Communication Technology

OFFICIAL TRADE JOURNAL OF THE SOCIETY OF CABLE TELECOMMUNICATIONS ENGINEERS

JUNE 1999

30th 1969-1999

WHERE WEB AND TV COLLIDE:
AN ENGINEER'S GUIDE TO MELDING MEDIA

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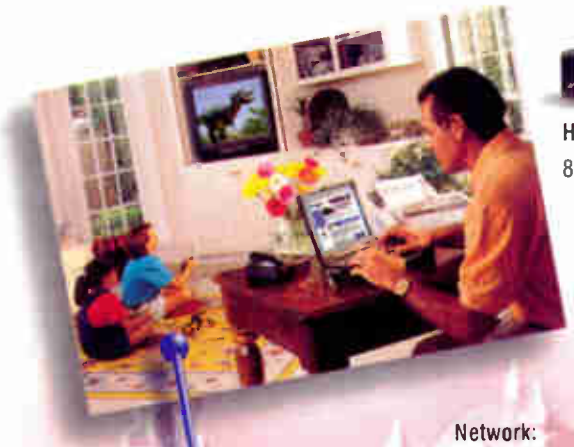

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Certification: How It All Started

Members Committed To Technical Excellence

All photos courtesy of SCTE

Vicki Marts of Multimedia Cablevision was the first woman to be certified in the BCT/E program.

The Society of Cable Telecommunications Engineers Broadband Communications Technician/Engineer (BCT/E) Certification program has reached many milestones since its debut in 1985 when 90 SCTE members sat for the first examination. Seventy-two percent achieved a passing grade of 75 percent or better for Category IV of the program at Expo '85, which marked the official introduction of this service to the Society's members.

Les Read of Mastec receives congratulations from former SCTE President Bill Riker at the 1987 Western Show for becoming the first fully certified BCT/E candidate at the engineer level.

In September 1987, Ron Hranac of HSA Corp. successfully completed the program at the technician level, thereby becoming the first certified Broadband Communications Technician (BCT). A few months later, Les Read of Mastec became the first participant in the program to become fully certified at the engineer level, and Vicki Marts of Multimedia Cablevision became the first woman to achieve certification in the program in 1991.

Today, more than 600 members have completed their certification in the BCT/E program.

BCT/E Certification program candidates pass the first examination held during Expo '85.

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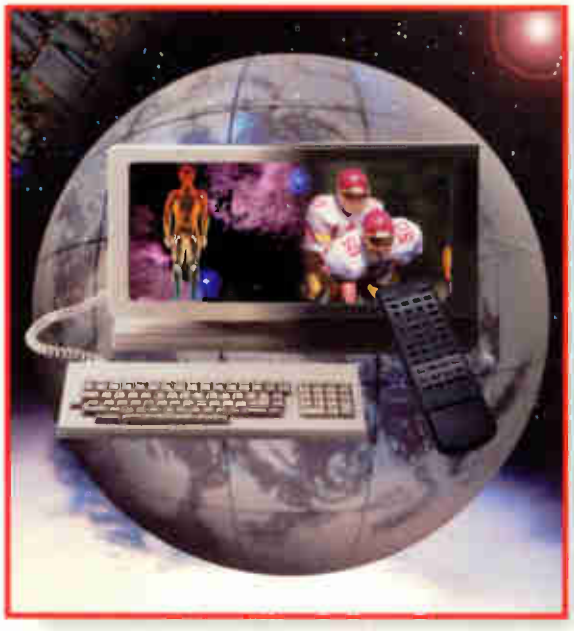

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Finally. A Cable Modem That Can Be Self-Installed.

Anyone can do it. Just ask TCA Cable TV. A full 80 percent of their Terayon cable modem installations are self-installed by their customers. Anyone can install Terayon's robust cable modems. Grandma, the kids, even Dad.

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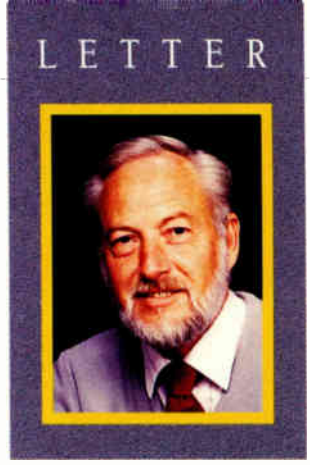
Reader Service Number 3

By Rex Porter



Shame on Member Apathy

The results of the election for new Society of Cable Telecommunications Engineers board members are in. Want to know who won? That information was passed along by SCTE membership letters, *CT* articles, e-mail and word of mouth. The new directors are outstanding.

I have been awaiting the results for a different reason. I was sure we would have a record number of ballots returned. Today I got the news. Fewer than 20 percent of our members voted. This is especially disheartening because I and the members of my nominations subcommittee spent days trying to put together such a superior slate of candidates. Then, to back this effort, we made editorial appeals and posted the SCTE-List calling for everyone to vote.

Let's review the excuses I have heard for not voting in the national SCTE elections:

1) "I'm too busy to vote." You can vote only for the candidate for your region and two at-large candidates. It takes less than three minutes to digest the background information on three candidates. If your region is not listed, you still can vote for an at-large director. Reading their biographies must take every bit of five minutes.

2) "I don't know these candidates." If you don't know the candidate running for your region, why not? Don't you go to chapter meetings? Are you too busy for that, too? Even if you don't recognize the regional candidates, I can't believe you don't know any of the candidates running for the at-large spots.

3) "I never see my regional director at my local chapter meetings anyhow." I know that many of the regional directors made sacrifices to travel to different chapter meetings in 1998. Do you invite the regional director to the meetings? Do you post your meetings on the SCTE-List?

4) "My vote doesn't make a difference. The board just does what it pleases." These candidates were not from some clique. They are the same people who work with you, call on you and try to help daily. The board supports your interests. But what interest do you show when you simply trash your ballot?

Perhaps we should mail out questionnaires and ask all SCTE members if they are interested in voting in future elections. Then we could simply mail ballots to those interested enough to vote. We'd save lots of time, postage, work and perhaps some space in trash cans. If you did not vote—shame on you.

Rex Porter
Editor-in-Chief

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Reader Service Number 6

Telcordia Rides GI's Coattails Into Cable Market

Its name is not the only thing Bellcore has changed about itself. Now known as Telcordia Technologies, the former research tank for the regional Bell operating companies (RBOCs) is using its newly discovered independence to break into the broadband cable market.

To pitch Internet protocol (IP) telephony strategies to cable operators, Telcordia joined forces with a seasoned vendor in that space—General Instrument.

This is a savvy move on Telcordia's part because General Instrument has close, historic ties with TCI and remains cozy with the cable operator now that its parent is AT&T. In fact, General Instrument signed an agreement with AT&T to become the telco's first contracted development supplier for the AT&T/TCI IP telephony cable network.

Under the agreement, General Instrument will develop, trial and deliver customer premise equipment on a nonexclusive basis for the AT&T broadband cable network.

General Instrument will further the development of AT&T's voice over IP (VoIP) applications with its suite of gateway solutions, including stand-alone broadband telephony interface (BTI) terminals and integrated BTI solutions for the Data Over Cable Service Interface Specification (DOCSIS)-based SURFboard cable modem and the DCT-5000+ advanced digital set-top terminal.

While Telcordia has dabbled in cable telephony-related projects, its deal with General Instrument is its first major foray into the cable market, said John Boese, vice president and general manager of Telcordia's advanced network systems business unit. Because Telcordia wants to be center stage for all things related to IP, cable was the obvious way to go.

Under a nonexclusive agreement with General Instrument, Telcordia will integrate its call agent software, which uses its Media Gateway Control Protocol (MGCP), with General Instrument's communications gateway for the customer premise. The software sits between the set-top box and the call agent and resides on a UNIX processing platform that is connected to a broadband network.

Without the participation of General Instrument equipment, Telcordia is trialing its call agent software with Canadian cable operator Vidéotron and, for noncable applications, with Sprint for its Integrated On-Demand Network (ION). Telcordia has other customers for its call agent software, but declines to name them.

The arrangement between Telcordia and General Instrument could speed the pace at which VoIP via cable is deemed reliable.

"This represents a significant step in the continuing convergence of voice, video and data networking," says Bruce Leichtman, director of media and entertainment strategies for Boston-based high-tech consultancy Yankee Group. "The complementary capabilities of these two companies should help accelerate the ability of the cable industry to deploy new IP-based telephony services over their broadband infrastructure."—*Elisa Modugno, editor, "Broadband Networking News"*

Motorola Says Retail Not Quite Ready For Cable Modems

Although its equipment didn't surf the first wave of approval from CableLabs, rapid-fire deployments and deals with @Home and Intel have been keeping Motorola in the broadband limelight.

"A lot of regular marketing programs have to take place which will drive consumers to retail channels in the future," said Jeff Walker, director of marketing and business

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Reader Service Number 8

DEPLOYMENTWATCH

By Greta Durr

In the year since we caught wind of the **TCI/AT&T** merger, our industry has consolidated forces much like the Borg depicted in later incarnations of Star Trek. Much like energy, which can neither be created nor destroyed, the entrepreneurial spirit that made this industry great also is changing form. Below is that story of two yet-to-be assimilated broadband industry veterans.

Eye on the Sky

InterTECH, in addition to operating cable systems in Colorado and Nebraska, has developed a high-speed Internet and data access system using bidirectional satellite technology. Its Information Distribution Services (IDS) system provides high-speed data services to cable systems, schools, corporate business sites, paging companies and remote Internet service providers (ISPs). In cable, the company is targeting small systems to deploy high-speed Internet services over hybrid fiber/coax (HFC) networks.

InterTECH says that by June it will have completed deployments with Tele-Media in Pleasant Valley, Pa.; Kuhn Cable in Walnut Bottom, Pa.; and Private Cable in North Carolina. Tele-Media and Kuhn Cable will be using Nortel's Data Over Cable Service Interface Specification (DOCSIS)-compliant modems and CMTS-LITE (cable modem termination system) headend equipment.

InterTECH Vice President Frank Wimler, formerly of CableLabs, said the company built its uplink facility last year in Nebraska's panhandle so it could single hop satellites to markets in Canada, South America, Europe and Asia. Since getting all the hardware in place, InterTECH has reported deployments in New Mexico, Iowa, Michigan, New York, Alabama and Nebraska.

"The CMTS-LITE is just a scaled-down version of the Nortel full-service CMTS," Wimler said. "It uses the same software. It just can't do more than one upstream data path. However, having more than one upstream data path is not an issue with the small operators. Because it uses the same software and hardware—without the reverse ports—we believe it will be qualified alongside its big brother. It is fully DOCSIS-compliant and will talk to certified modems."

In its first generation, Wimler said, the InterTECH system uses a typical asymmetrical bandwidth allocation with a large delivery path to the customer and a small upstream path. "What we have found is that Web surfing has a greater than 1-to-100 ratio. For example, a mouse click, which is very small, produces a very large file download," he explained. The next generation of the IDS, he said, will increase the upstream path from the current 19.2 kbps to a 500 kbps data stream.

"The biggest difference between our system and the traditional t-span is the latency or delay as the signal traverses the satellite link," Wimler said. "This latency makes twitch games impossible to provide over the satellite link, but to someone just surfing, the screen data just pops up on the screen after a little delay. Users, for the most part, find this very tolerable."

"We are just starting to ramp up our sales," said Bill Bauer, president of InterTECH and chief executive officer of WinDBreak Cable. He attributes the surge of interest and revenues to recent CableLabs DOCSIS certification efforts.

"Harrison, Neb., a community with 100 cable subscribers, located in the panhandle of Nebraska, was our test system," said Bauer. "We have had Internet services running almost three years and have a 34-percent penetration rate there."

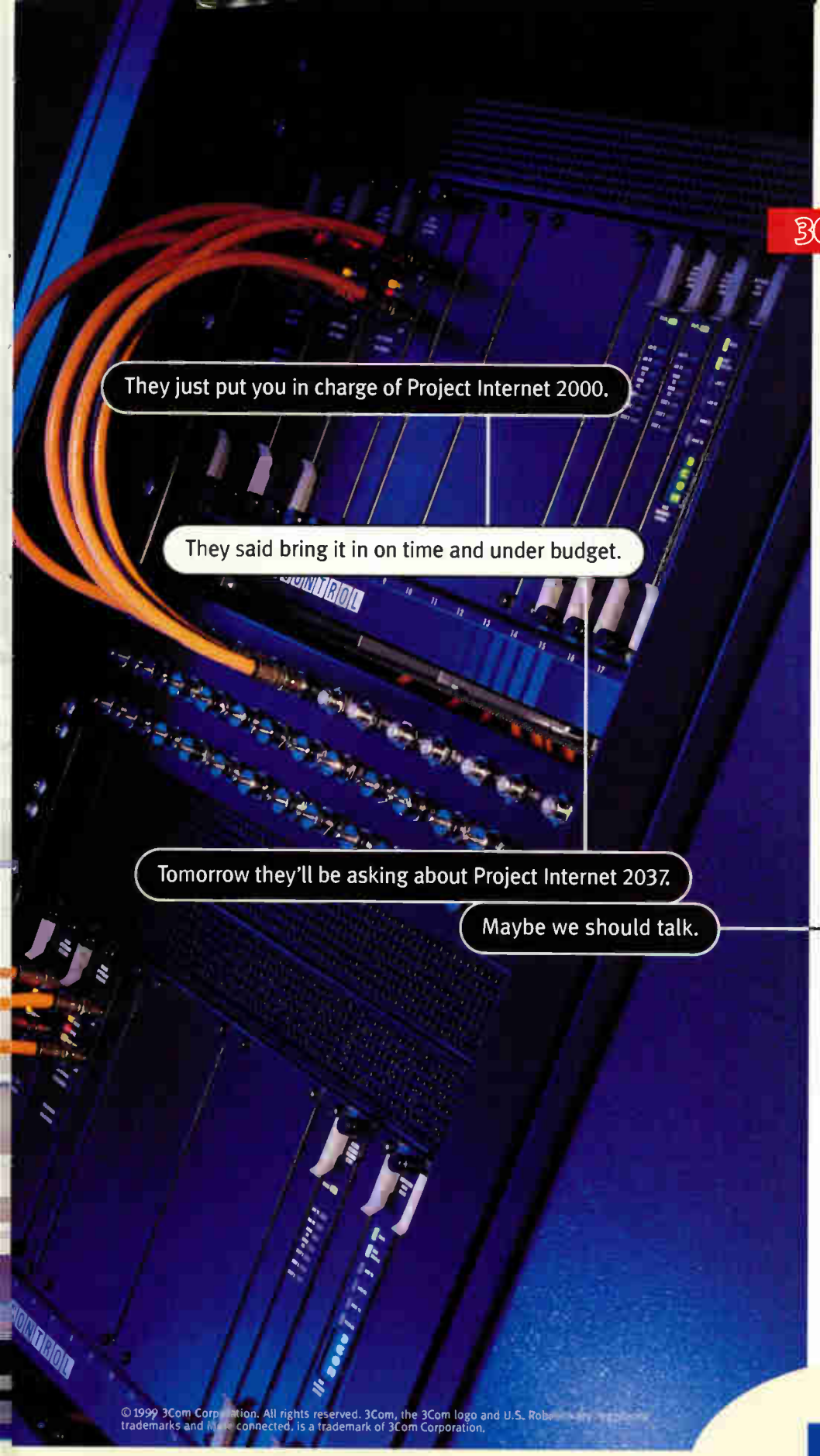
Bauer served as chairman of CableLabs' high-speed data committee and helped to write DOCSIS. Wimler was the technical coordinator at CableLabs for the CableNET demonstrations from 1994 to 1997.

When asked how he got into his current line of work, Wimler said, "I was working at CableLabs for seven years and needed a change, so I gambled on a startup company that I thought had a good idea. With a lot of work, blood, sweat and tears, we constructed the satellite uplink facility, remodeled a building and launched an Internet backbone company in less than a year's time." CT

Greta Durr is deployment editor at "Communications Technology" in Denver. E-mail deployment information or comments to gdurr@phillips.com.

Who's Who in Deployment

- **Cisco**'s cable modem termination system (CMTS), the first to pass **CableLabs**' Data Over Cable Service Interface Specification (DOCSIS) muster, is starring in several cable modem deployments planned by **Comcast** this summer. The launches will enable Comcast's high-speed Internet service to approximately 200,000 homes passed in Orange County, Calif. Initial California launches are slated for Santa Ana, extending to Buena Park, Fullerton, Placentia, Seal Beach and Newport Beach. Comcast currently offers Comcast Online service in seven markets including Baltimore; Detroit; Orange County, Calif.; Philadelphia; Sarasota, Fla.; Chesterfield, Va.; and northern and central New Jersey.
- An agreement bundled in **@Home**'s recent slew of announcements involves a deal between the broadband ISP and **Falcon Communications** for high-speed Internet access. Initial deployments are scheduled to continue throughout 1999 under the moniker **Falcon@Home**. Officials have said that the deal will ultimately allow the ISP access to an estimated 1.2 million homes passed in 23 states.



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SCTE UPDATE

SCTE Elects New Board

The Society of Cable Telecommunications Engineers is pleased to announce the results of this year's election to fill empty seats on its 1999-2001 Board of Directors.

Newly elected board members include:

At-Large Director: Chris Bowick, Cox Communications, representing the entire membership

At-Large Director: Tom Elliot, CableLabs, representing the entire membership

Region 1 Director: Steve Allen, JCA Technology Group, representing California, Hawaii and Nevada

Region 2 Director: Steve Johnson, Time Warner Cable, representing Arizona, Colorado, New Mexico, Utah and Wyoming

Region 6 Director: Bill Davis, Communications Supply Group, representing Minnesota, North Dakota, South Dakota and Wisconsin

Region 9 Director: Keith Hayes, BellSouth Entertainment, representing Florida, Georgia, South Carolina and the Caribbean

Region 11 Director: Marianne McClain, Baker Installations, representing Delaware, Maryland, New Jersey and Pennsylvania

They will join the eight SCTE board members currently serving their 1998-2000 terms:

At-Large Director: Ron Hranac, High Speed Access Corp., representing the entire membership

Region 3 Director: Norrie Bush, TCI of Southern Washington, representing Alaska, Idaho, Montana, Oregon and Washington

Region 4 Director: Jim Wood, PPC, representing Oklahoma and Texas

Region 5 Director: Larry Stiffelman, CommScope Inc., representing Illinois, Iowa, Kansas, Missouri and Nebraska

Region 7 Director: James Kuhns, Terayon Communications Systems, representing Indiana, Michigan and Ohio

Region 8 Director: Don Shackelford, Time Warner Cable, representing Alabama, Arkansas, Louisiana, Mississippi and Tennessee

Region 10 Director: Wes Burton, MediaOne, representing Kentucky, North Carolina, Virginia and West Virginia

Region 12 Director: John Vartanian, Viewer's Choice, representing Connecticut, Massachusetts, Maine, New Hampshire, New York, Rhode Island and Vermont

Newly elected directors officially began their two-year terms at the SCTE Board meeting, held the day prior to Cable-Tec Expo '99 in Orlando, Fla.

