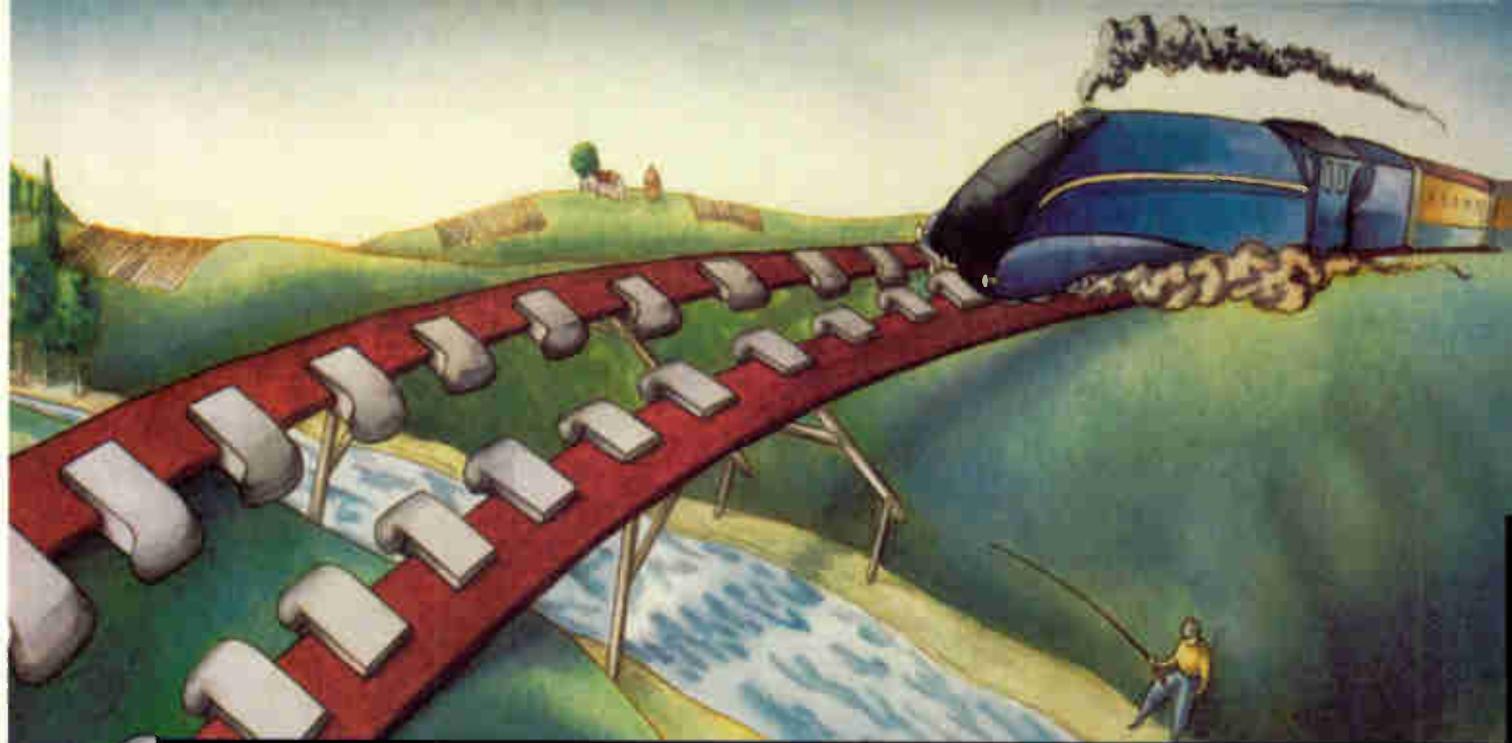
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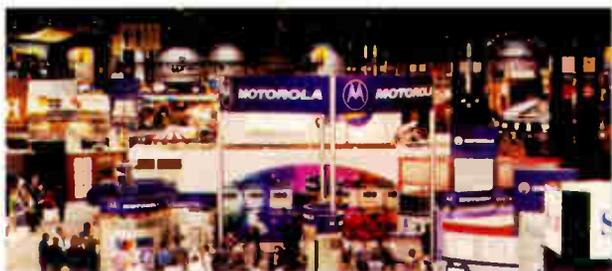
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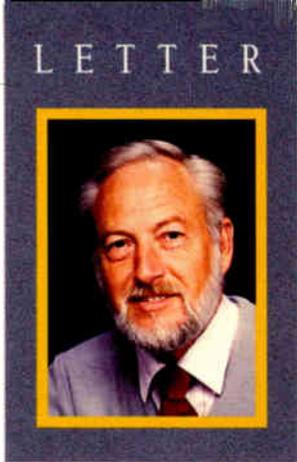


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Reader Service Number 3

By Rex Porter



# “Can’t Be Done,” Indeed



few months ago, CableLabs held a conference to update financial analysts. One panel consisted of chief technical officers from our largest system operators at the time, and audience members could question the panel.

One question was: “Every discussion about transmitting the Internet has been limited to ground-based cable and fiber systems. Why don’t we envision long distance Internet signals being uplinked from the sender’s headend to a low-orbit satellite system such as Teledesic? Then these same signals would be downlinked to the addressee through that system’s headend, completing the journey through the cable system to that long-distance addressee.”

Only one panelist gave the query much consideration. Other answers amounted to: “It can’t be done!” “There’s not enough bandwidth with satellites!” “It’s too complicated!” “Fiber is better!”

Now the *Washington Post* says Lockheed

Martin’s new telecommunications unit is investing \$3.6 billion in a four-satellite system called Astrolink. And guess what—Lockheed Martin plans to carry high-speed data and video Internet traffic across the nation and around the world with it.

I simply hate seeing money wasted on a venture with no future. And Lockheed Martin earlier lured poor little Comsat into a proposed \$2.7 billion merger, which doubtless means disaster for Comsat, too.

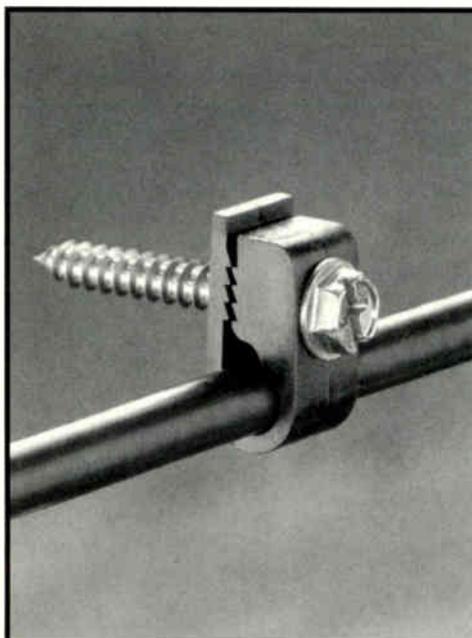
Lockheed will provide A-2100 satellites and launch vehicles. It also duped a tiny outfit named TRW into thinking this is a viable project. According to the *Post*, TRW will provide digital communications equipment for the satellites.

Not only is Lockheed ready to add five more satellites if demand warrants, but Hughes Network Systems’ Spaceway and the Teledesic project owned by Bill Gates and cellular phone pioneer Craig McCaw also have their own systems.

Apparently, America Online also thinks it’s possible, investing \$1.5 billion in Hughes Satellite TV Service. If Internet-over-satellite can be done, and these players certainly have the means to do it, then we might keep our local Internet business while others just grab the long distance Internet business—for now. Later, we’ll pay the piper whatever he demands.

But we say it can’t be done. Shouldn’t we share our knowledge with other industries to protect them from their own folly?

Rex Porter  
Editor-in-Chief



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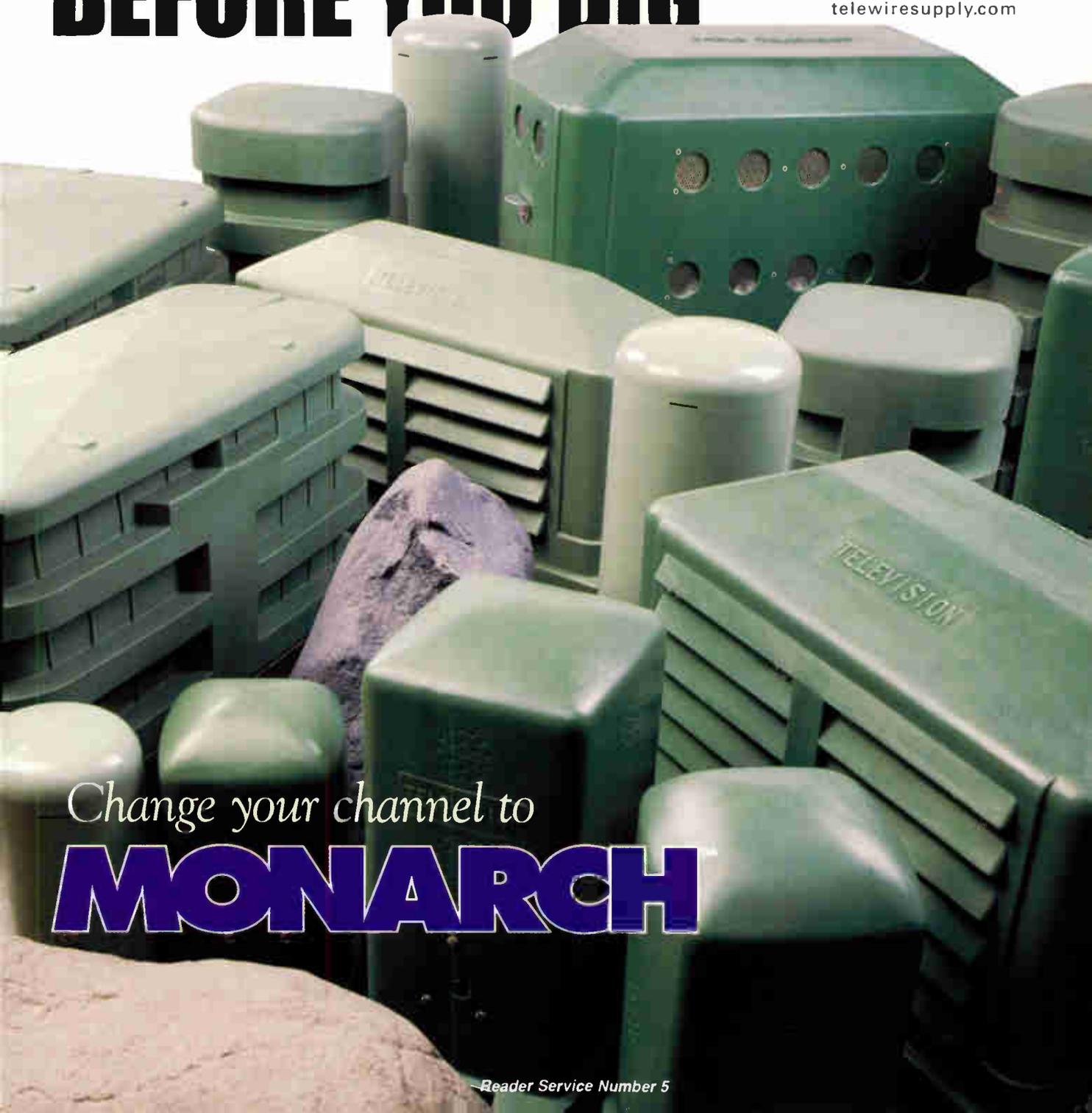
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Reader Service Number 6



## Vendors Tout Software for the Broadband Millennium

With much of the focus at Cable '99 placed on programming, the show floor provided an opportunity to discuss the latest in cable telecommunications with broadband luminaries from the vendor side of the coax. In separate interviews, Philips Broadband Networks' Paul Pishal and Scientific-Atlanta's Bill Wall agreed that keeping up with the growing and changing needs of cable operators these days is no easy task, but it's an exciting one.

What does it take to keep up with cable operators planning for broadband's new millennium? "Two parts technology, part RF technology, part science and one part engineering," said Pishal. "Everyone knows the ingredients, but no one knows the recipe."

Pishal, who moderated a technical conference called "Internet Topics" at the show cites traffic and software as two major areas of concern as operators expand their networks' capabilities. "It's a new set of services and engineering considerations that vendors are rolling out," he said, and it's important to be prepared.

"Now we're going into new technical places because of interactivity and the In-

ternet," Pishal added. With that progression comes some serious concerns about traffic. "Traffic was never an issue when you were just offering a new channel," he said. Now, things are different. "One of the worst things you can do is talk about high-speed on your network and then realize that there is congestion," he warned.

With two-way services comes increasing demands for interactivity and the software to make it happen. "It's important," he said, "so that you can get third-party applications on the TV set." The current vehicle to achieve this functionality is the set-top box.

As they progress into this relatively new territory, Pishal cautioned operators to be aware of what he calls "IT (information technology) immersion." Striving to achieve the latest in interactive services over cable networks means, "You really get dunked in the technology." The increased revenues are worth it he said.

"Software applications are key to revenue growth," Pishal explained. An important facet of this is the way they all interplay and reach the consumer. Keeping this in mind, PBN is responding accordingly. "We're building flexible platforms to move in the direction operators need to go," he said.

Flexibility also is important to S-A said Wall. The industry's high-speed evolution has prompted it to delve into new arenas to help meet cable operators' needs and rapidly increase revenues.

"S-A always has been thought of as a hardware-oriented company," Wall said. "But today, the majority of our R&D efforts are with software rather than hardware."

At the show, S-A announced a deal with Israel-based Peach Networks to integrate Internet gaming, Microsoft Windows applications and Internet browsing on its Explorer 2000 digital platform. This deal will enable many of the personal computer's (PC's) most popular features over the set-top.

According to Wall, Peach Network's system can deliver most all applications written to run on Microsoft Windows. Coupling the system with the PowerTV operating system (OS) enhances these capabilities. A browser from WorldGate will take these features to the subscriber.

WorldGate's product is very much a server-centric application. "It gives the MSO (multiple system operator) choices," explained Wall.

Networking also is emerging as a hot topic at S-A. "Home networking is really

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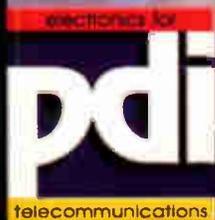
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an area we're focusing on a lot right now," he added. Standards are what will allow the industry to really progress in the area. "Standards activities are very much in their infancy today," Wall explained. When it comes to home networking, "We think that standards should be in the middle of it," he added.

## NEWS BITES

- Cable modem systems vendor Terayon plans to acquire Imedia, which produces routing and re-multiplexing systems for digital video. The technology enables cable operators to select and customize their program lineups for delivery over standards-based set-top boxes. Terayon officials said the deal will expedite the company's ability to offer a complete broadband system portfolio to support high-speed delivery of data, voice and video over cable.
- Five more cable modems have been approved by CableLabs for retail availability in the latest round of Data Over Cable Service Interface (DOCSIS) certification. The newly certified companies are Askey Computer Corp., Cisco Systems, Philips Broadband Networks, Samsung Information Systems of America and Sony Corp.

These additions join previously certified modems by Toshiba, Thomson Consumer Electronics, 3Com, General Instrument and Arris Interactive, bringing the total number of certified modems to 10.

- Charter Communications and Bresnan Communications have a deal under which Charter will acquire Bresnan. When completed, the acquisition will add approximately 690,000 customers to Charter's subscriber base. Upon closing, slated for early 2000, Charter will serve approximately 6.2 million customers as the fourth largest MSO in the United States.
- Adelphia said it will operate its majority-owned subsidiary Hyperion Telecommunications Inc. under the doing business as (d.b.a.) name of Adelphia Business Solutions. The name change reflects the company's ongoing efforts to forge a single brand in the converging voice, video and data markets for both residential and business customers. **CT**

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# Wavetek Wandel Goltermann. One Focus. Infinite Solutions.



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Think you need major Wall Street backing, a magic spell and several first names to deploy advanced services in your cable system? Think again. Better yet, let an operator in the boondocks of North America's vast prairie lands tell you how it's done.

Meet Joe Floyd, president of Midcontinent Media, a freshly formed parent company to Midcontinent Communications.

Midco operates approximately 130 cable systems throughout North Dakota and South Dakota, as well as the northern sand hills of Nebraska. Subscriber counts range from 50,000 in Sioux Falls, S.D., to 38 in Lehr, N.D., said Floyd.

## More channels

"The problem we originally faced was trying to expand programming and increase the number of channels we could offer in many of our smaller systems to compete with (direct broadcast) satellite (DBS). Many of these systems were 20-channel systems," said Floyd.

"It became our mission two years ago to get a minimum of 40 channels on all of our systems," explained Floyd. By interconnecting the neighboring systems with fiber, Midco was able to eliminate headends and reuse channel processors. "The theory was to connect several cable systems in a cluster, eliminating all but one headend, and then salvage the channel processing equipment and use it in the cable systems which were not connected to a fiber cluster."

"With the fiber interconnect, we actually got 80 pieces of equipment back to use in four other nonconnected systems," Floyd added. "The plan did significantly slow the loss to DBS."

Floyd said that ADC stepped in to help Midco with the analog deployment, providing installation support and training staff to wrangle with the relatively new technology.

"Once we had the fiber clusters completed," said Floyd, "we decided to connect Bismarck, N.D., to the Aberdeen,

S.D., network to save costs on T-1 circuits for customer service, PPV (pay-per-view) and customer call routing." The cost of a T-1 from North Dakota to South Dakota is about \$5,000 per month, reported Floyd. The solution was to install a 24-count fiber route to avoid the T-1 cost burden.

## Teamwork spurs success

With teamwork, the deployment was a success, said Wayne Walters, ADC's vice president of product management for Cellworx.

"Some of the distances between distribution and colocation sites were reaching the limits of the transmit distance of the lasers," Walters said. "The ADC engineers were able to test the distances and optical budgets. Midco also agreed to use their best fiber strands to transmit their traffic." Walters said the decision helped the deployment's cause.

Simultaneously, Midco had developed a cable-based, high-speed Internet service running at 1.5 Mbps symmetrical with the network operations center (NOC) in Sioux Falls, S.D. "This service was designed to be deployed on all of our systems that we had rebuilt to 500 or 750 MHz HFC (hybrid fiber/coax)," said Floyd. The decision followed to continue the 24-count fiber all the way to Sioux Falls.

"This gave us a 530-mile fiber route on which we could deploy advanced digital services to all systems connected to the network. We then decided on an OC-12 (optical carrier) SONET (synchronous optical network) design. We selected the ADC Cellworx system because we knew

they could do it in severe weather conditions," Floyd explained. "If you have not been to Bismarck, N.D., in January, you have missed something," ADC performed the installation in January.

"We found the ADC personnel seemed used to the cold, sometimes oppressive weather; they stuck with the job under all conditions. We were pushing the limits of the technology for distance on fiber, so we had no patterns on performance. We also had some bad conditions in Steel, N.D., getting the terminal installed," he said.

This network is allowing Midco to deliver advanced services and to operate more cost-effectively and seamlessly.

"Midcontinent Communications is now able to offer high-speed Internet in many of our small systems where people have had to use long distance to use the Internet and PPV service. We also use this network to connect our SeaChange digital insertion equipment in several systems."

## Improvements across the board

Customer service call routing also has improved greatly since the deployment. "This backbone network is our future in the telecommunications business in the Midwest," he said.

"We are very proud of this project; it gives us a great technological lead in the area in the deployment of advanced service on HFC cable systems. Our high-speed Internet service that we call CableNet is very well-received. In the future, we plan to use this network for the deployment of the Midcontinent@Home service," said Floyd.

"In the future," he predicted, "we will most likely introduce the TCI-developed HITS (Headend in the Sky) digital service by locating the HITS headend at our NOC in Sioux Falls and deploying it up our network." **CT**

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Greta Durr is deployment editor of "Communications Technology" in Denver. E-mail deployment information or comments to [gdurr@phillips.com](mailto:gdurr@phillips.com).

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## SCTE Seeks OSP Management Input

The Society of Cable Telecommunications Engineers' Hybrid Management Sub-Layer Subcommittee is seeking feedback from interested parties on its draft documents outlining "Specifications for the Physical Layer" and "Specifications for the MAC/DLL Layer."

The document defines standards for the operation of hybrid fiber/coax (HFC) outside plant management systems. These draft documents are available through the SCTE Standards Department.

Interested hardware vendors also are invited to participate in the preliminary interoperability testing. Phase One will allow testing of a proposed standard power supply wire harness based on preliminary specifications as outlined and suggested by the HMS Subcommittee.

If this preliminary phase is a success, it will be a significant step forward to

achieving true interoperability of outside plant management systems in the cable TV environment.

The HMS Subcommittee has set the week of Aug. 2-6 as the target date for initial hardware interoperability testing to be conducted at a site to be determined. Preliminary hardware testing will be done only on products built to specifications as outlined in the current draft documents.

Additional hardware test sessions will be scheduled for the remainder of 1999, with a goal of having deployable standards-based product early in 2000.

The HMS Certification Working Group, whose task is to define test procedures to guide initial interoperability test activities, also is inviting contributions from interested parties.

Anyone interested is invited to contribute to these activities as participants or observers.

Please submit responses, questions and comments regarding these activities by Aug. 30 at 5 p.m. Eastern Time. Contact Dr. Ted S. Woo, SCTE, 140 Philips Road, Exton, PA 19341-1318; (610) 363-6888; fax (610) 363-7133; or e-mail [twoo@scte.org](mailto:twoo@scte.org).

## Training Pubs Aid Decision-Making

SCTE has introduced two new training publications, *Making the Right Decision* and *Effective Decision-Making and Problem Resolution*.

Both resources help decision makers address issues such as basics of successful businesses, working with others, use of resources, ethics and customer focus. All of these issues are critical to being a professional employed in today's complex work environments.

The books include a five-step plan for actual decision-making that provides a solid method for logical approaches to making effective business decisions in the workplace.

The first book, *Making the Right Decision*, provides training on decision-making for customer service representatives (CSRs) and field personnel.

*Effective Decision-Making and Problem Resolution* is a valuable tool intended for technicians and technical managers who are looking to sharpen their own techniques.

Practice in considering possibilities and outcomes is provided, and feedback is included to help guide those decisions. Information analysis and documenting that thinking also are key skills that are covered.

As products of SCTE's Knowledge Avenue brand, these materials can be used for self-study or classroom-style training. The programs also will support candidates enrolled in the Society's Broadband Communications Technician/Engineer (BCT/E) certification program as they prepare for Category VII exams.

The new publications, with a corresponding video, are available now from SCTE. For more information about these new publications, contact SCTE at (800) 542-5040, fax (610) 363-5898 or e-mail [bookstore@scte.org](mailto:bookstore@scte.org). CT

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Reader Service Number 14



By Ron Hranac



# Cable-Tec Expo: A Really Big Shoe ...

**T**his year's Society of Cable Telecommunications Engineers' Cable-Tec Expo was another record-breaker, both in terms of attendance and overall quality. A tip of the hat to the Society's national headquarters staff and everyone else involved in making Expo a success.

SCTE's preliminary estimates put overall attendance in the 11,000 range. As for show quality, the Engineering Conference panels featuring cable company chief executive officers and chief technical officers were superb. All of the workshops I attended were excellent, and the exhibit hall was nicely laid out, easy to get around and had generally good traffic most of the show. I was especially pleased to see that a dear friend and talented engineer, Antonio Huerta, was named SCTE's Member of the Year. That recognition was well-deserved for his dedication to the Society.

## Book signings

SCTE's bookstore offered several book signing sessions by the authors of a number of excellent publications. Walt Ciciora, Jim Farmer and Dave Large were on hand autographing *Modern Cable Television Technology*, an outstanding book reviewed in this column last month. Other authors included Francis Edgington and Jeff Thomas (*Digital Basics for Cable Television Systems*); Jim Kuhns (*The Satellite Calculations Handbook*); Steven Biro (*The CATV Engineer's Antenna Handbook*); Jay Junkus (*DigiPoints, Volume One*); and Dean Stoneback (*Broadband Return Systems for Hybrid Fiber/Coax Cable TV Networks*). One person who had appeared for book signings at several prior Expos was definitely missed this year: William Grant, author of *Cable Television*, now in its third volume. Bill passed away in December.

As Cable-Tec Expo grows each year, it becomes more difficult to see it all. This

year was even more interesting because, for the first time in my career, I got to spend time on the "other side of the fence" in one of the exhibit hall booths. Or, as one longtime friend (an industry vendor who shall remain anonymous for obvious reasons) said with a grin, "Welcome to the dark side."

As it turned out, other commitments kept me elsewhere most of the show. I wound up spending a total of about an hour in the booth over three days, but my colleagues at HSA Corp. gave me some good-natured ribbing and told me that would change at the National Show. By the time you read this, I will have paid my booth duty dues in Chicago.

## Assorted goodies

One of the things I enjoy doing at any convention—Cable-Tec Expo in particular—is wandering the exhibit hall looking for some of the more unusual and interesting things on display. While I didn't get a chance to stop by every booth this year, I did manage to find a number of neat goodies in the booths of both large and small companies.

Cable Innovations: Fred Runkle and gang introduced a line of fuseless line passives, an interesting concept that removes a potential weak link in our powering chain. I stopped by to see just what they did to the circuits to allow operation without fuses or buss bars. The bottom line is heavy duty, given that 14-gauge wire is used to wind the inductors, and board traces and other components are very ro-

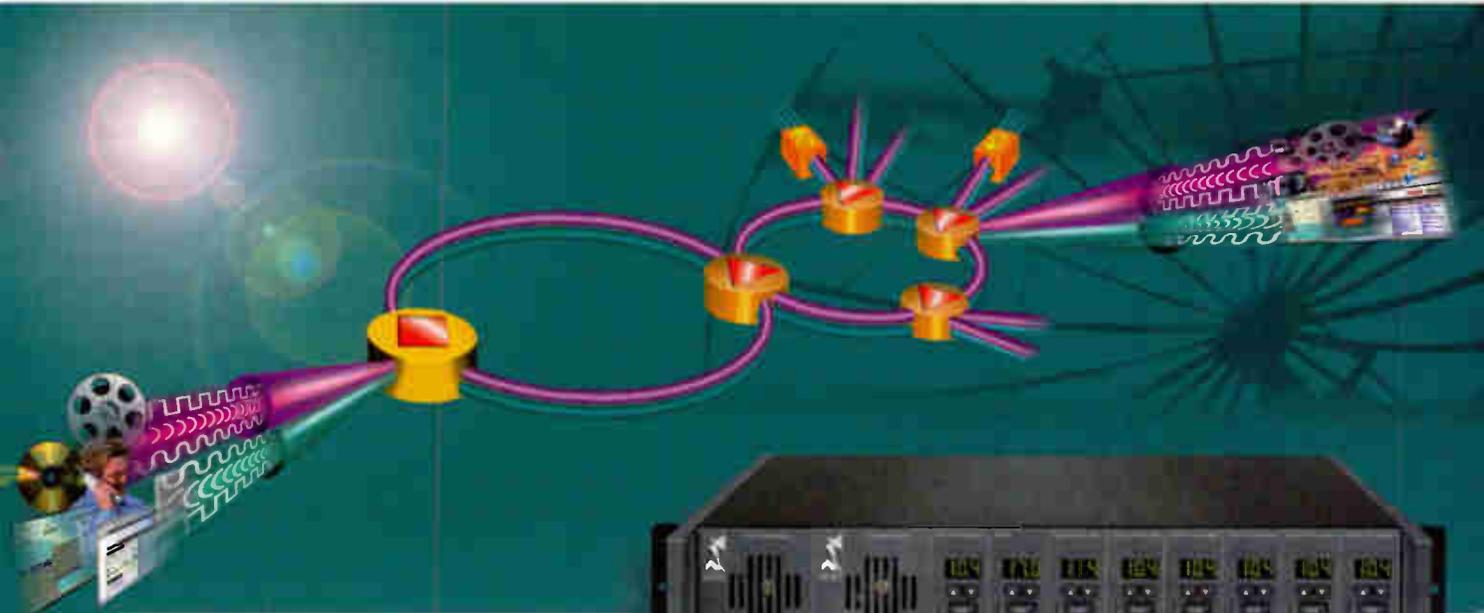
bust. A quick peek at the insides of the new passives suggests to me that they won't easily be a weak link. As for the obvious question about routing or blocking power, that can be dealt with in most cases with a novel power-blocking housing-to-housing connector.

Cheetah: Return path management. Need I say more? OK, I will. Cheetah's new Phasor System uses intermediate frequency digital signal processing (IF-DSP) for upstream signal analysis. One feature that will be useful for identifying unknown reverse path carriers is Phasor's ability to demodulate AM, FM and single sideband signals.

CommScope: If you've read even part of what I've written over the years, you know that I'm a fanatic about good subscriber drops. CommScope has a new series of corrosion-resistant drop cable called Bright Wire. The cable's center conductor and shield are chemically treated during the manufacturing process, producing corrosion resistance that CommScope says works better than powdered treatments or conventional flooding compounds. The premium for this is about a dollar a reel, which in my book is pretty cheap insurance.

Digital reverse: No, this isn't the name of a company that was exhibiting at Expo. It's technology that was being touted by both General Instrument and Scientific-Atlanta. Here's the idea: When the 5-40 MHz reverse spectrum reaches the node, the entire spectrum is digitized and transported to the headend via fiber as a digital signal. In a nutshell, the 5-40 MHz reverse spectrum—desired upstream signals, ingress and everything else—goes into a powerful analog to digital (A/D) converter and some other circuits before modulating the laser. In the headend, the output of the upstream receiver passes through processing

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circuits, including a digital to analog (D/A) converter, which changes the digital signal back to the original 5-40 MHz spectrum. The idea is that lower cost upstream lasers can be used, and time division multiplexing (TDM) can be applied at the node to digitally combine several digitized return spectra onto one fiber. Keep your eyes on this technology.

**Digitrans:** When I stopped by Digital Transmission Equipment's booth, Clayton Dore and Mason Truluck showed me real-time satellite reception and decryption of DigiCipher II programming. While satellite reception demos at conventions are nothing new, what was unique here was that this was the first time a company licensed by General Instrument has successfully received and decrypted a DigiCipher II signal. Nice feather in the cap for the folks at Digitrans.

**Hewlett-Packard:** H-P was showing a new low-cost cable TV spectrum analyzer that is based on its L1500 series. Availability was scheduled for July, so by the time you read this you should be able to get your hands on one.

**Matrix Test Equipment:** Matrix is best known for the company's multicarrier signal generators used for broadband carrier-to-noise (C/N) and distortion testing. Jack Kouzoujian showed me the new Model ASX-16-QAM (quadrature amplitude modulation) 256-QAM generator. This device can generate the usual multiple continuous wave (CW) carriers, plus AM, quadrature phase shift keying (QPSK), and 4-QAM through 256-QAM test signals. This will provide a nice way to test active device performance with various combinations of CW and digitally modulated carriers.

**Mega Hertz:** Steve Grossman had a number of neat goodies on display. Among my favorites was a coaxial surge suppres-

or made by TII Industries. It's for use in the subscriber drop and is available in several configurations, including double female F ground block, standalone double female F, and male F/female F.

**Multipower:** Bob Bridge (Multipower) and Jorge Restrepo (Integral Broadband) were all smiles as they demonstrated what they call "outage prevention without batter-

ies." The patented double power source (DPS) is in a nutshell line power inserters with the ability to automatically switch to a redundant power feed from an operational power grid in the event of a loss of commercial power in the primary power grid.

**Times Fiber:** TFC's TX10-15 low loss drop cable is drop cable on steroids. How else to describe half-inch drop cable that has the same attenuation performance as 0.500 feeder cable? It's available in most of

**"As for show quality, the Engineering Conference panels featuring cable company chief executive officers and chief technical officers were superb."**

the usual drop configurations: plain, flooded, messengered, 60-percent, quad shield and so on. Intended applications include just about anything that requires the performance of traditional hardline feeder cable but the flexibility of drop cable.

**Visionteq:** "RF Grooming R Us" might be appropriate for Visionteq and its head-end combining equipment. Its RCD-1001 and RCD-1002 are the best reverse path combiners and distribution units I've seen.

### Wrap-up

There you have it. Another Cable-Tec Expo goes down in the record books as a "really big shoe" (if you know where that came from, you're dating yourself), definitely appropriate considering this year is also the Society's 30th anniversary. **CT**

*Ron Hranac is vice president of RF engineering for High Speed Access Corp. in Denver. He also is senior technical editor for "Communications Technology." He can be reached via e-mail at rhranac@aol.com.*



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By Justin J. Junkus

# Cable Telephony's Oxymoron

**C**able telephony is moving too fast to just call it technology evolution. Because of some factors I will discuss in this column, I still can't call it a technology revolution. So, I am going to use an oxymoron—contradictory terms—to describe what is happening in summer 1999 as cable telephony's "evolutionary revolution."

## Revolution

First, let's look at the revolution. The marketing side of our business—both vendors and operators—seems to support a major commitment to telephony as a cable service. We definitely want the public and our technical staffs to perceive our industry as a full-service communications provider, right now. In particular, we want the public to know we are the alternative to the phone company, as well as their video and data services provider. The mergers, the product announcements and CableLabs' PacketCable standards all add a very pointed focus to the general direction we have been taking for almost four years. The pace of the activity, as well as its volume, certainly makes it look like a technology revolution is occurring.

## Evolution—or is it?

On the other hand, the evolution part of the description becomes appropriate when examining the status of the technology. Unlike cable's apparent strategic marketing direction, its technical tactics are still somewhat blurred.

Take a look at Internet protocol (IP) telephony as an example. Probably because the term IP conjures up visions of data, packets, broadband and multimedia communications, anyone selling telephony products to our industry wants to demonstrate that they can deliver packet-based telephony over cable as soon as the industry wants to install and sell it. All the telephony vendors at Expo, for example, had a way to show how they can provide IP telephony now, in conformance with the Data Over Cable Service Interface Specification (DOCSIS).

If you consider that the first published PacketCable spec (NCS 1.0, short for network-based call signaling protocol) was released a mere two months earlier, on the surface it looked like the revolution has happened. You could actually make real IP telephony calls at all the telephony vendor booths.

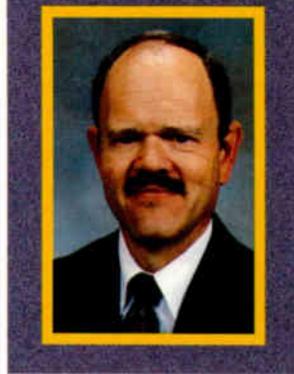
But when you compared the NCS 1.0 document against what was being shown at Expo, you could see that this is the beginning of a path, not the destination.

The NCS 1.0 spec is based upon a standard called media gateway control protocol (MGCP). It is a different way to deliver IP telephony than the International Telecommunications Union's H.323 standard used by most existing vendors of IP telephony equipment.

## Competing protocols

Without getting into all the details, the main components of MGCP as documented in NCS 1.0 are endpoints, gateways, embedded clients and call agents. Call agents within the network, rather than endpoints or terminals, control most of the call activity by monitoring call events or requesting signals to be applied. This tends to make it easier to initially implement a solution that looks like regular telephony to the subscriber and to make many changes at centrally located call agents with minimal need to dispatch to the subscriber location.

H.323, on the other hand, assumes the terminal device (call it a phone) looks a lot like a computer and places much more responsibility on that terminal to manage the call and its signals. The reason is that



H.323 originally was developed as a general purpose multimedia data standard for local area networks (LANs), and the terminals on LANs usually are computers.

Neither standard is inherently better or worse than the other; however, H.323 is a data LAN solution, and NCS 1.0 was built specifically for a cable telecommunications distribution environment. Both will probably be around for a long time, and the choice of one over the other will be based on what makes technical sense for the particular application of IP telephony, or voice over IP (VoIP). The good news is that H.323 systems will be able to communicate with systems based upon NCS 1.0 and vice versa.

Even though H.323 probably will not be part of the PacketCable specifications, you can implement an H.323 solution on a DOCSIS 1.1-compliant network. After all, DOCSIS provides a way to implement a high-speed data LAN with cable modems, and H.323 is a specification for LANs.

## State of the market

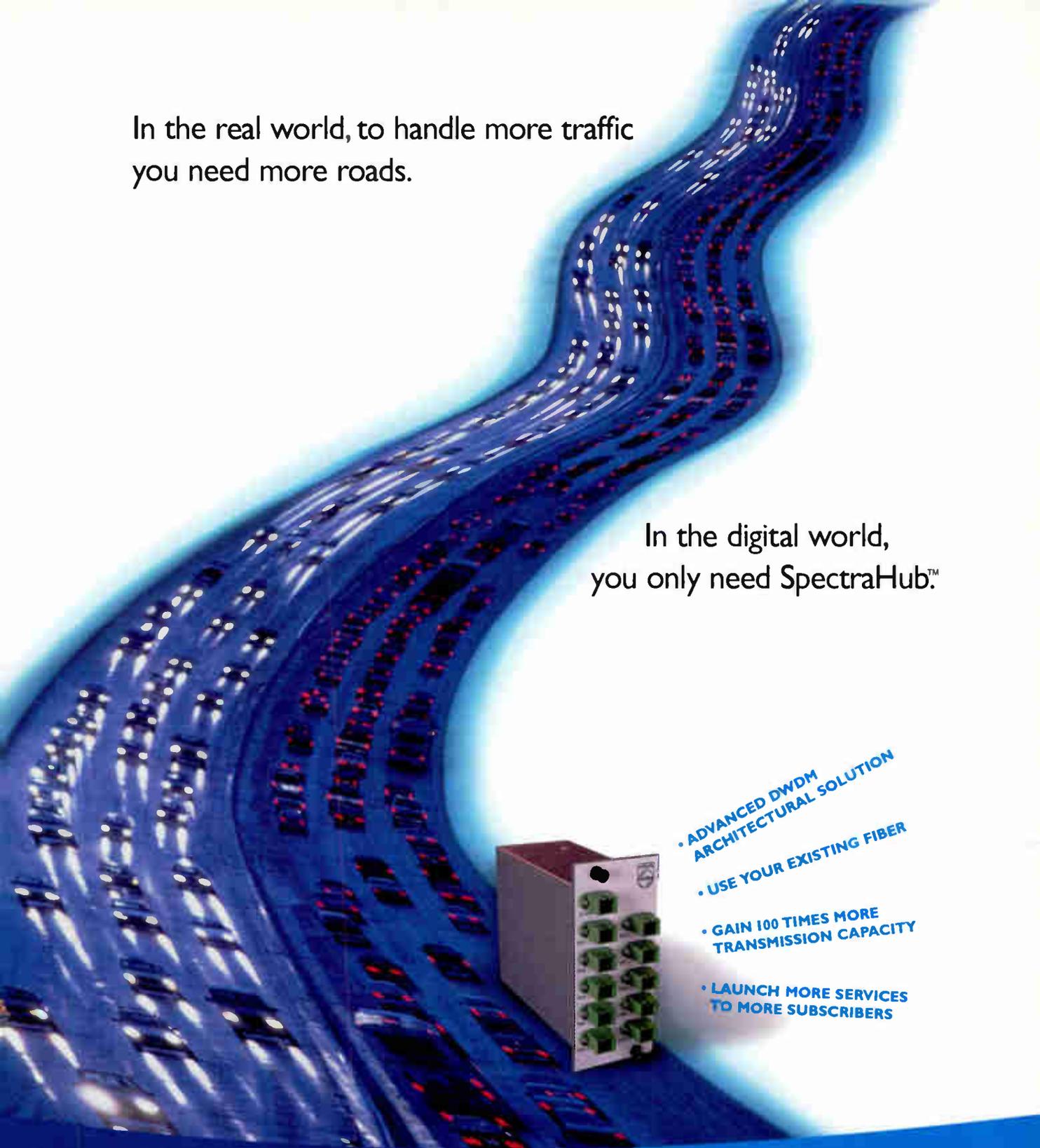
This type of implementation of "cable IP telephony" is what several vendors were showing at Expo. Essentially, it is data transport for the particular case of an IP telephony call, rather than an end-to-end IP telephony system.

ADC and Motorola, for example, used boxes for the IP telephony home interface that were physically separate from their network interfaces for circuit-switched telephony over hybrid fiber/coax (HFC) implementations.

The Tellabs demo looked more like an integrated solution because both circuit-switched and IP telephony calls were connected to the same remote service unit (RSU). However, even the Tellabs EXPRESS/Path circuitry is still basically providing high bandwidth transport,

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Reader Service Number 18

rather than IP telephony functionality. (In fairness to ADC, its circuit-switched cable telephony product provides a similar way to handle IP telephony calls over reserved data bandwidth.)

The negative aspect of all these configurations is that H.323 implementations over DOCSIS 1.1 networks are neither the most efficient, nor the most cost-effective, way to do IP telephony over a cable network. The new PacketCable standards, including NCS 1.0, attempt to overcome the shortcomings. However, vendors must first manufacture the systems that conform to NCS 1.0 and other PacketCable specs before they can offer those systems to cable operators. As of Expo '99, no one had reached that point in the evolution yet.

### Trends and directions

Getting there may be a long road. Several alternative vendor implementations will appear. Each will need to be evaluated by the operators and their customers, and each evaluation will take time. Some will

win in the market, and some will disappear, but if history is any guideline, it will take three to five years before a stable solution for IP telephony over cable becomes a commercial offering.

In the meantime, cable must offer telephony now because the major established communications companies that have paid for the privilege of using its broadband distribution network are anxious to compete with telephone company access. The only proven commercial solution available now is circuit-switched technology, and the telephony equipment vendors realize that. That's why, despite the marketing emphasis on IP telephony, each telephony vendor is continually improving its circuit-switched offering to make it more attractive than the competition's.

For example, when you look at Arris Interactive's Cornerstone product, you could see they have introduced a larger capacity host digital terminal (HDT) and neatly packaged combiners and splitters into the same frame as the HDT. Tellabs has a new

four-line version of its RSU for multiple dwelling units (MDUs) and hinted at Expo about how its RSU could be enhanced at a later date with an integral IP telephony module (as did ADC, for its interface unit). Even Motorola, which recently appeared to be downplaying circuit-switched technology for the U.S. market, has completely redesigned its Cable Access Unit (CAU) interface unit.

*"The only proven commercial solution available now is circuit-switched technology, and the telephony equipment vendors realize that."*

Before we close out this month's subject, I suggest watching Lucent Technologies' PathStar Access Server as an example of the type of equipment service providers will need in their IP telephony architectures. Jim Blake, the PathStar Access Server product manager, showed me a range of features offered and planned for this product that could make it possible to emulate a Class 5 central office switch. The PathStar Access Server architecture comes close to a real-world delivery of the "feature-server" concept I discussed in the April column. It will be interesting to see when individual features will be available for commercial deployment and how the traffic-handling capability of the server will hold up. **CT**

Justin J. Junkus is president of KnowledgeLink, a consulting and training firm specializing in the cable telecommunications industry. To discuss this topic further, or to find out more about KnowledgeLink, you may e-mail him at [jjunkus@aol.com](mailto:jjunkus@aol.com).

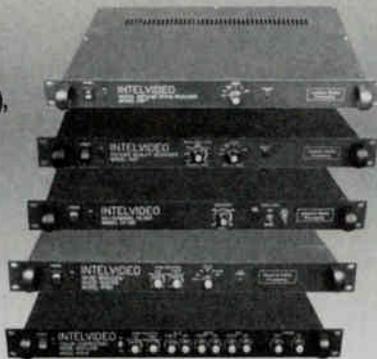
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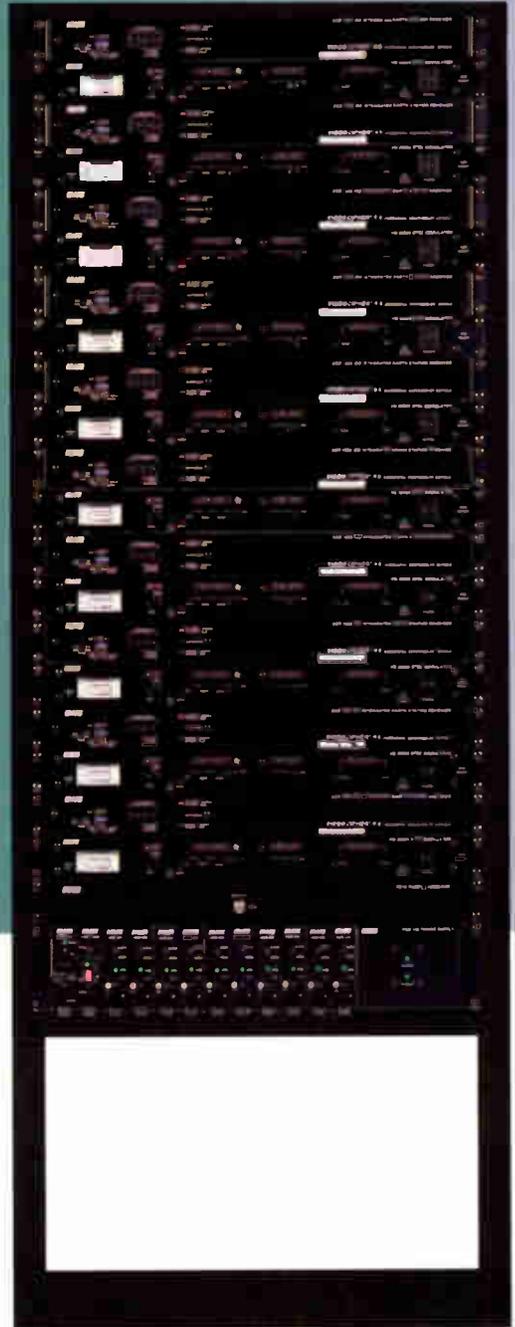
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**DRAKE**

Reader Service Number 20



By Jennifer Whalen



# Customer Service In the Age of Bandwidth

## Misery Loves Company

W

ell, judging from the response to my column in June ("Don't Forget Your Customers in the System Shuffle," page 40) about my Cable & Wireless experience, it really is

true — misery does love company.

It seems I hit a nerve with my observations on customer service, and neither long distance carriers, regional Bell operating companies (RBOCs), nor cable operators remained unscathed in the aftermath of shared misery that followed. I was also accused of whining ... which was definitely true. But I can take the heat.

Steve Johnson, director of engineering and technology with Time Warner Cable, had his own Cable & Wireless nightmare to report. Johnson tried out MCI Internet for a month and then dropped the service. He thought that was the end of it. Wrong.

"Approximately two years later, I started getting bills from C&W for an account that I had closed," Johnson wrote. "I've been receiving monthly bills of \$14.95. When they do 'fix' the billing, they only wipe out the past due amount, and the monthly fee keeps getting billed. Forget about reaching anyone on their 800 number."

Talk about long-term memory.

"I think I finally have the billing problems on my nonexistent account fixed, but only after numerous letters, e-mails and phone calls," Johnson continued. "They definitely are a great example of 'Don't let this happen to you' when running a CSR (customer service representative) department or telecommunications company," he added.

Sage advice from a respected cable engineer.

### Cable not unscathed

Before you snicker too loudly over the plight of your telco competitor, I've got to warn you that cable took a few potshots, too. Drew Stone, project leader with Uniphase, had his own customer service lesson—cable style.

"Your article was right on the money," he wrote. "I signed up for a 1.3 Mb pipe from TCI, delivered over my cable. The installers didn't show up when they were supposed to. My wife rescheduled. She then passed them on the way out, and they said because she had rescheduled they'd have to come back—three weeks later. Can you recommend a good place at TCI and AT&T to send hate mail?"

Even I'm not going to touch that request.

Unfortunately, Stone was still struggling with his cable data connection at press time.

"The saga continues," he reported. "TCI finally showed up to install our cable modem. When the initial appointment was set up, they asked for a two-hour window. They neglected to mention that's the arrival window. After over four hours, the technician had to leave because my wife had to go out. As of last night, the system still wasn't working, and we're supposed to call in to customer support and spend our time trying to get it running—customer service in the age of bandwidth. Where's Terayon?"

Wow. What a plug for Terayon. I asked Stone if he was using a Terayon modem.

"Just dreaming," he said.

It's not only cable that's causing Stone angst.

"I've been getting terrible quality service from Bell Atlantic in my area, too. Any suggestions on who to write there?" he asked.

### Anguish from the trenches

It seems there are some frustrated telecommunications employees in the trenches as well. Michael Walsh, with Mitre, had this to say.

"As a former project manager with a local Bell company, it was a constant irritation to me to see an undermanned workforce attempting unsuccessfully to provide good service to our customers. The catch phrase at that time was 'work smarter, not harder,' an easy enough comment to make if you are not the one doing the work.

"In my opinion, the incumbent companies, such as the baby Bells, are going to be in quite a bit of trouble if their senior managers don't wake up to the fact that competition is here and one of the best ways to retain and attract customers is through service. Like you, I will shop around for companies that provide me with good service. At times, I am also willing to pay a little more for proper treatment."

### You get what you pay for

Walsh wasn't alone in his willingness to pay a bit more for good service. (I knew I'd take a hit for being cheap.) Joe Blaschka, P.E., with Adcomm Engineering Co., wrote to say good service is worth the extra money. And he's getting good service from AT&T.

Blaschka operates a virtual office, with employees working in their homes.

"I wanted to aggregate the long distance charges to a single bill to obtain the largest

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**Reader Service Number 21**

discount," he said. "In addition, I wanted project billing codes added so, when I got the bills, they were already subtotaled by project for billing purposes. At the time several years ago, AT&T was the only carrier that allowed me to have the long distance for all these phone lines spread out over two states incorporated into one bill and have project codes added.

"In addition, I can now have not only my cellular long distance but also the basic monthly service added to the single bill .... If AT&T were to offer me local service and I could have it all on the same bill, I would switch to AT&T local service immediately ... right now, I am served by GTE (Great Telephone Experiment or Get There Eventually).

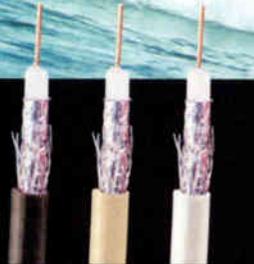
"While AT&T's long distance rates aren't the cheapest (about \$0.10 per minute), I have had very little trouble with their billing or adding on new lines to the service. I am willing to pay a little more for a service that works well and doesn't cost me a bundle of time. An hour or two a month messing around with my bill would cost me more than I would save by going to a 'low-cost' carrier."

Blaschka's got a point. Over and over, we hear that tomorrow's telecommunications winners will be those companies that provide integrated billing and discounts for bundled services. Take Blaschka's advice to heart. AT&T has a head start in this arena.

So where does that leave me? Well, in my last bill, C&W reported it was finally ready to roll out a new billing system. Ah ha, I thought, the end of my troubles. Then I fired up my e-mail.



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"Over and over, we hear that tomorrow's telecommunications winners will be those companies that provide integrated billing and discounts for bundled services."

I had a message from C&W. More news on the new billing system? Or maybe that notice I was supposed to have received on the recent price increase? Wrong on both counts. It was a kindly note informing me that C&W is selling its residential Internet business to Prodigy. As Charlie Brown would say, Aaugh! Isn't that how this whole mess started? CT

Jennifer Whalen is the editor of "Communications Technology." She can be reached via e-mail at [jwhalen@phillips.com](mailto:jwhalen@phillips.com).

Reader Service Number 22

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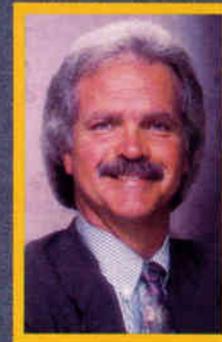
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Reader Service Number 23

By Terry Wright



# Providing Service Integrity Requires Constant Vigilance

**M**any of you may have noticed a common theme in nearly all of my columns for the last year or so. During that time, I have written about issues I believe are or will become important to the industry, and I've tried to surface them before they become the topic of the day.

They all share the common theme of service integrity.

This time, my goal is to weave aspects of these prior columns into a common definition of service integrity. I hope that this definition will bring substance to the theme and help explain why it's the most critical obstacle to the continued success of broadband data/Internet services.

## What's at stake?

With the industry continuing to consolidate, and considering the constant evolution of the Internet and its underlying technologies, now seems to be a particularly good time to get the concept of service integrity out on the table.

Why? Well, for one thing, literally hundreds of billions of dollars are riding on cable's ability to get another \$30 a month or so from about 30 percent of its existing subscribers through Internet/data and other digital services. Frankly, this is no back-room, penny-ante card game—the players represent some of the biggest names on Wall Street, as well as the telecommunications and consumer electronics businesses.

The cable industry's ability to understand and embrace the need for data service integrity, simple as that theme might sound, is fundamental to the longevity of the industry in the data and digital services space. My conclusions are based on firsthand observations of broadband Internet services delivery within the cable TV industry over the past five years.

Of course, achieving and maintaining service integrity is equally critical to the suc-

cess and longevity of the digital subscriber line (DSL), local wireless and satellite outfits, and they know it. That's why I am preaching service integrity to the cable industry.

Unfortunately, too many cable operators limit their view of service delivery to just the cable modem and cable modem termination system.

## Understanding integrity

To see service integrity as fundamental to the success of cable in the data and Internet services space, you need to thoroughly understand it. The commonly understood meanings of the words "service" (to do something for someone else) and "integrity" (the state of being intact or unimpaired) themselves provide a good starting point.

Integrating the meanings of these words suggests that to achieve service integrity, a service must be complete, unimpaired,

whole and in an unbroken condition. The service delivery infrastructure is what either enables or prevents service integrity.

Unfortunately, too many cable operators limit their view of service delivery to just the cable modem and cable modem termination system (CMTS). Others focus on a sophisticated content package. Subscribers, however, tend to view services in a much broader way.

## Subscribers' perspective

While speed of service is important to subscribers, they expect other data service attributes to be comparable to those of other Internet services they've previously experienced.

Such attributes include knowledgeable 24/7 helpdesk support and problem escalation capability, trouble ticket tracking and resolution, high service reliability, prior notification of planned service outages, responsiveness to unique needs, accurate billing, and so on.

All these attributes help define the integrity of the service from the subscribers' point of view. Without competitive parity in all the dimensions of a data service, a provider risks becoming the topic of unflattering chat room conversations, newsgroup posts and word-of-mouth from the technically astute and communicative online community.

Service integrity requires a constant vigil on the performance, reliability, quality and support of the complete service. Any integrity-threatening condition must be taken seriously. These threats can be in the cable plant (noise floor/carrier-to-noise ratio); the server, routing and switching complex (storage space, caching schema, domain name system and proxy management); the Internet network access portal (availability and capacity); abusive

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## A vehicle, not a destination

The point is that subscribers see cable modems and the cable network as simply the access device and local access network, respectively, of the service. They pay a premium for performance; they expect the remaining service attributes to be at least as good as what they can get from competing lower performance services.

“Subscribers see cable modems and the cable network as simply the access device and local access network, respectively, of the service.”

Therefore, if the great gamble on cable's high-speed broadband data/Internet services is to pay off, the cable data service provider must view the service delivery infrastructure as a whole—the same way subscribers see it.

## Stay on your toes

The successful long-term view of broadband data/Internet services is one that accepts the continuous evolution of the Internet at the hands of its users and those responding to the demands of its users. Cable operators must be willing to help facilitate this evolution while delivering services with high integrity. This calls for a very involved, end-to-end systems perspective of the services being delivered.

An exotic sports car is a fast form of dependable transportation (compared to the family sedan) only if it starts every time, doesn't stall often, doesn't leak when it rains and never strands the driver in rush-hour traffic. **CT**

Terry Wright is chief technology officer at Atlanta-based C-Cor.net Corp. He can be reached at (770) 416-9993 or via e-mail at [tlwright@convergence.com](mailto:tlwright@convergence.com).