Dillon-Malone Wins Shapp Scholarship

SCTE has awarded Barry Dillon-Malone of Liverpool, N.Y., its 1999 Milton Jerrold Shapp Memorial Scholarship. Dillon-Malone is the son of SCTE member Basil Dillon-Malone of Arcom Labs.

The scholarship, sponsored by General Instrument and administered by SCTE in memory of former Pennsylvania Gov. Milton Jerrold Shapp, will award Dillon-Malone a $20,000 grant ($5,000 per year for four years). The scholarship is designed to recognize high school seniors who are children of current cable industry employees who demonstrate the same ambition, community activism, determination and entrepreneurial spirit exemplified by Shapp's life and accomplishments. "I feel especially honored and extremely grateful," said Dillon-Malone. "I will do my best to carry forward Mr. Shapp's ideas."

Dillon-Malone, who plans to major in computer engineering, has been accepted to a number of universities, including Cornell. The National Honor Society student attends Liverpool High School, from which he has received awards in mathematics and physics. He also scored 1,480 on his Scholastic Aptitude Tests.

Dillon-Malone has been named in "Who's Who Among American High School Students" and was chosen twice to attend the "People to People Student Ambassador" program in Washington, D.C.

Call For Papers

SCTE is seeking technical papers to be presented during the 1999 Western Show in Los Angeles. The show will be held at the Los Angeles Convention Center from Dec. 15-17. SCTE will be coordinating the technical sessions for the event.

Papers are open to any subject and must be submitted by Aug. 1. Submissions must include title, author's name, presenter's name, affiliation, full address, telephone/fax numbers, e-mail address and a one- to two-page abstract detailing the technology or issue to be discussed and its significance to the industry. Presenters will be expected to submit copies of their complete presentations to the California Cable Television Association for inclusion on the Western Show CD-ROM.

Proposals may be mailed to Marv Nelson at SCTE, 140 Phillips Road, Exton, PA 19341-1318; faxed to (610) 363-7133; or e-mailed to mnelson@scte.org.

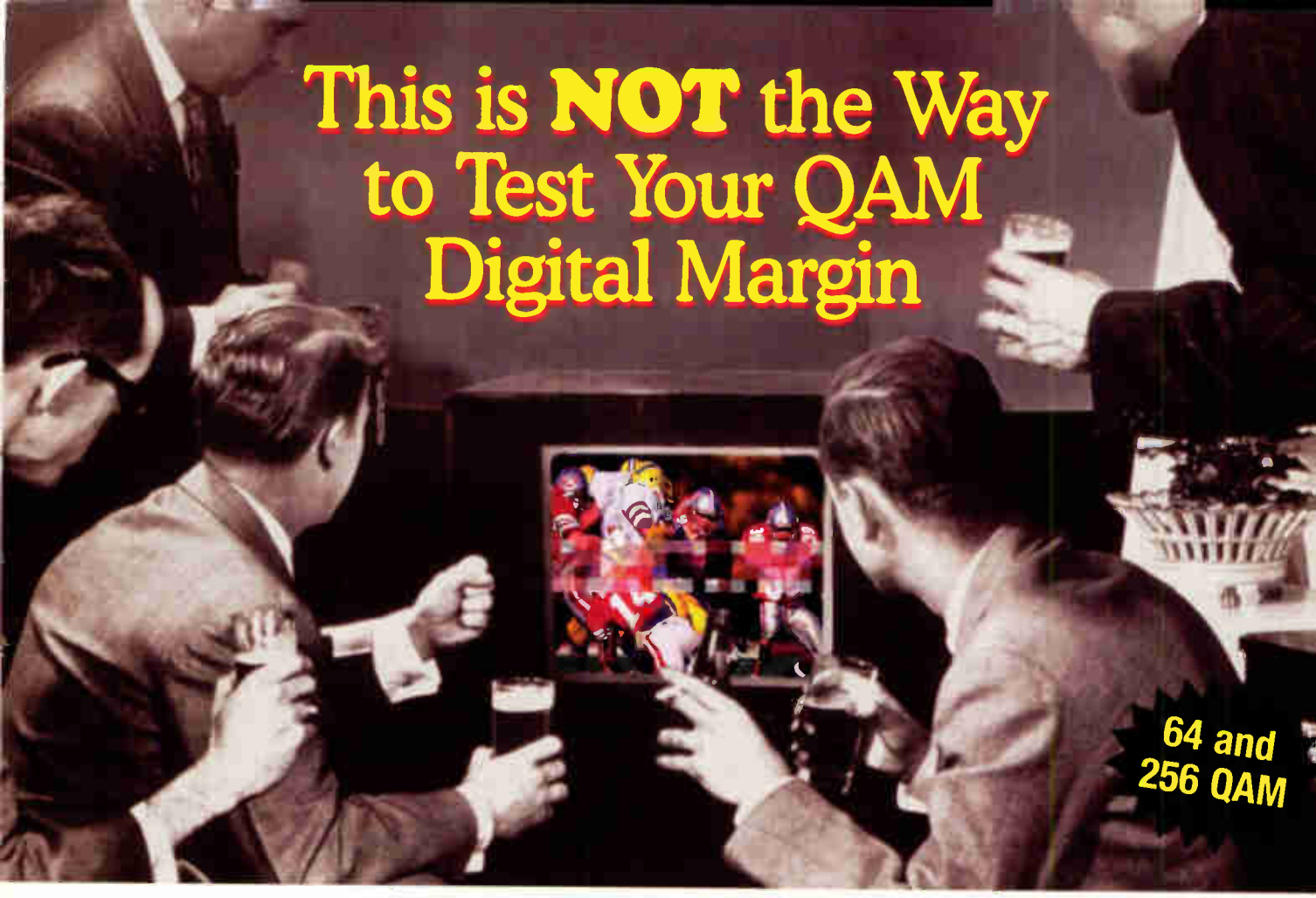
SCTE Reaches Out With Member-Get-A-Member Campaign

In just the fourth month of its 1999 Member-Get-A-Member campaign, the SCTE has signed on more than 300 new members ... and counting.

With a worldwide network in touch with thousands of industry professionals, the basic tenet of the campaign is to have SCTE members expand their membership, yielding enhanced career growth for both themselves and their newly recruited industry peers. SCTE Manager of Membership Services Paula M. Jones, said: "We are just thrilled with the enthusiasm our members have exhibited with this campaign. It is clear that SCTE membership has worthwhile benefits and programs."

The campaign opens the door for more individuals to receive the training needed to succeed in the ever-changing telecommunications industry. This year's campaign also has created greater access to technical training for existing members. Members who sponsor new recruits will receive a $5 coupon for each new member. Up to eight coupons per purchase may be used toward SCTE training.

The campaign will run throughout 1999. For a sign-up packet, contact the Membership Services Department at (610) 363-6888, fax (610) 363-5898, e-mail pjones@scte.org, or visit the SCTE Web site at www.scte.org. CT



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Reader Service Number 12

Interview with a Leader

By Rex Porter

Cable Pioneer Steve Allen

Steve Allen

Steve Allen is western regional sales engineer for JCA Technology Group, a TVC company. He has been involved in the cable industry for most of his life and is the son of former National Cable Television Association Chairman and President of Western Communications Ed Allen.

Steve has been a member of the Society of Cable Telecommunications Engineers since 1979 and has served on the boards of the Golden Gate and Sierra Chapters of the SCTE. Steve also serves on the SCTE Planning Committee, Broadband Communications Technician/Engineer (BCT/E) Administration Committee, Emergency Alert System (EAS) Subcommittee, and is chair of Northern California Vendors Day.

Steve holds a bachelor's degree in telecommunications from California State University, is BCE certified, and was the SCTE's 1991 Member of the Year. He has recently been elected to the post of SCTE Region 1 National Director. He is one of the youngest members of the NCTA Cable Pioneers, Class of '93, and a charter member of the Loyal Order of the 704.

Communications Technology: *Steve, we know you probably were one of the youngest cable folks around. Tell us about your early days.*

Steve Allen: I was born in 1951 in Winona, Minn. That's on the Mississippi River down in the southeast corner, about 40 miles east of Rochester.

My father was the general manager of the local AM radio station, KWNO, 1240 AM. This was a 250-watt station serving Winona and the river area. I remember my father taking me down to the radio station and letting me wander around. He would be in his office, and I would be in the back bothering the disc jockeys.

One of my fondest memories was going into the newsroom and listening to the clattering of the old black Teletype machines. Associated Press and United Press International machines would be punching out news reports all day long, so it was what was called a "rip and read" radio station.

I remember being fascinated with how those machines worked. How could they send printed letters over a wire and make a typewriter work with no one typing the keys? (I was also fascinated by player pianos.) They seem pretty simple now, but they were very complex and mysterious back then.

While playing up in the attic of that station, I got my first introduction to old broadcast equipment. One day I found an old, old wire recorder. This was before tape recorders. It was interesting that they used a roll of steel wire for recording sound. These devices fueled my interest in electronics and communications.

Communications Technology: *But how about early cable days?*

Steve Allen: My first memories of cable were about 1958, and I was 7 years old.

A local businessman who had gone to Chicago had been introduced to the idea of cable TV. Upon his return, he approached my dad for help. Winona was an area that was perfect for this thing called "cable TV" because we were down in the valley, 800 feet below the bluffs on the edge of the Mississippi River. A more effective terrestrial interference shield has yet to be invented.

Back in this period of the early '50s, TV sets were proliferating very slowly. I recall that we had an almost 100-foot antenna mast on top of our house trying to grab something out of the air. We considered ourselves lucky if we were able to get two channels out of Rochester or La Crosse, Wisc., part of the time.

Winona was perfect to thrive with a cable system. When this local merchant returned from Chicago with the idea, he approached the only guy in town who had any knowledge of communications. That was the manager of the radio station, my father.

He asked Dad if he would be interested in being a partner in building this new thing called "cable TV" for Winona. After some study, my father decided that it would be a good idea and phoned the local bank president, who happened to be an advertiser on the radio station. Dad went down and took out loan papers on Saturday, which was unheard of. So all of a sudden he was in the cable business under the name of Winona TV Signal.

The offices consisted of a front office and an electronics/repair shop in the back: tube caddies, tube cookers, tweaking things, primitive sweep gear consisting of a Jerrold Comparator (often referred to as

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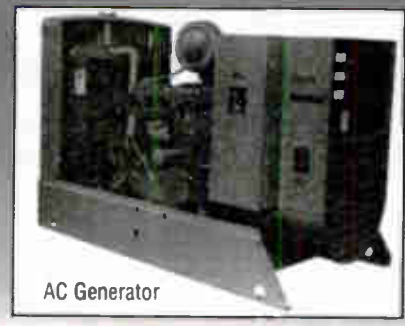

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a flicker-dicker), pad boxes, and an O-scope. It was pretty simple back then.

Communications Technology: *Tell us about that system.*
Steve Allen: The eight-channel system was designed with Spencer-Kennedy Labs amplifiers. The actives were 110 V strip amplifiers using 6BY5 and 12AY7 tubes. (I don't know why I still remember those names.) They were mounted in metal boxes on the poles with electric service running up to the power lines. So they were running off 110 V all the time.

There were no line-powered amplifiers in those days. The trunk system consisted of RG11. Every house had a tap device called a Chromatap cut in at its location. It was a signal splitter, but you had to cut the cable and attach it almost like an F-connector. You cut the distribution cable, stripped it, inserted it into the tap, wrapped the center conductor around a screw, tightened it down, and then clamped a ring around the outside of it. Multiport taps were still a number of years away.

At 8 or 9 years old, a lot of my time was spent crawling through attics for the regular installers. They would send me up into the attics and under the houses because I was small. I would go grab the RG-59 wire they had shoved through a vent or drilled hole and drag it to wherever they told me. I enjoyed this immensely, and I got to see a lot of the early business.

The installers let me ride with them, I did some service on the poles, and every once in a while I would sneak up a step-pole. They wouldn't teach me how to climb a pole with hooks, but every once in a while, I would go up a step-pole in a spare climbing belt and watch them work.

On one occasion, I was up at the headend on top of the local bluffs, where my father had constructed a 600-foot guyed tower. It took a tower at least that tall to pick up anything from the Twin Cities, which were more than 150 miles away.

My father had three people on his staff: Gary Nelson, who later came out and ran the cable system in Reno, Nev.; Dick Ashpole, who now lives in Virginia; and Par Peterson, who now works for ADC in Minneapolis. I see Par at the cable shows, and he is truly a person who has "been there, done that." He stuck with my father for much of his career. Par is one of the best teachers I have ever known, and he loves this business as much as I do.

Communications Technology: *I heard you began climbing towers at an early age.*
Steve Allen: One day, we were at the headend, which was full of Jerrold Commander I processors, Jerrold Teletrols and Conracs. While they were working inside, they told me to go outside and play. So I went outside but couldn't find much to do. So I decided to climb a short way up the tower. About 20 minutes later, when I had gotten about half way up the tower, my dad came out yelling for me, "Steve, where are you?" "I'm up here, Dad," I yelled back.

Now, my dad had never been up the tower before. He pushes pencils, and to him "dBs" are dollar bills. He took a look to where the sound had come from and saw me 300 feet up the tower. Then he went ballistic, absolutely sparks flying from his brain. He jumped into the elevator, rode it up the tower and snatched me off to give me a ride back down.

As far as I was concerned, I was perfectly OK. I had been prepared to climb back down if he had told me to do so. I guess that has to do with the origin of the term "young and stupid." You just don't conceive of the danger when you are that young. Oh yeah, I couldn't sit down for a week afterwards.

Communications Technology: *Your father, Ed Allen, built some other systems, didn't he?*
Steve Allen: In 1960, my father built the cable system in LaCrosse, Wisc., so there was La Crosse TV Signal, as well as Winona TV Signal. Then in 1964, Jack Kent Cooke bought both of my father's cable systems.

In 1965, my father was asked by SKL if he was interested in moving to California and operating their system in Lafayette. Dad accepted the offer, and in January 1966, we left Minnesota in three feet of snow and sub-zero temperatures and arrived in San Francisco with clear skies and temperatures in the 40s and 50s.

Then a group from the *San Francisco Chronicle* approached him. They hired my father to be the president of Western Communications. Western Communications proceeded to build a number of cable systems in the area.
Communications Technology: *Among the*

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other people you worked with was one of cable's most colorful characters, Joe Hale. Didn't you work for him at one time?
Steve Allen: Joe Hale was a true engineer who worked for my father in the startup days. He performed signal surveys, designed systems and built headends. He really understood the whole plan as it existed at that time.

When I was 16 and had just gotten my driver's license, Joe Hale invited me to come to work for him part-time during the summer. I wound up driving an old Land Rover over the San Bruno Mountains by South San Francisco doing signal surveys up there for the South San Francisco cable system.

I sat on top of the mountain with a power generator, a 704 meter, a chart recorder, an antenna on a stick and a TV set. I also had a thermos, an ice chest and a can of gasoline.

One day I was sitting on top of a rock right above Highway 101. I heard this big clanking noise behind me. I turned around to see a big diesel Caterpillar cutting a trail down toward me. The operator seemed to be as surprised to see me as I was to see him. He warned me there was a fast-moving grass fire coming over the hill toward us. With his bulldozer, he dug a circle around where I was sitting, and I managed to drag all of my things into the middle of that circle of bare dirt. Moments later, the fire came sweeping all around me. Fortunately, it didn't get me because I was in the middle of the circle. I was amazed at how fast those fires can move. Afterwards I turned my generator back on and went back to doing the signal surveys.

> "The telephone companies will figure this broadband business out,... we need to be very cautious."

Back at the Lafayette office, I hung around with guys like Ken Wahl and Rick Clevenger. *(Editor's note: Rick Clevenger is a charter member of the SCTE and the first regional SCTE director assigned to California.)* My first full-time job was with Concord TV Cable in 1970 as summer vacation relief. I was assigned the task of auditing the cable plant, riding around in the bed of a pick-up truck with a friend of mine, Tom Coleman. Tom now works for Falcon Cable up in Oregon, and we have both been in the cable industry since.

A short time later, I started a doing installs, and I just progressed on to maintenance, construction work and electronic splicing.

Communications Technology: *You left Concord about then, didn't you?*
Steve Allen: Yes. I sent out some letters, and soon I was working for Nor-Cal Cablevision in Yuba City, Calif. Sacramento's McClatchey newspaper people were partnered with Viacom as system owners. This was 1979, and this is where I met my wife,

Carol. They were launching Showtime, and she was a salesperson for Showtime.

I worked there as a technician for about six months. About that time, I was offered a promotion to chief technician of the systems up in Oroville about 25 miles away. I consider this the first time I had recognition of my abilities, that I did know what I was doing and wasn't just "the boss's son." I was responsible for four systems and a high-powered amplitude modulated link (AML) site. It was my introduction to microwave.

Communications Technology: *How did you get involved with the SCTE?*
Steve Allen: While working in Oroville, I got involved with the SCTE for the first time. There was a real shortage of technical information at that time, but I managed to get a subscription to *CATJ* magazine, the only technical publication available at the time. Otherwise, I had to read *Popular Science* or *Popular Electronics* to learn anything about developments that were happening.

Somewhere in *CATJ*, I read about this organization called the SCTE run by a woman named Judy Baer. I called, joined and have been a member ever since. Judy left to pursue other things, and Bill and Anna Riker came aboard.

I found myself at home with the SCTE. It offered things I had wanted such as networking, training, publications and seminars I could attend. There was no school for cable TV, but that's what the SCTE became to me.

In 1983, I was asked to go down to the Viacom system in San Rafael, Calif. There were some labor union problems down there. During my time there, I got to work with the plant manager. He and I were partnered up on some of the service calls. He seemed to recognize my energy, skills and dedication.

A couple of weeks after the labor dispute ended, I got a call from him asking if I would be interested in staying on as regional engineer. This job had the responsibility of caring for roughly 100,000 customers and a major microwave site servicing 14 communities. It was a great move for my wife and I, so I accepted the job in San Rafael.

Communications Technology: *But I remember you at Viacom Headquarters. Tell us about that.*
Steve Allen: After a couple of years at San Rafael, I got to know the people at Viacom's headquarters. I was offered a position on the engineering staff in Pleasanton, Calif. I worked for Doug Semon, Joe Van Loan, Del Heller and crew at Viacom headquarters.

There were three staff engineers: George Campbell, Mike Campbell and myself. Also, there was a lab technician, Tim Habigar, who now works for MediaOne. We were a pretty happy crew, and it was a wonderful place to learn. The people I mentioned a moment ago were some of my finest teachers. I admire them all to this day.

I had wonderful mentors. My area of responsibility was converters and descramblers, covering deployment and repair facilities across the country. So I got a good dose of scrambling and security problems, manufacturing problems and early addressability.

While I was at Viacom's headquarters, I became involved with the Golden Gate

Chapter. They were great meetings. The SCTE was young, and all the minds were curious and eager. I think the first meeting I attended was held in the Concord Sheraton, and John Ridley of Jerrold taught a back-to-basics class for us. I worked with the chapter for a while and was later elected to the board of directors serving as vice president of the Golden Gate Chapter.

Communications Technology: *When did you get to Roseville?*
Steve Allen: In 1986, I began to long for the mountains again, and with the birth of my son, I decided we needed a little more room and less traffic on the way to work.

I managed to get a job up in Roseville, Calif., as the chief engineer of the system there. This system was operated by a private firm, but within a year was purchased by Jones Intercable. That was wonderful because Jones Intercable was a terrific company with a strong belief in engineering—my kind of company.

I was with Jones for almost 10 years. After receiving one of those offers that you can't refuse, I took a three-year stint with the Roseville Telephone Co. I liked my time there very much, and I came to appreciate the telephone industry more than I had suspected. They do things very differently. In some ways they are more bureaucratic, but they are committed to doing things right.

I received fabulous training and support when I was with the Roseville Telephone Co. I left when they decided, much like other phone companies, that they were not dedicated to broadband or cable. The Internet changed everything, not to mention some legal decisions regarding telephone and cable TV.

The telephone companies will figure this broadband business out at some point, and I think we need to be very cautious. If we don't pay attention to them, they will be us. AT&T's purchase of TCI is just the first "big" shot fired in convergence of industries. They may be a little slower to move, but their sheer weight means they will be there.

"We are a customer business. Good guys don't have to finish last."

The phone companies have been very supportive of the SCTE and vendor days. I remember meeting with Earl Langenburg, who was with US West at the time. We spoke of how the "telephone company" could write one check to sign up all of their technicians and take control of one division of the telecommunications industry, and that one regional Bell operating company (RBOC) is larger than the entire cable industry. I suppose that had something to do with limiting the number of SCTE board members from one company.

Communications Technology: *You have become a champion of the SCTE and all of its efforts. How'd you get so involved?*
Steve Allen: There was no SCTE chapter in the Roseville area, and I had to drive to San Jose or to Pleasanton to attend SCTE meetings, so I decided to start a local chapter. With the big system in Sacramento and other systems to the north, I started a telephone campaign. We had a meeting, and I found myself the first chairman of a new Sierra group in 1990.

That work and my involvement with the California Cable Television Association led to the Sierra group being awarded chapter status in record time, and me being honored at the SCTE Cable Tec Expo as a Senior Member and Member of the Year. The honor was doubled when Bill Riker called my father on stage to present the awards.

People who read the SCTE-List realize that I constantly refer to my father and his sage advice as I move forward in my own

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career. My father taught me never to forget who we are and what we are. We are a customer business. Good guys don't have to finish last. And we can be nice to people.

Communications Technology: *Is that where you began to think about a vendor day event?*
Steve Allen: I came back from that Expo fascinated that it was such a different show from the Western Show or NCTA, where all of the programmers seemed to be in such attendance. I thought the idea of a show like the Cable-Tec Expo being dedicated to hardware vendors was wonderful.

I imagined how the idea of that Expo might be expanded to allow so many other people to see it. The vendors who visit the corporate offices get to see the chief engineers and the purchasing people, but the people out in the field usually never get to see these vendors face to face. They never get invited to lunch, and they never get to play with the new products. Basically, the chief technical people get to make the decisions, and the people who use the products daily never get to see everything available.

So, when I got back from the Expo, I thought: "What if I got all of the vendors together locally and we put on a small show? We could rent a little place, bring everything into one place and invite everyone to attend." The local technicians could "kick the tires," talk with the vendors and provide their own intelligence about quality and advancements in the gear they used daily.

I really just envisioned a small local show with 10 or 20 vendors from the local area, along with installers and technicians being able to take half a day off and come see. At first, I had the idea of calling it a Mini-Tech Expo, but it was felt that using Tech Expo's name might confuse people and also might diminish the value of the Expo itself. Bill Riker suggested we use Vendor Appreciation Day.

Communications Technology: *What was the first vendor day like?*
Steve Allen: I sat down one weekend, and using the CCTA's annual directory, I wrote all of the vendors. I booked the Party Palace in Fairfield, located just feet from the entrance to Travis Air Force Base. It was the only meeting hall located halfway between Sacramento and the Bay area, and I wanted to attract people from both areas.

The day before that first vendors day was the first day of the Gulf War. I worried that the news of our first day would be consumed with the war. My wife and I drove down, set things up, and discovered that we had a good attendance, but everyone found themselves watching news reports on the war or reading newspaper reports.

Here we were trying to work close to the main gates of Travis Air Force Base, and security was tight all around the place. Our first vendor day reception consisted of hot dogs cooked on a machine from a rental place and soft drinks from the Coca-Cola distributor. I had to reserve a jockey box with the dispensers, syrup and CO_2 bottles.

One of the Sierra chapter directors was going to pick this stuff up and deliver it to the Party Palace. He didn't know exactly where the Party Palace was located, so he accidentally drove right through the entrance gates of Travis. Of course, the Air Policemen surrounded his truck and found all of the CO_2 bottles and syrup bottles in the back of his pickup, spread-eagled him over the hood, and tore his truck apart. About an hour later, they released

him and he made his way across the street to the Party Palace and the vendor day meeting. He was pretty shook up.

Anyhow, we had about 40 vendors and about 150 to 200 people attending, so we knew we had a success going for the future. I knew we would have to locate a bigger hall, so I searched around and found the Holiday Inn in Fairfield. Now we had rooms to house the vendors and the attendees.

I had decided to extend invitations to other Northern California chapters to participate and to offer more support. Vendor day now consisted of the Golden Gate, Sierra, Shasta-Rogue and Central California Chapters. But I never imagined it would grow to what it is today.

I found myself spearheading and doing most of the work, and it seemed to be Steve Allen's vendor day. I now have people to help me after the event starts. But beforehand, I found my son and I sitting on the living room floor, doing all of the folding, stuffing envelopes, getting labels, stamping envelopes, mailing everything out—only to get ready for it to come back so we could handle the reservations, answer the questions, fax out information, handle the hotel arrangements and cash the checks.

> "We have an obligation to help those around us so that we can all advance and provide the best we can to our customers."

Now we have a golf tournament, host the vendor reception and handle the complex technical training agenda. It is a lot of work for all of the committee, but as long as my name is associated with this event in any manner, I hope to continue to give my time and best efforts to make sure the quality is there.

I have a real passion for the Northern California Vendor Days. Some people go to the mountains every year for 3 months. I do vendor day.

Communications Technology: *Would you like to see the national SCTE office get more involved with vendor day activities?*
Steve Allen: This is the ninth year we have done it, and other chapters have begun vendor days during recent years. The national Society has begun to recognize this as an important part of SCTE activities. As vendor day grows, I continue to seek aid and assistance from the national office in the form of mailing, publicity and staff presence.

I think vendor day is where the rubber hits the road. Vendor day is designed for the majority of the SCTE membership. It is "their" show. It is not an engineers' affair or a programmers' show. It is a show for the guy in the trench or on the pole. Vendor day has evolved into one of the most important member benefits the SCTE has to offer. It brings vital information to the people who need it most.

When you look at the SCTE mission statement being Training, Certification and Standards, the training goal should bring itself right down to the street level of its membership. There are very few Dave Willises, Rex Porters, Tom Eliotts or Dan Pikes left out there. Those are people who are "few and far between." There are maybe 3,000 true engineers in the SCTE.

The other 15,000-plus members consist of technicians and installers. They are interested in information and training that will help them get their jobs done today. For $10 to attend the vendor days, these people can get some of the best hands-on education they might ever have.

This year, we were pleased that John Clark, the new SCTE president, and his staff chose to attend our "Biggest and Best" in Concord, Calif.

I hope others in the SCTE will step forward to strengthen vendor days here in Northern California as well as throughout the United States. It has reached a kind of critical mass, and the demands of the show are getting to be a bit more than I can handle while keeping a job that actually pays me.

Communications Technology: *Cable Games is really popular in California. How do you make it so enjoyable at your show?*
Steve Allen: At one point, I became concerned with the lack of participation in Cable Games at the shows, but it seems

they are being revived and are once again becoming a wonderful event.

Much of the credit for that goes to Steve Christopher of Thomas & Betts. He seized the idea from the Rocky Mountain group and has pushed it into its prominence.

Another thing I found interesting was, this year at the Northern games, we had two female participants. Although they were relatively new in the industry, these two ladies had the courage and the skills to compete with the men. Bravo, ladies. You go, girls.

Communications Technology: *Now that you are a vendor, how difficult is it to continue to participate at shows compared to when you worked as an engineer in a system?*

Steve Allen: I am very proud that JCA recognizes the importance of the SCTE and its activities. My boss, Rick Anderson, has supported my efforts 100 percent. I know I should have been manning our booth at vendor days this year, but he allowed me to spend my time on show logistics. I bless Diana Riley and the people from Tektronix and TVC for covering my butt.

This was by far the busiest show I have seen. I was there, but I was busy taking care of the show. I never got a chance this year to visit with the vendors or to collect my usual handful of new business cards.

Communications Technology: *We have known and respected your father for years. He set the pattern for leadership as he led this industry through some rough times as the chairman of the NCTA. You are following in his footsteps. Any final words about your future aspirations?*

Steve Allen: Rex, I do love this business, and if you consider me a leader, I am very flattered. I've always tried to help others up the ladder of success.

My father always said: "You cannot push a rope up a ladder, but you can pull it up. Lead by example." So I try to stay out in front by continuing to develop my own skills and offer my knowledge and help to others who may benefit. We have an obligation to help those around us so that we can all advance and provide the best we can to our customers.

My son and I are doing well, and I enjoy my job as a sales engineer. I get to interact with most of the people I have dealt with for many years. Vendors Day has introduced me to many fine, knowledgeable people from around this state and the country. The SCTE is a wonderful networking group. The solutions to the hardest problems are only a phone call away.

Bringing my son to the Northern and Southern California Vendor Days has been my way of introducing him to this cable business. I would be very proud to see him follow two dedicated generations in cable.

The SCTE needs dedicated volunteers and people who have visions of what is to be and are willing to forge the path to get there. CT

Rex Porter is editor-in-chief of "Communications Technology." He can be reached via e-mail at tvrex@earthlink.net.

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By Ron Hranac

Everything You Always Wanted To Know About Cable, But Were Afraid to Ask

Every now and then, a good book comes along that is a must-have. This month, I review two such publications, both of which should be sitting on your bookshelf if they aren't already there.

The first is an engineering reference book specifically about cable TV technology, and the second, while targeted to the amateur radio community, contains a lot of information that will be helpful to those sorting their way through RF interference problems, cable or otherwise.

If you could pick only one ....

Modern Cable Television Technology: Video, Voice, and Data Communications; Walter Ciciora, James Farmer and David Large; Morgan Kaufman Publishers, Inc.; 1999.

Over the years, a number of very good books on cable TV technology and related topics have been written. But none approaches the reference quality of *Modern Cable Television Technology*, a nearly 900-page hardcover tome by three of our industry's most respected engineers. Indeed, The Strategis Group's Archer Taylor said in the first sentence of the book's foreword, "*Modern Cable Television Technology* seems destined to become the standard engineering reference work in the rapidly developing field of cable television." I'm inclined to agree.

I'll admit up front that I haven't sat down and read the book from cover to cover, but I have had a chance to skim its contents during the past few months, and I've used it as a job-related reference on several occasions. I also randomly picked a few topics to read in depth, intentionally looking for gotchas. I found a few that made it past the editors ("the breath of his experience," Ron Cotten's name misspelled and similar such) and a very minor technical point or two that made it past the peer review process. For instance, -59.17 dBmV for room temperature 75 ohm thermal noise: The math actually works out to -59.1590976 dBmV. But what's a hundredth or so of a dB? Seriously, my only real complaint, if it could be called that, is not about the book's quality, but its quantity. It's not big enough.

Nine hundred pages isn't long enough? *Modern Cable Television Technology* easily could have been several hundred pages longer. I had a chance to speak with co-author Jim Farmer about this, and he chuckled while explaining that the publisher's original size limit was around 600 pages. This number was increased twice while the book was being written. Jim noted there was more than one spirited discussion about what and how much to include.

In lieu of what ultimately might have been a 2,000-page book, the end of each chapter directs the reader to several references that will provide more in-depth information on related subjects.

The sum of the parts

That said, let's look at what is included. The book's content is divided into six major parts: Part 1—"Once Over Lightly;" Part 2—"The Signals;" Part 3—"Headends;" Part 4—"Broadband Distribution Systems;" Part 5—"System Architecture;" and Part 6—"Customer Interface Issues." All except Part 1 consist of several chapters each.

"Once Over Lightly" provides an introduction to cable TV, including a brief look at its history, how a cable system works and some comments about cable's economics. This part is a nice overview for folks just starting out in cable, or those who may be less technically inclined. It's also suitable for those with an engineering background, but in a different field.

"The Signals" covers in four chapters analog TV, digital compression, data transport (including an overview of the Data Over Cable Service Interface Specification, or DOCSIS) and cable telephony.

Part 3 does a nice job with headends. Here the reader will find a good description of antenna fundamentals, satellite reception, signal processors and modulators, TV stereo, channelization, and signal quality measurements.

"Broadband Distribution Systems" takes care of the outside plant. Besides discussing the coaxial network and its design, Part 4 includes fiber optics as well as useful information about amplitude modulated link (AML) microwave and microwave path engineering principles. Unfortunately, little is said about long haul frequency modulated link (FML) microwave. This part also devotes a chapter to the reverse path.

"System Architecture" introduces the reader to performance considerations as they relate to network architecture and gives several examples of different architectures that have been deployed in cable systems. I was pleased to see the authors included a chapter on network reliability and availability, along with references to CableLabs' 1992 *Outage Reduction*.

"Customer Interface Issues" discusses conditional access (CA), which the authors call "program denial technologies," the ever-changing consumer electronics interface, and equipment compatibility. ➤

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The book concludes with a much-too-small appendix—it has a TV channel allocation chart based on EIA/ANSI-542 and some background on the NTSC video waveform—and a helpful glossary.

Primary value

Modern Cable Television Technology will appeal to a fairly broad audience. The subject matter intentionally covers much of the material included in the Society of Cable Telecommunications Engineers' certification programs and, as such, will be a good resource for exam preparation.

For those in search of a truly comprehensive cable engineering reference volume, you simply won't find anything better. The overall writing style will appeal to most readers and is a reflection of the three co-authors' excellent communication skills. If you've ever heard any of them speak at engineering conferences, you'll know what I mean. The book does contain a fair amount of math in places, offering a rigorous analysis of several topics.

I have no hesitation about recommending this book to anyone employed in the technical side of our business, or to persons with an interest in cable TV engineering. Ciciora, Farmer and Large have a real winner on their hands and are to be commended for taking the time to collaborate on this excellent publication. *Modern Cable Television Technology* is available through bookstores, or even better, from SCTE: 140 Phillips Road, Exton, PA 19341; (610) 363-6888; fax (610) 363-5898; or on the Internet at www.scte.org. If you buy it from SCTE, the cost is $96 for nonmembers and $80 for members.

"For those in search of a truly comprehensive cable engineering reference volume, you simply won't find anything better (than *Modern Cable Television Technology*)."

Figure out RFI

The ARRL RFI Book, First Edition, The American Radio Relay League, Newington, Conn., 1998.

The second book to add to your reference library is *The ARRL RFI Book*. As I mentioned earlier, this publication is geared toward the radio amateur, providing a comprehensive background on the subject of radio frequency interference (RFI). Despite being called a first edition, this actually is a completely rewritten version of earlier ARRL publications covering the same subject matter.

What makes this softcover book of interest to cable personnel is its thorough overview of RFI. Understanding many of the sources of interference discussed in *The ARRL RFI Book* will prove helpful in tracking down signal leakage and ingress problems, particularly from the perspective of where and how some of the over-the-air interference occurs. There are a variety of troubleshooting tips and fixes for specific interference problems, including common-mode currents on the outer surface of cable shielding.

Chapter 7 covers cable TV interference, and while intended primarily for the benefit of the ham operator who experiences cable TV signal leakage-related interference, it discusses the responsibilities of both parties when problems occur. This chapter has been appended with a reprint of a three-part article that appeared previously in *Communications Technology*.

The ARRL RFI Book can be ordered at most bookstores, purchased at most ham radio stores, or is available directly from the ARRL: 225 Main St., Newington, CT 06111; (888)-277-5289; or on the Internet at www.arrl.org. The cost is $20. CT

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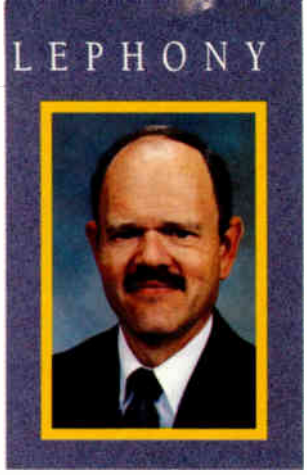
Reader Service Number 25

By Justin J. Junkus



Get Your Money's Worth From Consultants

Think of this column as your survival guide for working with telephony consultants. A bunch of us will be trying to meet with you during the shows this month. It's helpful to think ahead of time how we can become your assets, rather than just another expense.

Seeking a consultant's advice makes economic sense when you are weighing new technology choices against the substantial investment they require. Circuit-switched vs. Internet protocol (IP) telephony is only one example, albeit an important one.