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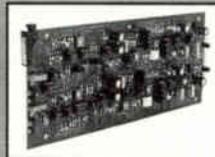
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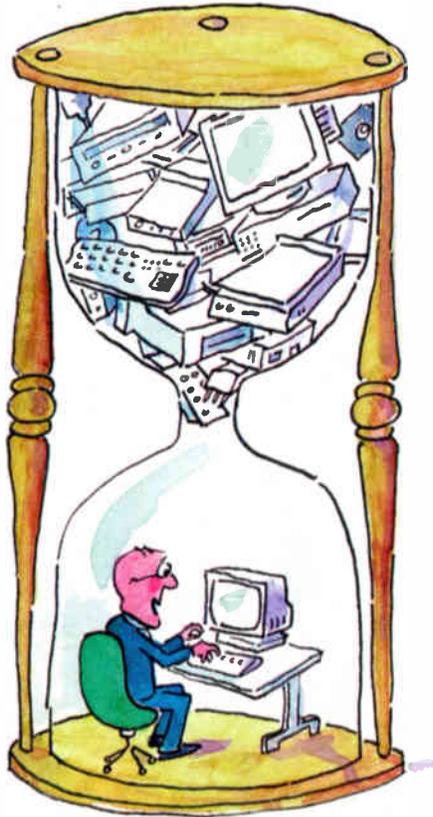
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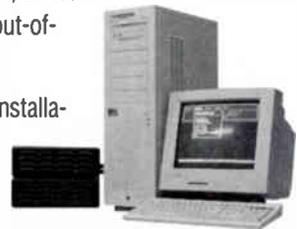


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Reader Service Number 27

By David Devereaux-Weber

# The Physics of Loss And Temperature



**W**ant to know about cable? Ask the experts on SCTE-List. Be careful, though—you might get far more information than you bargained for. Take Bill Mays of TV Cable in Chambersburg, Pa., for instance. He asked: "Can anyone explain the physics of why coaxial cable loss changes with temperature? Does it have to do with the expansion and contraction of the inner and outer conductors?"

As often happens on the List, he got numerous responses—almost 30. Here are two edited answers.

## Joseph A. Ferreri, Times Fiber

The answer resides in the discussion of resistivity of metals in the conductors. The resistivity ( $\rho$ ) of a material is defined as the electric field ( $E$ ) required to produce a unit current density ( $J$ ). The resistivity can be written mathematically as  $\rho = E/J$ .

A practical definition of resistivity is the resistance of a length of wire 1 foot by 1 mil in diameter, measured at 20° C. The resistance of a conductor increases as temperature rises because of the increased molecular movement within the conductor, which hinders the flow of charge (current).

The resistance of a material will increase almost linearly (straight line) as temperature rises. Conversely, the resistance of a material will decrease linearly as temperature falls until the inferred temperature of zero resistance for that material (-234.5° C for copper and -228.1° C for aluminum).

The "loss" or attenuation of a coaxial cable is defined by parameters such as impedance, dissipation factor, frequency, conductor dimensions and conductor resistivities.

Because the resistivities of the inner and outer conductor reside in the numerator of the attenuation equation for coaxial

cable, the attenuation is proportional to the square root of conductor resistivity. As defined by the physics/mathematics, the attenuation of coaxial cable increases with increasing temperature (and vice versa).

## Randy Altergott, Cox in Phoenix

I've been researching attenuation in detail for the last three weeks, and here are some answers I've found.

Attenuation stems from several basic factors:

- 1) The number of valence electrons in each atom's most distant orbit. The fewer valence electrons, the better the conductivity—1 electron for copper.
- 2) The length of the conductor. Longer length equals more resistance.
- 3) The diameter of the conductors. Larger diameters equal less resistance.
- 4) Inductive reactance. Even a single, straight conductor exhibits some inductance, which creates a magnetic field. This magnetic field (also known as the countermagnetomotive force, or CMMF) opposes the normal flow of electrons in a circuit and is measured in ohms.
- 5) Capacitive reactance. The capacitive properties of a conductor, such as coaxial cable, also increase the opposition to current in a conductor. This opposition to current also is measured in ohms.

## 6) The temperature of the conductor.

Yes, you were correct. The temperature of the conductor determines the density of the atoms that make up the conductor. At colder temperatures, the density of the conductor increases, making it easier for electrons to move from one atom to the next (since the atoms are closer together). Higher temperatures actually decrease the atomic density, which causes an increase in resistance.

- 7) Frequency. As you already know, the higher the frequency, the higher the attenuation.

## The point

It's pretty safe to say that Mays got an answer to his question, possibly far more answer than he expected. This is what the List is all about, though—providing a forum in which we can help each other solve problems and learn more about our business. **CT**

*Dave Devereaux-Weber, P.E., is a network engineer at the University of Wisconsin-Madison. He is a senior member of the SCTE, and he can be reached via e-mail at [djdevere@staff.wisc.edu](mailto:djdevere@staff.wisc.edu).*

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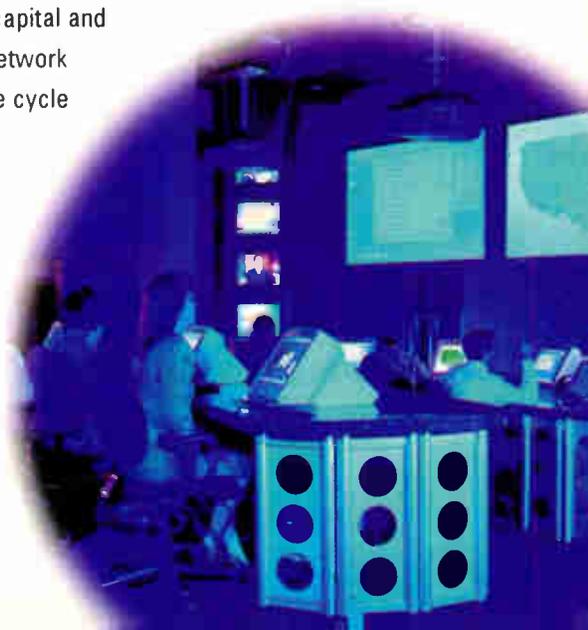
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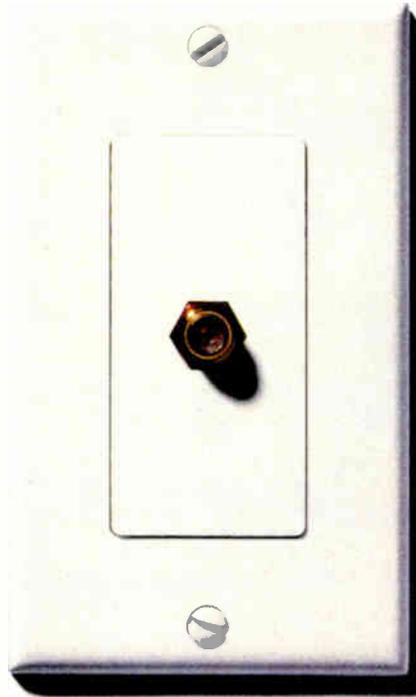
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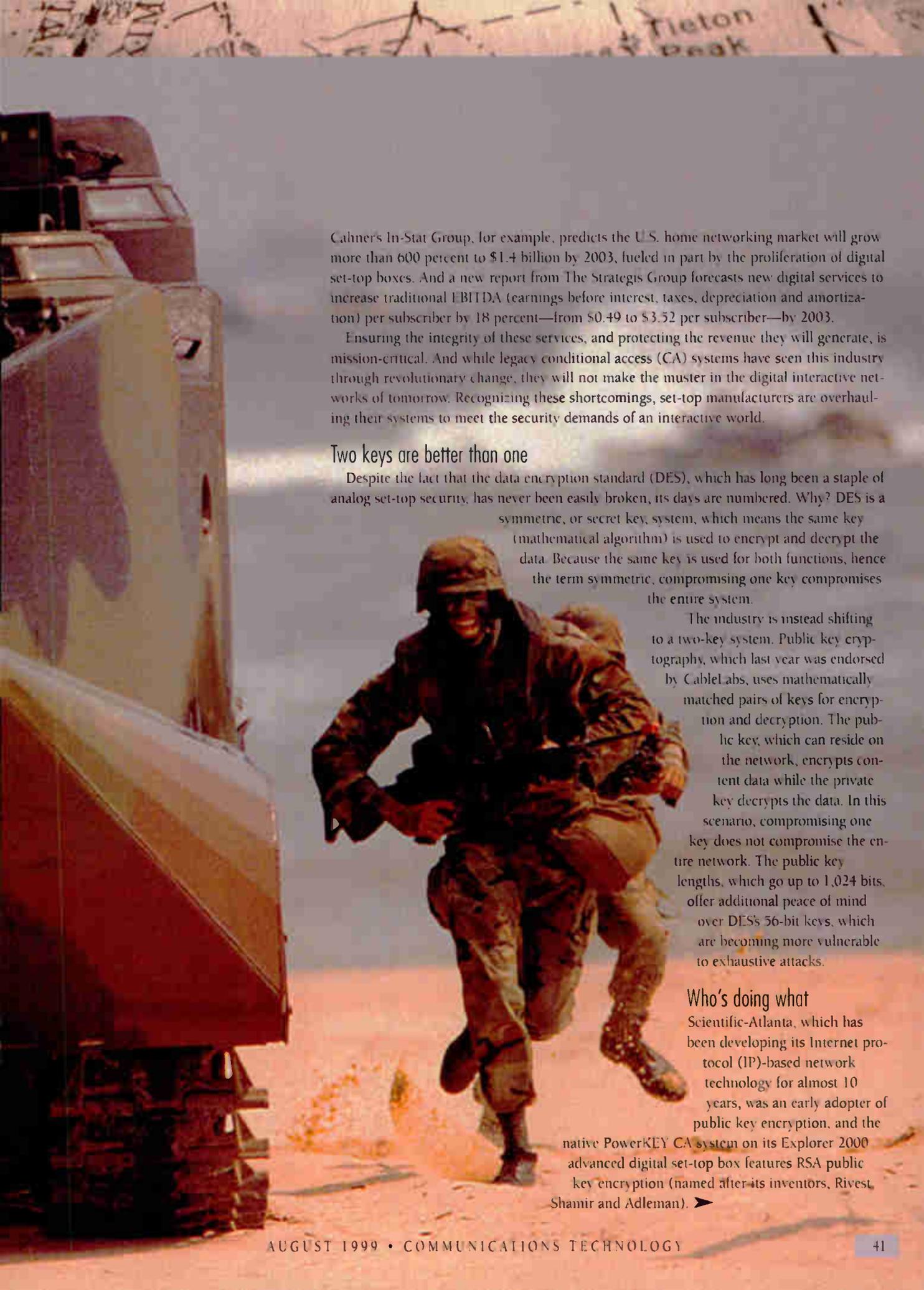
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# Storm the Digital Set-Top Beachhead, Secure It With Conditional Access

By Doug Larson

**A**fter three years and more than \$20 billion in system upgrades, digital D-Day has arrived, and operators are rushing to establish and hold a digital beachhead against an onslaught of hungry competitors. At stake are staggering new revenue streams awaiting multiple system operators (MSOs) when tomorrow's digital interactive applications such as video-on-demand (VOD), home networking and Web browsing come online.



Cahners In-Stat Group, for example, predicts the U.S. home networking market will grow more than 600 percent to \$1.4 billion by 2003, fueled in part by the proliferation of digital set-top boxes. And a new report from The Strategis Group forecasts new digital services to increase traditional EBITDA (earnings before interest, taxes, depreciation and amortization) per subscriber by 18 percent—from \$0.49 to \$3.52 per subscriber—by 2003.

Ensuring the integrity of these services, and protecting the revenue they will generate, is mission-critical. And while legacy conditional access (CA) systems have seen this industry through revolutionary change, they will not make the muster in the digital interactive networks of tomorrow. Recognizing these shortcomings, set-top manufacturers are overhauling their systems to meet the security demands of an interactive world.

### Two keys are better than one

Despite the fact that the data encryption standard (DES), which has long been a staple of analog set-top security, has never been easily broken, its days are numbered. Why? DES is a symmetric, or secret key, system, which means the same key (mathematical algorithm) is used to encrypt and decrypt the data. Because the same key is used for both functions, hence the term symmetric, compromising one key compromises the entire system.

The industry is instead shifting to a two-key system. Public key cryptography, which last year was endorsed by Cablelabs, uses mathematically matched pairs of keys for encryption and decryption. The public key, which can reside on the network, encrypts content data while the private key decrypts the data. In this scenario, compromising one key does not compromise the entire network. The public key lengths, which go up to 1,024 bits, offer additional peace of mind over DES's 56-bit keys, which are becoming more vulnerable to exhaustive attacks.

### Who's doing what

Scientific-Atlanta, which has been developing its Internet protocol (IP)-based network technology for almost 10 years, was an early adopter of public key encryption, and the native PowerKEY CA system on its Explorer 2000 advanced digital set-top box features RSA public key encryption (named after its inventors, Rivest, Shamir and Adleman). ➤

"The use of public key cryptography sets us apart from others that are available today," says Tony Wasilewski, chief engineer for S-A's subscriber networks sector. "Because we use RSA public key cryptography, the headend is a more secure place because the keys you use to send encrypted messages to an individual set-top are now public keys—they can be stored openly, and shared in fact, in the head-

end, you can actually link to larger chains of trust where by (using) a digital signature you really know whom it is on the other end of the digital transaction.

"Because we've adopted public key cryptography, we can use digital signatures to authenticate messages that are sent from the headend, for example, to authorized set-tops," explains Wasilewski. "It becomes impossible to send false messages."

While RSA data security is a relative newcomer to the cable TV industry, more than 400 million copies of the company's brand of encryption and authentication technologies have been installed worldwide. They can be found in products from companies such as Microsoft

Institute and the Institute of Electrical and Electronics Engineers.

### Simplify your life

A newcomer to the U.S. set-top box market, Netherlands-based Philips Broadband Networks also has adopted RSA public key encryption for its CryptoWorks CA system, which it says has simplified the security functions for the operator.

"The reason for a public key management system like RSA is that it enables change of keys on a per-card basis in order to exclude pirated cards," says Mathieu Goudsmits, product marketing manager for CryptoWorks. "Systems without this feature will have to rely on card exchange in case all keys in a card are found. With RSA, the only secrets that a card can reveal are the public key of the provider or the secret key of that single card."

For changing keys on a smart card, Philips uses the RSA public key mechanism with key lengths that go up to 1,024 bits. In addition, Philips, which has more than 45 years of experience in designing cryptographic algorithms, developed proprietary algorithms for entitlement management messages (EMMs) and entitlement control messages (ECMs).

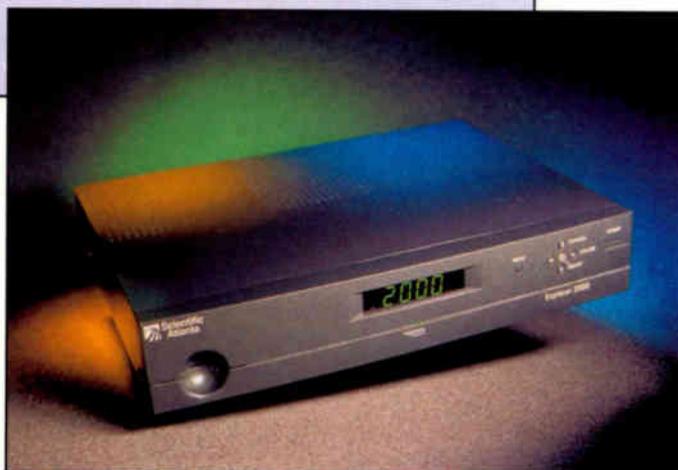
Goudsmits says his company's CryptoWorks CA system was originally designed for use with broadcast services but now also comes in a Fine Grain CA version for use with Internet-based services, which he says will allow it to encrypt content at the IP level and target data services to specific subscribers.



Above: General Instrument's DCT 5000+ digital set-top box will have built-in hardware support for public key cryptography.

Right: This digital set-top from Philips features the company's CryptoWorks public key CA system.

Bottom: Scientific-Atlanta's Explorer 2000 digital set-top box features a native PowerKEY CA system.



end," says Wasilewski. "With the Explorer 2000, you no longer have to protect a secret database in the headend."

In addition to making the headend more secure, Wasilewski also notes the critical role RSA plays in its e-commerce offerings. "We operate for the MSO a public key infrastructure, which includes a database of public key certificates for every single Explorer," explains Wasilewski. "We also have public key digital signatures that the MSO can actually enact on its own. So, with the public key infrastruc-

ture, you can actually link to larger chains of trust where by (using) a digital signature you really know whom it is on the other end of the digital transaction. "Because we've adopted public key cryptography, we can use digital signatures to authenticate messages that are sent from the headend, for example, to authorized set-tops," explains Wasilewski. "It becomes impossible to send false messages." While RSA data security is a relative newcomer to the cable TV industry, more than 400 million copies of the company's brand of encryption and authentication technologies have been installed worldwide. They can be found in products from companies such as Microsoft

### A matter of choice

For its part, General Instrument has licensed RSA encryption technologies for use in its DCT 5000 advanced digital set-top, but currently offers secret key encryption on its baseline DCT 2000 model, allowing its customers to tailor its CA to

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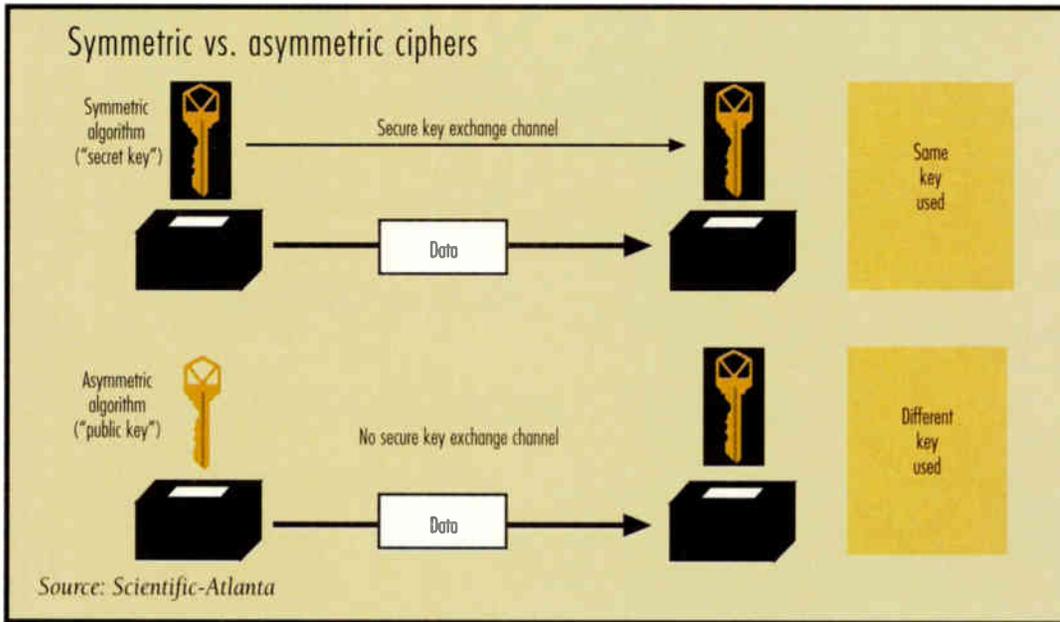
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the unique requirements of their networks. "Our conditional access technology has been designed to be flexible," says Kevin Keefe, GI's director of product management, digital network systems. "It can be used to secure broadcast and narrowcast distribution of content, in both interactive two-way systems as well as systems with limited return-path capability."

The DCT 2000 and DCT 5000 both feature the company's DigiCipher II CA system, which employs a hierarchical key management scheme and uses DES as an algorithm building block to construct more complex mechanisms for encryption and authentication.

"DigiCipher II features powerful base security features (primitives) that can be used to provide session-based encryption for new revenue services such as video-on-demand while supporting more common services such as tier-based and subscription services," says Keefe, adding that the company continues to innovate its system to accommodate the growth of digital applications.

"New features of the GI conditional access technology will support industry standard cryptographic APIs (application programming interfaces), which will greatly enhance the performance of e-commerce type applications," says Keefe.

"In addition, features for controlling advanced interactive services available via the DOCSIS (Data Over Cable Service Interface Specification) data channels are also being

added to current generation digital networks," adds Keefe.

While current versions of DigiCipher use secret key encryption, Keefe notes that support for public key cryptography can be added via the use of TvPass modules or software downloaded to the DCT 2000 set-tops.

"Next generation set-tops (DCT 5000s) will have built-in hardware support for public key cryptography. The DCT 5000 will support Secure Sockets Layer (SSL), RSA public key cryptography, and Authentication and Authorization (A&A) for secure code downloads," says Keefe.

Keefe says the company's DCII CA system remains unbroken after more than 3.5

million digital set-tops and 760 digital headend deployments.

### What's next?

While all of the CA systems discussed earlier currently reside within their host navigation devices, this soon will change. In an effort to spur competition and create a retail set-top box market, the Federal Communications Commission in 1998 released a Report and Order mandating set-top box security be removable by July 2000.

Since then, the Society of Cable Telecommunications Engineers' Engineering Committee has been working with CableLabs to

## BOTTOM LINE

### The Changing Face Of Conditional Access

Digital D-Day is here, and operators are rushing to establish and hold a digital beachhead against the competitive onslaught. At stake is great potential revenue for cable operators when the digital interactive applications of the future such as video-on-demand (VOD), home networking and Web browsing become widespread reality.

Ensuring the integrity of these services, and protecting the revenue they will generate, is mission-critical. And while secret

key conditional access (CA) systems have seen this industry through revolutionary change, they can't stand up to the demands of tomorrow's digital interactive networks. Public key cryptography is emerging as the new industry standard, and set-top vendors increasingly are moving in that direction, touting the greater security that the new CA systems can provide for cable operators.

Vendors are also working on removable security in the form of point of deployment modules (PODs). CableLabs was slated to begin POD interoperability testing in July.

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## SET-TOP SECURITY

develop this specification for removable security, known more commonly as the point of deployment (POD) module.

At press time, SCM Microsystems and Mindport were working together with CableLabs on the development of a POD interoperability test tool, and the first wave of interoperability testing was scheduled to begin in July. "One of the most important aspects of a retail market will be interoperability," says Luc Vantalón, director of SCM's digital TV group. "The test tool, named POD Tool, allows checking that any receiver or host will have a POD socket compliant with the OpenCable specification."

Vantalón says the tool will be used by CableLabs for interoperability testing and will be sold by SCM to consumer electronics vendors for self-certification.

"Because we've adopted public key cryptography, we can use digital signatures to authenticate messages that are sent from the headend, for example, to authorized set-tops."

— Tony Wasilewski,  
Scientific-Atlanta

In addition to creating consumer choice, the removable security mandate also will help further secure digital cable networks.

"Security is a state of mind," says Vito Brugliera, a consultant in cable TV and

consumer electronics. "If the value is there, it will eventually be compromised. The conclusion is that security must be renewable and replaceable and owned by the operator or content source."

### Dual CA systems

In addition to the POD development, General Instrument and Scientific-Atlanta currently are in the process of hammering out an interoperability specification to further competition and retail availability. Known as Harmony, the accord will enable operators to run GI and S-A boxes within the same system.

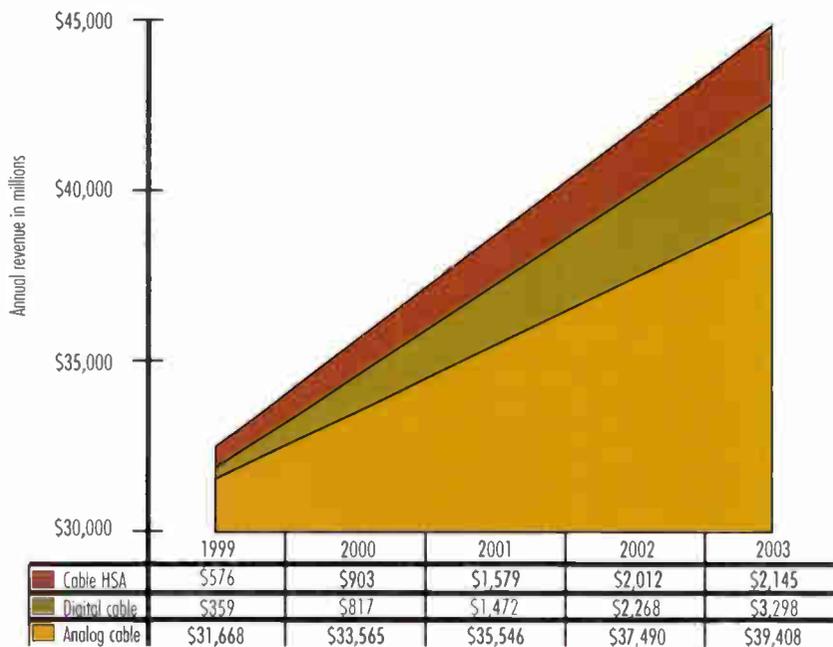
"Harmony is progressing well, with set-top solutions already in place that comply with the specification," reports S-A's Wasilewski. "Work on the headend key sharing solution is also on track. Harmony gives operators an expanded choice of vendors for set-top boxes that can receive common secure

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programming in an interoperable way on their network."

Wasilewski notes that a Harmony dual CA system will have only a 1-percent overhead.

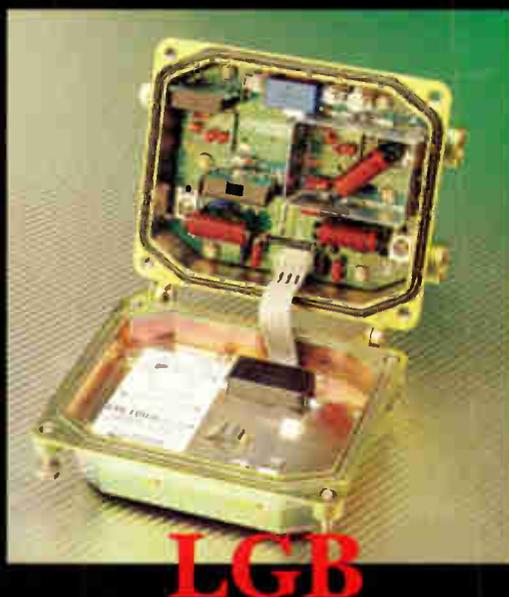
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Doug Larson is senior editor of "Communications Technology" in Denver. He can be reached via e-mail at [dlarson@phillips.com](mailto:dlarson@phillips.com).

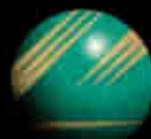
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# IP Telephony: The Race Heats Up

## Vendors, Start Your Engines

By Evan Bass





**A**s the technology for Internet protocol (IP) telephony for cable TV matures (or evolves, or migrates, depending on who you're talking to), competition for the nascent market is reaching a fever pitch. Vendors are racing to launch new products across the starting line with a focus on features, scalability, ruggedness and performance.

With multiple system operators (MSOs) gunning their engines to deploy telephony services, it's a good time to check in and get an IP status report with five industry leaders: Lucent, Telcordia, Arris Interactive, ADC and Tellabs.

### Lucent makes a play at Cable '99

Murray Hill, N.J.-based Lucent Technologies made the biggest splash recently with its announcement at the Cable '99 show of a set of products and services for cable networks that will enable operators to offer packet telephony service with the features and reliability of existing telephone service.

Called Lucent's CableConnect Solutions, the offering includes hardware and software for cable operator networks and customer homes and businesses, along with a portfolio of network design, installation and management services from Lucent NetCare.

Lucent's CableConnect Solutions give cable operators the tools to create reliable, scalable networks with broadband bundles of telephony, high-speed data and video services.

Designed by Bell Labs,  
the PathStar Access  
Server and

7R/E Packet Solutions make up the core of Lucent's CableConnect Solutions. The two products provide integrated access over cable networks, local voice and data switching and routing, and a set of telephony features, including those that generate 90 percent of the feature revenue in circuit networks today.

As part of its CableConnect Solutions, Lucent entered into a joint development and marketing agreement with Motorola, an industry powerhouse in deployment of cable modem systems. Motorola's Cable Router cable modem termination system (CMTS) and PhoneLink, a multimedia terminal adapter (MTA) that combines cable modem and IP telephony capabilities, will be integrated into Lucent's offer.