A consultant is valuable when it's difficult to grow the knowledge in-house as fast as you need it. This is especially true in telephony, where cable is competing with established market leaders. The leaders have years of technical and market experience in disciplines that could be called "niches of expertise."

The amount of access your company has to these niches can determine market success and profitability. Good consultants are independent sources of that same experience, and often their background spans multiple service providers and vendors.

The key to getting value for your consulting investment is to identify which niches of expertise you need and target your consultant to those areas. Let me give you some examples.

Subscriber analysis

Subscriber demographics become more critical when a cable company becomes a phone company. One reason is that telephony subscriber characteristics directly affect the amount of distribution plant and hardware at the subscriber's location and at the headend.

Changing plant and hardware is many times more difficult than changing a channel lineup. Telephony switches and host digital terminals (HDTs) are directly affected by the number of subscribers and their traffic patterns.

A consultant can help you identify the subscriber demographics that will most affect your telephony investment. For example, in residential areas with large teen-age populations, the required number of lines per residence may exceed your vendor's capability per network interface device (NID). Home office and work-at-home applications also can present unexpected hardware compatibility issues from some vendors.

Traffic behaviors

Unlike broadcast video equipment, telephony or data equipment modules are installed based upon network usage. Traffic engineering is the discipline that calculates the appropriate equipment quantities.

The traffic engineer therefore needs to understand the demographics mentioned earlier, the types and projected number of calls being placed (data traffic differs from voice traffic), and the effect of delays attributable to insufficient equipment. The task is complicated by the fact that there is a cumulative, nonlinear effect when several stages of equipment are involved during a call.

In this area, depending solely on a vendor's recommendation or your own engineering can be risky. It may be tempting for a vendor to under-engineer a system to hold down costs. While the early stages of a service offering may present no problems, it would become necessary to reconfigure the entire system as more subscribers sign up. Service degradation or interruptions may result.

A consultant can help your in-house engineers understand call completion rates and probability theory in sufficient depth to create a system that will continue to provide the same grade of service to your subscribers a year or two into your service offering.

Powering requirements

Powering requirements for telephony are substantially different from those for basic cable service. Lifeline service (the need for uninterrupted availability) demands ultra-reliable power sources, with backup. A consultant can help you understand the several design philosophies for placement and sizing of these sources, as well as the substantial differences in costs between the alternatives.

Feature needs

Subscriber features and the way you market them are ways to distinguish yourself from your competition. Most telephony features are provided by the telecommunications switch or the telephony network. Examples are call waiting and calling number identification.

Literally hundreds of features and combinations of features are available. Some telecommunications systems allow the service provider to create new features as subscribers request them from the service provider.

Your ability to offer these features and create new ones is part of the design of your equipment. Different architectures provide different degrees of flexibility. Both initial costs and upgrades can vary substantially across vendors. As I discussed in my April column, IP telephony

Spectrum Analyzer Company Launches QAM Option

In a bold move to go after the QAM market, Avantron Technologies Inc. will be introducing its QAM Digital Analyzer option today for its AT-2000R field portable CATV Spectrum Analyzer.

Until now, cable operators had to choose between very expensive lab digital test equipment costing many times more or low-cost hand held QAM instruments, many of which are limited in performance allowing only forward path measurements. This also meant technicians had to carry a second instrument just to test the digital channels.

Integrating 64/256 QAM digital measurements with a field spectrum analyzer such as the Avantron AT-2000R is truly a breakthrough from both a cost and performance point of view.

On a purely technical level, Avantron's AT-2000R equipped with the QAM Digital Measurement Analyzer option features a full 1 MHz to 1 GHz frequency range and provides the measurement power the field technicians need for the latest 64 and 256 QAM digital technologies and is very simple to use. The high-resolution 6.4" color LCD display is a huge plus when analyzing detailed digital measurement displays.

Avantron takes the CATV market by surprise

Some key elements that make Avantron's QAM option beneficial are the Constellation display with zoom capability, Pre and Post Bit Error Rate testing (BER), Modulation Error Ratio (MER) and Adaptive Equalizer display. A Data Logging function is also included to test over a long period of time, storing events of errored or severely errored seconds.

Avantron Technologies Inc. manufactures test equipment and is best known for its AT-2000R field portable CATV Spectrum Analyzer and for its Return Path Monitoring System.

AVANTRON News Item 1999

adds even more complications to how subscriber features can be offered. A consultant can help you to recognize the key differences and evaluate their impact on your ability to evolve with your market.

Don't forget billing

A telephony consultant can help you sort out the alternatives and interfaces for call accounting. The accounting for telephony charges is built into a telephony switch. If you are offering a circuit-switched telephony product, the interfaces between the billing systems in the switch and your present accounting system will be important.

The way you split call revenue with any other carriers involved in call completion also will be critical. If you are contemplating an IP telephony offering, how will you track and manage the costs you incur to complete each subscriber call? How will you track and bill IP telephony subscriber usage so you can bill the subscriber? Will flat-rate or measured usage make more business sense, and technically, what is the difference?

"A consultant's advice costs little compared to the price of closing shop because your competitors knew the fundamentals better than you did."

Carrier interfaces

Providing telephony service requires connecting to the rest of the public switched telephone network (PSTN). These interfaces are totally new to the cable business, and a number of alternatives exist. Could your staff use help in determining the best business and technology arrangements?

Data communications capability

It may be tempting to think of data as a separate high-speed offering, using entirely different hardware. However, several alternatives are part of telephony systems that vendors are offering to the cable industry.

The technologies and architectures differ across vendors, and some provide more flexibility in the ways you can introduce and continue to offer data services to your residential and business subscribers. A consultant can help you sort out the relationships between telephony and data, along with how these services can be provided to residential and business markets.

Training your staff

A training consultant with a telephony background can substantially shorten the time to create and implement a training plan that will attract and retain high quality support personnel.

The consultant's telephony background will help you prepare a curriculum to provide your staff with telephony skills that equal or surpass those of the incumbent phone company personnel. The consultant's recommendations should include a plan that integrates skills with job performance and career growth.

A good consultant will charge you between $100 and $200 per hour for advice. The cost may seem high, but weigh this against a $300 to $700 per subscriber telephony hardware investment multiplied by the number of subscribers you target. Now add customer service and marketing investments to this figure.

You're looking at spending a couple of thousand dollars, but you're protecting a five- to six-figure investment. A consultant's advice costs little compared to the price of closing shop because your competitors knew the fundamentals better than you did. CT

Justin 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.

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Reader Service Number 28

By Jennifer Whalen

Don't Forget Your Customers In the System Shuffle

Swaps, clusters, mergers, takeovers. These are the buzz words of today's communications industry. With the deals each day getting more complex, as exemplified by AT&T's stunning winning bid for MediaOne, it's critical that we as an industry pay attention to the potential impact these network shuffles can have on customers.

In the excitement of the chase, it's easy for the deal makers to forget how all these mergers, swaps and takeovers can impact the folks who buy the services we are trying to sell. No matter the owner, customers still want reliable service, accurate and timely bills, and quick response to trouble calls. It's critical that your operational support systems be prepared to handle the influx of new subscribers.

Failure to smoothly bring the new customers into your fold jeopardizes the current revenues your company receives from them. But more importantly, your multiple system operator (MSO) also puts at risk any future cash it may earn from the new, advanced services that you, the engineer, have been working so hard to upgrade your network to deliver.

Pushing bundled services

According to Forrester Research, current cable subscribers pay an average of $34 per month for TV service. However, if you add high-speed Internet access ($40) as well as local and long distance phone service ($50), monthly bills could top $120 for an MSO. (See sidebar.) Customers buying all three services from cable companies will become a significant market after 2001 and account for 11 percent of cable subscribers in 2005. You don't want to lose those potential revenues by fumbling the customer transfer.

You also need to remember that customers are very price sensitive. If they feel unloved, they're apt to move to a cheaper provider. (They're likely to do this anyway.) Forrester Research reports that 55 percent of those who switched Internet service providers (ISPs) or online service providers did so because of price.

Cable TV service also is subject to the same price pressures. The company's research reveals that given a choice of providers, 5 percent of subscribers would leave their cable company with no price difference, 12 percent would jump ship just to save five bucks a month, while half the cable population (53 percent) would switch to save $10 a month. Offering customers a bundle of services that costs less than if they'd purchased each service separately is one way to protect against this sensitivity to price.

However, if your service stinks and there's a lower priced competitor, then nothing can save you.

How one telco bungled the transition

You're probably tired of everyone badmouthing the cable TV industry. So, let me share a personal example of how one telephone company left its customers in the cold as a result of all this merger mania.

First off, I have to say that I'm one of the 55 percent of consumers who switched ISPs because of price. In other words, I'm cheap. I signed up for AT&T's free Internet service for a year, and when my year expired, paid the amazing rate of $4.00 for four hours of access. When AT&T had the nerve to raise the price to $10.00 for 10 hours, I switched to MCI's bargain rate of $3.00 for 3 hours. (I'm obviously not a Web junkie at home.)

Then began the merger trouble. WorldCom wanted MCI. As a result of the Federal Communications Commission's attempt to keep MCI WorldCom from capturing too large a share of the Internet market, the FCC forced MCI to sell its Internet customers and backbone. Cable & Wireless was the "lucky" winner, paying $1.75 billion. C&W is now suing MCI for what it calls sabotage and noncooperation during and after the transaction. But I digress ....

Cable & Wireless e-mailed me in September to tell me that it was now my ISP. Then, I waited for a bill ... and waited and waited. Some three months later, I finally got a bill for $14.95 for one month's service. So I called C&W, and yes, the customer service agent acknowledged, the company had made a mistake and billed me for the incorrect amount. She assured me the billing system was being fixed, and next time I'd receive an accurate bill.

Well, another month rolls along, and I receive my next bill. This time it's for

Average Monthly Household Expenditure	
Local Phone:	$24.53
Long Distance:	$23.45
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Source: Forrester Research

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$3.00, but it shows the previous $14.95 as a past due charge. In addition to being wrong, the other annoying thing about these bills is they are for the period three months prior. In other words, the bill is postmarked the 20th or so of the current month, the invoice is dated the 25th of the prior month, but the billing period is for the month before that. I have a hard enough time remembering what I did yesterday, let alone three months prior.

So now, my husband is annoyed. He calls the customer service number, presses "2" for existing account inquiries, and gets the message that due to the high volume of calls (I guess everyone else was annoyed with their bills), it will be 20-30 minutes before the call will be answered.

He waits, and waits, and waits for probably 40 minutes. When he finally talks to a live person, let's just say that the agent is less than impressed with our $3.00 account and doesn't do anything to convince us that the problem has been fixed. Somehow in all the billing mess, we've also managed to overpay and now have a credit. We ask if we can receive a new bill, showing the amount we actually owe. Not possible, says the agent.

Well, my husband isn't someone who gives up easily. In spite of the earlier 40 minute wait, he calls back. This time he selects "1" to order new Internet or long distance service, and what do you know, an agent immediately picks up the phone. (I won't tell you what I think of a company that understaffs its support lines for existing subscribers when it knows it has a major billing problem, yet staffs up its lines for new customers.)

In fairness to C&W, the new agent doesn't transfer the call in spite of the sneaky way my husband got through to a live person. She apologizes for the confusion, and says she'll ask for a new bill, but doesn't know if we'll be able to get one. (We never did get a corrected statement, but the next bill at least was finally accurate.)

Making more money

Why does this matter? Because C&W cares about my $3.00? No. Because the carrier now wants to sell me long distance service, and has been e-mailing me and including notices in my bill that I can buy phone service for 7 cents per minute on weekdays and 5 cents per minute on the weekend. Needless to say, after all the trouble I've had getting a $3.00 Internet bill, I'm not interested in compounding the problem by adding my phone service to the account.

C&W is an international telecommunications carrier with the potential to sell me not just Internet access or phone service, but all manner of advanced telecommunications and video services. But, because it took the company so long to generate its first bill, and then when the first two bills weren't even accurate, I won't be buying additional services from the company, and I imagine other customers are thinking the same thing. That's an important lesson that cable can learn from its telco brother.

There's a lot of money at stake here. By 2005, Forrester predicts cable subscription revenues will top $61 billion ($38.3 billion video, $11 billion cable modem, $11.4 billion cable phone). Don't risk those revenues. Make sure your support systems can handle both new customers and new services on your network. CT

Jennifer Whalen is editor of "Communications Technology." She can be reached in Potomac, Md., at (301) 340-7788, ext. 2057, or via e-mail at jwhalen@phillips.com.

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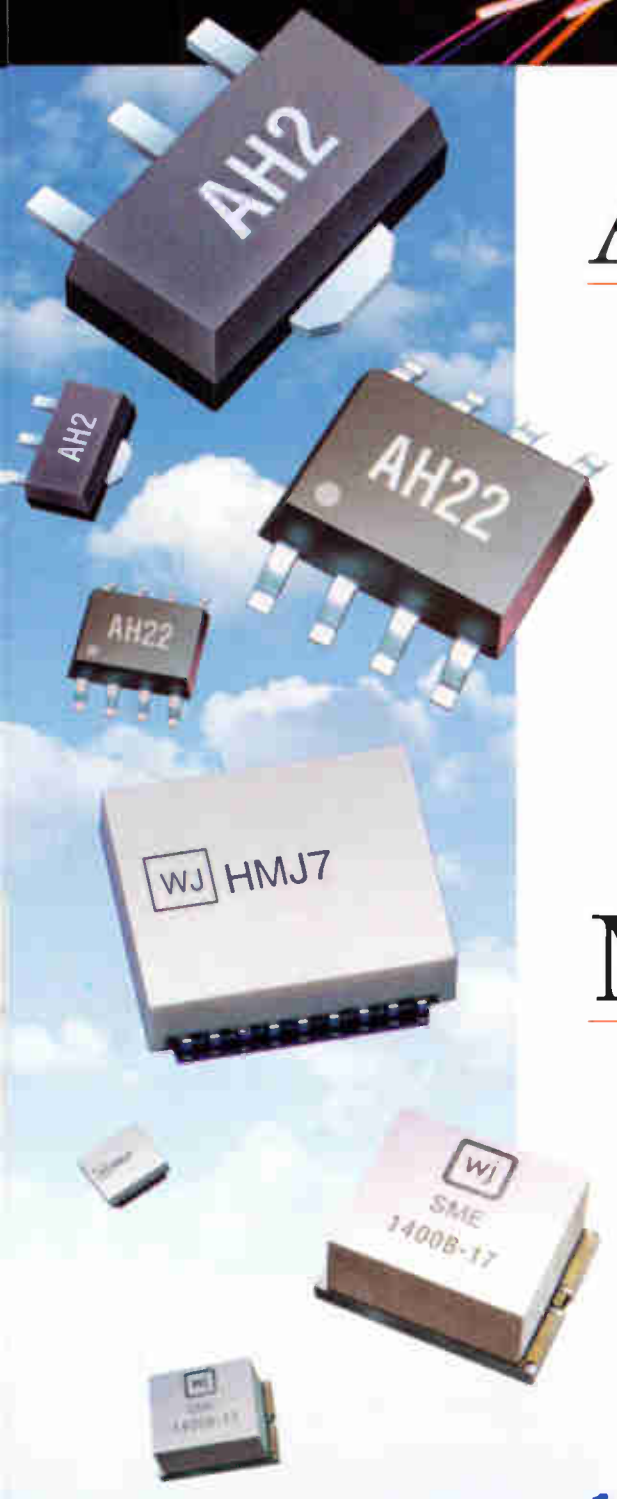

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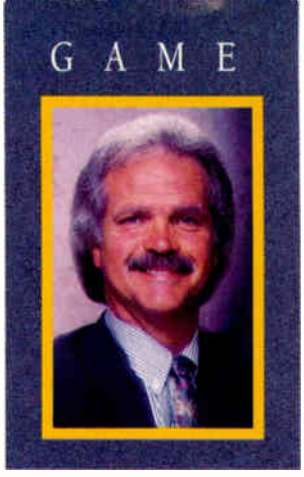
Reader Service Number 31

By Terry Wright



Prepare to Open Your Network

In the April 1999 "Data Game," we explored (at a summary technical and user-perception level) the impact of launching advanced broadband telecommunications services on your networks. This exploration focused on subscriber service perceptions and a few key technical issues associated with delivering advanced broadband telecommunications and Internet services.

In this edition, I would like to explore a somewhat similar topic, but one with a very important difference. Service management systems (SMSs) already have come of age for some cable operators. For others, an SMS or service management operating center (SMOC) is right around the corner.

Looming need

With the threat of unbundling ("service" from underlying broadband "transport") regulations looming on the horizon, now seems to be an appropriate time to explore this other, perhaps more challenging, aspect of delivering broadband-based advanced telecommunications services.

SMSs for advanced telecommunications services represent capabilities for which the broadband cable industry has not traditionally had a significant need. Even in today's industry environment, most cable operators still can get by without such a thing.

However, broadband cable operators that allow multiple external service entities to deliver concurrent advanced telecommunications and data services over their networks probably wish they already had these sorts of management systems in place. Understanding the concept of an SMS or SMOC warrants a certain degree of explanation and supporting rationale.

Some background

As the broadband cable industry evolves, especially in the digital and data services arena, new infrastructure management requirements will be imposed on broadband cable network operators in order to adequately manage these services.

These requirements will be centered around those shared elements and components of the broadband infrastructure that play a direct role in the delivery of various digital services involving cable modems, interactive set-top boxes and other devices.

Should the Federal Communications Commission impose unbundling requirements on cable at some point, these new infrastructure and service management capabilities will become a necessity. Perhaps an SMS or SMOC can best be understood by comparing it to a traditional network operations center, or NOC.

Like a NOC, but not quite

A NOC typically contains a suite of technology, both hardware and software, designed to assist network engineers in maintaining a reliable networking environment. A typical NOC contains systems that monitor various components of a network, enable manipulation of those components, sense service-threatening conditions, and help isolate (and possibly resolve) problems that are discovered.

NOCs are necessary for a variety of reasons. The complexities of the underlying technologies and the number of companies and offerings (such as circuits and devices) involved in maintaining a sophisticated network are good examples. Beyond these, the absence (generally because of cost) of total redundancy for all solution components and the potential for both human error as well as hardware and software failure also are contributing factors.

Most service providers maintain at least one NOC. These NOCs generally are viewed as critical components of provisioning advanced services—part of the cost of entry into the advanced telecommunications services arena. Importantly, an SMS is not a replacement for a NOC, yet a traditional NOC lacks the functionality of a broadband SMS. You need, or will need, both.