Service providers realize the only economical way to deliver video, voice and data is through a converged network, which is defining itself as IP in this case, says John Slevin, director of business development for Lucent's cable communications group.

"So in order to deliver a robust packet solution, we really needed to bring some capabilities in products like our PathStar and our 7R/E that can actually deliver a feature set more consistent with what customers are used to in their existing circuit-switched telephone environments,"

Slevin says. "Our PathStar is capable of a variety of different functions; it's basical-

ly six functions in one. What we're doing is marrying it to a Motorola cable data router.

"We have a suite of offerings that we're creating, as well as partnering with, in order to ensure a robust, scalable, reliable high-speed voice and data network capability," he continues. "When we talk about voice, what we're trying to do is inform the market of the difference between traditional voice over IP (VoIP) and what we call true telephony."

Lucent's advantages over the competition depend on the environment you're in, Slevin says.

"Some companies specialize in the circuit-switched world," Slevin says. "Others are trying to evolve standards to work into the IP world. The advantages we bring are (that) we are currently building networks for real-world customers, people who need to have a manageable, scalable network that serves hundreds of thousands of subscribers, if not millions."

Lucent's CableConnects Solutions will undergo a series of trials for market validation and technical reliability for the rest of 1999 before going to market late in the first quarter of 2000. Slevin declined to announce pricing at press time.

## Arris moves outdoors

Because low-cost, high-bandwidth access to the home is prevalent now with the execution of the Telecommunications Act of 1996, hybrid fiber/coax (HFC) operators are offering local service, and long-distance companies are offering local service in the form of xDSL (digital subscriber line) or wireless technology.

This has opened up the market, and people are looking for a way to integrate data and telephony, which is where IP telephony should swoop in, says Blair King, senior marketing planner for Suwanee, Ga.-based Arris Interactive. But whether it happens soon is another question.

"The way we view it is: IP telephony has to be of the same quality as the public switched telephone network (PSTN)," King says. "When you pick up your phone in your house, you don't care if you're getting service from your local phone company or your HFC operator or whether it's going to the PSTN or IP. All you care about is the quality of sound, and if you can do an emergency breakthrough or call 911. All the things you can do today you have to still be able to do. And a lot of those things are still being worked out."

A lot of the intelligence that supports those key features currently is in a switch, so in order to make VoIP viable, the intelligence has to come out of the switch and move into servers all around the network. But that creates a need for a whole different body of standards, King says.

"In order for there to be a seamless integration of voice and data over IP, you have to offer carrier-grade reliability and scalability, and you have to do it in a way that's affordable for an operator to deploy," King says. "Everybody's made a lot of progress in that. Not just Arris, but Tellabs and ADC as well."

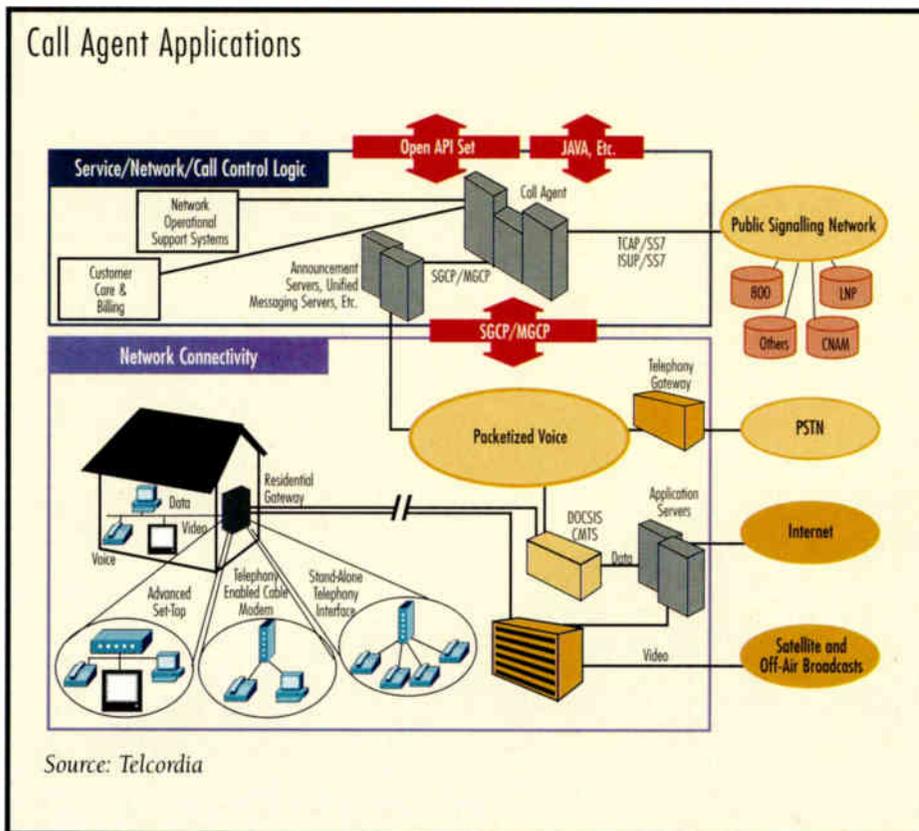
King views this as not so much an evolution but more of a migration from circuit-switched to VoIP or Internet telephony. Arris has scheduled field trials at the end of this year to start testing some products and expects people will start to use the technology in 2000.

"We also expect there to be a huge market for the circuit-switched product," King says. "And as people upgrade their backbones and move toward voice over IP, the circuit-switched obviously starts to decline. But today circuit-switched is a proven technology; people know it works. It's a great way for HFC operators to get out there and capture customers and get in the market today and compete for local revenues."

"Arris" is defined in Webster's II dictionary as "the sharp edge... formed by two surfaces meeting at an angle." In this case, Arris Interactive is the result of two market giants—Nortel Networks and ANTEC—coming together to develop products for delivering voice and data services over HFC networks.

Arris announced a new product June 15 called a PacketPort, which is a carrier-grade, outdoor-hardened version of the company's Voice Port, which includes Ethernet connection.

"So it basically is taking all the experience that we have in voice, and all the experience that we have in data, and is collapsing it in one single box that an operator would put on the side of someone's home," King says. "It's basically an outdoor cable modem with four lines of carrier-grade lifeline telephony service applied to it. We'll build redundancy into it so one system will support up to 6,400 lines of telephony. It will allow



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**"In order for there to be a seamless integration of voice and data over IP, you have to offer carrier-grade reliability and scalability, and you have to do it in a way that's affordable for an operator to deploy," — Blair King, Arris Interactive**

the functionality to merge both voice and data on the same platform."

Operators who already have deployed Arris' Cornerstone Voice Ports would no longer need to replace them with what the company calls PacketPorts. The customer could keep those Voice Ports on the side of the home and interface into the IP world or be routed up into the PSTN.

"So if an investment has been made in switch capacity already, they could still use that capacity in the PSTN," King says.

"And if they wanted to route traffic over the IP, they would have the functionality to do that as well."

Arris plans to have PacketPort in trials at the end of this year, with shipping targeted for mid-2000. King had no comment on pricing structure.

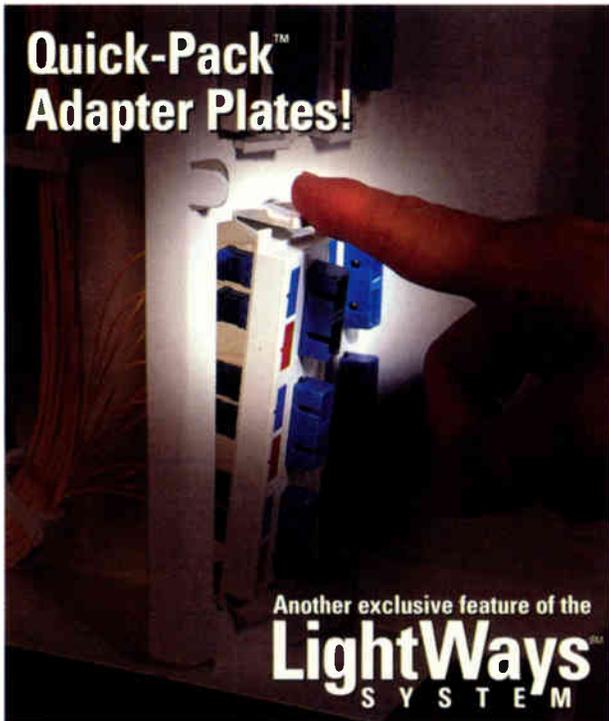
**Tellabs combines IP and Circuit-switched solutions**

Founded in 1975, Lisle, Ill.-based Tellabs Inc. started into the cable telephony business

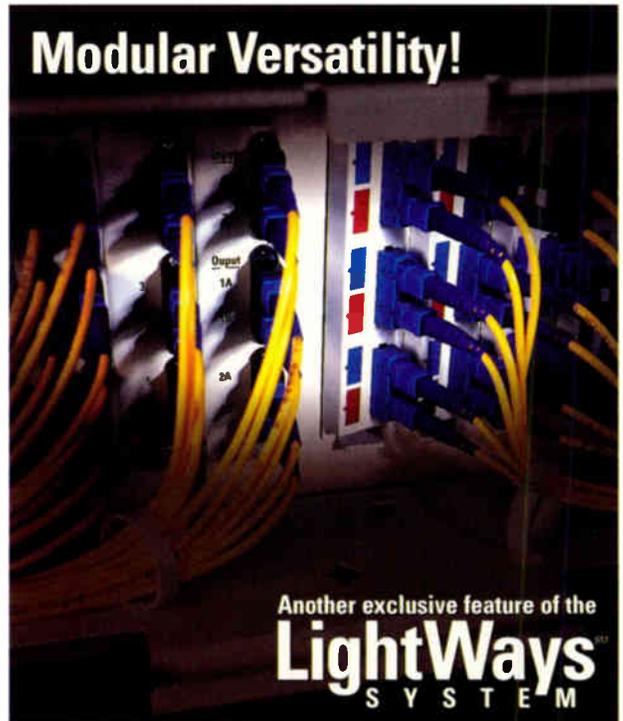
in 1994 and has developed a product line company execs say has done pretty well.

"What we've presented is an evolutionary path from the circuit-based network to a combination of circuit-switched and IP," says Don Lemley, Tellabs manager of advanced planning. "That's a combination that we believe will really handle both types of networks because we believe that while the marketplace will develop toward an IP-based network, there could be years of circuit-switched service ahead of us. So our thrust has been to build a product that bridges that gap, instead of expecting someone to jump over it."

Lemley says a lot of competitors are talking about IP telephony, and a lot have built prototypes. There's a lot of products that are really based on enterprise networks, but as far as lifeline-type telephony or residential telephony service, the standards are still evolving, and no one really has a product yet that addresses all the issues in the cable market for IP telephony.



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"The PacketCable initiative has players on both sides of the fence—those who have been in traditional switch networks as well as those who come from a router/IP background," Lemley says. "Everyone is involved in that—including Tellabs—pretty heavily. But that's very separate from what has to happen in the transport networks. In that area, it's still up for grabs."

Tellabs' signature product in this space is the Cablespan 2300 universal telephony distribution system, which the company touts as being able to bridge the gap between traditional telephony and the delivery of advanced network services.

The Cablespan 2300 system encompasses a scalable family of access units designed to cost-effectively serve single-family homes, shared tenant/multiple dwelling units (MDUs) and business locations. The system provides direct high-speed data connectivity to serve applications including residential access to the Internet, small office/home office

## BOTTOM LINE

### IP Telephony Solutions

As Internet protocol (IP) telephony over cable develops, competition for the small but growing market is heating up. Here follows a taste of what Lucent, Arris Interactive, Tellabs, ADC, and Telcordia are doing.

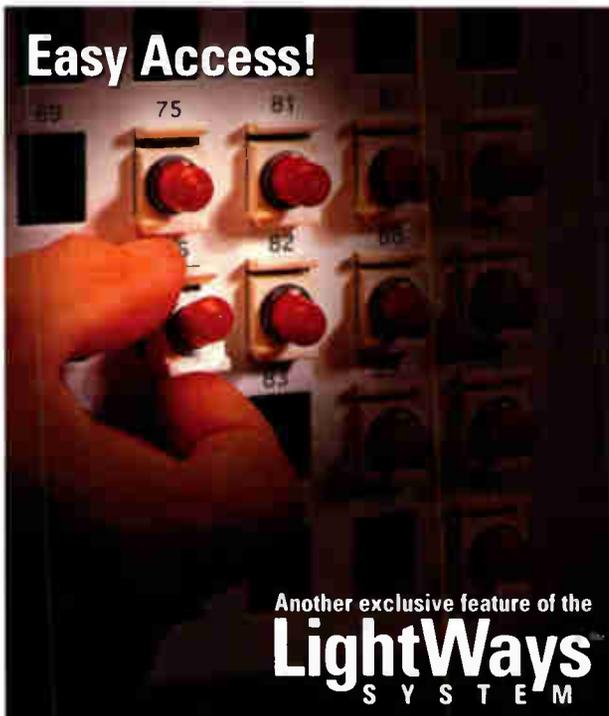
Lucent Technologies' CableConnect Solutions include hardware and software for cable networks and homes and businesses, along with network design, installation and management services.

Arris Interactive's PacketPort is a carrier-grade, outdoor-hardened version of the company's Voice Port, which includes Ethernet connection. Operators who already have Arris' Cornerstone Voice Ports wouldn't need to replace them.

Tellabs' Cablespan 2300 universal telephony distribution system is intended to bridge the gap between traditional telephony and advanced network services, encompassing a scalable family of access units to serve single-family homes, multiple dwelling units (MDUs) and businesses.

ADC's NewNet SS7-IP gateway products are intended to help operators solve switch and trunk congestion from the demand for IP-based applications and services by letting providers cost-effectively increase bandwidth.

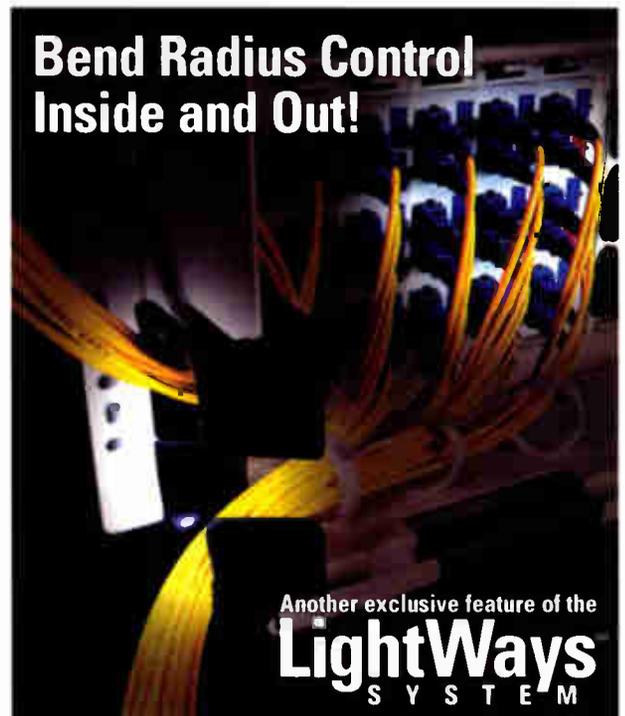
Telcordia Technologies (formerly Bellcore) has partnered with General Instrument to develop next generation network IP telephony products. The companies set out to promote open, standards-based telephony focused on helping operators deploy complete and cost-effective IP telephony solutions.



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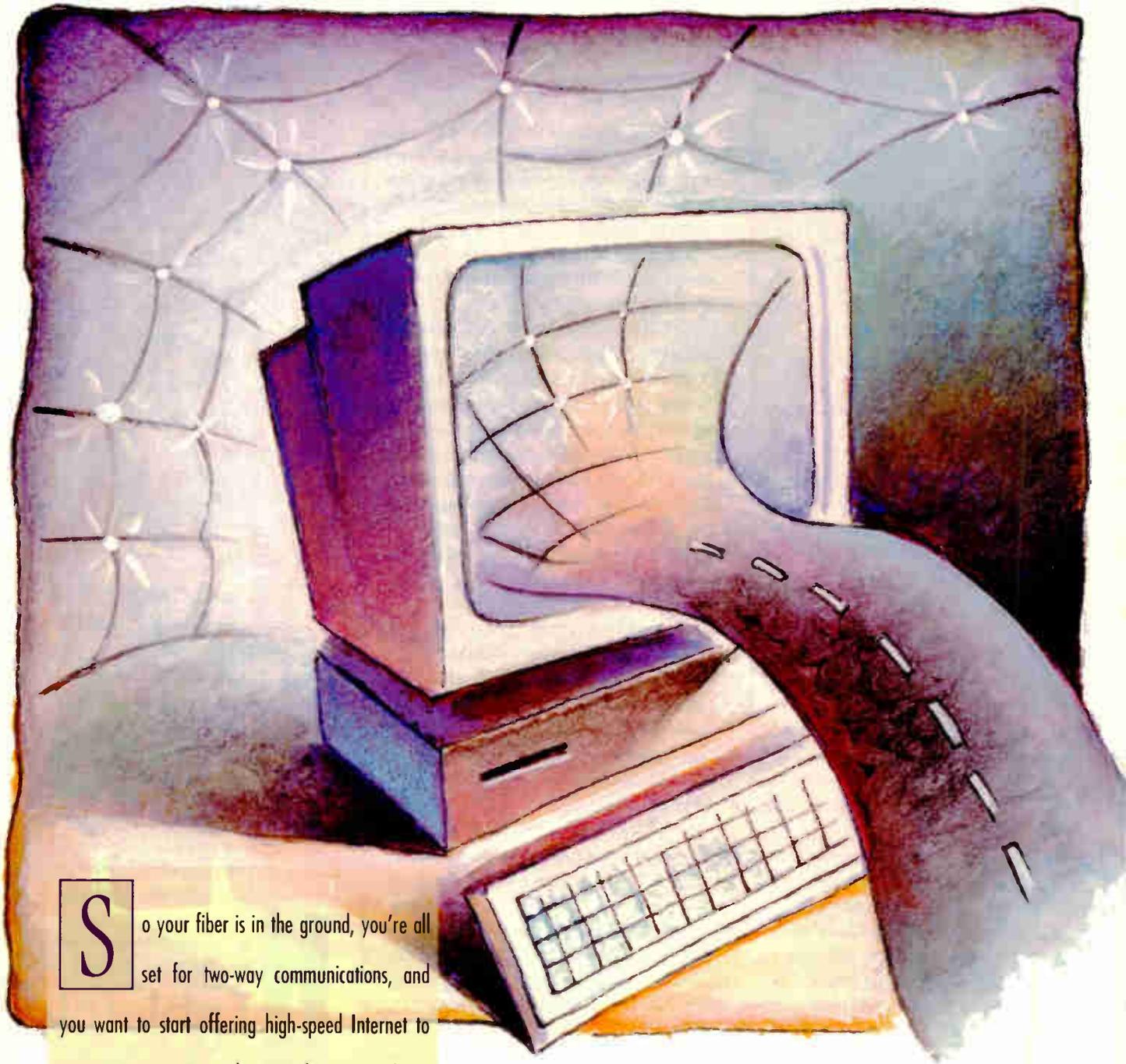
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# NET • CONNECTIONS

Where to Turn for an ISP

By Arthur Cole



**S**o your fiber is in the ground, you're all set for two-way communications, and you want to start offering high-speed Internet to your customers. But unless you have enough in-house experience to act as your own Internet service provider (ISP), you'll have to bring in an outside firm to manage the service. ➤

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That, in and of itself, is not such a terrible thing: Have the provider maintain the service and manage the traffic flow for a split of the profits. The tricky part is selecting which provider best suits your needs and offers the most value.

To date, only a handful of ISPs serve the cable modem market. The two most well-known firms, Road Runner and Excite@Home, come with the backing of leading multiple system operators (MSOs) and are targeting mostly first-tier systems of roughly 100,000 homes passed and more. Another pair making headlines, High Speed Access Corp. and ISP Channel, are battling it out for the smaller systems market. Yet another, Convergence.com is merging with C-COR and shifting its focus to include providing outsourced network management and design services to first-tier systems.

The criteria for selecting an ISP range from your location and terrain, the anticipated speed of cable modem adoption and the level of service you require—in other words, whether you are looking for a full-service operation staffed by your ISP vendor or a system that will be handed off following a training period.

## Start at the beginning

According to leaders in the field of broadband access, the best place to start is

to make an honest assessment of your system's capabilities and your goals.

"When you get to high-speed data, two-way capability is much more rigorous than simply facilitating pay-per-view (PPV)," said Robert Rusak, vice president of business development at Road Runner. "Our approach is to have a field engineering team work with the cable engineers doing measurement and testing on the plant and explain the type of tolerances that must be maintained and the effects that weather will have on the system. If you simply try to put cable modems on a normal system, it wouldn't work."

Once you're ready to commit, the actual hardware impact on your plant should be minimal. Most vendors report that a few racks of headend equipment are all that's required. Some vendors establish a connection to a regional monitoring system to keep tabs on performance.

With most vendors, the level of operational assistance and technical support is determined by the cable operator.

"Every arrangement is unique, but in most cases, we are providing a full-blown turnkey service," said Ron Hranac, vice president of RF engineering at High Speed Access Corp. "In some cases, there may be an operator with a very high comfort level (with the technology) where we get involved minimally. Some need help with

## Cable ISP Round-Up

### Excite@Home

Has access to more than 50 million homes nationwide  
Target: Mostly tier 1 systems in the West  
Owned by TCI, Cox, Comcast and others

### Road Runner

Owned by Time Warner and MediaOne (minority stakes by Compaq and Microsoft)  
Deployed in 25 systems  
Target: Mostly tier 1 systems east of the Mississippi  
Passes 8 million homes (1.5 million are non-TW or MediaOne systems)  
Revenue splits: Variable, 50-70 percent is retained by the operator, depending on level of involvement

### ISP Channel

Owned by SoftNet Systems  
Deployed in 31 systems  
Target: Tier 2 and 3 nationwide  
Passes 1.6 million homes  
Users: About 2,000  
Revenue split: 50/50 with full turnkey offering

### High Speed Access Corp.

Deployed in 51 systems (LOIs with another 23)  
Target: Tier 2 and 3 nationwide  
Passes: 982,000 homes (under contract)  
Users: About 7,300  
Revenue split: Varies, depending on level of involvement

### C-COR.net

Formed by the merger of Convergence.com and C-COR  
Deployed in 93 communities (currently)  
Target: All tiers for traditional services; tier 1 with options for other tiers for service management  
Passes: Approximately 400,000 homes  
Users: About 7,000  
Revenue split: Varies, but usually averages 20-25 percent

The usual suspects in cable's burgeoning ISP market



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**The 9580-SSR<sup>SM</sup>.** Up to six SSR field units can communicate with one SST simultaneously. The SSR displays ingress and reverse sweep information. The 9580 and GUARDIAN products are a complete return path maintenance system designed to test and service the entire return path.

**The IsoMeter<sup>SM</sup>.** Now there is a fast and easy way to test the home cabling for resistance to signal ingress. The RSVP generates a special 28 MHz test signal. The installer uses the IsoMeter to track down leaks in the cabling. Moving in the direction of the leak causes a rise in pitch, quickly pinpointing its location.



**The 9580-TPX<sup>SM</sup>.** The 9580-TPX offers a very attractive alternative for monitoring a large number of return test points for ingress at a relatively low cost. The TPX is fully compatible with the 9580-SST, expanding capacity up to 64 test points.



**The 9580-SST<sup>SM</sup>.** The SST headend unit collects balancing and ingress measurement data from one to eight test points, and transmits updated measurements to the SSR field units, the second component of the 9580 system. The SST operates as an ingress monitor, receiving 80 ingress samples per test point, per second.



**Ingress Management Software.** Allows the operator to set up a powerful ingress monitoring system for hundreds of reverse path test points. IngressManagR<sup>SM</sup> compares the ingress spectra measured at each test point to its own user-settable limits, logs data, sounds alarms, calls pagers and initiates other programmed responses if the ingress exceeds those limits.



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Reader Service Number 38

reverse plant issues, and others prefer us to take care of the entire cable modem operation."

**Capital investment**

In most small and midsize systems, a turnkey operation is probably the best way to go. Only the larger systems will have the available capital and the expertise to handle a data service from scratch.

"It's a pretty big capital investment up front to acquire the technical and marketing expertise," said Marian Neely-Carlson, spokeswoman for HSA. "A turnkey solution is a matter of convenience because installation is a lot smoother and you have a revenue stream right away."

Still, one cable ISP is rethinking its turnkey approach. "We're finding that more and more second and third tier (operators) understand the fact that they would like to own these subscribers," explained David Ames, president of Convergence.com and soon to be senior vice president of broadband management services for C-COR.net. "They don't want to

**"In most small and midsize systems, a turnkey operation is probably the best way to go. Only the larger systems will have the available capital and the expertise to handle a data service from scratch."**

sign a seven- or ten-year contract and give up rights to a market they don't know how big it will be. One person recently said, 'I think 50 percent of my business

will come from those services. Why would I give that up?"

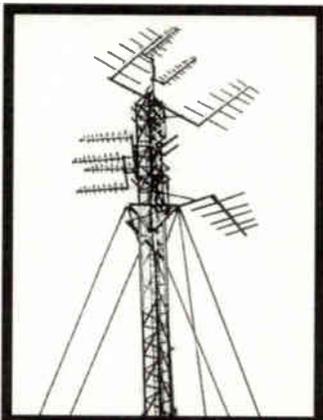
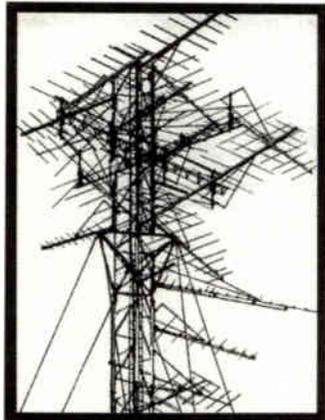
Whatever you decide, the best part about it is that adding data to the network won't require expensive headend reconfiguration. Available technology supports both one-way and two-way systems, but a properly maintained two-way system can provide much better performance than a one-way system using telephone return.

Once the equipment is installed and customers are online, the biggest challenge is maintaining a smooth-running operation. No longer are you simply running a single business—your data service will require its own staff to cover technical support, marketing programs, and 24/7 online or dial-in help. A full turnkey service likely will provide all this, but again, it will depend on the level of involvement you choose and the amount of revenue you are willing to share.

"The problem is (cable operators) want to deploy these services, but it requires a substantial infrastructure," said Ian Aaron, president of ISP Channel. "We cover the

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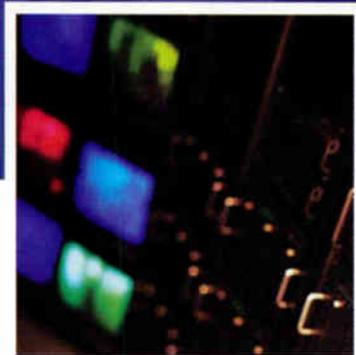
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## Strong regional presence needed

Still another consideration in selecting an ISP vendor is who is getting the lion's share of business among neighboring systems. No, it's not a matter of keeping up with the Joneses. A dominant service in your geographic region already has a strong network that your customers can more easily tap into and will most likely have advertising and marketing programs already in place.

Among the two rivals for the tier 1 systems, Excite@Home and Road Runner, Excite@Home is concentrating its efforts on the West Coast, while Road Runner is setting up shop in the East.

"In Florida, Road Runner, through its affiliates, will eventually be in front of every cable TV subscriber in all major regions with exception of where Comcast serves the East Coast," Rusak said. "Other states may have primarily @Home, and it may not make sense to go with someone without an established presence. Part of it is technical in that it is more cost-efficient for (the ISP vendor and the cable operator) if they are

interconnecting with a system that is already established in that region. You also get strong brand recognition that you can piggyback on when you're ramping up."

At this point in the game, it's hard to say whether broadband data will be the moneymaker in the digital age. Video-on-demand (VOD), telephony, videoconfer-

encing or some other unimagined service could become the must-have technology for the new millennium. The wisest course is to leave a little room on your system for all these services. **CT**

Arthur Cole is a contributing editor for "Communications Technology."

## BOTTOM LINE

### Custom-Order Broadband ISPs

Making the decision to offer broadband Internet service is a no-brainer. Selecting the right Internet service provider (ISP) vendor is a little more complicated.

Most ISPs serving the cable market offer customized packages that let you dictate the level of involvement—from full turnkey systems that include installation, operation and maintenance, to

handing you the reins once the hardware is in. Naturally, the amount of revenue you get to keep depends on how much you feel you can handle right now.

But be forewarned, high-speed Internet access is a very different animal from traditional cable TV, with its own set of hardware, suppliers and technical specs. Unless you've got a whiz-bang engineering staff that is 100-percent on all things digital, it might be best to let someone else run the show for now.

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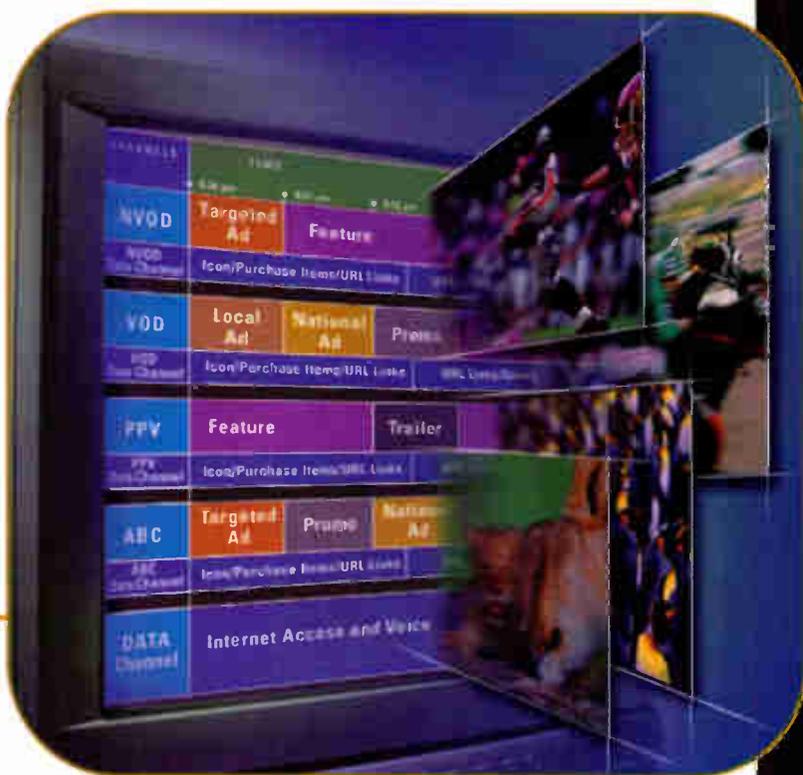
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# NCTA Celebrates 48th

By Jennifer Whalen and Greta Durr

## Industry Gears Up For High-Speed Future

**T**echnology sizzled at the National Cable Television Association's 48th Annual Convention and International Exposition, which was held in Chicago for the first time in 20 years. Conventioneers eager to enter the Broadband Millennium packed technical sessions to the brim and quizzed vendors on the latest products and services.

### Technology shares the stage

The rapid development of technology that will drive greater interactivity and increase customer choice had executives at Cable '99 euphoric over cable's future prospects.

"Leading the pace of consolidation is the rapid rise of technology," said Michael Armstrong, chairman and chief executive officer of AT&T. He cited advances in Data Over Cable Service Interface Specification (DOCSIS) modems, digital set-tops, and deployment of the digital cable infrastructure as key drivers of cable's future.

"Where we're going is interactivity—a future where television breaks out of the passive mode, forever, and adds a dimension of consumer control that, until now, has been just talk," he added.

Key to interactivity is the set-top. "The most significant thing in the cable



# Annual Convention

Photos by Oscar & Associates

industry today is the proliferation of the digital set-top box," said Gerald Levine, chairman and CEO of Time Warner. Levine praised the additional channels, near video-on-demand (NVOD), and eventually VOD services that digital networks can deliver.

Brian Roberts, president of Comcast Corp. concurred. "There's an unstoppable march to giving customers more choice. That's what the Internet is about. That's what these boxes are about."

Comcast ought to know. The cable operator is deploying between 7,000 and 8,000 digital set-tops a week, Roberts reported, and expects to have 350,000 to 400,000 digital TV subscribers by year's end.

Still, not everyone was falling over with

enthusiasm for video-on-demand and digital services in general. "We've been hearing about (VOD) forever, and it still hasn't happened," said Sumner Redstone, chairman and CEO of Viacom International, which owns Blockbuster Video. "The boxes become outdated almost before they are deployed. The studios are not going to risk what they're getting from the rental business on what doesn't exist."

So what does the future hold? "The TV will become Internet-enabled. That's an exciting prospect," predicted Paul Allen of Vulcan Northwest. Allen also envisions new consumer electronic devices, such as an impulse buy button on a remote control for purchasing products shown in commercials.

Levine forecast continued proliferation

of digital set-tops with rollout of true VOD services as well as broadband streaming of video to the Internet. "We will be compensated by having smaller nodes and dark fiber turned up," he said. Levine also predicted higher penetration of telephony.

## Home is where the network is

Judging from the standing-room only crowd in the "Home Area Networking" session, the home is the next great networking frontier. Why the burst of good feelings for an idea that's been around a long time? According to IDC research, by 2002, 23 million households will have multiple personal computers (PCs), and half of those will be networked, reported Thomas Funk, vice president of the Home

# SuperComm Highlights IP Telephony



It's Not  
Just for  
Telcos Any  
More

By Justin J. Junkus

**D**id you attend SuperComm this year? I'm willing to bet most of you out there didn't. After all, this year's show was held smack dab in between Cable-Tec Expo and Cable '99. Perhaps more importantly, though, it's not a cable show. Or is it?

As our industry shifts toward multiple service bundling, of which telephony promises to play a lead role, SuperComm should jump up a couple places on your annual trade show priority list.

### Size matters

The show's "super" moniker is most appropriate for a trade exposition where more than 750 vendors exhibit telephony products on more than 400,000 square feet of show floor, and where five major conferences are held simultaneously with the show.

This year's floor was divided into six zones, representing products for wireless and satellite communications, enterprise communications, information technology (IT), components and fiber optics, Internet protocol (IP) telephony, and global service providers.

As a person with a vested interest in cable telephony, I gravitated toward the conference sessions on IP telephony and the related products in the IP telephony zone of the show floor. I also spent some time reviewing the range of digital subscriber line (DSL) products, which

*Above: Making the rounds. Attendees at SuperComm '99 in Atlanta inch their way across the show floor.*

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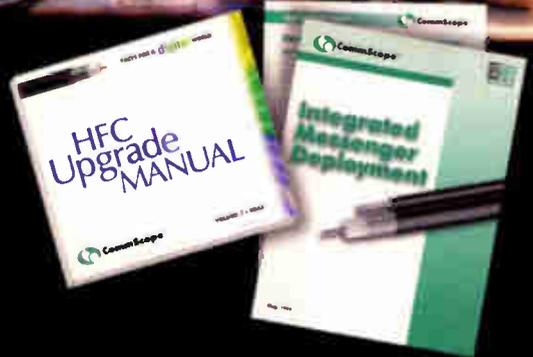
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*Hordes of attendees converge on booths like this one from Nortel Networks in search of answers to the burning IP telephony questions of the day and a peek at some of the products that will be making headlines tomorrow.*

provide the enabling technology for IP telephony applications on the telephone company's twisted-pair lines.

These areas of the show delivered two key messages. First, IP telephony is a current, not future, technology that includes more applications than voice over IP (VoIP). Second, vendors are positioning DSL with cable's competition as a technology with more uses than high-speed data access.

### IP applications

The conference session delivered by 3Com's director of product line management for Internet telephony, Houman Modarres, provided a listing of IP telephony applications that covered most of the vendor offerings on the show floor. New revenue from these applications, rather than the ability to deliver basic plain old telephone service (POTS), is the motivation for IP telephony technology implementations in telephone company networks.

Per Modarres, "Voice is just the tip of the iceberg." His list included early applications such as "transparent" network trunking, international facsimile, Web commerce, 800 number gateway, Class 4 and Class 5 circuit switch replacement, virtual private line (VPL) service for business, and universal messaging.

Beyond these initial applications, he also listed several enhanced services, such as "follow-me" intelligent call transfer, mobil-

ity management, location tracking, call filtering and programmed alerting/response, self-service Web-based subscriber line provisioning, multimedia multicast, and end device advertisement of capabilities.

**"Most of the vendors with early products close to NCS 1.0 specifications indicated their flexibility to develop and offer PacketCable-compliant products when market demand justifies an offering."**

The common thread to many of these applications is that voice or data information, once converted to packet form and transported using IP, can be accessed and combined with information from other sources that adhere to the same protocol.

Universal messaging services are a good example of such an IP telephony-enabled application that traditional carriers are rapidly adding to their service portfolios. These services allow a subscriber to pick up or send both e-mail and voice mail messages using any available communications device. With this capability, for example, a business traveler can use a cellular phone to access e-mail as a text to voice converted message.

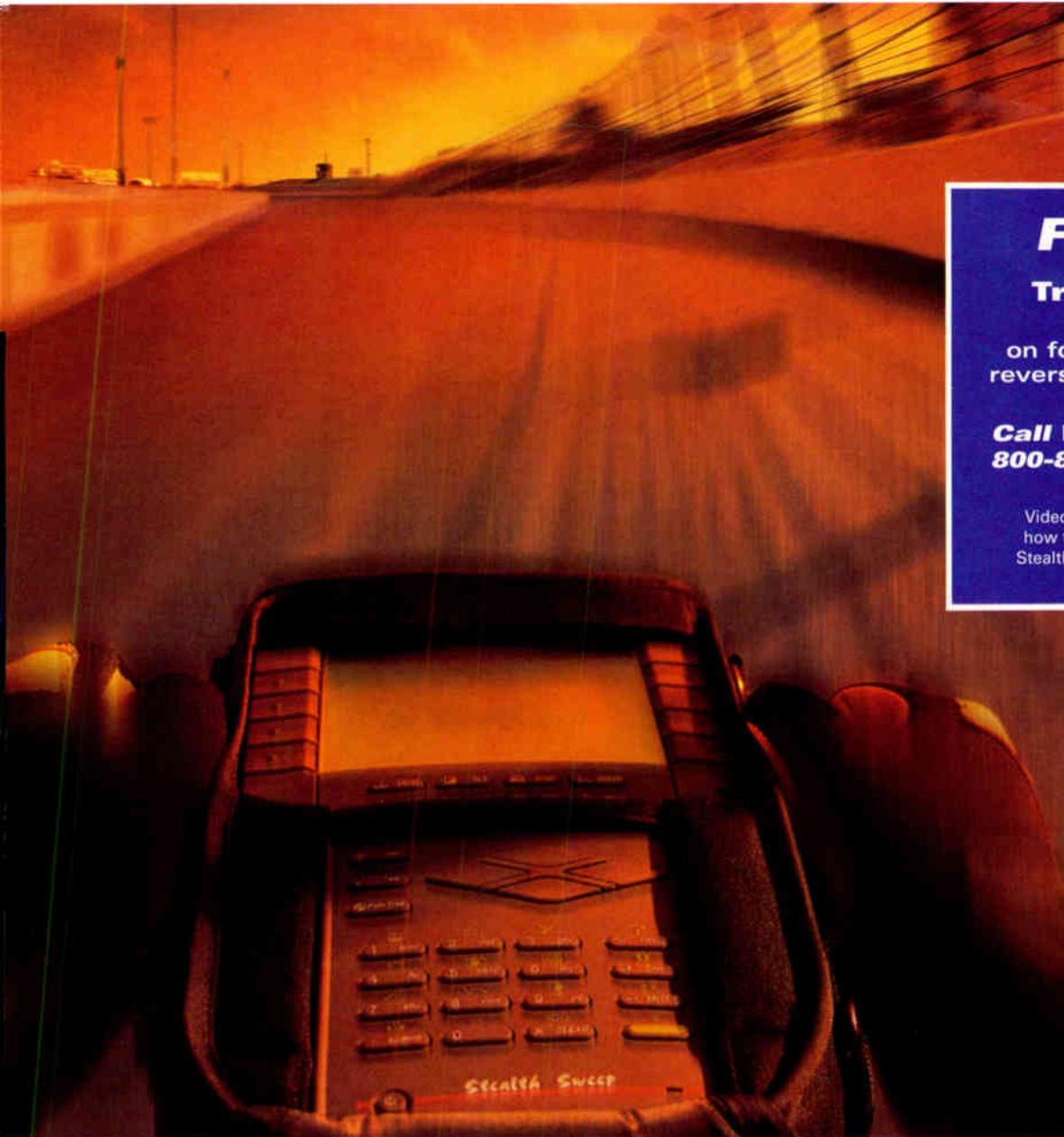
### Standards

The availability of IP telephony standards and interoperability between those standards is key to rapid growth of applications as subscriber offerings. There are several standards bodies, including CableLabs, the International Telecommunications Union, and the Internet Engineering Task Force, attempting to define IP telephony.

CableLabs has included the IP telephony media gateway control protocol (MGCP) in its Network-based Call Signaling (NCS) 1.0 specification for PacketCable. Similarly, the ITU has defined H.323 to include IP telephony as part of a multimedia specification for local area networks (LANs). The IETF is another standards organization whose concerns include defining IP telephony call signaling.

In a SuperComm session on signaling control of next generation IP/PSTN (public switched telephone networks), Lucent's Louise Spergel described some of the rela-

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tionships in the standards "alphabet soup." Spergel says IP telephony has three layers: services, signaling and media.

H.323 is one of the standards that applies to the call signaling layer. Simple gateway control protocol (SGCP), Internet protocol device control (IPDC), MGCP, and media device control protocol (MDCP) are vendor contributions to a new ITU and IETF standard, which will be known as H.gcp/MEGACO (media gateway control), that applies to both the signaling and media layers. Yet another effort is under way by an IETF working group called SIGTRAN to define the signaling interfaces between IP telephony and Signaling System 7 (SS7), including how IP will carry SS7's integrated services digital network user part (ISUP) call signaling protocol.

The SuperComm show floor was rich with IP telephony vendor demonstrations that complied with one or more of the standards. Some of the products, such as NetSpeak's Call Agent 1.1 and Telcordia's call agent software came close to conformance with emerging PacketCable specifications.



Lucent demonstrated its TR/E Call Feature Server for IP telephony at SuperComm.

Demonstrations of these products completed IP telephony calls using the SGCP protocol, which is similar to CableLabs' NCS 1.0 specification of MGCP. Like PacketCable,

however, these products are in early stages of implementation. Most of the vendors with early products close to NCS 1.0 specifications indicated their flexibility to develop

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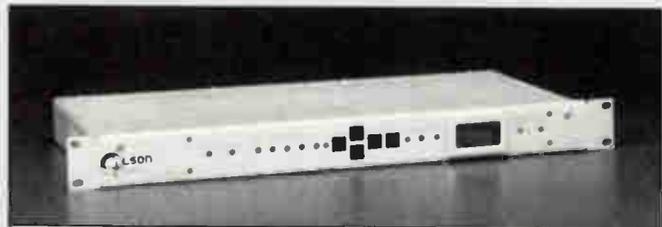
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Gain	16.5	11.7	dB
NF	3.0	4.5	dB
DC voltage	5	5	volts
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\*Measured at 30 dBmV output/channel, 83 channels.  
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and offer PacketCable-compliant products when market demand justifies an offering.

Other vendors showed product lines based upon the more-established ITU H.323 standard for IP telephony. VocalTec's approach to IP telephony standards is typical of the H.323-compliant vendors that have been delivering IP telephony products for field implementation for several years. When I asked VocalTec's Jo Lee about the company's plans for conforming to emerging standards, she replied that VocalTec is focusing on the traditional service providers, using H.323 as the basis for its products.

VocalTec's emphasis is definitely on selling hardware solutions that support revenue-generating applications beyond voice telephony. VocalTec Surf and Call Center is an example. This is a customer service application that implements a simultaneous VoIP telephony connection and collaborative Web browsing session between a firm's service rep and its customer. Service providers can package and brand label the solution for offerings to their business subscribers.

### Go cut me a switch

A discussion of IP telephony products at SuperComm would be incomplete without mention of switch vendors.

Both Nortel Networks and Lucent Technologies showcased new solutions. Nortel announced 11 new products targeted at customers with enterprise data networks who will be using those networks to provide IP telephony services. The products are based upon the company's open-standards Internet Communications Architecture (Inca). Inca-based systems will be built on a policy-based network infrastructure and on an industry standard Windows NT server.

Nortel's Accelar routing switch is an integral part of the architecture. Both standard analog and Internet telephones will be supported. Availability is on a phased basis, with most of the products planned for initial shipment near the beginning of 2000.

The Lucent exhibit included its 7R/E Call Feature Server, which it announced in April for shipment in this year's fourth quarter. The 7R/E is an evolution of the

**"The availability of IP telephony standards and interoperability between those standards is key to rapid growth of applications as subscriber offerings."**

5ESS circuit switch to the packet environment. Lucent is stating that all 3,000-plus features of the 5ESS switch will be available on the 7R/E, including popular features such as call waiting, call forwarding, call conferencing and call transfer. To facilitate the evolution from circuit-switched technology to packet switching, many of the hardware and software components of the 5ESS switch can be re-used in the 7R/E architecture.

### Digital subscriber lines

As for DSL technology, vendors concurred that a telephone company strategy based strictly upon high-speed data is at best shortsighted because of the highly competitive nature of the data access market. The predominant alternative application is to use the expanded bandwidth provided by DSL to offer multiplexed digital lines over a single twisted pair.

While multiplexing can be an attractive way for an incumbent local exchange service provider to save the costs of additional copper pairs, it also is a good way for a competitive local exchange carrier (CLEC) to enter the market. By serving several lines on one copper pair leased from the incumbent LEC, the CLEC greatly improves its profitability.

The target for multiplexed lines over DSL is predominantly the upscale residence and small business market. The reason for targeting this market as stated by one vendor of the technology should merit some thought by cable's strategic planners. According to Jennifer Stagnaro of CopperCom, this market is the source of 40-60 percent of LEC profits.

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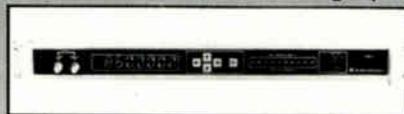
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Physically, the DSL interface at the subscriber location is very similar to a network interface unit (NIU), with one DSL line facing the network and multiple voice ports toward the subscriber. At the telephone company's central office, the DSL lines are connected to a DSL access multiplexer (DSLAM). There are several variations of DSL, but vendors are fast learning to work with each other via open interfaces. SuperComm included an interoperability showcase, where more than 30 vendors demonstrated interoperability of products such as DSLAMs and DSL modems based on the G.lite asymmetrical DSL (ADSL) specification.

Justin Junkus is president of KnowledgeLink, a consulting and training firm specializing in the cable telecommunications industry. To discuss IP telephony further, or to find out more about KnowledgeLink, you may e-mail him at [jjunkus@aol.com](mailto:jjunkus@aol.com).

## BOTTOM LINE

### SuperComm: Not Just for Telcos Any More

Even though the SuperComm show is traditionally a telco venue, we need to check it out as well. As cable moves into telephony and other offerings using Internet protocol (IP) technology, this show will take on more significance for us.

The show featured something for everyone, with 750 vendors exhibiting products in six key telecom areas: wireless and satellite communications, enterprise communications, information technology (IT), components and fiber optics, global service providers, and, of the greatest interest to us, IP telephony.

The show delivered two key messages for cable. First, IP telephony is a current, not future, technology that includes more applications than voice over IP (VoIP). Second, vendors are pitching digital subscriber line (DSL) technology to telcos as a technology with more uses than high-speed data access.

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# Why Standards?

## Part 3



### Three Years of Indecision for Color ... That Didn't Work

Original text by Kyle Moore; forward by Doug Larson

**I**f cable is to grow and meet the challenges of a rapidly advancing telecommunications environment, standards will become increasingly important. However, some remain skeptical of the need for standards.

In hopes of swaying some naysayers, we revisit the color TV standard fiasco of a half-decade ago. Originally published in "CATJ" by Kyle Moore (then president of CATA), the article provides a blow-by-blow account of the squabble, which nearly scuttled television entirely.

In the first installment, the two color system proponents, CBS and RCA, first faced off against one another in Federal Communications Commission hearings that began in the fall of 1949. The RCA Sarnoff system was experimental, while the CBS system

had been around for nearly 10 years. Both had problems.

Over the next few months, the battle heated up as both companies worked around the clock to get their systems accepted as the national standard.

In our last installment, the color standard race picked up speed as RCA and CBS continued their demonstrations, and Color Television Inc. of San Francisco joined the party. Throughout the tests, quality of color was paramount to the FCC. Public interest

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seemed to be the interest of getting good color, and no one seriously considered the incompatibility aspect of the problem.

The CBS system was the leading contender, but people could not watch CBS color programs in black-and-white without costly converters. Meanwhile, CTI and RCA made dramatic progress in their systems, and both were compatible; that is, people could watch colorcast programs in black-and-white on the nearly 9 million existing receivers.

These developments, as well as the largely unexplored issue of color signal interference, led many to believe that the FCC would delay its color standard decision. All the while, the Commission was under relentless attack from Colorado Sen. Edward Johnson, who badgered the Commission to approve a color standard immediately.

This third and final installment details the resolution of the conflict by, of all things, another conflict.

So it was some surprise when in September 1950 that the Commission released a 48-page "memo decision" awarding the color prize to CBS.

The Commission, by a 4-2-1 vote, approved the CBS system, but left a carrot dangling for CTI and RCA. It told the two firms, "You have until December 5th to demonstrate how improvements in your existing color will bring it up to the 'grade' of the CBS quality."

The memo made little mention of the compatibility problem. It stated: "If a compatible system that produced satisfactory pictures was available, it would certainly be desirable to adopt such a system. Compatibility would facilitate, for the broadcaster, the transition from black-and-white to color broadcasting and would reduce to a minimum the obsolescence problem of present receivers. However, no satisfactory compatible system was demonstrated at these proceedings."

Sen. Johnson made public a letter to FCC Chairman Wayne Coy in which he said: "The decision brings very close the day when this great new improvement will serve the American people. I know every effort will be made to push forward rapidly the allocation decisions so that television will be made available to many more millions of citizens who are waiting impatiently to have television in their homes."

Dissenting on the rushed choice of CBS,

Commissioner Frieda Hennock said: "Incompatibility will produce a serious problem for the broadcaster, and its effects will very likely be felt by all TV viewers. To the extent that there are receivers in the hands of the public which are unable to receive field-sequential color broadcasts, every program broadcast under those standards will entail a loss of audience for the broadcaster. The decision to produce a program in color will be a difficult one for the broadcaster if it means that the program will become less salable."

### Stay of execution

While the shock of the decision was wearing off and RCA and CTI were working 24 hours a day to meet the Dec. 5 reprieve deadline, someone noticed some fine print in the 48-page decision.

It said that within 60 days of finalization of the new color standard, all receivers produced for interstate commerce would be required to have a built-in capability to switch between standard 525-line black-and-white and 405-line field sequential color (in black-and-white). This meant that all TV sets would have to be capable of receiving standard black-and-white broadcasts in black-and-white, and at the throw of a switch, CBS colorcasts in black-and-white. This was a "conversion" that CBS had earlier stated the average set owner (by now there were 9 million sets in use) could make at \$75 per set.

The receiver manufacturers came unglued. "We can't change over that fast," most cried. Others questioned the authority of the Commission to force an extra-cost receiver standard into receivers. CBS considered the ruling a victory.

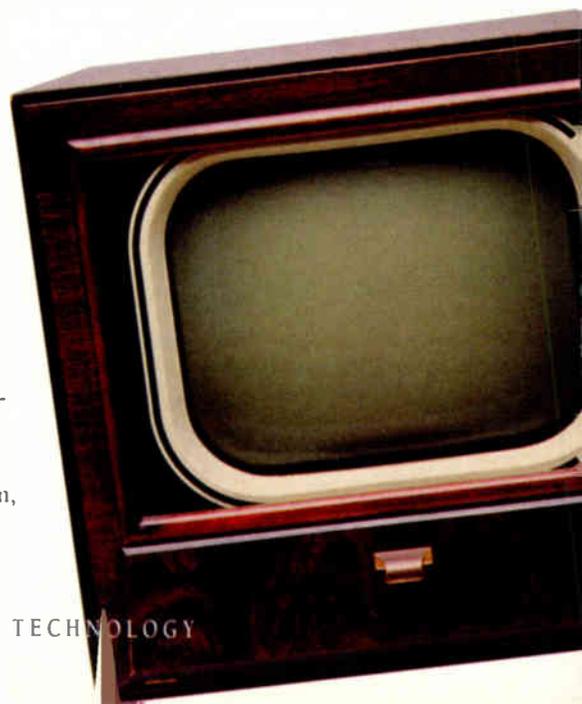
When the receiver manufacturers brought their case to the FCC, a new bit of intrigue developed. FCC Commissioner Harry Plotkin let the cat out of the bag when he announced that FCC Engineer Ed Chapin had constructed in the FCC laboratory a receiver that "featured automatic adaptation from 525-line black-and-white to 405-line color, shown black-and-white, thereby eliminating the need for a manual switch. If the receiver manufacturers were upset when they went into the session, they became irate when Plotkin dropped that bomb.

The RCA attorney said: "This development of Mr. Chapin's constitutes what might be considered an improvement in the CBS system. The Commission has set itself up in a judicial capacity to hear evidence between two or three competing systems. Now the Commission's own staff comes forward with an invention, which seems to be an improvement of the system proposed by one of the litigants. It seems to us as if we have a situation where the judicial group is assisting one of the parties in the contest. We think this is inconsistent with the judicial position which the Commission should take in these proceedings."

Chairman Coy showed a flash of temper as he rebuked the RCA attorney, defending the role that the Commission had played to date. He then explained that the Chapin circuit was going to be the subject of a patent application, said patent to be owned by the U.S. government. The exchange left an extremely bitter rift between the Commission and the receiver industry, not to mention RCA.

### Lawsuits

Within weeks, two lawsuits were filed, both landing in the U.S. District Court in Chicago. One suit was filed by a TV receiver manufacturer (Emerson) and another by RCA. Both suits charged "... that industry, broadcasters and set owners stand to be seriously affected by this ruling of the FCC .... The order is contrary to public interest, is arbitrary and capricious, and exceeds the authority of the Commission .... The order is not supported by the evidence." ►



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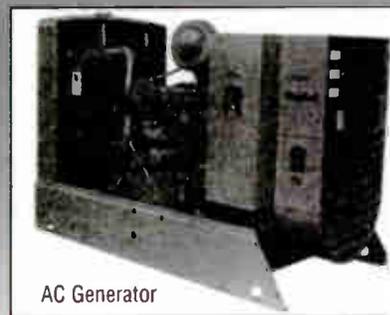
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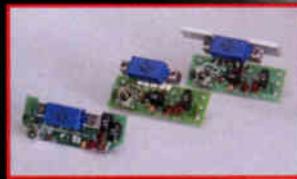

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Both suits sought injunctive relief from the courts to keep the FCC from enforcing the order and putting the color standards and new compatible receiver standards into effect. One suit stated: "Although the Commission has no jurisdiction over receiver manufacturers, the Commission seeks to require that such manufacturers agree with the Commission to build all of their black-and-white receivers according to specifications laid down by the Commission. These specifications require extensive alterations in present production model receivers."

Obviously, today's color receivers do not have the large spinning color discs required by the CBS system, so somehow we must have gotten out of this predicament. One could reasonably think that the courts turned the matter around. They did not.