Managing shared resources

Whether multiple external entities deliver services on your network or you deliver multiple services on your own network, you need an SMS in place to manage the underlying shared infrastructure in support of those services.

Whereas a NOC generally is concerned with network integrity (reliability and performance), an SMS is concerned with dynamically managing demands from individual services that contend for use of the shared broadband infrastructure.

This shared infrastructure includes cable modems, cable modem termination systems (CMTSs), set-top devices, network interface units (NIUs), bandwidth, data switches, routers, domain name services (DNS) servers and so on.

If you are deploying multiple services on your own, you need an SMS in order to ensure the basic functionality, quality and performance of those services. If you are providing a broadband delivery transport for one or more external service providers, you need an SMS not only to ensure service integrity, but also to serve as an abstracted interface between your shared infrastructure and the management systems of these service providers. Naturally, an SMS will need to

Digital Solutions
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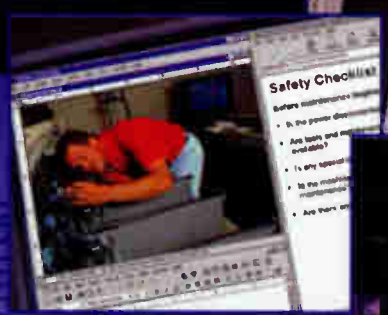

SUPPLEMENT TO COMMUNICATIONS TECHNOLOGY & INTERNATIONAL CABLE

INDUSTRY LEADER SERIES

Letter from the Editor

It's an Interconnected World

The world of cable TV has changed forever. To survive competitive threats and flourish in the 21st Century, cable operators must move beyond their traditional realm of one-way, downstream video transmission. New networks must be interconnected, interactive and based on open standards. Scientific-Atlanta is well positioned to help cable operators make this transition.

In an interactive world, not only must the distribution, transport and access portions of the network be able to communicate with each other, but they must also be able to talk to other networks. Such a level of interconnection requires a strong commitment to open standards as well as a systems approach to networking.

IP networking: the heart of cable's future

Scientific-Atlanta is committed to open standards and is actively involved in CableLabs' OpenCable initiative. Support for Internet protocol (IP) networking is the centerpiece of Scientific-Atlanta's strategy for the new millennium. In addition to IP, Scientific-Atlanta's products also support a variety of other Internet-related standards, including hypertext markup language (HTML), asynchronous transfer mode (ATM), Java, and UNIX.

By taking a systems approach to cable networking, Scientific-Atlanta enables operators to follow the content from where it's generated, to the headend where it's distributed, and all the way to the consumer's home where it's used. More than 25 years of satellite voice and data experience, coupled with its long history in cable, enables the company to deliver fully tested and integrated systems that include satellite distribution to move video into the cable headend, transport and access products that deliver that content to consumers, and interactive platforms that physically deliver the new applications.

But it's more than hardware. Scientific-Atlanta has spent vast development funds to create the critical pieces of these new interactive systems. In addition to hardware, Scientific-Atlanta has been ramping up its customer support and network monitoring abilities and has been aggressively supporting development of new applications.

Interactive applications

Realizing that the creation of innovative, interactive applications is of paramount importance to cable operators, Scientific-Atlanta is working with more than 100 software developers, including powerhouses like IBM, Microsoft and NCI (a venture between Netscape and Oracle) to develop new software-based applications. The advantage of such applications is that once cable operators have deployed an IP network, they can quickly launch new commercial services.

Interactive applications such as video-on-demand (VOD), Internet access and electronic commerce will enable operators to generate new revenues and reap the benefits of the investments they've already made in upgrading their networks. In addition to making money, delivering such interactive applications will help cable operators fend off competition from direct broadcast satellite (DBS) services and from telcos as they roll out high-speed data services over digital subscriber lines (xDSLs).

For a closer look at how Scientific-Atlanta can help cable operators make the most of an interactive network, take look at the articles that follow. You may find a solution that's right for you.

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Scientific-Atlanta: Where IP Meets Cable

An Interview with James McDonald, President and CEO of Scientific-Atlanta

Communications Technology: What is your vision for Scientific-Atlanta's role in the broadband telecommunications market?

Jim McDonald: Our goal is and has been to be the premiere supplier of systems that would allow our customers to deliver interactive voice, data, and video applications. What we envisioned is quickly becoming reality.

Scientific-Atlanta customers are now providing two-way interactive digital services to consumers. Already, more than 60 Explorer® 2000 digital interactive systems are fully installed in multiple system operator (MSO) systems, and we have shipped more than 330,000 digital interactive set-tops in the first nine months of this fiscal year.

We see a future in which the Scientific-Atlanta interactive digital network will provide consumers with a complete complement of applications ranging from standard entertainment television, to video-on-demand, Internet TV, telephony applications and more.

CT: How do you see the broadband telecommunications market changing over the next five years? How will you help operators respond?

JM: Television sets will become interactive in-home communications centers. Scientific-Atlanta's customers are on the leading edge of this exciting new technology. Our CreativEdge™ software developer program is a strong tool for accelerating the delivery of new applications and services. We will continue to work with these and other developers to ensure that our customers will benefit from new opportunities.

CT: When will some of those new applications actually roll out?

JM: Some of these applications will be available almost immediately. MSOs will begin offering electronic mail (e-mail) to consumers via their Explorer 2000 set-tops this month. Subscribers will be able to download the e-mail application in a matter of seconds. We have also already installed video-on-demand (VOD) services in a customer's headend, and expect that system to have paying VOD customers by the end of the summer.

CT: How does Scientific-Atlanta help its customers overcome the challenge of finding personnel trained in the new technologies such as voice, data and digital TV (DTV)?

JM: We work with our customers to design, install, and bring their systems up operationally. Our Worldwide Service organization provides timely service and support when it is required. The Scientific-Atlanta Network Operations Center can monitor network performance so that we can address potential problems immediately. Our digital network control software simplifies network monitoring and control for our customers.

We designed our network architecture and the Explorer 2000 set-top to minimize how much time and effort our customers will need to provide services to consumers.

For example, in one of the systems that is already operational, and growing at the rate of about 1500 new installations a week, approximately 93 percent of subscribers are installing the Explorer 2000 set-tops themselves, which means that our customer does not need additional personnel to deploy this equipment, and consumers are up and running and adding new services faster.

CT: With competition from direct broadcast satellite (DBS) and asymmetrical digital subscriber line (ADSL) expected to intensify, how does Scientific-Atlanta help cable operators stay ahead of competitors?

JM: The most important thing we can do is provide interactive applications that cannot be offered by competitors such as the DBS providers.

Our customers also want to be able to deliver an offering that is superior to that being supplied by the telephony providers. We believe that cable operators will be able to prevail over ADSL with cable modems.

CT: Any additional thoughts you want to share with our readers?

JM: We have deployed a network with an IP capability because we believe that this is essential to providing interactive applications. As the first company to see the potential of a two-way interactive digital network and bring it to market, Scientific-Atlanta is uniquely positioned to help our customers be successful even as they face increasingly intense competition. Our efforts provide our customers with products and applications that will enable them to meet subscriber demand and maintain their competitive advantage. ■

Answering Challenges of the Evolving Digital Market

Without a doubt, the ability to send and receive digital video, data and voice transmissions has revolutionized telecommunications. In particular, the Internet and corresponding Internet Protocol (IP) applications have changed the nature of the way people live and do business.

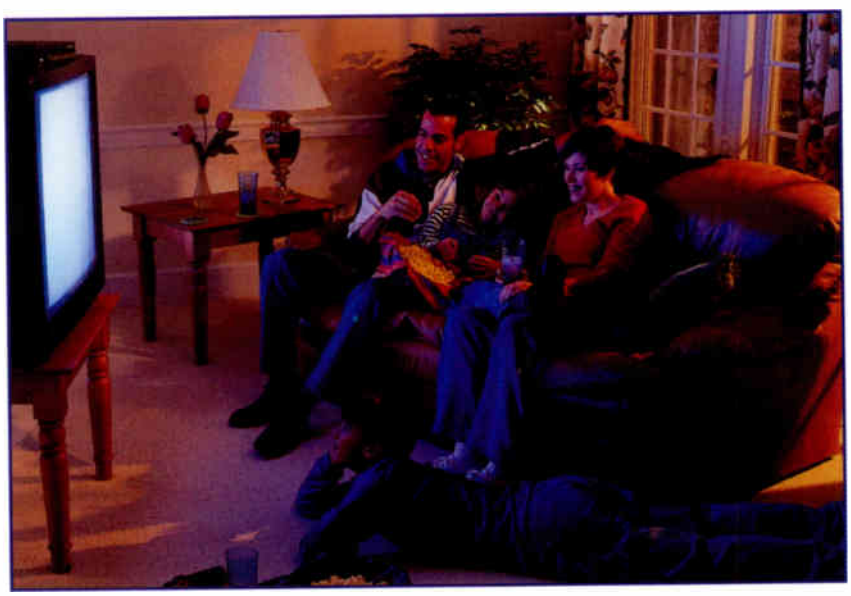
Today, people shop from their computers, download audio and video content from around the globe and correspond via e-mail. Indeed, the amount of e-mail correspondence has far surpassed the amount of paper correspondence exchanged around the world. New business and consumer applications are being developed as quickly as potential new services are identified.

Scientific-Atlanta is no newcomer to this accelerating trend toward digital technology. More than 10 years ago, the company first defined timeframes in which the inevitable conversion to digital cable technology would take place. From there, the company went on to develop its pioneering digital compression, then digital set-top and digital network technologies.

The company's leading work has been recognized and applauded industry-wide. Scientific-Atlanta serves on several key standards development organizations including the Moving Pictures Experts Group (MPEG), Digital Video Broadcasting/European Launching Group (DVB), Digital Audio Video Council (DAVIC), Corporation for Open Systems (COS), and the Asynchronous Transfer Mode (ATM) Forum. Scientific-Atlanta was also selected by CableLabs to draft the specifications for the end-to-end OpenCable network on behalf of the entire cable industry. Additionally, the company's products support a variety of Internet-related standards including hypertext markup language (HTML), asynchronous transfer mode (ATM), Java, and UNIX.

Development of and adherence to these key standards are a significant part of the reason why Scientific-Atlanta's products are so well positioned to help its customers deliver advanced new services. Case in point: the company's Explorer® 2000 digital set-top is designed around IP standards, which support exciting services that can enable consumers to select, view, rewind, fast-forward, pause and re-view video programming, on-demand, without a VCR; browse the World Wide Web; exchange e-mail and participate in chat sessions; view home shopping programs and place orders with instantaneous confirmation and billing; attend university classes from their own living rooms; view customized news, financial and sports programming on demand, and more.

The Explorer 2000 set-top was designed with an eye toward the increased demands of future applications: if future applications require additional memory, sub-



scribers can install those applications themselves through an optional external high-speed memory interface. Additionally, Scientific-Atlanta's Digital Network Control System (DNCS) allows operators to monitor and manage digital elements of the system, including the subscribers' set-tops, all from a workstation at the headend.

Even Scientific-Atlanta's advanced analog products take advantage of digital technology. In essence, they enable operators to transition from analog to digital systems by giving customers a taste of the kinds of services they'll be able to enjoy as operator networks are upgraded to support more complex digital technology.

Of course, those network upgrades are critical to an operator's ability to successfully deliver advanced, interactive services. Scientific-Atlanta is committed to helping operators design their network architectures around specific business goals, not the other way around. The company offers a vast range of products that support the transmission of many different types of services in a wide variety of system environments. These products include several different kinds of opto-electronic fiber, digital transport systems that are optimized for regional headend-to-hub interconnections; a Transmission Network Constrol System (TNCS) which allows operators to easily monitor and manage digital elements of the transmission network; and innovative baseband digital reverse path technology that will enable operators to gain the greatest benefit from two-way, interactive digital applications.

Scientific-Atlanta's experience with and commitment to the IP standard extend to other business areas, as well. In anticipation of the coming wave of demand for IP applications, the company developed the PowerVu *IP*™ system. It allows the transmission of DVB compliant video, audio and data directly to an end user's personal computer (PC). This new capability enables a host of new applications for the businesses. Programmers, service providers and broadcasters can use the PowerVu *IP* system to complement their video offerings with advanced data services. Indeed, PowerVu *IP* capitalizes on the asymmetrical profile of most Internet transactions, especially Web-based applications: a small request for information answered with a large amount of graphics and data.

Businesses using PowerVu systems for private or Business TV (BTV) networks to deliver training videos and other corporate communications to remote offices and facilities can add Internet access, large file transfer and true multimedia to their BTV networks. Corporate training can be conducted far more effectively with video fed directly to the desktop, paired with an Internet connection to respond to questions or quizzes.

Another satellite network, the SkyRelay.*IP*™ system, is an overlay to a SkyRelay Very Small Aperture Terminal (VSAT) system. It delivers high-speed capabilities for Internet surfing, software updates, and data broadcasts. The SkyRelay.*IP* system is especially well suited for establishing corporate Intranets for organizations that need to provide access to large amounts of information to sites that may be widely scattered. Saab Cars USA's SkyRelay.*IP* network connects more than 240 sites in the U.S. to one centrally located reference library. Using electronic information on sales, warranty, parts, service, and other manuals helps the company eliminate huge mailing and printing costs and ensures that everyone is literally on the same page when it comes to serving its customers.

Development of and adherence to these key standards are a significant part of the reason why Scientific-Atlanta's products are so well positioned to help its customers deliver advanced new services.

While others begin to explore ways to keep up with the rapid advance of the demand for IP applications, Scientific-Atlanta is already delivering products and services to a wide range of customers around the world. Its early recognition of market trends for digital technology and commitment to providing solutions has enabled the company to establish a leadership position in one of the fastest growing, rapidly evolving markets in the technology industry. ■

Tomorrow's Digital Cable TV Networks

WHERE DATA NETWORKING MEETS CABLE TV

According to estimates released by Paul Kagan Associates, cable TV operators have spent more than $20 billion in infrastructure upgrades over the past three years. In 1998 alone, operators spent more than $7.8 billion, adding fiber to their plant and activating the return path.

While the early driver for these upgrades was the promise of more channels and digital picture and sound, the industry is realizing that the "more channels" driver may be short-sighted. The real value of our broadband cable infrastructure is in the number and types of revenue-generating services it can deliver to consumers. The HFC network, if properly leveraged, uniquely positions operators to deliver digital video programming today while creating a smooth migration path to integrated, interactive voice and data services as well. The question is, what is "proper leveraging" for any individual cable system? And what is the best way to make transitions with confidence?

Building tomorrow's digital network

One company that understands the demands and implications of the migration to an integrated, interactive digital network is Scientific-Atlanta. The company began its initial work in the development of an Internet protocol (IP)-based digital network over five years ago, in the days before Data Over Cable Service Interface Specification (DOCSIS) and OpenCable.

"What we really wanted to do in developing our network was to build a platform that could take advantage of the ability to network down to the individual set-top and the ability to do something useful with that data," says Scientific-Atlanta's Technology Director, Dr. Bill Wall, recently named "Unsung Hero of the Net" by Inter@ctive Week magazine. Scientific-Atlanta concluded that IP technology offered the most flexibility, and set out to engineer a network based on open Internet standards.

Networking down to individual set-top boxes enables efficient message routing from an origination point (at the headend or set-top), over multiple networks and to a final destination point. That kind of routing is critical to the delivery of services such as e-mail and home banking, which include the application and data about its origin, destination, etc.

Scientific-Atlanta's focus on network strategies is the basis for the company's work on advanced HFC services. After all, the most advanced set-top in the world is only as good as its supporting network. This focus is evident in that the majority of the company's investment in R&D has been devoted to the development of modulation schemes, protocols, server interfaces, gateways, security and software for networks that support advanced set-tops.

Scientific-Atlanta supports and encourages third party application development through its **CreativEdge Developer Program.** Partners include the following developers:

ACTV
CONCURRENT COMPUTER CORPORATION
nc NETWORK COMPUTER, INC.
CreativEdge developer Program
SEACHANGE INTERNATIONAL
interactive channel
PEACH NETWORKS
WORLDGATE
Microsoft webtv
wink.

Scientific-Atlanta's Explorer® 2000 digital set-top helps consumers receive a wide range of interactive services

Managing the network

The ability to manage that supporting network, assure secure transactions and allocate bandwidth dynamically is critical to the success of a cable network. The heart of Scientific-Atlanta's system is the Digital Network Control System (DNCS). Its key management mechanisms control the distribution of the encryption keys that protect secure digital transactions, such as those used in e-commerce. The encryption keys are part of the PowerKEY® dual-key conditional access system (CAS), the broadband industry's first CAS to employ both RSA public key and private key cryptography. The DNCS handles traffic and contention, manages sessions, and allocates bandwidth and frequency resources as new applications are layered onto the network.

Scientific-Atlanta's IP network also supports the industry's shift to proactive network management paradigm. The company took its cue from Local Area Network (LAN) technologies and adopted a product that lies on top of a standard network managing system. That gives operators the ability to centralize their monitoring capability and definitively measure plant performance.

Set-top computer?

New network considerations have created new ways of seeing what traditionally has been a broadcast-only, "dumb" terminal: the set-top box. As operators think about their networks as LANs, they must also think about the set-top as a computer.

Such thinking is not new to Scientific-Atlanta, whose engineers built the company's first Explorer set-top on that model in 1994. Today, the Explorer® 2000 set-top is capable of supporting a wide range of interactive digital applications, including e-mail and Web browsing; electronic commerce; video-on-demand (VOD); and home networking. Through its ability to add new functionality via a remote software download, and featuring an ISO-compliant smart card slot and Ethernet port, this set-top also will be able to support tomorrow's applications.

The company recently celebrated the second major release of its subsidiary's PowerTV operating system (OS). Designed specifically for the cable TV market, PowerTV incorporates features that enable computer-like functionality: efficient memory utilization, a hypertext markup language (HTML) engine to support seamless content conversion and powerful graphics. The PowerTV OS also supports DAVIC 1.0 signaling and session management and provides implementation of SNMP, enabling a wide variety of end-of-line (EOL) measurements like bit error rates (BERs), channel status and memory utilization.

Because each box has its own IP address, the Explorer 2000 set-top also will be able to support IP telephony. Although delivering high quality IP telephony is complex, Scientific-Atlanta is well positioned to take a leadership role in this area because of its extensive work with Siemens on developing telephony solutions.

New applications for a new network

Since outstanding systems and technology are critical to an operator's ability to offer new and emerging interactive services, content-driven applications will ultimately enable operators to realize a return on their network investment. With that in mind, Scientific-Atlanta aggressively fosters application development through its CreativEdge™ Developer Program. Through the program, developers receive special software discounts, access to the company's headend integration labs, comprehensive technical and sales support, technical information, and operator input and other benefits. To further ease the development process, Scientific-Atlanta supports a number of middleware solutions, such as HTML, Java and PersonalJava, as well as the PowerTV OS. "Our customers want choices," says Wall, "so we support choices."

Current CreativEdge partners include SeaChange, SkyConnect, Diva, Intertainer and Concurrent Computer Corp. for VOD; Microsoft/WebTV, WorldGate, Peach Networks and the Interactive Channel for Internet services; and Prasara, NCI, Wink and IBM for e-commerce.

Choosing the right partner

HFC networks have emerged as the medium of choice for tomorrow's advanced telecommunica-

Tomorrow's Digital Cable *continued from page 7*

tions services for good reason. HFC offers virtually unlimited bandwidth and supports a wide range of two-way video, voice and data services. To realize the potential of this network, however, operators must adopt the right supporting hardware and software for their system requirements today, while simultaneously balancing these requirements against tomorrow's needs. Without proper planning on the front end, operators risk investing in hardware and software incapable of supporting tomorrow's applications and bandwidth demands.

Working with a seasoned vendor can spell the difference between success and failure during this migration phase. An experienced end-to-end solutions provider will ask the right questions during the planning stages to help its customers avoid common pitfalls during and after deployment. The right partner also will provide its customers ongoing training and technical support to meet consumer demand for higher levels of reliability once the system is up and running.

Scientific-Atlanta dedicates significant time and resources to helping its customers successfully migrate to digital, including launch and post-launch support. That support includes on-site training and technical support and customer service representative (CSR) training. The company also offers its customers ongoing network management services and is now putting equipment in place to be able to remotely monitor every customer site. With a growing number of cable systems committed to Scientific-Atlanta's digital networks and set-tops (89 as of April, 1999), operators who work with this company can make their digital transitions with confidence. ■

Vidéotron: Leading the Way to Interactive Digital in Canada

Vidéotron, the second largest cable TV operator in Canada and largest in Quebec, has been a leader in the North American cable TV market for years. In fact, it has been offering interactive services to its customers under the Videoway brand name for almost ten years.

Videoway, an analog-based system, offers pay-per-view (PPV), over 60 educational and board games, the TV Express electronic program guide (EPG), and other news services such as weather, news, stock market updates, etc. "With Videoway, we have 250,000 terminals in the field, which is about 20 percent penetration," says Guy Beauchamp, Vidéotron's executive vice president of operations.

In February, Vidéotron rolled out Scientific-Atlanta's digital platform, including the Explorer® 2000 set-top, to 1.5 million cable subscribers in its Montreal, Quebec cluster. The rollout was the first step in the company's plan to provide a broad range of interactive digital services to its customers. "New competitors were coming with digital TV services," says Beauchamp, "We had to offer them as well, and we decided to go with the Scientific-Atlanta network and Explorer 2000 set-top. We felt it was the only technology that could offer digital TV signals as well as digital interactive services."

Beauchamp continues, "The Explorer 2000 offered the two major things we were looking for. First, the expanded channel offerings. It was important for us to be able to compress signals in order to offer more channels because it's one of the biggest requests from our customers. The second thing was that the set-top combined with the whole system allows us to offer two-way services."

Among Vidéotron's major technical considerations in purchasing an interactive digital network was the scalability of the open platform. "Scientific-Atlanta's digital interactive network and digital set-tops give us the flexibility to begin providing digital services now, knowing that we will be able to add new offerings in the future without having to rebuild our network infrastructure," says Beauchamp.

Vidéotron currently has 1,200 paying customers using the Explorer 2000 set-top and is activating about 400 terminals per week, 85 percent of which are self-installs. The operator is initially launching digital TV in its Montreal system, and will ramp up with additional services as its system is upgraded to two-way.

The Explorer's open-standards architecture was also important to Vidéotron. "What we want to do with the Explorer 2000 is to offer services that will be complimentary to the TV programming experience," says Beauchamp, adding that it was difficult to convince content suppliers to develop applications for their proprietary Videoway system. "With open standards, we feel that we will be able to reach a critical mass of content, which will justify that people will buy these services.

"We're very satisfied with what is going on with the Explorer 2000," concludes Beauchamp. ■

Digital Perks IN AN ANALOG WORLD

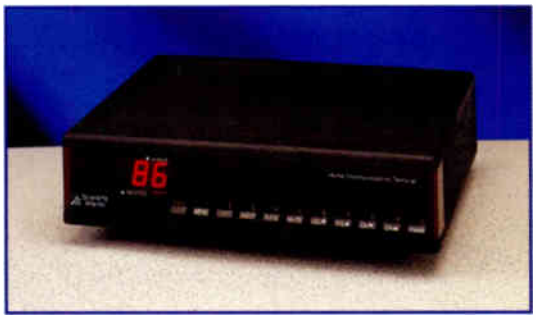
While digital has emerged as cable's clear future, the move to digital is not an overnight phenomenon. In the wake of increased competition, cable operators are confronted with a dizzying array of choices that can have serious potential consequences. When should you migrate to digital? How will you manage the transition? What new services should you launch first? Expanded channel offering seems an obvious choice, but then what?

The answers to these and many other questions will vary by operator and by system. However, one constant in this rapidly changing market is the critical role an advanced analog service offering can play today in retaining existing customers, realizing new revenue streams and paving the way to digital.

"Advanced analog and digital complement each other," says Steve Havey, vice president of Scientific-Atlanta's Advanced Subscriber Networks business, adding that the challenge has been to show cable operators how advanced analog technology could increase customer satisfaction and generate revenues. An advanced analog system is defined as one that is two-way capable and offers such features as an electronic program guide (EPG) and software download to enhance the set-top's applications.

Following the successes of advanced analog deployments of over five million 8600[x] advanced analog set-tops in North America, including MediaOne's upgrade of its entire Atlanta system, it is fair to say that the value proposition for advanced analog systems has won acceptance.

Scientific-Atlanta's advanced analog systems deliver expanded bandwidth, impulse pay-per-view (IPPV) and interactive program guides, as well as new services like Web access, enhanced broadcast, and virtual channels. Scientific-Atlanta's turnkey application package, the Virtual Channel Express Starter Pak, enables operators to differentiate and expand their offerings by delivering valuable information to subscribers.



Advanced analog technology, such as that found in the 8600x set-top, can help operators transition to digital services.

Scientific-Atlanta helps operators to develop marketing campaigns for advanced analog systems and services. The company also provides training to bring the operator's customer service representatives (CSRs) up to speed on the advanced analog set-tops' expanded offerings. Operators further benefit from the standard interfaces Scientific-Atlanta provides to billing vendors like CSG and CableData, as well as to in-house, proprietary systems.

In August 1998, the company made its System Release 4.5 hardware and software upgrade available to pave the way for migration to a client-server-based network, to enable cable operator branding on an enhanced interactive viewing guide (IVG) and new pay-per-view options. This is an example of how Scientific-Atlanta continues to support and develop new features and applications to for its comprehensive mid-tier service offering.

While the digital upgrade decision will be different for different cable subscribers and for different cable systems, Scientific-Atlanta offers a range of products that allow operators to choose the one that's right for their systems and demographics. ■

Keep Pace with Network Evolution

Visions of full-service video, voice and data offerings in a rapidly converging telecommunications industry began in earnest in the early 1990s.

For several years, however, this concept was mere trade show fodder as competing cable, telephony and satellite interests fiercely debated the technology that ultimately would act as the conduit for this panoply of services. Would it be coax, copper, fiber-optic or wireless cable? What's more, how many wires would invade the home?

Then, two years ago billionaire Bill Gates gave cable's hybrid fiber/coax (HFC) pipe the nod with his $1 billion investment in Comcast, followed quickly by the steep $3,700-per-subscriber proffered by cohort Paul Allen for Charter Communications' video assets, then AT&T's acquisition of top operator TCI, and finally Microsoft's investments in Europe's NTL and United Pan-Europe Communications.

The HFC approach rose above the pack for many reasons, not the least of which is its ability to provide consumers any imaginable array of digital broadband, two-way applications. While anointing the transport medium of choice, these watershed developments also signaled the indisputable need for size and scope. Rampant cable-system swapping in an effort to consolidate and cluster regional networks offered further proof of HFC's power.

Today, cable operators of all sizes search the landscape for clues on how to maximize bandwidth most cost-effectively. Many are turning to Scientific-Atlanta for answers.

Who's the real architect?

Operators must engage with the issue of "the right architecture." Scientific-Atlanta works together with customers to identify the architectural implications and scope of any network project. Scientific-Atlanta has a track record of successfully identifying and recommending the best way operators can provision for future needs and properly map demand against investment.

Activating the digital return path

A critical element in the transition to a two-way telecommunications world is the progress of baseband digital reverse path technology. For the last 18 months, Scientific-Atlanta has been tackling reverse path issues such as analysis of signals, noise and interference; multiple access and modulation analysis; simulation of reverse path links; reverse path design; and traffic and economic analysis. Based on the excellent results of that research, the company will trial its rule-changing baseband digital reverse technology in the early summer and roll out commercial service later this year.

Specifically, Scientific-Atlanta will help operators greatly increase reverse bandwidth by using time division multiplexing (TDM) at the node and installing digital transmitters, converting analog to digital at the node, then back to analog with receivers at the hub or headend. Besides overcoming many analog transmission-related obstacles, the added capacity enabled through TDM allows a greater number of subscribers — up to four times as many, to be served by a single fiber. This translates to more bandwidth per subscriber, the "holy grail" for any network seeking to effectively deploy true multimedia interactivity. As an added benefit, Scientific-Atlanta's baseband digital reverse technology makes a network easier to manage, with opportunities for digital signal processing functions, such as filtering, noise suppression and data manipulation to enhance performance. Perhaps the biggest benefit is found in the system economics. The qualities inherent in the digital signal, enables many components, such as modulators and routers, to be moved upstream to the headend or to be entirely eliminated. Bypassing the hub and transmitting directly from the node to the headend is now a viable and very attractive option for operators who are in the process of building networks or want to create passive hubs.

The company already has run the technology through its paces in front of major U.S. cable operators with very positive results. The technology's scalability is excellent for systems of all sizes. The technology can be used on a node-by-node basis so that the operator's modularity is down to approximately 200 subscribers. So, Scientific-Atlanta's baseband digital reverse path technology can be implemented as easily in a 10,000 subscriber system as in a one million-subscriber system.

Paul Connolly, Scientific-Atlanta's vice president of marketing and network architectures

"The major roadblocks for delivering high-speed interactive services are in bandwidth and node size ," says Paul Connolly, Scientific-Atlanta's vice president of marketing and network architectures. "Our digital solution will allow smaller node sizes that effectively increase the available per-user reverse bandwidth — critical to the operator's ability to meet the ever-increasing demands of the future." Scientific-Atlanta's baseband digital reverse technology helps operators that have yet to upgrade their systems' return path to centralize information processing. For example, in a system with two or three headends and 30 or 40 hubs, the solution allows the operator to pull all of the telephony, data and interactive traffic back to those central headend points very economically.

Increasing RF bandwidth

In an effort to further maximize network bandwidth, Scientific-Atlanta recently unveiled its 870 MHz GainMaker™ broadband amplifier platform. The GainMaker platform is unique in that it is not adaptation of older technology. Instead, it was created from the ground up to deliver 870 MHz. Technical innovations that include Gallium Arsenide (GaAs) technology allow the amplifiers to be dropped into networks that were previously lower bandwidth, often with no respacing necessary. The company is offering the GainMaker with no price premium on equivalent 750 MHz equipment.

Driving fiber deeper into the network

Today's operators know that the deeper fiber is driven into networks, the greater the available-per-user bandwidth. One way Scientific-Atlanta helps operators design "fiber-deeper" architectures is by manufacturing its own low-cost, high-powered 1550nm fiber-optic amplifiers. The company now holds some 55 high-power optic patents and currently is conducting several optical amplifier research projects.

Scientific-Atlanta is able to reduce the cost of pushing fiber deeper into the network by using its Prisma™ Optical Networks 1550nm technology, including Dense Wavelength Division Multiplexing, in conjunction with a new kind of 1310nm transmitter that's been optimized to carry only interactive information. "Since we don't have to put all of the analog channels on it, we can manufacture it at lower cost," Connolly says, adding that wave division multiplexing (WDM), which puts two different colors of light into the same fiber to combine both wavelengths, further enhances the bandwidth efficiency of HFC networks, taking as much as 20-30 percent of initial costs out of the access part of a fiber build. That enables the operator to push the fiber deeper at no increased expense. Yet another key enabler of fiber deeper is the fiberoptic node, a staple of Scientific-Atlanta's arsenal of solutions for operators who need the architectural flexibility to build-out networks in any density scenario. ■

The GainMaker broadband amplifier platform helps operators increase bandwidth to 870 MHz for the same cost as most upgrades to only 750 MHz.

Support Network Regionalization and Two-Way Services

Operators seek economies of scale through continued consolidation of existing local networks and creation of large, regional clusters consisting of one or two primary superheadends and several distribution hubs.

To facilitate this process, Scientific-Atlanta rolled out its Prisma DT™ Digital Transport system earlier this year. The Prisma DT system is a multi-service synchronous optical network (SONET)/synchronous digital hierarchy (SDH) broadband multiplexer optimized for regional headend-to-hub interconnections. It extends the achievable range for the fiber-interconnect backbone and rings, from several hundred miles to more than 1,000 miles.

By going with a new level of the SONET platform instead of a proprietary system, Scientific-Atlanta was able to take advantage of 15 years of experience designing reliable networks based on SONET. The company also omitted some of SONET's more expensive attributes to improve cost-efficiency.

The platform, which operates at the standard OC-48 rate of 2.488 Gbps, transports video channels in a 10-bit uncompressed format. This avoids the undesirable effects of video compression and exceeds RS-250C/CCITT short-haul specifications. A single digital interconnect system that can provide video, voice and data services will result in less craft training, fewer equipment spares, more efficient use of fiber, and lower capital costs to introduce interactive services.

Prisma DT also offers operators the flexibility to use bandwidth in various ways. This flexibility is essential with many operators getting into data and voice, as well as a broad mix of video, including analog, digital, narrowcast, broadcast, high definition TV (HDTV) and video-on-demand (VOD).

So how do you build a backbone network that allows you to handle all that traffic?

"You'd better have a lot of flexibility and reusable bandwidth," answers Paul Connolly, Scientific-Atlanta's vice president of marketing and network architectures. "What we really have is a system that allows you to plug individual IO cards into the used portions of the bandwidth and to reuse them over time. So if your analog needs go down but your digital needs goes up, or you need some Ethernet transport or some cable Internet access transport, you can continue to evolve your network just by changing IO cards."

Scientific-Atlanta has orders from several top U.S. MSOs that already have shipped and are being installed. Connolly notes that there is also international interest in the platform because many of the European operators are Post, Telegraphs and Telephones (PTTs).

The Prisma DT system makes multiservice video transport possible and the SONET multiplexer is optimized for regional interconnects.

Build the Model System

As today's operators make the transition from being broadcast video entertainment providers to providers of a wide variety of interactive services, they must understand what and where that demand is.

Today, operators are trying to look at overlaying four or five different applications on one or more networks. The choices are endless - should they use analog or digital technology? Should they use datacom optics? Should they install SONET systems? How big should their physical nodes be? How many fibers should they pull? Should they use WDM? Should they process out at the hubs or centralize it?

With so many issues and options, cable operators must consult industry players like Scientific-Atlanta with the technological expertise and perspective to understand exactly how to create the most cost-efficient and flexible end-to-end, full-service network possible. Key in this consulting role is the necessity of investing in and having a full understanding of the core technologies from the headend out to the taps, including video processing and headends, video transport, 1310 nm and 1550 nm opto-electronics, fiber nodes, RF amplifiers, taps, and passives — and a cost and performance-effective return path.

Scientific-Atlanta helps operators to conduct as much modeling and as many 'what-if' scenarios as possible. In the company's work with Charter Communications' end-to-end upgrade of its 4,200-mile system in St. Louis, the companies spent several months examining different 'what-if' alternatives such as node size, digital vs. analog and 1310 nm vs. 1550 nm.

Paul Connolly notes that the company's modeling and analyses tend to spur even more creative thinking, "... discovering where the sweet spots are with the technology, where gaps are, and we're actually using that to guide our product development and partnerships. And, as always, the key beneficiary is our customer." ■

Above: Near-instantaneous activation of service with the Addressable tap helps operators reduce costs and capture additional revenue.

Left: Best-in-class specifications make the Continuum platform a top selling headend.

Take Control of Cost and Efficiency

Operators seeking to derive the greatest benefit from their services are wise to implement network management strategies. Anticipating the need for cost-effective system management, Scientific-Atlanta's response was to develop the TNCS™ transmission network control system. Based on a client/server model, the TNCS system provides the critical monitoring and control functions operators need to assess and maintain operational efficiency while protecting the investment in their network technology.

Yet another area operators where operators will find opportunities for cost and efficiency gains is within the drop network connecting the subscribers. With Scientific-Atlanta's Addressable Multimedia Stretch™ Tap operators can benefit in two ways. With near-instantaneous subscriber connect/disconnect capability, tremendous savings can be realized by eliminating truck rolls and drop maintenance expenses. And, the remote activation of tap ports gives operators an opportunity to generate additional revenues not only through more billable days, but also through new impulse purchase marketing campaigns.

Satellite Television Networks:

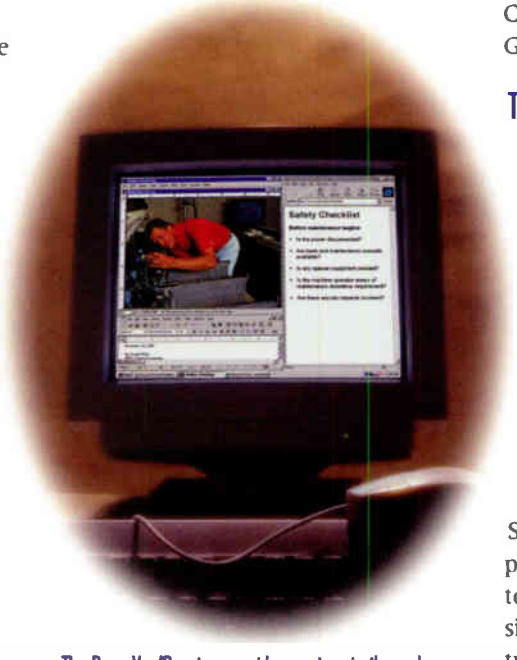
The Key to Program and Service Compression and Distribution

Just as cable operators must keep pace with technology and content offerings, programmers, broadcasters and television service providers must also stay on the cutting edge to avoid losing market share to new entrants that offer improved services.