## Supreme Court ruling

The case moved through the courts with lightning speed, and the U.S. Supreme Court had it in no time at all. Because the FCC was the defendant, U.S. Solicitor General Philip B. Pearlman presented the case for the FCC. The Supreme Court provided a good forum, although it initially was uncertain just how far the court should go; should it, for example, re-study all the technical evidence that went into the FCC decision and perhaps hold another round of hearings? Justice Jackson was particularly interested in this question because everyone was plowing new ground.

Justice Frankfurter asked the CBS counsel whether "... the FCC decision does not create a condition in which a possible monopoly might develop if the incompatible system were developed." He also asked how a government commission, not composed of experts, could foreclose, once and for all, the further development of color systems and improvements by accepting the CBS system at this point, then closing the door to others thereafter.

After a couple of months, the Supreme Court released a decision: It backed the FCC's right to establish a standard for color TV, and in effect, the CBS system was finally approved.

But in the process of passing judgment on the FCC's legal right to set and adopt standards for color TV, it was evident that the Supreme Court dug deeply enough into the evidence and exhibits to make another determination. In its decision, the Supreme Court said: "However, the wisdom of the decision (by the FCC) can be contested, as evidenced by the fact that two of the Commissioners dissented in the decision. It is not the job or function of the courts, however, to overrule an administrative decision merely because the courts may disagree with its wisdom."

It appeared that the Supreme Court was establishing a dangerous precedent for future contestants of the FCC. In effect, as long as the FCC was within its legal framework to make a decision, it could make virtually any decision it wished. And these decisions would not be overturned by any federal court, even the Supreme Court, based on the questionable wisdom of the FCC decision.

Perhaps the broadcasting industry did not realize it at the time, but this was to become a significant milestone for future TV hassles. The doctrine of administrative agency expertise was to become supreme, larger even than the Supreme Court. All the FCC had to do to stay out of trouble was to base decisions on whatever criteria it wished, as long as it stayed within the broad regulatory areas that the Communications Act of 1934 established.

## Conflict and resolution

As previously stated, we do not have CBS field sequential color spinning discs in our receivers today—we have all electronic colorcasting. If the Supreme Court backed the FCC, what prevented CBS from running with the ball? Believe it or not, it was the Korean War.

During the late summer and fall of 1951, CBS felt pretty comfortable, though RCA and others steadily made large-scale improvements in their color systems. CBS announced ordering 250,000 small electric motors for color receivers, as well as a small increase in color broadcasting activity.

Then, in mid-fall of 1951, the Washington Chief of Defense Operations Charles

E. Wilson did what the federal courts could not do for RCA and the all-electronic color group. It shut down CBS production of color sets. The defense industry requirements of the Korean War had built steadily, and certain materials used in CBS color receivers were required for the war effort. Because CBS was the only manufacturer of CBS color receivers at that point, CBS also shut down its colorcasting for

the duration of the war. Without receivers, why have programs?

At the point of shutdown, CBS color receivers were just beginning to come off the production line. At the same time, the compatible color group made dramatic improvements in its system. Some were certain that CBS engineered the shutdown to keep itself from being financially and nationally embarrassed by a fatally flawed

## BOTTOM LINE

### The Case for Standards

"Technology is a market-driven tool," says Ted Woo, Society of Cable Telecommunications Engineers director of standards. "What good is technology unless somebody buys it?"

That point is the basis for a flurry of activity aimed at developing open standards for digital set-top boxes, cable modems, headend systems and the like for our hybrid fiber/coax (HFC) networks. This standards-based equipment will help to drive mass deployment and consumer acceptance of digital interactive networks and services.

With the first few waves of Data Over Cable Service Interface Specification (DOCSIS) certification completed, and the OpenCable and PacketCable initiatives starting to heat up, standards activities are taking center stage in the industry's push into the seemingly unlimited potential of a digital interactive world.

However, while diversity and participation in standards development and certification is on the rise, there are those who remain skeptical. The color TV standard process of a half-century ago perhaps does as good a job as any in revealing the critical need for standards.

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"In effect, as long as  
the FCC was within its  
legal framework to  
make a decision, it  
could make virtually  
any decision it  
wished."

color system. Others opined that RCA and others prompted the Department of Defense visit to CBS to keep CBS from getting a head start with 12-inch whirling disc color receivers. Still others merely accepted the fact that the CBS production needed to be shut down for the war effort.

And when the Korean War was over and the manufacturing embargoes were lifted, the interim development of compatible color had run full circle. In a not very controversial and not very lengthy debate, all the industry supported the compatible color program initiated by RCA, which became the standard. In 1954, the nation would purchase 5,000 compatible color TV receivers, followed by 25,000 the next year.

### The point

Had the Korean War not come along, we might very well have been saddled with a thoroughly unworkable color standard, which easily could have hampered the industry for years thereafter. The standards process of the day—controlled by nontechnical FCC commissioners, rather than engineers—simply wasn't up to the task.

Today's standards processes—run by industry engineers, as they should be—are vastly improved over this 50-year-old example. Competitive pressures, squabbling and delays do still crop up from time to time, but they're a far cry from the crippling foolishness illustrated in this story. In fact, they run extremely well, if not quite instantaneously.

The next time someone questions the necessity of "all this work just for some dang standard," it might pay to bring up the color TV standard fiasco of the late '40s and early '50s. **CT**

Doug Larson is senior editor at "Communications Technology." He may be reached via e-mail at [dlarson@phillips.com](mailto:dlarson@phillips.com).

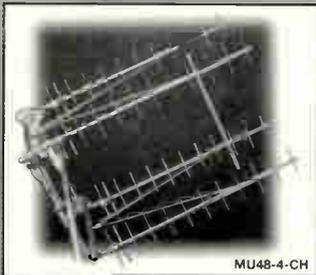
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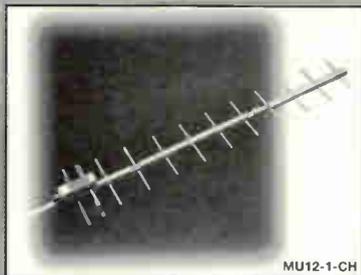
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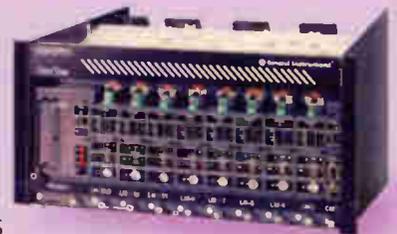


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**Reader Service Number 62**

# THE Build

Training and Construction Strategies for Evolving Broadband Networks

## Cable Should Take Dark Fiber Deal To Heart

By Reed Miller

Metromedia Fiber Network, a competitive local exchange carrier (CLEC) based in White Plains, N.Y., has fired a shot that will be heard around the telecom industry. The carrier has negotiated an agreement with Bell Atlantic that allows it to install dark fiber within Bell Atlantic central offices without leasing colocation space.

The implications for the telecommunications industry are enormous. On the practical level, Metromedia can link up to its customers, such as CLECs and cable TV companies, without having to lease colocation cages. But in the bigger picture, Metromedia will become a carrier with a platform that is very similar to Bell Atlantic's. Metromedia will have a dark fiber network sprawling throughout areas of the Bell Atlantic territory that connects back to switching facilities. Provided other CLECs pursue similar arrangements with regional Bell operating companies (RBOCs), they also could pursue customers with the freedom of an RBOC.

"This is the first time ever that a competitive player, a dark fiber player, will sit inside of LEC central offices without needing colocation space or cages," says Nick Tanzi, senior vice president of the Eastern region at Metromedia. "We will terminate our network (with customer's facilities) in a common area within each central office."

The agreement could be advantageous to

any cable company that wants access to Bell Atlantic's copper network, says Tanzi. A cable company may want to compete against the carrier in selected markets, he says. Metromedia has four cable companies as customers, one of which is Hyperion.

The agreement gives Metromedia access to all of the central offices in Bell Atlantic's territory. Bell Atlantic and Metromedia will conduct an initial trial of the agreement in five central offices in New York. Upon successful completion of the trial, Metromedia plans to offer connections in more than 100 Bell Atlantic central offices in New York; Philadelphia; Washington, D.C.; and Boston.

There will be time and cost savings involved for Metromedia customers. Historically, Metromedia's fiber was run in front of a Bell Atlantic central office, and then Bell Atlantic execs would tell Metromedia how to enter the building with the fiber to reach a customer. The engineering and construction process could take up to six months. Now, Metromedia's fiber will be located within the central office, so customers can be connected in 60 days, says Tanzi.

Colocation cages also cost \$54,000 up front, plus a few thousand dollars a month, but now they are not required.

Surprisingly, Bell Atlantic execs say they are "satisfied" with the agreement with Metromedia. "Basically, we are going to

develop a service around the agreement," says Jennifer Van Scoter, director of interconnection services, negotiation and policies at Bell Atlantic. "Metromedia will be charged for using our central offices."

The agreement with Metromedia also can be leveraged by Bell Atlantic in its battle to enter long distance. After all, what better way to convince regulators there is competition in your region than to allow a carrier equal access to your central offices? One thing's for sure—Bell Atlantic won't come out behind as a result of its agreement with Metromedia. **TB**

*Reed Miller is senior editor of sister publication "Fiber Optics News." He can be reached at [rmiller@phillips.com](mailto:rmiller@phillips.com).*

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Making the path easy to follow.

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[Training]

**Build**

# Make the *Transition* From Analog to *Digital*

By Thomas G. Dolan

At Prime Communications,  
Education Is the Key

*Partnering with vendors is a key element in Prime Communications training program. Here an engineer with Harmonic performs fiber node training.*

**"I** 've been in the business for 15 years and thought that making the switch from analog to digital would be routine—boy, was I naive," says Scott Shelley, vice president of operations at Prime Communications Inc. in Rockville, Md. "Digital changes the way you do business by 180 degrees." >



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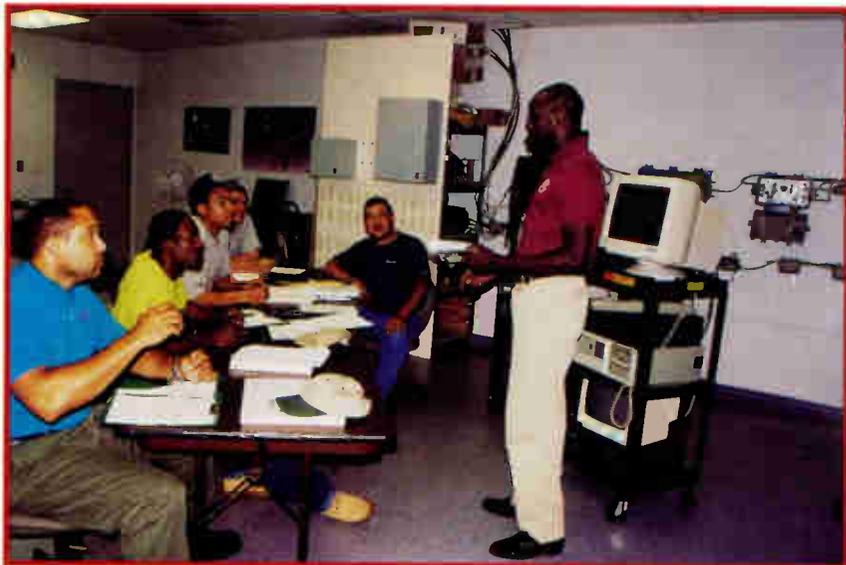
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Outsourced instructor Craig Tennell trains new hires, installers and service technicians.

Advanced service launches—such as cable modem and digital TV (DTV) service, video streaming, pay TV, near video-on-demand (NVOD), Internet protocol (IP) telephony, and so on—place new and sometimes unexpected demands upon cable companies.

The solution for Prime, says Shelley, has been education, education and more education. It's easy to say, he adds, but difficult to implement effectively. All 227 employees receive at least some degree of training, which varies in terms of the job category. It's taken the company 18 months simply to plan out the training system, and that's only the start.

## Technology challenges

"Perhaps the biggest challenge is to get technicians to understand the difference in measuring analog and digital signals and how those signals are represented," says Technical Training Manager William Catlett. "With analog, you can still see a picture. It may be grainy or snowy, and the quality may not be there, but at least there's something to work with. With digital, however, it's either there or not there. Also, you have to keep a closer eye on the noise floor with digital signals because once it gets to a certain level, you might compare it to a cliff—it just drops off."

Troubleshooting and maintenance also are difficult for this reason, Catlett explains. Ingress and distortion don't affect digital signals in more ways than they do analog signals, but the disturbances are of a different

nature and harder to spot. Add to this that with traditional analog TV service, you have only the forward signals to contend with, but with advanced two-way digital services, you have both the forward and return.

## Apprehensive personnel

There have been personnel challenges as well. First, because the new technical orientation is so different, there has been some resistance among technicians and even more apprehension. The learning curve has been steep. Yet, on the other hand, the success of the training has led





## SKILLS ENHANCEMENT WORKSHEET

Below Section to be completed by Designated Trainer only  
\*\*Tech to work initially as their trainee for this item\*\*

Trainee's Name: _____		Date: _____
Supervisor: _____		Dept: _____
INSTALLER LEVEL II		Tech #
		Initials
<input checked="" type="checkbox"/> SAFETY		
<input type="checkbox"/> Inspecting PPE		
<input type="checkbox"/> Reporting discrepancies with PPE		
<input type="checkbox"/> LADDER HANDLING		
<input type="checkbox"/> CUSTOMER RELATIONS		
<input type="checkbox"/> STOCK NOMENCLATURE		
<input type="checkbox"/> GROUNDING V.S. BONDING		
<input type="checkbox"/> BASIC TROUBLESHOOTING		
<input type="checkbox"/> USE OF HAND TOOLS		
<input type="checkbox"/> SURVEYING THE INSTALLATION		
<input type="checkbox"/> ORGANIZATIONAL SKILLS		
<input type="checkbox"/> TWO-WAY RADIO USE AND RADIO CODES		
<input type="checkbox"/> ROAD MAP USE		
<input type="checkbox"/> ROUTING CABLE THROUGH CUSTOMER'S HOME		
<input type="checkbox"/> AERIAL INSTALLATION		
<input type="checkbox"/> READING/FILLING OUT A WORK ORDER		
<input type="checkbox"/> Job Codes		
<input type="checkbox"/> MAINTAINING PERSONAL TOOLS/TRUCK TOOLS		
<input type="checkbox"/> MAINTAINING TRUCK STOCK		
<input type="checkbox"/> REPORTING TRUCK DISCREPANCIES		
<input type="checkbox"/> SRO's		
<input type="checkbox"/> TEST EQUIPMENT		
<input type="checkbox"/> SLM	TYPE	
<input type="checkbox"/> Tester		
OTHER		
<input type="checkbox"/>		
<input type="checkbox"/>		
<input type="checkbox"/>		

to a new problem.

"Right now, because of the skill level our technicians have achieved, the competition is grabbing them like hotcakes," Catlett says. "Our technicians want us to meet the new salary offers they are getting, but we don't want to get into a salary matching competition."

The solution to these challenges? Although the company does not want to get into bidding wars to retain the technicians it has trained, Catlett says it's experimenting with a new incentive/bonus structure, so that employees can make more based

on productivity. He adds that the learning curve, though difficult, once completed will not have to be undergone again. He says that the new challenges necessitate instilling in technicians a deeper sense of and pride in craft. Moreover, as they become more confident in their skills, the resistances and apprehensions fade away.

### Training strategies

But the key to all of this is training, including vendor training on the new equipment, intensive in-house training using computer based training (CBT) and Na-

tional Cable Television Institute correspondence courses—also incorporated into the in-house training—plus hands-on, on-the-job training with more experienced personnel.

The most intensive training is broken down into the following job categories: contract installers, in-house installers, service technicians, line technicians, system technicians, sales installers, telemarketers, dispatchers and customer service representatives (CSRs).

Contract installers: The outsourced installers are given classes in professional customer relations and the technical aspects of digital. The amount of training varies as needed.

In-house installers: The in-house installers are given two-week new hire classes, also in both the customer relations and technical aspects. This is followed by two more weeks riding with someone in the

**"The training process is good, but what's been hard is implementing it in a timely fashion and trying to coordinate the vendors and various departments to cut down on lag time and frustration levels."  
— William Catlett, Prime Communications**

field, during which time they also receive accelerated service classes.

Service technicians: After a week of classroom training, these technicians spend two to three weeks riding with experienced personnel. They begin accepting two to three calls a week on their own and keep at it for six months to a year until they are proficient and ready to move on. ▶



## SKILLS ENHANCEMENT APPLICATION



This training program has been implemented in order to help CTM/CTA employees increase their job related skills. Please return all completed forms to Bennett McPhatter.

Name: \_\_\_\_\_ Date: / /

Supervisor: \_\_\_\_\_ Dept: \_\_\_\_\_

Trainer's Name: \_\_\_\_\_ Date: / /

Below Section to be completed by Designated Trainer

SYSTEM TECHNICIAN		G	U	T	E	X	C	A	V	P	O	R	N	/	A
<input checked="" type="checkbox"/>	SAFETY														
<input type="checkbox"/>	24 HOUR VARIANCE TESTING														
<input type="checkbox"/>	SWEEP TESTING														
	<input type="checkbox"/> Injecting the Sweep Pulse														
	<input type="checkbox"/> Balancing the Cascade														
<input checked="" type="checkbox"/>	TEST EQUIPMENT														
	<input type="checkbox"/> OTDR														
<input checked="" type="checkbox"/>	AML RECEIVERS														
	<input type="checkbox"/> Checking/Diagnostics														
	<input type="checkbox"/> Aligning														
<input type="checkbox"/>	JOB CODES (Solution and Finding Codes)														
<input type="checkbox"/>	PROOF OF PERFORMANCE TESTING														
<input type="checkbox"/>	TEST POINT MONITORING														
<input type="checkbox"/>	HUB MAINTENANCE FORMS														
<input type="checkbox"/>	CABLE MASTER														
	<input type="checkbox"/> Routing/Scheduling														
	<input type="checkbox"/> Reassigning														
<input type="checkbox"/>	OTHER														
<input type="checkbox"/>															
<input type="checkbox"/>															
<input type="checkbox"/>															

Technicians wishing to be certified for a particular job category must demonstrate to an instructor that they can perform all the duties listed on the worksheet. Once employees complete the worksheet, they then take an exam and, if necessary, an NCTI training course to complete the certification process.

**Line technicians:** The ordinary training period here encompasses 16 hours in the classroom and 16 hours in the field. An accelerated course involves two four-hour classroom sessions. The trainees also ride with experienced line technicians and gradually start with a few calls on their own, progressing from there.

**System technicians:** Here the training is almost entirely in the field working with

established system technicians. For each of these levels, technicians go through testing and certification processes. Once a person becomes certified as a system technician, the education is virtually complete.

**Telemarketers:** These personnel receive a four-hour class on theory, basic TV hookup and troubleshooting.

**Dispatchers:** Sometimes called field communicators, dispatchers go through a

four-hour class as well. Covered topics include cable theory, map reading, meter reading and basic troubleshooting.

**Customer service:** "This is a big one," says Catlett. "We have a program called 'Get It Right,' in which they are taught troubleshooting to resolve customer complaints and minimize service calls." There are four different levels, each involving a four-hour class.

"Employees have to know the product like the back of their hand so that, just like the installing of cable today, there is a seamless transition," says Shelley. The key to the training is the mastery of the use of the navigator, especially for the sales or customer service representatives who deal directly with customers.

"They have the navigator on their desks, all integrated to one type of remote control, so that questions can be answered over the phone and customers can be literally walked through the system," Shelley says. "It doesn't matter how good your product is—if your customers don't know how to operate it, it will fail miserably."

Catlett explains that the navigator is a function of the new digital set-top, which

## The Bottom Line

### Training Is Key To Digital Success

Deploying new digital services, from cable modems to digital television (DTV), tends to lead to new and sometimes unexpected demands upon cable companies.

The solution for Prime Communications in Rockville, Md., has been education, education and more education. All of Prime's employees receive at least some degree of training, which varies depending on the job category. It's taken the company 18 months simply to plan out the training system.

The most intensive training is broken down into the following specific job categories: contract installers, in-house installers, service technicians, line technicians, system technicians, sales installers, telemarketers, dispatchers and customer service representatives (CSRs).

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Employees undergo field training as well classroom instruction.

allows the user to access much more information than was possible through the analog system. For example, it allows you to preselect movies, rather than simply channels. "The navigator is not that hard to use," he says, "but it does take a learning curve for a person to understand how to utilize all of its many features."

Cable modems involve an entirely different group of technicians. Training takes a week, followed by a two-week ride with an installer or data technician before a trainee starts out on small jobs on his or her own. Prime teaches these technicians how to install and configure the computer to provide the high-speed

data and to troubleshoot. The hardest thing for installers to master, Catlett says, "is the computer configuration and the inherent problems customers have with computers."

### If I had it to do over ...

What does Catlett wish he had known ahead of time before making the transition from analog to digital? "The training process is good, but what's been hard is implementing it in a timely fashion and trying to coordinate the vendors and various departments to cut down on lag time and frustration levels."

As for the most important advice he could give colleagues in making a similar transition, Catlett emphasizes "education, education and more education. Train your technicians to look upon themselves as craftsmen. Instill in them the right attitude so they will want to do the job right the first time." **TB**

Thomas G. Dolan is a contributing editor to "Communications Technology."



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Reader Service Number 67

# Maintain Your Safety Net

## Keep Generators From Failing

By John Bisset

**A**re you living on the edge of catastrophe? You may be walking a tightrope and not even know it. As more eggs are placed in the communications basket, having reliable and adequate power backup systems becomes essential.

If you haven't taken a few moments to review your backup systems, you're on that tightrope—and could be ready for a nasty fall. On the other hand, if you have maintenance contracts in place, what is there to worry about? Plenty! In an age when qualified technical help is harder and harder to find, it's important to ensure that your staff and your contractors know what is expected of them.

This couldn't be more important than in the maintenance and periodic testing of backup power systems. But where do you start, and aren't the service contractors supposed to know what they are doing?

### Implement a solid Maintenance program

As a starting point, dust off the equipment service manual. For backup power systems such as generators, the manual

usually lists routine maintenance procedures and their frequency. Review the last service work order from your generator service company. Are the recommended points being covered? If you maintain the generator in-house, does the maintenance include more than just checking the fuel level?

Remember, a generator is akin to an automotive engine. It takes more than fuel to make the engine run. Do you have a staff member who likes to work on his car? Assign him to generator maintenance.

Create a checklist of maintenance items, including routine fluid level checks—oil, coolant and battery electrolyte. Note from the generator manual whether there are static and dynamic fluid levels. The manufacturer may specify measuring the oil with the motor at rest, but there may also be a dynamic level.

Your staff needs to look for leaks, including oil, fuel and coolant. Leaking fluids will not correct themselves and only point to future trouble. A good place to start the leak inspection is around hoses.

### Environmental damage

The generator usually is in an exposed environment—extremes of heat and cold cause engine components to deteriorate faster. Before the generator is turned on, squeeze the hoses to check for pliability and cracking. Check for tight hose clamps. A folded white napkin or paper towel can be swept around the hose connection and viewed for any absorbed fluids.

As the leak inspection continues, look at the base of the motor housing. Fluid can pool in these locations. Keeping the base clean of grease will make it easier to spot leaks. Using a clean cloth to periodi-

# OUT OF SPACE?



## NEW SVM 555

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## NEW MTS-5

## NEW MTS-5

### BTSC STEREO GENERATORS WITH AGC AND SAP

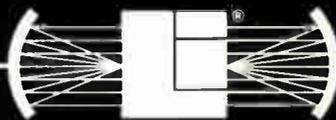
The SVM 555 is a TV modulator rich with features: 60 dBmV output; 550 MHz agile from the front panel; BTSC stereo with 30 dB stereo separation; audio and video AGC's; LED audio and video bargraphs; dual stereo audio and video inputs for EAS or commercial insertion. An optional SAP board can easily be added inside at any time. With all these standard features, the SVM 555 sells for under \$2000 and mounts in one rack space.

The MTS-5 BTSC stereo generator is another breakthrough in compact design. Features include: audio AGC; 30 dB stereo separation; 14 kHz frequency response; dual inputs for EAS or commercial insertion; Bessel-null test tone; optional SAP board can be added inside. Mounting in one-half of a rack space, this self-contained unit is one of the most compact, high performance, BTSC stereo generators on the market for under \$1000.

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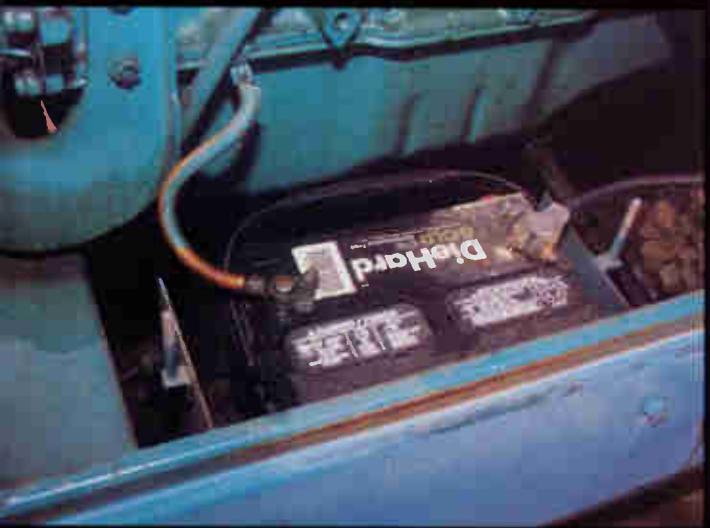
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*There's no auxiliary power without a battery. Keep connectors clean and tight.*



*A periodic inspection of all hoses is in order. Check for pliability, cracks, leaks and weak spots.*

cally wipe down the engine is a good way to get familiar with the engine while keeping it clean.

## Parts is parts?

If a hose cracks, don't skimp on quality when you replace it. Silicone hoses cost more, but are worth the extra investment. Cheaper hoses can dry rot and become so brittle that they can be torn apart with bare hands.

Before you balk at the prices of replacement parts, remember that this equipment is your safety net. How will you explain the cost of routine maintenance when the generator fails and you've lost tens of thousands of dollars in revenue? A \$50 hose becomes a paltry sum in such cases.

Belts fall into the same category as hoses. Check to see that they are not cracking or glazed. Cog belts are more expensive, but they provide better transfer of energy—improving the efficiency of the system—and last longer than standard belts.

## Other checks

While you're under the hood, what else should you look for? Keep an eye out for things such as broken bolts or nuts that may have loosened or fallen off. Also make sure that electrical connections are tight and corrosion-free. Remember that battery terminals and the wires for the block heater need periodic cleaning and tightening—all of these are parts of the backup system puzzle that will shut you down if you miss them.

Does the exhaust pipe have a rain cap? This is the little weighted cover that keeps rain, snow and insects out of the exhaust pipe when the engine isn't running. It doesn't seem like much, but a clogged exhaust pipe can run down a battery in no time.

How often is the generator exercised? Does the exerciser work? I had a customer who supervised a number of generator-backed sites. He tied the exercise circuit into a security system auto-dialer that he picked up at Radio Shack. As each generator underwent its weekly test, the auto-dialer dialed his pager number and entered a site number. This was an inexpensive way of being "on site" at 10 different locations. If he missed a page, he knew there was trouble.

## You can't go to Jiffy Lube

Now, you're probably thinking that because this generator engine is so much like your car that you need periodic oil changes ... not necessarily. The "oil change" is where you can get ripped off. Oil changes are costly, but unfortunately there are no generator Jiffy Lubes. When you add the labor, the hazardous materials charges, disposal charges (especially if the generator is on the roof of a building), and the cost of the oil and filter, you've accumulated a princely sum. What's worse, your oil might be fine.

So how do you know? Have your oil analyzed. Laboratory oil analysis is cheaper than you think, and in addition to giving you a go/no go as to the quality and condition of your oil, an analysis for trace metals can be invaluable. Through the oil analysis, premature metal wear can be spotted. The various metals found in the oil can diagnose specific problems, and catching them early can save you plenty. (See sidebar on page 102.)