For broadcasters and programmers especially, the pressure is on to merge video and data into a sophisticated service that will keep the attention of the increasingly savvy consumer market. Service providers are expanding their offerings beyond video uplink and downlink capabilities to include more data services as their customers begin to seek new revenue generating opportunities.

In order to evolve to meet these growing challenges, companies in the television business must embrace technologies such as digital transmission, Internet protocol (IP) and data content, and two-way interactivity. Digital compression technology has been especially well received in the international marketplace. The lessons learned implementing these earlier systems can provide a valuable advantage in the U.S. market as the push intensifies to migrate from analog to digital program delivery. The digital video compression capabilities of Scientific-Atlanta's PowerVu *Plus*™ system enables the company's customers to send as many as 16 channels of video over a single satellite transponder. Since a single analog channel requires an entire transponder, the multiple channel opportunities available using digital video compression are very appealing to Scientific-Atlanta's customers.

The company's digital video compression customers fall into three broad groups: programmers, broadcasters and service providers. Currently, more than 325 Scientific-Atlanta satellite digital video compression systems are transmitting over 1050 channels of digital programming into more than 170 countries - over 90 percent of the world. According to Perry Tanner, president of Scientific-Atlanta's Satellite Television Networks business, his company's successful worldwide launches of digital video compression systems gives Scientific-Atlanta the leading market share position. Scientific-Atlanta has shipped more than 100,000 commercial decoders (often called IRDs or Integrated Receiver Decoders), the devices needed for receiving digital transmissions and converting them to video for delivery to viewing audiences.



The PowerVu *IP* system provides services to the end-user's desktop PC, enabling rapid Internet/Intranet access, fast file transfers, information retrieval and training.

The list of customers using the company's digital video compression systems reads like a Who's Who of the worldwide television industry: Discovery Channel, Toon Disney, Turner Broadcasting, Cisneros Television Group, Spain's Retevision, Australian Broadcasting Corporation, Hongkong Telecom, Japan's NHK, ARABSAT, Deutsche Telecom, PBS, PanAmSat, Family Channel, Venezuela's CANTV, and GLOBOSAT of Brazil.

The U.S. market beckons

Scientific-Atlanta now stands ready to expand its digital leadership position with programmers and broadcasters in a marketplace fertile with analog-to-digital needs: the U.S. TV market. The company began supplying PowerVu® systems to prominent programmers such as E! Entertainment Television, Family Channel, Eye on People and VH-1 two years ago. Scientific-Atlanta won over these programmers as the first company to enable them to attach a digital side carrier to their standard analog transmission. This Single Channel Per Carrier (SCPC) digital channel was most frequently employed to facilitate West Coast feeds by shifting the digital channel by three hours for delivery of programming in more advantageous time slots.

With that leading technology, Scientific-Atlanta achieved other victories with such high-profile

customers as Toon Disney, TNT, BET, A&E and Lifetime. Last summer, the company expanded its longstanding relationship with Time Warner Cable. Scientific-Atlanta is providing a digital platform to offer Time Warner's digital subscribers a new tier of programming called AthenaTV.

Expanding the power in PowerVu

In designing the PowerVu and PowerVu *Plus* products for the demanding criteria of U.S. customers, especially in the cable industry, Scientific-Atlanta has not lost sight of the most fundamental concern: video quality. 4:2:2 encoding gives broadcasters higher video quality and improved "blue screen" capabilities, as well as more bandwidth and compression capability. This also improves the quality when contribution links require repeated encoding/decoding, which can introduce errors into the video. This technology has enabled Scientific-Atlanta to continually surpass the competition in head-to-head comparisons of video quality.

PowerVu *Plus* products include the BitMizer™ Statistical Multiplexer and the Multiple Decryption Receiver (MDR). These products combine to enable Scientific-Atlanta's customers to deliver up to 16 digital channels within a single multiplex over one satellite transponder and pass this digital programming directly onto a cable system for delivery to a digital set-top such as the company's Explorer® 2000 set-top.

Scientific-Atlanta recognizes that its programmer customers may not want every channel of a multiplexed signal. CNN Español, for example, might not be in great demand in Minnesota. So, the PowerVu *Plus* products enable the cable operator to drop or add channels in the multiplex to customize their offering to meet the viewing preferences of their subscribers.

Cable headends that want to carry both analog and digital programming can take advantage of, the new PowerVu *Plus* Multiple Decryption Receiver. The MDR allows customers to receive and decrypt a digital multiplex, then output any data rate desired, from 2 to 46 Mb, all in one receiver. Scientific-Atlanta also recognizes that cable operators may need interoperability with products from multiple vendors. The PowerVu *Plus* MDR's support for DVB-ASI and DHEI enables programmers to deliver a signal to any digital set-top, even those made by other companies.

In the United States and Australia broadcasters have been mandated to deliver high definition programming. The PowerVu *HD*™ encoding and decoding system is designed to meet that need. In the U.S., PBS is delivering HDTV with this system.

Scientific-Atlanta service provider customers include traditional private network providers, such as Deutsche Telecom (DT), and satellite operators such as, PanAmSat. Scientific-Atlanta rarely, if ever, provides a system directly to the end user; typically, the company provides the equipment to a third party who then packages the equipment into a value-added service offering. For instance, in the past year, PanAmSat has used its PowerVu system to help FIFA broadcast all World Cup matches from France and World Youth Cup soccer matches from Nigeria to viewers around the world. Since an organization such as FIFA does not need a television transmission system on a year round basis, using the capabilities of a service provider's systems and expertise is an economical means of delivering video without incurring the cost of a full-time network.

Demand for the Internet

The PowerVu *IP*™ system was developed in anticipation of the current wave of demand for IP applications. It allows the transmission of DVB compliant video, audio and data directly to an end user's personal computer (PC). This new capability enables a host of new applications for businesses. For example, rather than devote an entire transponder to advertising distribution for insertion in cable programming, a cable operator could send the video to the headend in an ad hoc fashion.

Scientific-Atlanta's programmer, service provider and broadcaster customers can couple PowerVu *IP* systems data with new interactive applications and advanced consumer devices like the Explorer 2000 digital set-top. This positions cable operators to be a profitable consumer gateway to a seemingly endless array of entertainment, information and communication services.

Clearly, there are many ways in which programmers, broadcasters, service providers and cable operators can differentiate themselves, attract consumers and achieve success. Fortunately, Scientific-Atlanta is there at every point in the content delivery process to provide the technology and expertise they need to accomplish their goals. ■

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"As we look toward the future advanced broadband services environment, we can expect the complexities of these environments to increase proportionally to service features."

be tightly integrated with a NOC, or possibly an extension of a NOC.

Other complications

However, an SMS must address additional complications. These arise from the lack of integration among, and the variety of, backend billing and geographical information (GIS) systems used in many cable operations.

The combinations of disparate backend systems many cable operators have in place have largely come about as a function of market acquisitions and functionality demands of new services absent from legacy systems.

The need to normalize disparate backend databases so that an SMS can have access to accurate data probably is the most daunting of challenges. Without such a normalized database from which to operate, however, an SMS easily coulc become unmanageably complex.

As we look toward the future advanced broadband services environme we can expect the complexities of th environments to increase proportion to service features such as quality of vice (QoS), bandwidth consumption pricing models, new service introdu tions and so on. Ideally, we'll hear n about SMS issues in some of this ye popular industry trade events.

Terry Wright is chief technology offi Atlanta-based Convergence.com Co can be reached at (770) 416-9993 o mail at tlwright@convergence.com.

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Reader Service Number 35

By David Devereaux-Weber

How Will the Internet Impact Your Network?

Now that many cable operators are getting into the Internet business, how will that affect their business? The Internet is changing everything. How are cable service and Internet service alike, and how are they different? How will these things affect you? If we then add Internet protocol (IP) telephony to the mix, what happens?

In the cable world, the operator holds the keys to the headend—nothing gets on or off a system without the operator making arrangements first. On the Internet, everyone is connected to everyone else, and unless a local provider takes extraordinary measures, anyone can see information anyone else publishes.

Networks, not network

The term Internet doesn't even mean a single network anymore. It means the idea of interconnected networks. That means, when talking about national backbones, that @Home's network connects to Road Runner, AT&T, MCI, Sprint, GTE and so on. It doesn't matter which national carrier your local Internet service provider (ISP) uses because they all interconnect, and you can send e-mail to users on any other provider, or look at World Wide Web pages whose servers are connected to any other provider.

Usually there is only one cable company in any geographic area, but there are often three or more ISPs serving the same area. In addition to analog modems, many areas also have integrated services digital networks (ISDNs) with up to 128 kbps bandwidth or digital subscriber lines (DSLs) with up to 2 Mbps bandwidth.

Be careful when comparing alternative technologies. The effective bandwidth that a customer experiences includes not only the theoretical speed of the cable modem, but also the effect of sharing bandwidth with other subscribers in the same node, the method of aggregating traffic from other nodes, and the bandwidth of the backhaul to the Internet.

Alternative technologies such as ISDN and DSL may not share their bandwidth in the loop. If I share my 10 Mbps cable modem bandwidth with 20 other users on a node, and my neighbor gets exclusive access to 768 kbps, who will see the faster access? It depends.

Change—the only constant

Here are some ways that business is changing:

- Customers have more choices. It will be more important to answer customer and potential customer questions quickly and accurately. It will be more important to complete installs and trouble calls on time. This also means that customers are likely to be more confused. Confused customers dig in and don't feel comfortable trying new services or technologies. It will be more important to present information to them openly and to build their trust. Large-scale success will require building a long-term relationship with customers.
- The idea of "competitor" will change to "partner." Cable companies may sell point-to-point circuits to local ISPs. Depending on customer needs, it may make more sense to recommend a dial-up ISP than to try to serve a customer with cable modems. For example, a warehouse in an industrial park may require a very expensive line extension; if there is only a single Internet user, it would be better for both customer and company to recommend a dial-up ISP. It may make sense for a customer to use a local ISP to build a local area network (LAN) within an office and for you to sell it high-speed access over your fiber plant.
- Company organizations are changing. The old structure of multiple layers of management is giving way to flatter structures with fewer middle layers.
- The level of technical knowledge required is increasing. The cable industry is getting into new services (such as Internet access and telephony), and the level of technical information in each of these areas is increasing.
- The rate of change is increasing.

Keep in touch

One way to keep up with these changes is a forum such as the SCTE-List. Subscribers help each other out by answering questions, sharing contacts and other information. Subscriptions are free, but the information is invaluable. 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@facstaff.wisc.edu.

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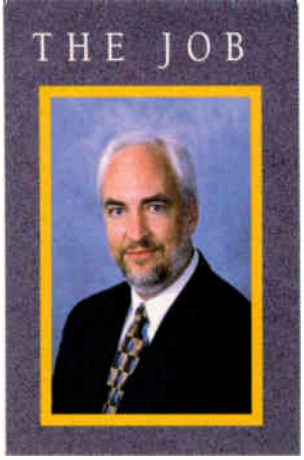
By Alan Babcock



Vendor Partner Offers Hands-on Training

How do you stay on top of the rapid technical changes occurring around you? I get terribly frustrated about my own ability to keep up. I worry about the new technologies and their applications in our industry so the Society of Cable Telecommunications Engineers can try to provide training that is current, not a year late. I also worry about the applications of technology in training delivery so the training we provide can be delivered in the most effective way.

One of the technologies taking the industry by storm at the moment is high-speed data transmission. Many of you already are involved in either experiments or at least partial rollouts of some type of data service. Many operators are deploying their own Internet service access products while others are using third-party Internet service providers (ISPs) and providing a higher-speed pipe than that available through the local twisted-pair provider.

Fairly common concerns

I am a "work at home" type, so I'm very interested in these services from a user point of view. This interest is driven by a need for speed as well as reliability.

I have had problems all week with my phone and Internet services. The local phone provider has been working in my area and taking lines down. We have been experiencing strong winds, and the lines won't keep a connection for more than a minute or two—if they even connect at all. My ISP seems to be having problems with e-mail attachments—the attachments keep getting dropped. I also understand, however, that my local cable provider won't rebuild my area for two-way for some time yet, maybe two years.

I'm also interested in the technology needed to provide data routing and access through the cable network. I have read some things in the various trade magazines, attended SCTE's Conference on Emerging Technologies in Dallas earlier this year, and I read *DigiPoints*, but I still have a hard time grasping how routers, cable modem termination systems (CMTSs) and modems really function in a broadband data network. And how does the Data Over Cable Service Interface Specification (DOCSIS) fit into the whole picture?

I can learn a lot by reading, but I am a kinesthetic learner. I need to touch it and do it to really learn about something.

> "Attendees will be able to make changes to the network to see the effects of noise, bad connections, ingress and other impairments."

Good news for hands-on types

SCTE will begin offering a regional seminar in the near future to provide us kinesthetic learners with the opportunity to get hands-on experience with the equipment used in a data network. SCTE is working with some very talented folks at Cisco Systems to provide a new type of regional seminar. This seminar breaks new ground in a couple of ways.

First, the seminars will be held in facilities where attendees can get real hands-on experience with equipment. Approximately 50 percent of the time will be planned for experiential learning with data systems. Attendees will be able to make changes to the network to see the effects of noise, bad connections, ingress and other impairments.

To accomplish this training scenario, the seminars are being scheduled in facilities around the country that have computer workstations and capabilities to set up a complete broadband network on-site.

Second, the seminar demonstrates a more involved relationship with our vendor/manufacturer community. SCTE always has worked hard to maintain neutral relationships with the equipment and service providers in the industry, and we don't plan to change that approach.

We do, however, realize that much of the knowledge about new technologies, and the application of existing technologies, resides with the companies developing the hardware, middleware, firmware, and software.

For this reason, we feel it is appropriate to work with manufacturers and vendors to find ways to disseminate knowledge to SCTE members and associates. SCTE will not promote equipment or services provided by a specific organization, but we are very willing to work with companies to help provide training on the newest technologies and applications in the industry.

Look for the Data Networking Over Cable Symposium coming to a city near you. CT

Alan Babcock is director of training development for the Society of Cable Telecommunications Engineers. He can be reached via e-mail at ababcock@scte.org.

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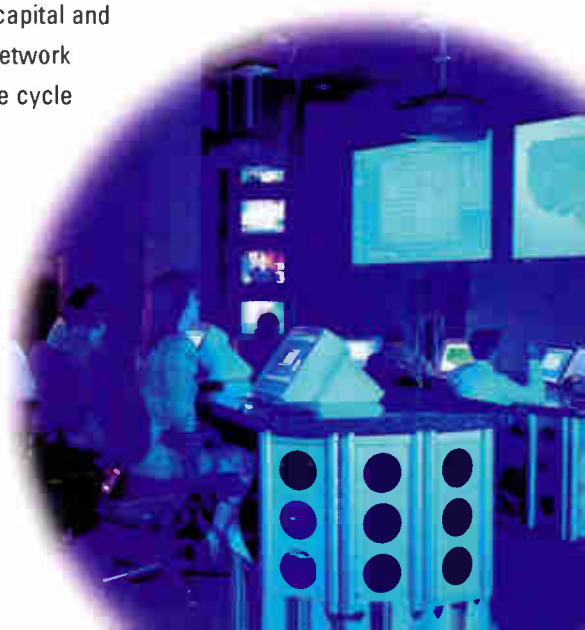

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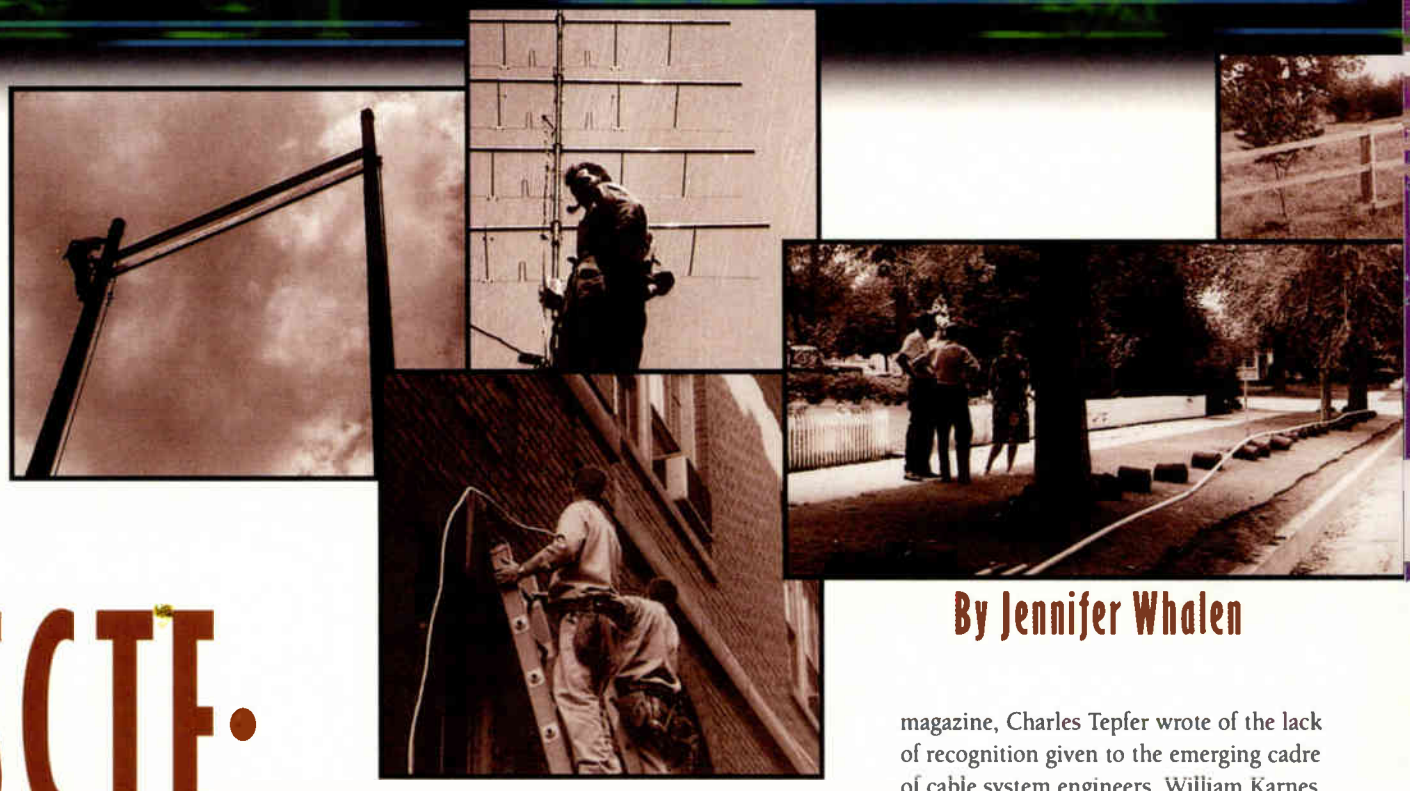

SCTE:

A Look Back on The First 30 Years

Much Ground Covered, But Still Only the Beginning

Training, certification and standards. The Society of Cable Telecommunications Engineers' 30-year commitment to these three ideals resonated throughout the halls of the 1999 Cable-Tec Expo last month in Orlando, Fla.