## Records, fuel and water

By now, you've developed a pretty exhaustive maintenance procedure—one that either your staff or a contractor can follow. Keep

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a loose-leaf binder with printed forms, or save the completed inspection reports from your contractor. The point here is to be able to trace any work done on your backup power system. Keep a list of "normal" operating readings of gauges and meters. Instruct your staff to investigate any changes from the norm. Even the cost of a "false alarm" inspection by your generator contractor will be much less than the cost of a system failure.

As you round out your generator maintenance procedure, put together a fuel replacement program. If your generator is fueled by a fuel truck, what backup plan do you have if inclement weather prohibits the truck from entering your compound? If the generator uses diesel fuel, the answer might be finding the closest diesel service station and having several metal canisters for transporting the fuel to the site.

Fortunately for most of us, dependable power means never having to lean on your backup system. Unless you've encountered a power disaster, you may not even know how many hours of fuel your tank will

hold. Find out now, and plan in advance with your fuel supplier how often the tank will need to be refilled. Log this information, along with 24-hour numbers so your generator won't run dry. Now is also a good time to obtain a fuel dipstick, especially for underground tanks. Also pick up a container of water paste, usually available from heating oil fuel suppliers for less than \$10 a tube. When coated on the end of the dipstick and inserted into the tank, the presence of water will change the color of the indicating paste.

Keep a log of the amount of water indicated on the dipstick. An inch or two of water isn't the end of the world, because the tanks usually are inclined 5 degrees. The fuel pickup and return are located six inches from the bottom at the opposite end of the fill. More than two inches of water could cause a problem and need to be removed. Because of the need to dispose of the fuel/water mixture, an environmental company is best suited for this task.

Keeping regular entries of the accumulation of water, as indicated on the dip-

stick, keeps the problem in check. Water usually comes from condensation, which can be prevented by keeping the tank full of fuel. In warmer climates, bacteria and algae can grow in this watery environment, which can further foul your system.

## Don't forget your UPSs

Most facilities that depend on generators have some kind of maintenance program in place to guarantee their reliability. It's sad to say, but most facilities that incorporate uninterruptible power supplies (UPSs) do not. A UPS is by its very nature an "install and forget" type of device. It's shoved under a desk, behind a cabinet, in the bottom of a rack, and may live and die without anyone's knowledge.

Having a routine inspection program for your UPS is just as important as having one for your generators. Depending on the sophistication of the UPS, operating parameters may be accessible. Some systems require the purchase of a small monitor that plugs into the UPS and displays operating parameters. Spend the money for this monitor—it

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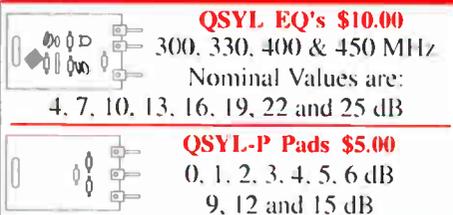
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**For Pathmaker**



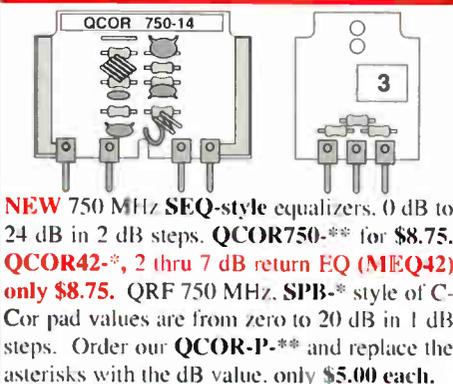
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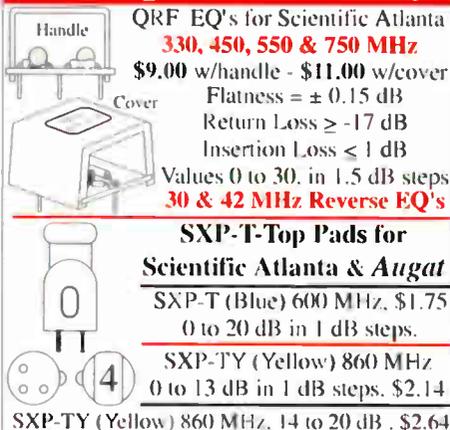
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**For AUGAT**



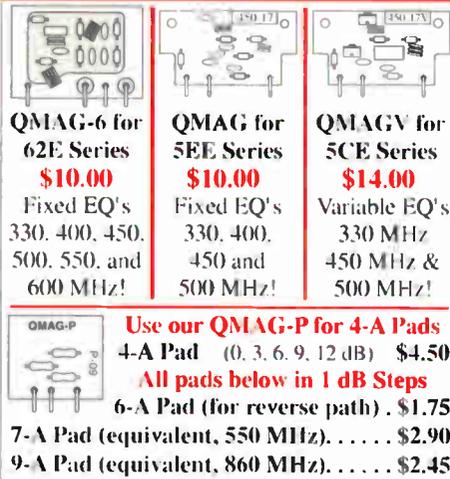
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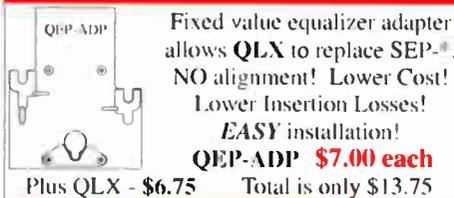
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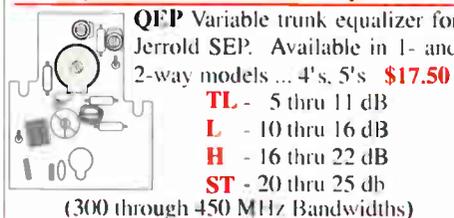


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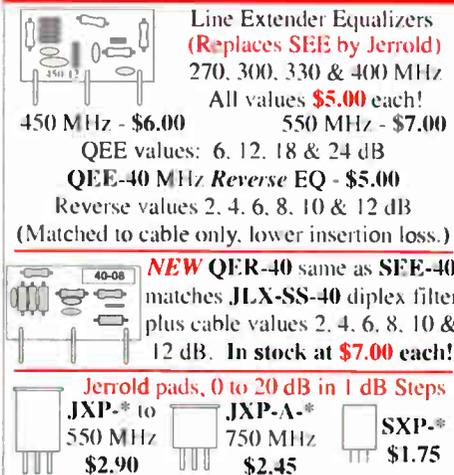


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## Engine Oil Sample Analysis

If you're paying for a generator oil change even once a year, you probably are throwing your money away. Walt Billings, owner of TESSCO, a generator maintenance and repair company based in Baltimore, says if you are using a good quality oil, it is rated for 300 to 400 hours of usage in a genset application. If you're only putting 20 hours on a generator in a year's time, your oil will carry you for some time.

Just how long? Have the oil analyzed to find out. This is a service your generator technician can perform, but your maintenance staff also can complete the test. Oil analysis kits are readily available from an oil or lubricant supplier, says Billings. Shell or Valvoline are examples. Cummins and Caterpillar engine distributors also have the kits. The kits run \$10-\$15 a sample. Billings suggests buying a kit with a squeeze-bulb suction pump, so you're getting a good sample of oil from the engine oil pan. He also cautions to take the sample while the engine is hot.

In addition to giving you an idea of the condition of your oil, the analysis will tell you about wear metals present in the oil. A

single oil analysis is really a baseline measurement. To be effective, the test needs to be conducted periodically, every six months, so engine wear trends can be established. The more frequently the test is performed, the more information you have to track and gauge the wear of your engine.

The results of the analysis will spot suspended dirt in the oil and the presence of water in diesel fuel, in addition to the wear metals. The laboratory doing the analysis also can interpret the findings and even tell you when the oil needs to be changed. A savings may not be noticed when oil analysis is performed on small generators because of their size. However, the larger the generator, the more valuable the analysis, as oil change charges increase exponentially.

Billings of TESSCO can help answer questions about oil analysis, or generators in general. He can be reached online at [tessco@bellatlantic.net](mailto:tessco@bellatlantic.net). A maintenance checklist also is available by sending a self-addressed stamped envelope to TESSCO, P.O. Box 5265, Baltimore, MD 21224.

can save you hundreds of dollars in diagnosing problems. The less expensive UPS may have no provision for monitoring operating parameters and only signal trouble with either a light or a chirp or beep.

Posting a "caution" notice on the rack or on the cabinet housing of the UPS can guide staff—especially nontechnical members—in reporting what that periodic chirping or beeping actually is. A few

years ago, we were called into a facility that suffered a catastrophic power failure. A very large UPS had failed. It had been placed in a supply closet, next to the soda and snack vending machines. When the UPS started beeping, the staff simply closed the door to muffle the noise. No one thought it was a problem, and no one was called until everything died.

That brings us to two very different lines of thinking. Should the system be protected by one very large UPS, or several smaller power packs? There are pros and cons to both, and much of it is a personal decision. The larger UPS usually will provide more flexibility—a hot bypass, only one set of batteries to maintain and full monitoring data ports. Servicing may require taking the entire system down, however.

Smaller, individual UPS packages can be used to power specific clusters of equipment so that if the UPS fails, only a small cluster of equipment is affected. There are multiple batteries to maintain, but if the system is properly engineered, UPS loads can be shared should the system fail.

Whichever system you've chosen, keeping a few spare parts on hand is a wise investment. Cooling fans and batteries are the most common failures. As with the generator, it's prudent to keep a maintenance log listing operating parameters under normal conditions and when the manufacturer advises battery replacement.

Taking a little time now to document and prepare for worst-case scenarios will mini-



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mize problems when failures do occur. So enjoy the great weather, spend an afternoon outdoors getting to know your generator—the investment in time is priceless. **TB**

John Bisset has spent 30 years in the communications field. He is now a district sales manager for Harris Broadcast and can be reached via e-mail at [jbisset@harris.com](mailto:jbisset@harris.com).

## The Bottom Line

### Keep Backup Systems Healthy

If your backup power systems don't work when you need them to, they're worse than useless. To be sure they'll do the job when the time comes, follow these maintenance tips.

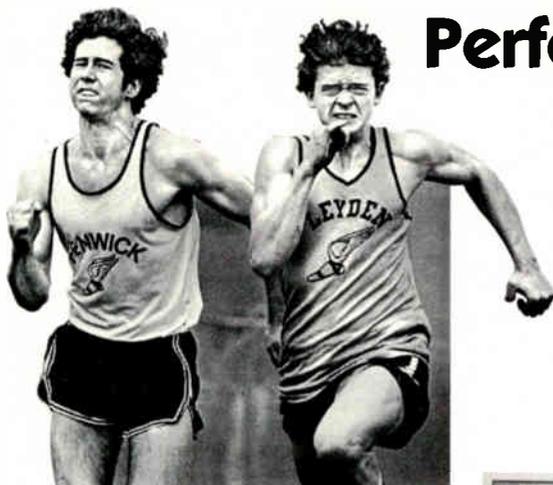
Dust off the equipment service manual. It usually lists routine maintenance procedures and their frequency. Review the last service work order from your generator service company to be sure the recommended points are covered. If you maintain the generator in-house, does the maintenance include more than just checking the fuel level?

Use good quality parts. If a hose has cracked, don't skimp on quality when you replace it. Before you balk at the prices of replacement parts, remember that spending a few dollars more for quality parts pales in comparison to the money lost if the system fails.

Watch for the simple things. Keep an eye out for things such as broken bolts or nuts that may have loosened or fallen off. Also make sure that electrical connections are tight and corrosion-free. Battery terminals and the wires for the block heater need periodic cleaning and tightening.

Keep a loose-leaf binder with printed forms, or save the inspection reports your contractor completes. Be sure you can track any work done on your backup power system. Keep a list of normal operating readings of gauges and meters. Instruct your staff to investigate any changes from the norm. Even the cost of a false alarm inspection by your generator contractor will be much less than the cost of a system failure.

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Reader Service Number 74

# Detecting Signal Leakage

**T**his month's installment begins a series on detecting signal leakage. The material is adapted from a lesson in NCTI's Installer Technician Course. © NCTI.

All broadband cable systems share the responsibility of detecting, measuring and reporting signal leakage. Signal leakage (egress) occurs when one or more RF cable signals are emitted (leaked) from a cable system. Signal leakage can interfere with other over-the-air signals of the same operating frequencies. Signal leakage interference can cause something as minor as degrading another customer's TV reception or it can cause more serious problems such as interfering with aircraft navigation and voice communications. Technicians must understand the causes and consequences of signal leakage because of their detrimental effect on the cable system and other communications. Repairing sources of signal leakage, in addition to complying with Federal Communications Commission Technical Standards, has the benefit of reducing unwanted signals (ingress) from entering the cable system and adversely affecting the service delivered to customers.

## Examining causes And consequences

Table 1 lists common causes of signal leakage in the drop and feeder systems. Table 2 shows possible consequences of RF signal leakage including interference to navigation, radio communications and over-the-air TV signals. Other consequences of RF signal leakage can include unwanted reception of cable signals by nonpaying residents and impaired picture quality delivered to customers. As well, the FCC can impose sizable fines on a cable system for excessive signal leakage and mandate that the system not use spe-

cific frequencies to deliver its services until violations are corrected.

Cable systems must carefully manage any signal that has the potential to interfere with the over-the-air transmitted frequencies used for aeronautical navigation and communications. The Federal Aviation Administration primarily concerns itself with any cable system-caused signal leakage in the frequency bands 108-137 MHz and 225-400 MHz. Clearly, the great majority of broadband cable systems carry services on these frequencies.

## Eliminating signal leakage

The detection of signal leakage can serve two important purposes for the cable system: 1) compliance with FCC regulations and 2) as a support tool for the service and maintenance of quality cable installations. Technicians can detect and locate signal leakage sources while performing installations, service/trouble calls and regular quarterly monitoring. Many cable systems employ a tagging process at the headend, where an easily identifiable tone is inserted at a specific frequency that matches the tuned frequency of the leakage detector in the field. This can assist in monitoring, isolating and repairing signal leakage, as well as helping recognize false alarms. Because a broadband cable system can attribute much of its signal leakage to the drop system, it is important to thoroughly monitor the drop and any equipment connected to it. When a leak is detected in the drop system, it is also important to locate the exact source of the leakage to facilitate a quick and effective repair.

**Table 1: Typical causes of signal leakage**

- Coaxial cable leakage  
Scraped, cut, stapled or chewed
- Connector leakage  
Wrong type or size connector  
Loose connectors  
Poorly installed or corroded connectors
- Passive device leakage  
No seal or a defective RFI gasket  
Broken or corroded ports
- Active device leakage  
Loose amplifier housing bolts

**Table 2: Possible consequences of signal leakage**

- Interference to aircraft navigation and communications, amateur radio, over-the-air TV reception, police and fire communications
- Imposition of FCC fines and loss of channels and credibility
- Impaired pictures due to ingress
- Greater number of service calls
- Customer dissatisfaction

## Monitoring and inspecting The drop system

Previously, we discussed that many instances of signal leakage are caused by damage to portions of the drop system. When installing or servicing the drop system, perform a visual inspection in addition to using a leakage detector. This not only helps keep leakage in check, but can also assure that the workmanship of drop materials is of acceptable quality.

Monitoring the drop system for signal leakage is best done with a hand-held leakage detector. Hand-held detectors allow the technician to get close-in and easily check the tap, ground block and splitters, drop cable, and customer premises equipment for possible signal leakage where other types might not be practical.

Next month's installment will focus on isolating signal leakage sources in the drop system. **TB**

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# • MARKETPLACE •

The actual climate in Chicago was cool and rainy, allowing Cable '99 attendees a break from the heat on the show floor. At 48, the National Cable Television Association's International Convention and Exposition exhibited more than the latest and greatest in all things cable telecommunica-

tions; it radiated the broadband industry's newfound maturity and sophistication. With the likes of arch rivals General Instrument and Scientific-Atlanta showing products developed through compromise in one another's expansive booths, it became crystal clear to attendees that con-

vergence is no longer a catch-phrase heralded from corporate marketing's ivory towers, it is a technological tsunami taking the industry by storm. This special blowout edition of Marketplace highlights many of the products that made steam rise to the heights of the Chicago skyline.

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Reader Service Number 76

## DOCSIS Modem

Ericsson selected Cable '99 as a launching pad for its Home Information Pipeline portfolio. The first product to blast off was the vendor's Data Over Cable Service Interface Specification (DOCSIS)-compliant PipeRider modem. Features include a compact design and standard universal serial bus (USB) interface connectivity. According to the company, the unit is easily upgradable to the DOCSIS 1.1 specification and slated for availability in October. The PipeRider includes a user-friendly on-board hypertext transfer protocol (HTTP) sever and enhanced security using Pipe-Lock technology, which allows users to easily suspend network communications. It supports 64 and 256 quadrature amplitude modulation (QAM), signal levels from -15 dBmV to +15 dBmV and a frequency range from 5-42 MHz.

Reader Service #302



## Remultiplexer

V-Bits showcased its RateMux 300 statistical remultiplexer at Cable '99. Officials said that the product was designed to enable custom programming for cable operators. It uses Headend in the Sky (HITS) transponders and local Moving Pictures Expert Group (MPEG) encoders to create a custom digital multiplex consisting of 12 programs than can interface with modulators for transmission into a single 6 MHz channel.

Reader Service #296



### Wireless Field Data Solution

BellSouth Wireless Data, Mobile Data Solutions Inc. and Ikrionix Corp. have teamed up to offer a wireless workforce management solution created for cable telecommunications operators. According to the companies, the wireless data solution allows field workforce automation, increased productivity and better customer service. By combining the BellSouth's Intelligent Wireless Network, the Ikrionix T5200 handheld wireless CE-based workstation and MDSI's software design, the companies have created a solution allowing dispatchers, field technicians and supervisors wireless connectivity for the instantaneous exchange of mission-critical information. The T5200 features a 73.7 MHz processor and a 7.3-inch monochrome touch screen display. Offered as a bundled solution, the product's cost is estimated at around \$15 per day per technician, company spokesmen said.

Reader Service #311

### Statistical Multiplexer

Imedia teamed up with General Instrument to debut the CherryPicker 500 digital TV (DTV) statistical multiplexer at Cable '99. Imedia has since been acquired by Terayon. According to Imedia, the product breaks the price barrier for system operators looking for the ability to locally select digital programming line-ups from HITS and other compressed video providers in order to achieve customized channel line-ups and incremental revenues for their video service offerings.

At the show, GI officials said that the CherryPicker 500 was a welcome addition to the company's end-to-end digital solution. Backed by GI's sales, support and experience in launching digital systems, parties from both companies are optimistic that the product offers immediate

launch capabilities and a chance for operators of virtually any size to improve plant efficiency and revenue opportunities.

The product allows North American cable operators maximum bandwidth efficiency and programming options by allowing them to groom compressed video digital transponder feeds; it can take up to four satellite feeds and two local feeds to output 12 programs. Imedia officials said that prior to the development of this tech-

nology, cable operators were unable to add or drop programs from a statistical multiplex in the digital tier. With the Cherry Picker 500, cable operators can match programming with regional and demographic preferences.

Reader Service #309



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Reader Service Number 77



### Digital End-to-End System

Divicom showed many products at its booth, although its major show announcement was a digital deployment deal with Time Warner Cable.

As components for the company's end-to-end digital cable system glimmered on the show floor, the latest in compression, digital turn-around, transport stream manipulation, trans-

mission, customer premise and high definition (HD) gear captivated attendees searching for shortcuts to the future.

Highlighted at the Divicom booth was the MediaView MV400 HD Moving Pictures Expert Group (MPEG)-2 encoder (shown) in a one-rack unit high chassis. Supporting multiple formats, the MV400 enables delivery of HDTV and provides an upgrade path for future requirements. Features include MotionTrack software and C-Cube's DVxpert encoding engines for motion prediction and unified rate control.

Reader Service #310



### SOHO Modem

The Comport 5000 Office Cable Modem from Com 21, announced at the show, is designed to meet the needs of small businesses, telecommuters and multiple personal computer (PC) residential users. According to the company, it delivers secure high-speed multiport local area network (LAN) and Internet connectivity in the form of a modular solution. The modem, said Com 21 officials, is the fruit of its latest attempts to leverage its integrated voice and data platform in the rapidly growing small office/home office (SOHO) environments. Features include a virtual private networking (VPN) software option for low-cost access to corporate networks. It utilizes asynchronous transfer mode (ATM) for transport that offers quality of service (QoS) to users over cable infrastructures and allows prioritization of voice over data traffic. Its network address translation (NAT) and dynamic host configuration protocol (DHCP) features allow multiple PCs to share a single Internet protocol (IP) address. The company said that the base modem is priced at \$760.

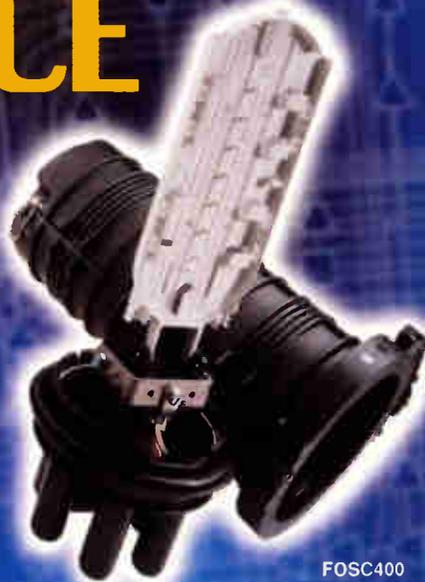
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Reader Service Number 78



### Partnership for Better Networks

ADC Telecommunications Inc. and Cheetah Technologies have announced a three-year partnership agreement to integrate Cheetah's core network management technologies with ADC's ISX optical distribution nodes and HWX headend optical transmission equipment (accompanying photograph is an HWX 1550 nm STX transmitter). Under the agreement, ADC has awarded Cheetah preferred vendor status for industry-compatible, multivendor element management solutions for hybrid fiber/coax (HFC) networks undergoing deployment of the HWX and ISX gear. The companies lauded the partnership as the first to be announced under Cheetah's Voyager Partners Program launched last year.

**Reader Service #307**

### Analog Set-Top Apps

General Instrument announced agreements with Tritheim Technologies and Millennium Networks to unveil two new applications on its CFT-2200 advanced analog set-top.

Tritheim's SmartCOM-MERCE system enables users to conduct smart card transactions such as banking and electronic commerce directly over cable networks using GI's CFT-2200. The system uses a TV as an Internet purchase terminal to enable secure electronic value transfer for pay TV as well. An Internet browser from WorldGate's Internet over TV application is used to support the transactions.

Millennium Networks, a technology integration company, has added its AudienceEngine application that provides local cable measurement service by capturing key viewing information directly from GI's CFT-2200 set-top. Local cable operators can then use the data based on actual local viewing data rather than estimated projections. The application uses existing cable plant, database technology and the Internet to capture and report information about what channels are being watched.



The data from the set-top is downloaded from the headend. The information is then aggregated by household demographic characteristics. Information is perpetually reported to operators over the World Wide Web (WWW).

**Reader Service #301**



### Set-Top Gaming

Scientific-Atlanta and Peach Networks announced at Cable '99 an agreement to integrate Internet gaming, Microsoft Windows applications and Internet browsing on S-A's Explorer 2000 digital platform, in effect, enabling many of the personal computer's (PC's) most popular features over the set-top.

Peach Network's Access Channel product allows a plug-and-play function to the applications and Internet without requiring an additional phone line, officials said. The Israel-based vendor's system is capable of delivering most all applications written to run on Microsoft Windows. Development of the two-way interactive applications and content is further enhanced by the PowerTV operating system (OS), S-A officials said. Through the PowerTV developer support program, cable operators and developers can write code in C++, hypertext markup language (HTML), JavaScript and PersonalJava. The OS also supports developers by freely distributing its application program interface (API) on its Web site at [www.powerTV.com](http://www.powerTV.com).

**Reader Service #300**

### DOCSIS Modem and More

Soon after Cable '99 came to an end, Philips Broadband Networks was informed that its Data Over Cable Service Interface Specification (DOCSIS) modem (shown) had garnered the coveted CableLabs certification seal.

On the show floor, the vendor performed demonstrations of its freshly developed optical transmission technology and advanced digital systems designed to help cable operators to deliver the latest in video, voice and data services. Highlighted products include PBN's SpectraHub 1550 nm dense wavelength



division multiplexing (DWDM) architecture for enhanced transmission capabilities. According to the company, the architecture allows transmission of up to 33 forward quadrature amplitude modulated (QAM) channels on each of its 20 wavelengths. It also offers the capability to accommodate additional wavelengths as scalable technology evolves.

PBN's booth also was packed with digital set-top networking gear and monolithic high definition TVs (HDTVs) for the digital home.

**Reader Service #305**

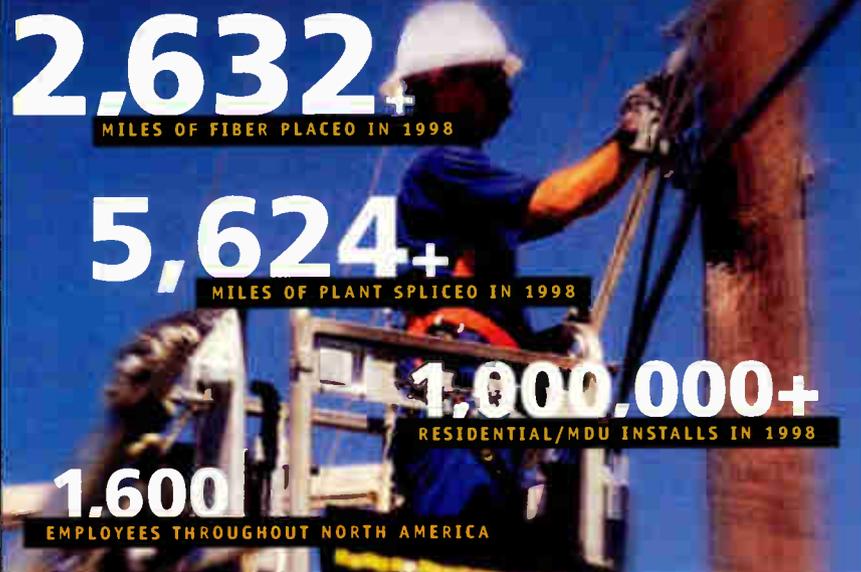
## Billing Software

Proxima Systems' new customer management and billing software supports multiple combinations of telephony, cable, and Internet products and services. Dubbed Mystral, the software features five functional modules, which interact with the customer's profile. The modules include:

customer care management for processing billing data; marketing and sales management for marketing campaign creation; product and service management for creating bundled packages; territory and network management for modeling the customer's physical environment; and administration and finance management for

defining the operator's administrative structure and relationship between Mystral and the operator's general ledger system. Using Mystral, operators can analyze each individual customer's usage trends and preferences to provide services that meet their unique needs.

Reader Service #298



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Reader Service Number 80



## Powernode Backup System

In its booth, Alpha Technologies was showing off its Powernode unlimited backup power supply for cable TV, data and telephony services. The CESC-3X accommodates XM series 2 CableUPS (uninterruptible power supply), Alphacell extended life batteries and generator systems in a low-profile design, the company said. The results are the unit's smaller size, lower cost, quieter operation and unlimited backup time. It can be custom configured to accommodate varying powering needs and may be initially installed with a power supply and batteries; it can later be upgraded to a full-function integrated generator-supported system. The unit's battery sidecar can store up to four batteries, including one for ignition, and leaves enough space for the coaxial output. The sidecar provides backup power for 36 V and 48 V systems until the generator kicks in. According to the company, the Powernode is compatible with other common network hardware and provides longer run times than traditional batteries-only solutions.

Reader Service #306

## High-Speed Cable Modem

The first in a planned series of Internet-related product and service related offerings from Aegis Integration Inc. debuted at Cable '99 in the form of a cable modem. Formerly known for its addressable analog systems, Aegis officials have said that digital broadband equipment and services have been on the vendor's agenda for quite some time. The modem is multimedia cable network system (MCNS)-compliant and supports both 64 and 256 quadrature amplitude modulation (QAM) schemes

## DOCSIS-Compliant Set-Top

England-based Pace Micro Technology touted its Data Over Cable Service Interface Specification (DOCSIS)-compliant set-top box in Chicago. Currently in deployment, the Di4100 is integrated with Cisco System's DOCSIS-compliant cable modem and powered by Hitachi's Super H3 chip. The set-top has been operating in what the company calls a "DOCSIS-live" network since May with subscribers in England.

It can easily be configured to U.S. TV standards such as NTSC and Annex B, added the company. Pace claims to have already integrated the Di4100 with a DigiCipher II license from General Instrument, allowing the company to work with any U.S. cable operator using GI's cable head-end equipment.

**Reader Service #304**

## Satellite Service

Targeting operators of smaller cable systems, Headend in the Sky (HITS) and General Instrument have developed a satellite/cable overlay system and service. HITS 2 Home, on display at Cable '99 allows operators to add more than 140 channels of digital programming to their existing analog lineups without plant upgrades or digital headend equipment. The digital signals are delivered via satellite dish to the subscriber's home, combined with the operator's analog service and integrated for delivery over a GI set-top.

**Reader Service #292**

and up to 16 customer premise devices. According to the company, onboard error correction logic and a high aggregate packet rate in excess of 14,000 packets per second enable the modem to tolerate noisy networks and deliver high bandwidth by consistently filling the 10BaseT Ethernet pipe. The modem is adaptable to emerging standards and protocols, and the company says one version of the product is Data

Over Cable Service Interface Specification (DOCSIS) 1.0-compliant.

**Reader Service #303**



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**Reader Service Number 81**

## Scalable Node

At Cable '99, Antec debuted its Laser Link Proteus scalable node, which will be available late this year. Antec has designed the node to deliver a low-cost base configuration for initial network deployment.

As bandwidth requirements increase, the cable operator can add modules to the node to further segment downstream and upstream traffic. Operators can segment upstream traffic by deploying



up to four return transmitters, block conversion or dense wavelength division multiplexing (DWDM) International Telecommunication Union (ITU)

grid lasers. Designed for flexibility, the unit can support redundant optical transmitters, receivers and power supplies for increased reliability, and it features dedicated input ports for network powering.

Reader Service #299

## IP Solutions

Arris Interactive welcomed additions to its Cornerstone product line at Cable '99. PacketPort and a high-capacity carrier grade cable modem termination system (CMTS) kicked off the festivities for the products aimed at enabling operators to deploy integrated Internet protocol (IP) telephony and data services to subscribers.

PacketPort is the network interface device for primary line packetized voice and data. It supports Data Over Cable Service Interface Specification (DOCSIS) 1.1 cable modem standards and resembles the vendor's Cornerstone Four-Line Voice Port product to help operators transition the installation process, officials said. The unit supports four lines of lifeline telephony service and delivers enhanced features such as call waiting.

The CMTS is a fully redundant, modular carrier-class system that can accommodate voice and data traffic. According to the company, it utilizes Cornerstone's frequency agility and can institute a hop to a predetermined clean channel when ingress threatens an upstream frequency.

Reader Service #295

## Internet on TV

At the show, MoreCom touted its end-to-end solution for merging digital video with Internet content on TV. According to the company, its software solution enabled advanced broadband Internet services using existing cable networks and digital set-top boxes. The system is based on digital video networks currently in deployment. MoreCom's system, officials said, takes advantage of the OpenCable architecture, is adaptive to any headend or digital set-top box and flexible enough to integrate well with software from other vendors.

Reader Service #294

## Integrated Circuit

Also hot at Cable '99 were samples of Zenith's integrated circuit (IC) that provide an interface for connecting digital devices. The ATSC (Advanced Television Systems Committee) Remodulator IC translates digital device output to a digitally modulated signal compatible with the RF inputs of ATSC-compliant TVs and other ATSC devices.

Reader Service #297

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Reader Service Number 82

## Broadband Flurry

C-Cor went to Chicago on the heels of its announcement to merge with Convergence.com. Its booth showcased C-Cor's line of FlexNet RF and Navicor AM products and Convergence.com's exhibit, which highlighted its network operations center (NOC) and Help Desk service. Also busy in the booth was Silicon Valley Communications demonstrating its forward and return path transmitters, dual return path receivers, erbium doped fiber amplifiers (EDFAs) and dense wavelength division multiplexing (DWDM) products. SVCI highlighted its externally modulated 1550 nm analog and quadrature amplitude modulated (QAM) transmitters at Cable '99 as well as its planned merger with C-Cor.

Reader Service #293



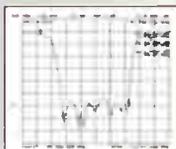
## Modem Sans New Wires

Zoom Telephonics, while chanting "No-New-Wires," has introduced an advanced cable modem line. The products, according to the company, are designed to minimize service calls by providing simplified self-installation for consumers utilizing a universal serial bus (USB) interface backed up by a 10Base T connection option. The technology supports CableLabs' Data Over Cable Service Interface Specification (DOCSIS) version 1.1 including 56-bit data encryption security (DES) for baseline privacy, simple network management protocol (SNMP) and quality of service (QoS) for traffic prioritization and bandwidth management. In addition, a variety of local area networking (LAN) options require that no new wires be installed in the home or small office environments, said spokesman Dan Brunelle. Zoom's cable modem networking solutions also include advanced networking capabilities, dynamic host configuration protocol (DHCP) and network address translation (NAT).

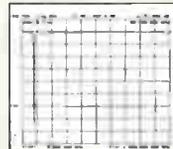
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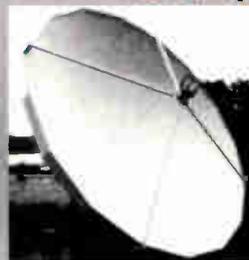
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**A. Please check your company's primary business: (check only one)**

- 04. Multiple System Operator (MSO) (operates more than one cable system)
- 03. Independent System Operator
- 98. Telecom Network/Carrier (RBOC, LEC, OLEC, Long Distance Provider)
- 19. Public/Private Utility
- 20. System Contractor
- 21. Hardware/Component Manufacturer/Dist.
- 18. Other (please specify) \_\_\_\_\_

**B. Do you hold a supervisory position?**

- 22. Yes
- 23. No

**B. Check the TITLE that most CLOSELY matches your current position: (check only one):**

**Corporate Management**

- 31. CEO
- 32. President
- 33. Owner
- 34. Vice President
- 35. Partner

**Operations Management**

- 36. General Manager
- 37. Business Manager
- 38. Operations Manager
- 39. Product Manager
- 40. Purchasing Manager

**Engineering Management**

- 41. Engineering VP

**C. Are you a member of the SCTE (Society of Cable Telecommunications Engineers)?**

- 01. Yes
- 02. No

**Installation**

- 64. Installer
- 65. CSR
- 66. Other Installation Title (Please specify) \_\_\_\_\_
- 30. Other (Please specify) \_\_\_\_\_

**D. Would you like to join the SCTE?**

- 01. Yes
- 02. No

**E. In the next 12 months, what cable equipment do you plan to buy?**

- 35. Amplifiers
- 36. Antennas
- 37. CATV Passive Equipment including Coaxial Cable
- 38. Cable Tools
- 39. CAD Software, Mapping
- 40. Commercial Insertion/Character Generator
- 41. Compressor/Digital Equip.
- 42. Computer Equipment
- 43. Connectors/Spitters
- 44. Fleet Management
- 45. Headend Equipment
- 46. Transmission/Switching Equipment
- 47. Networking Equipment
- 48. Video/Pretests
- 49. MMDS Transmission Equipment
- 50. Microwave Equipment
- 51. Receivers and Modulators
- 52. Cable Modems
- 53. Subscriber/Addressable Security Equipment/ Converters/Remotes
- 54. Telephone/PCS Equipment
- 55. Power Suppls. (Batteries, etc.)
- 56. Video Servers

**F. What is your annual cable equipment expenditures?**

- 57. up to \$50,000
- 58. \$50,001 to \$100,000
- 59. \$100,001 to \$250,000
- 60. over \$250,000

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7	31	55	79	103	127	151	175	199	223	247	271	295
8	32	56	80	104	128	152	176	200	224	248	272	296
9	33	57	81	105	129	153	177	201	225	249	273	297
10	34	58	82	106	130	154	178	202	226	250	274	298
11	35	59	83	107	131	155	179	203	227	251	275	299
12	36	60	84	108	132	156	180	204	228	252	276	300
13	37	61	85	109	133	157	181	205	229	253	277	301
14	38	62	86	110	134	158	182	206	230	254	278	302
15	39	63	87	111	135	159	183	207	231	255	279	303
16	40	64	88	112	136	160	184	208	232	256	280	304
17	41	65	89	113	137	161	185	209	233	257	281	305
18	42	66	90	114	138	162	186	210	234	258	282	306
19	43	67	91	115	139	163	187	211	235	259	283	307
20	44	68	92	116	140	164	188	212	236	260	284	308
21	45	69	93	117	141	165	189	213	237	261	285	309
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**G. In the next 12 months, what fiber-optic equipment do you plan to buy?**

- 61. Fiber-Optic Amplifiers
- 62. Fiber-Optic Connectors
- 63. Fiber-Optic Couplers/Spitters
- 64. Fiber-Optic Splitters
- 65. Fiber-Optic Transmitter/Receiver
- 66. Fiber-Optic Patchcords/Pigtails
- 67. Fiber-Optic Components
- 68. Fiber-Optic Cable
- 69. Fiber-Optic Closures & Cabinets

**H. What is your annual fiber-optic equipment expenditures?**

- 70. up to \$50,000
- 71. \$50,001 to \$100,000
- 72. \$100,001 to \$250,000
- 73. over \$250,000

**I. In the next 12 months, what cable test & measurement services do you plan to buy?**

- 74. Audio Test Equipment
- 75. Cable Fault Locators
- 76. Fiber Optics Test Equipment
- 77. Leakage Detection
- 78. OTDRs
- 79. Power Meters
- 80. Signal Level Meters
- 81. Spectrum Analyzers
- 82. Status Monitoring
- 83. TDRs

**J. What is your annual cable test and measurement expenditures?**

- 84. up to \$50,000
- 85. \$50,001 to \$100,000
- 86. \$100,001 to \$250,000
- 87. over \$250,000

**L. What is your annual cable services expenditures?**

- 91. up to \$50,000
- 92. \$50,001 to \$100,000
- 93. \$100,001 to \$250,000
- 94. over \$250,000

**M. Do you plan to rebuild/upgrade your system in:**

- 95. 1 year
- 96. more than 2 years

**N. How many miles of plant are you upgrading/rebuilding?**

- 97. up to 10 miles
- 98. 11-30 miles
- 99. 31 miles or more

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(Signature and date required by U.S. Postal Service)

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E-mail Address \_\_\_\_\_

Name \_\_\_\_\_ Title \_\_\_\_\_

Company \_\_\_\_\_

Address \_\_\_\_\_

City \_\_\_\_\_ State/Province \_\_\_\_\_

ZIP/Postal Code \_\_\_\_\_ Country \_\_\_\_\_

**A. Please check your company's primary business: (check only one)**

- 04. Multiple System Operator (MSO) (operates more than one cable system)
- 03. Independent System Operator
- 98. Telecom Network/Carrier (RBOC, LEC, OLEC, Long Distance Provider)
- 19. Public/Private Utility
- 20. System Contractor
- 21. Hardware/Component Manufacturer/Dist.
- 18. Other (please specify) \_\_\_\_\_

**B. Do you hold a supervisory position?**

- 22. Yes
- 23. No

**B. Check the TITLE that most CLOSELY matches your current position: (check only one):**

**Corporate Management**

- 31. CEO
- 32. President
- 33. Owner
- 34. Vice President
- 35. Partner

**Operations Management**

- 36. General Manager
- 37. Business Manager
- 38. Operations Manager
- 39. Product Manager
- 40. Purchasing Manager

**Engineering Management**

- 41. Engineering VP

**C. Are you a member of the SCTE (Society of Cable Telecommunications Engineers)?**

- 01. Yes
- 02. No

**Installation**

- 64. Installer
- 65. CSR
- 66. Other Installation Title (Please specify) \_\_\_\_\_
- 30. Other (Please specify) \_\_\_\_\_

**D. Would you like to join the SCTE?**

- 01. Yes
- 02. No

**E. In the next 12 months, what cable equipment do you plan to buy?**

- 35. Amplifiers
- 36. Antennas
- 37. CATV Passive Equipment including Coaxial Cable
- 38. Cable Tools
- 39. CAD Software, Mapping
- 40. Commercial Insertion/Character Generator
- 41. Compressor/Digital Equip.
- 42. Computer Equipment
- 43. Connectors/Spitters
- 44. Fleet Management
- 45. Headend Equipment
- 46. Transmission/Switching Equipment
- 47. Networking Equipment
- 48. Video/Pretests
- 49. MMDS Transmission Equipment
- 50. Microwave Equipment
- 51. Receivers and Modulators
- 52. Cable Modems
- 53. Subscriber/Addressable Security Equipment/ Converters/Remotes
- 54. Telephone/PCS Equipment
- 55. Power Suppls. (Batteries, etc.)
- 56. Video Servers

**F. What is your annual cable equipment expenditures?**

- 57. up to \$50,000
- 58. \$50,001 to \$100,000
- 59. \$100,001 to \$250,000
- 60. over \$250,000

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4	28	52	76	100	124	148	172	196	220	244	268	292
5	29	53	77	101	125	149	173	197	221	245	269	293
6	30	54	78	102	126	150	174	198	222	246	270	294
7	31	55	79	103	127	151	175	199	223	247	271	295
8	32	56	80	104	128	152	176	200	224	248	272	296
9	33	57	81	105	129	153	177	201	225	249	273	297
10	34	58	82	106	130	154	178	202	226	250	274	298
11	35	59	83	107	131	155	179	203	227	251	275	299
12	36	60	84	108	132	156	180	204	228	252	276	300
13	37	61	85	109	133	157	181	205	229	253	277	301
14	38	62	86	110	134	158	182	206	230	254	278	302
15	39	63	87	111	135	159	183	207	231	255	279	303
16	40	64	88	112	136	160	184	208	232	256	280	304
17	41	65	89	113	137	161	185	209	233	257	281	305
18	42	66	90	114	138	162	186	210	234	258	282	306
19	43	67	91	115	139	163	187	211	235	259	283	307
20	44	68	92	116	140	164	188	212	236	260	284	308
21	45	69	93	117	141	165	189	213	237	261	285	309
22	46	70	94	118	142	166	190	214	238	262	286	310
23	47	71	95	119	143	167	191	215	239	263	287	311
24	48	72	96	120	144	168	192	216	240	264	288	312



**G. In the next 12 months, what fiber-optic equipment do you plan to buy?**

- 61. Fiber-Optic Amplifiers
- 62.

Please send *Communications Technology* to the following individuals in my company:

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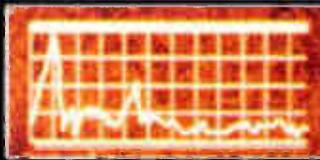
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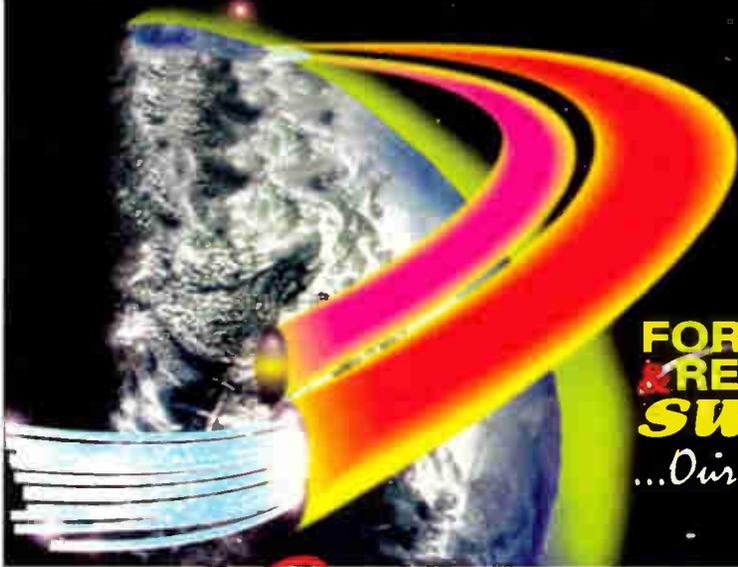
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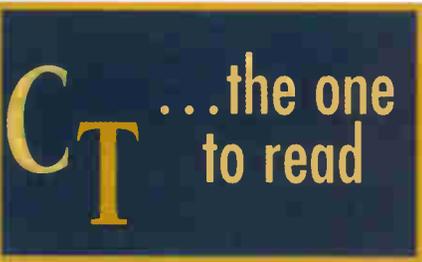
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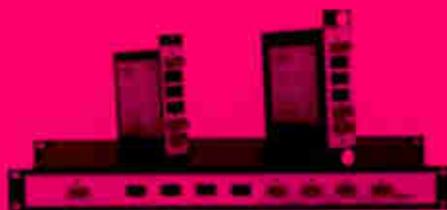
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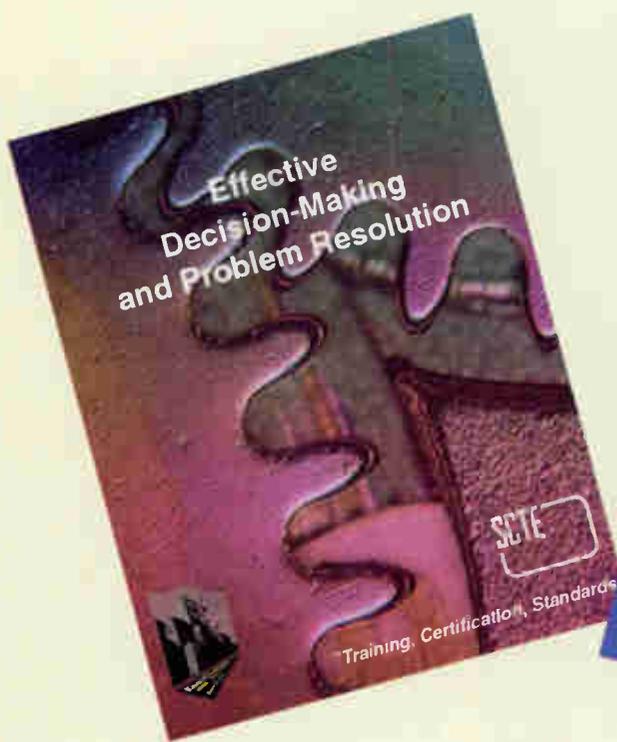
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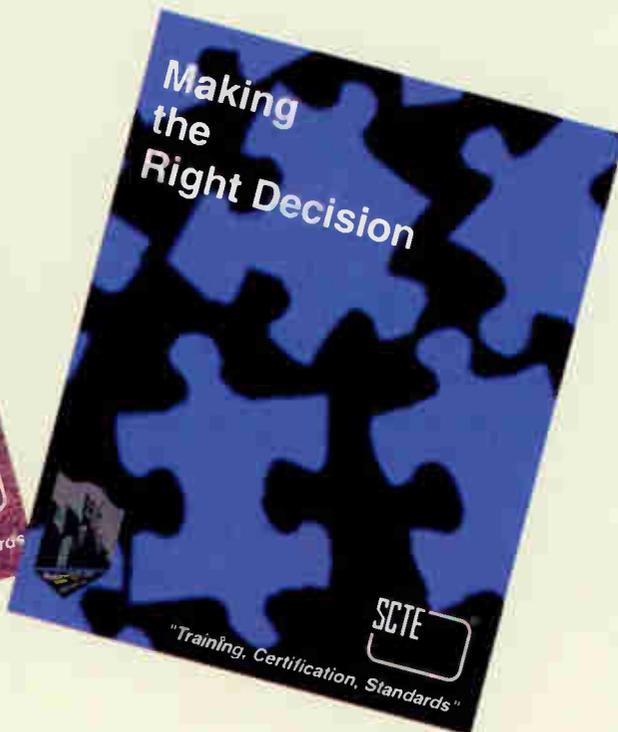
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Aug. 7: Llano Estacado SCTE Chapter, Technical Seminar, Cox Communications, Lubbock, Texas. Topic "Headends." Contact David Fielder, (806) 793-7475.

Aug. 8-10: SCTE Advisory Committee Meeting, Snow King Resort, Jackson Hole, Wyo. Contact Joe Nipper at (202) 467-2931.

Aug. 11: Greater Chicago SCTE Chapter Technical Seminar, Holiday Inn Willowbrook, Ill. Topic: "BCT/E Categories IV and V, Transportation and Data." Contact Jim Beletti at (630) 871-2727.

Aug. 12: SCTE Satellite Tele-Seminar Program, Galaxy 1R, Transponder 14, 2:30-3:30 p.m., Eastern Standard Time. Topic: "Data Networking and Architecture." Contact Janene Martin at SCTE Headquarters, (610) 363-6888, ext. 226.

Aug. 16-18: Great Lakes Cable Expo, Indianapolis. Call (317) 845-8100.

Aug. 17: Northern New England Chapter Vendor Show. Contact Bill Des Rochers, (207) 646-2672.

Aug. 17-18: Idaho Vendor Show, Idaho Falls, Idaho. Contact Richard Walker or Tim Alverson at (208) 472-8433.

Aug. 18: South Florida SCTE Chapter Technical Seminar. Topic: "Data Networking and Architecture." Contact Jim Goins at (954) 423-7176.

Aug. 18-21: American Women in Radio and Television's Annual Convention, The Drake Hotel, Chicago. Call (310) 557-2325.

Aug. 19: New England SCTE Chapter Vendor Show, Holiday Inn, Boxborough, Mass. Certification examinations available.

Aug. 25-26: Central Florida SCTE Chapter Vendor Show and Golf Tournament, Walt Disney World Village, Orlando, Fla. Contact Joyce Ventry, (850) 926-2508. CT

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Sept. 30: The 1999 Business Week Global Convergence Summit, Marriott Marquis, New York. Topic: "The Business of Convergence: Entertainment, Media, Communications and Technology." Contact Richard Rodriguez at (212) 512-4630.

Oct 4-6: Southern Cable Telecommunications Association's Eastern Show, Orange County Convention Center, Orlando, Fla. Contact Patti Hall at (404) 255-1608.

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**Phillips**

By John Clark

# "Expo Rocks Orlando"

## Sound Familiar?

**U**pon returning from Cable-Tec Expo, I read the above headline on *CT* and found that I couldn't agree with the author more. Expo '99 was a rocking event!

Expo serves many purposes—education, business, networking and recognition, to name a few. But I was most struck by the interaction and energy level on the exhibit floor. Expo has indeed found "magic in a bottle" for what transpires there. The direct interaction between hardware buyers and vendors, in a focused, professional environment without distractions, is a unique niche that Expo offers our members, vendors and our industry overall.

Feedback from exhibitors and attendees shows that Expo '99 was an overwhelming success. For the nearly 11,000 attendees and 460 exhibiting companies, networking opportunities abounded. Many exhibitors commented on the high traffic volume on the exhibit floor. One of our Board members commented that at some times he had difficulty getting the attention of a vendor representative because the booths were so crowded. These are problems we like to have.

### Charter members

As this is the Society's 30th anniversary, it was only fitting that its founders take part in the celebration. The Charter members kicked off the show and the Engineering Conference by re-enacting the meeting that formed the Society. It went something like this ... Charlie Tepfer made a motion to form the Society of Cable Television Engineers (as it was called then), which was seconded by Bill Karnes. Ron Cotten called for a roll call vote, at which time each of the Charter members present (Austin Coryell, Jake Landrum, Wayne McKinney, Rex Porter, Herb Timberlake, Al Williams, Bill Karnes and Ron Cotten) all voted "aye" as their names

were called. What a visual reminder of how far the Society has come!

Later on in the week, I attended the annual charter members dinner to pay special tribute to those who had the foresight to found such an organization as ours. My fiancée, Cynthia, and I enjoyed hearing the stories about how each of our Charter members came into cable. (I also learned why Roswell, N.M., is the site of strange occurrences—four of our Charter members have worked on the cable plant there.) In an ongoing effort to recognize those who have laid such groundwork, it was proposed to start a "Circle of Eagles" group. Watch for more details later.

### Cable-Tec Games

The Cable-Tec Games drew a cross-section of cable professionals from across the country on May 25. I enjoyed meeting Dennis Majors, the overall winner of the Cable-Tec Games. It was inspiring to learn that Dennis had only been in Orlando for four hours before the games began, and this was his first-ever trip to Florida.

The games were just a part of the excitement that was played out during Expo Evening. Disney's Pleasure Island was packed with more than 4,600 attendees, who had the opportunity to sample music clubs from disco to country and western to jazz. Thanks to our Expo Evening sponsors—Antec, CommScope, General Instrument, Scientific-Atlanta and Philips Broadband Networks—for making our 30th Anniversary one to remember.

### Engineering Conference

The opening panel for the Engineering Conference, which included Stephen

Burke of Comcast, Barry Babcock of Charter Communications, Jim Robbins of Cox Cable Communications, Jan Peters of MediaOne and Bill Fitzgerald of AT&T B&IS, met with instant success. The fact that the leaders of five multiple system operators (MSOs) were all in one place at Expo '99 speaks volumes on the growing importance of this show.

Throughout the session, all the panelists stressed the importance of technical staff in making and keeping the industry strong. For most of the systems represented, programs to enhance technical knowledge are under consideration or in place.

Our industry is fortunate to have high-caliber chief technical officers Tom Jokerst of Charter Communications, Alex Best of Cox Cable Communications, Tony Werner of AT&T B&IS and Bud Wonsiewicz of MediaOne during this critical time. The CTO position is one in which vision complements technical skill and knowledge.

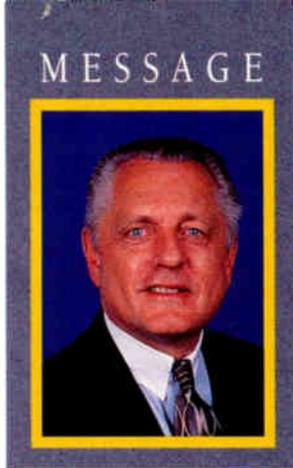
### Golf Tournament

The show not only ended on a high note, but the enthusiasm of the Exhibit Hall spilled over to the golf course for the Eighth Annual SCTE Golf Tournament. One great thing about Florida—there's no shortage of golf courses. I enjoyed meeting so many of our members in a non-business setting.

### The last word

All of these events, as well as many others like the technical workshops, Annual Awards Luncheon and training centers, are reasons that this was one of the best shows the Society has ever held. Join us next year in Las Vegas to continue the tradition of excellence. **CT**

*John Clark is president of the Society of Cable Telecommunications Engineers.*





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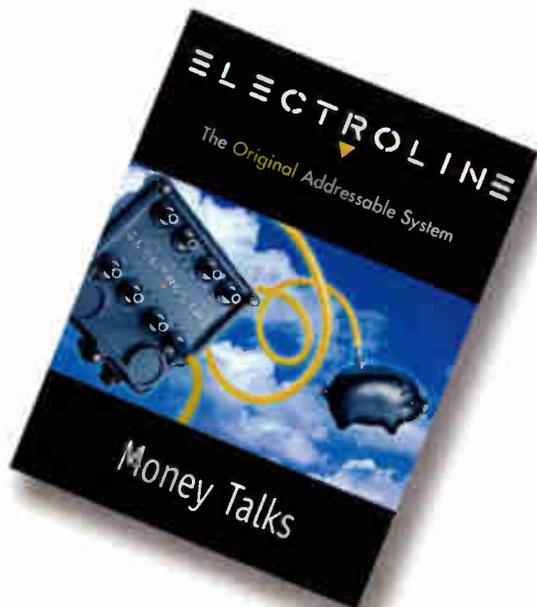
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