By Jennifer Whalen

As engineers packed technical workshops, sat for Broadband Communications Technician/Engineer (BCT/E) certification and dashed from booth to booth quizzing vendors on the latest technologies, it was easy to assume that SCTE has always had outstanding training, certification and standards programs. Those programs have evolved over the last 30 years due to the dedication and insight of you, the members. With the Expo dust settling and SCTE halfway through its 30th birthday, let's take a look back at how it all began.

Proving that the pen really can be mightier than the sword, SCTE was conceived in 1968. In an editorial published in the November issue of *Cablecasting* magazine, Charles Tepfer wrote of the lack of recognition given to the emerging cadre of cable system engineers. William Karnes, then of National Trans-Video, sensing a kindred spirit, followed up with a letter calling for acknowledgement of the valuable contributions that cable engineers were making to this nascent industry.

Soon, a groundswell of support surfaced, and *Cablecasting* published the first application for membership in the then-named Society of Cable Television Engineers.

The engineers moved quickly to capture the interest in the young association. The following summer at the National Cable Television Association's annual meeting in San Francisco, they held their inaugural meeting. Seventy-nine people participated, and Tepfer reported that 216 people had applied for membership. The 79 charter members then elected Ronald Cotten of Concord TV Cable as their first president.

Training seeds sown

The early association had two primary goals—to foster information exchange and to gain recognition for the engineer, recalled William Karnes, now president and owner of ISC Datacom. Today's training and certification programs have their roots in those early goals.

"At that time, we didn't have all the consolidation that we have in the industry

Photos courtesy of The National Cable Television Center and Museum

today," said Karnes. "We didn't have five or six major MSOs (multiple system operators). We had hundreds and hundreds of little independent operators. The technicians didn't get together that much, so that was one of the primary ideas—to get everyone together to talk about common problems and what could we do about them.

"At the chapter meetings, we would have guys come in from suppliers and show us things, such as how to use test equipment and how to measure cross modulation .... There was some training, but not as formal as it is today," Karnes added.

"We had a secondary goal—recognition of people. We thought the technical guys had a lot to do with making the industry successful. We wanted a means of recognizing their achievements and honoring the things that they had done," Karnes continued.

While certification is a key element of SCTE's recognition efforts today, a formal program was beyond the reach of the fledgling society. "Certification was just one of the things that was kicked around. But we didn't do it in the early days. We were too small, fragmented and didn't have a strong national organization," recalled Karnes. "In order for it to have any meaning, we had to be much stronger than 200 or 300 members. Being certified by the guy who lives down the street from you doesn't mean much. Being certified by a national organization with 15,000 or 20,000 members has some meaning." Of course, that would come later.

The association grew quickly. By the mid-'70s, membership neared 1,000, and the engineers revitalized their existing chapters and formed several new ones. Some of the initial efforts to create local chapters failed because of problems with correspondence, dues and miscommunication. Some people perceived that the SCTE had a hidden purpose of unionizing all technical personnel in the industry. Others also expressed concern that there were no standards established for admission to the Society. Those concerns ultimately led to the establishment of the Society's entrance requirements.

Training goes national

As membership grew, so did SCTE's national presence. In 1976, the Society's training efforts took a giant step forward with the launch of the first National Engineering Conference. This annual event, where the top engineering minds in the country discuss the present and future state of the industry, is now part of the opening day's activities at Cable-Tec Expo. The Expo, SCTE's premiere training event, followed in 1983 with its debut in Dallas.

"The concept behind Cable-Tec Expo was to bring together manufacturers and the people in the field," said Bill Riker, former

Some things don't change much: Ladderwork and pole-climbing are still staples in the industry, just as they were back in the early '60s.

SCTE president and now vice president of engineering and operations at the National Cable Television Center and Museum.

"As the industry grew, a lot of the trade shows became programming oriented. Manufacturers missed the opportunity to be in the forefront of the tradeshow," said Riker. "By getting together with manufacturers, engineers could talk with them about how to use products more effectively, and the manufacturers got feedback from the cable systems as to the performance of the products as well as suggestions on how to improve the products .... That's been the philosophy of Expo ever since: to bring together these two audiences that don't combine anywhere else."

The early '80s brought hard financial times for SCTE. Still, the engineers persevered and wooed Riker away from NCTA in 1984 to become the Society's executive vice president. Undaunted by the crisis and the need to move SCTE's office space to the garage of one of its members, Riker put SCTE's financial house in order and tightened the focus on training, certification and standards.

In 1984, SCTE launched its "Satellite Tele-Seminar Program" series so that all cable system engineers would have access to technical training videotapes. SCTE encouraged system operators to downlink and record the programs to serve both their current and future training needs.

Certification gets underway

Riker also led the certification charge. Before coming aboard as an employee, he had been volunteering as chairman of the BCT/E Examination Committee and was helping to develop the Society's first certi-

Donald Levenson with WACO (Wheeling Antenna Co.) constructs an early cable antenna in his backyard in 1963.

fication exam. Under his direction, training and certification activities exploded.

"The FCC (Federal Communications Commission) had announced that it was no longer going to be certifying the technical competencies of employees in everything from broadcasting to ham radio. Each industry now had to certify its own people," said Riker.

"The BCT/E program is a tool that management can use to gauge the technical competence of its employees," he said. "Our industry is changing so rapidly, it can be difficult to keep up with technology. There is so much to learn to just stay abreast of the bare bones of what we do today. A program such as the BCT/E program can be used by an individual as a means of self-challenge—a way to test and determine weak areas and strong areas."

SCTE backed its commitment to training and certification financially as well. It launched the Technical Assistance Program in 1985 to provide scholarships to members for NCTI correspondence courses, and three years later, expanded the tuition program to cover university courses as well. ➤

"With the Expo dust settling and SCTE halfway through its 30th birthday, let's take a look back at how it all began."

"This industry grew up through people who learned their jobs on the job. Most of the CEOs and leaders of the industry started off climbing poles in the '50s and '60s," Riker said. "You could not go to school and get a degree in cable TV ... so SCTE was replacing the FCC's examinations, and we were doing it because nobody had any credentials to prove that they knew how to do their jobs."

SCTE stepped up to the plate and designed its certification program with three goals in mind: to document technical ability, to provide recognition among peers, and to assist management in the hiring and promotion process, Riker added.

SCTE launched the BCT/E Certification program at the 1985 Cable-Tec Expo, and 90 candidates enrolled. Two years later, *Communications Technology*'s Senior Technical Editor Ron Hranac became the program's first graduate at the technician level. Later that year, Les Read became the first SCTE-certified engineer. Since its debut, 579 members have completed the certification program.

Hranac, now vice president of RF engineering for High Speed Access Corp., said that BCT/E certification benefits both the individual and the industry as a whole.

A young Cablevision brings service to the South.

New standards frontiers to conquer

Always striving to take its members to the next level, SCTE held its first Annual Conference on Fiber Optics in 1988. By 1993, recognizing the need to keep ahead of all the technological advances in the cable industry, the Society broadened the event's scope and renamed it the Annual Conference on Emerging Technologies.

Standards development also became one of the Society's key goals in the '90s. "A lot of the equipment being made was not compatible with each other. One manufacturer's cable would fit another's connector, but not with a different manufacturer's connector. There weren't even any specs on the dimensions of the cable," explained Riker. He added that Tom Elliott, then an engineer with TCI, pushed heavily for SCTE to get involved in standards setting.

SCTE now has seven engineering subcommittees that draft specifications on everything from connector fittings to data transmission over cable.

In 1995, the American National Standards Institute accredited SCTE as an official Standards Development Organization (SDO), and Ted Woo came on board to spearhead standardization efforts.

"It was important for us to set standards for our own industry. We did not need ANSI to do that. We felt, though, in order to add credibility to our activities and to get everyone to buy in, that being recognized by ANSI would compel manufacturers to comply voluntarily because the standards were recognized by a body outside the industry," explained Riker. "Also, the cable industry was moving internationally and getting into Europe. We wanted to get in there with equipment that was already compatible."

1998 was a banner year in SCTE's standards development efforts, with ANSI approving several items sponsored by the Society. Among those were standards for:

- "F" Port Physical Dimensions
- Coaxial Cable Structural Return Loss
- "F" Port Return Loss

The International Telecommunications Union also approved the Data-Over-Cable RF Interface Specification.

SCTE will continue its commitment to standards, training and certification, especially in the face of increased technological change, reported John Clark, who became SCTE president this year.

"The area of standards will become more important than ever. The challenge for us is how to make the consumer the beneficiary and not the victim of new technology. The only way we will be able to do this is to have standards that make it easy for consumers to enjoy the benefits of the new technology that we are bringing them," Clark said.

"I think the biggest challenge is maintaining our mission—'Training, Certification and Standards'—and yet updating that mission as we encounter new technology. The needs of our members in the year 2000 will be much different and more sophisticated than in the past," Clark added.

To learn how SCTE plans to conquer future training, certification and standards challenges for its more than 14,000 members, *CT* quizzed three of the society's top leaders. Discover their insights in the interviews that follow. CT

Jennifer Whalen is editor of Communications Technology. She can be reached at (301) 340-7788 ext. 2057 or via e-mail at jwhalen@phillips.com.

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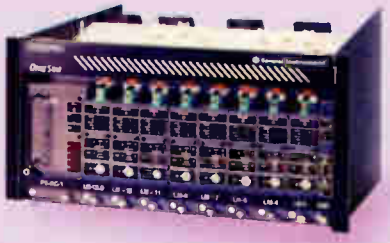

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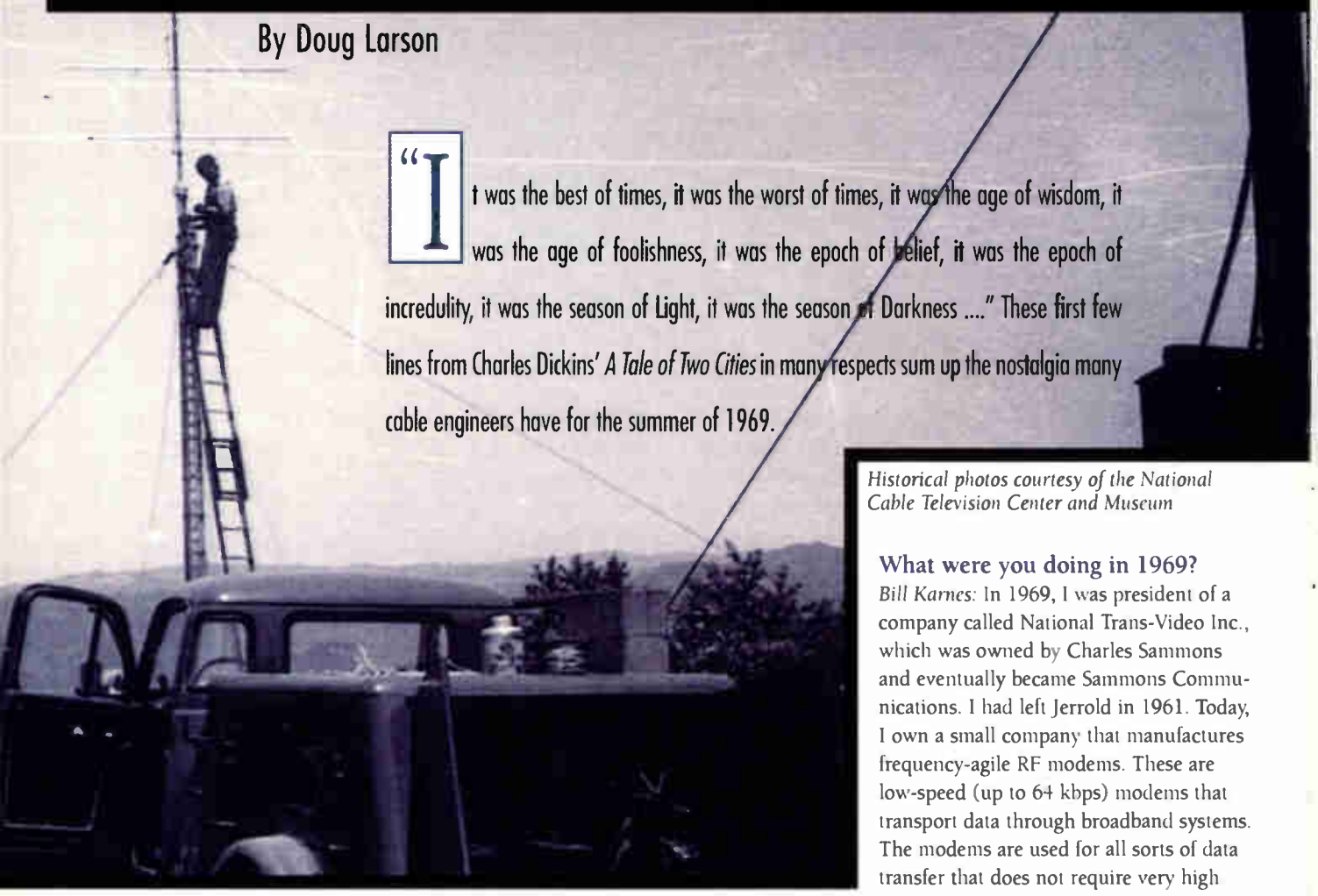
Reflections on SCTE's Pioneering Spirit

Progression from the "Good" Old Days

By Doug Larson



"It was the best of times, it was the worst of times, it was the age of wisdom, it was the age of foolishness, it was the epoch of belief, it was the epoch of incredulity, it was the season of Light, it was the season of Darkness ...." These first few lines from Charles Dickins' *A Tale of Two Cities* in many respects sum up the nostalgia many cable engineers have for the summer of 1969.

Historical photos courtesy of the National Cable Television Center and Museum

That summer, 79 people aligned with the nascent community antenna television industry gathered together at the San Francisco Hilton Hotel for the first meeting of what was then called the Society of Cable Television Engineers.

That fledgling organization today has more than 14,000 active members and is a leader in broadband training, certification and standards development. As we celebrate the 30th Anniversary of the SCTE and the 50th anniversary of the cable TV industry, we thought we'd take a step back and look at the evolution of the Society from the perspective of those who were there at the outset.

William F. Karnes: an early advocate

Bill Karnes was instrumental in organizing the first meeting of the SCTE and served as the first vice president, from 1969-1971.

What were you doing in 1969?

Bill Karnes: In 1969, I was president of a company called National Trans-Video Inc., which was owned by Charles Sammons and eventually became Sammons Communications. I had left Jerrold in 1961. Today, I own a small company that manufactures frequency-agile RF modems. These are low-speed (up to 64 kbps) modems that transport data through broadband systems. The modems are used for all sorts of data transfer that does not require very high data rates. Example: traffic signal control, school administrative information, payroll data and so on.

What were the hot items in 1969?

Bill Karnes: The hot items in 1969 were not nearly as exotic as today's concerns. We were concerned with lower-loss coaxial cable, higher-gain amplifiers, transition from pressure taps to directional taps. We were moving toward solid-state amplifiers, but still using tubes a lot. Expanding bandwidth was a concern, all the way up to 20 channels! ➤

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One of the first projects that I worked on in cable was the conversion of the Tyler, Texas, system from a three-channel strip-amplifier system to a "broadband" five-channel system. At the time, it was thought that five channels would be all we would ever need because, after all, there were only three networks, and if you included an educational station and maybe a weather channel, what else would anybody want?

A weather channel in those days was not what we now have. It was a series of instruments—clock, temperature, barometer, wind speed and direction—that were continuously scanned by a camera and put on a channel on the system. This set of instruments was usually located at the system headend. Audio for the sound was normally a local FM station, or in some of the more adventurous systems, a tape deck running large, 18- or 24-inch reels of quarter-inch tape at slow speed so they would last a while.

What has been the greatest accomplishment of the SCTE?

Bill Karnes: I think that the greatest accomplishment of SCTE has been its building of a good, solid base of local chapters. This was the core goal of the first group of members, and it seems to have happened. Not to take away SCTE's other accomplishments in becoming a standard-setting group and its efforts at the national level, but the training and certification work still goes on in large part through the local chapters. To me, those chapters are the real muscle of SCTE.

Who have been the most influential people in the SCTE?

Bill Karnes: Trying to pick three people from all those who have played parts (many unsung heroes are out there) is not easy. I would, if limited to three, probably choose Bob Bilodeau, Tom Polis and Bill Riker. Each of these men shouldered the load when times were tough and the Society's future looked doubtful.

> "The hot items in 1969 were not nearly as exotic as today's concerns . . . Expanding bandwidth was a concern, all the way up to 20 channels!"
> —Bill Karnes

What should SCTE's mission be over the next five years?

Bill Karnes: I would like to see the Society, in the next five years, focus strongly on building more chapters and intensifying its training work. As we move more into

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digital operations, whether it be TV, Internet, telephone or whatever, the level of technical expertise at the system is going to have to rise. I would like to see a formal traveling training group that could go to chapters and conduct hands-on training in digital techniques as well as the mechanics of making return paths work in the real world.

What are cable's biggest challenges over the next few years?

Bill Karnes: Cable's challenges in the next few years, as an industry, will be:

- Meeting the physical, electronic and financial challenges of continuing to upgrade plant to handle the new services. SCTE cannot handle the financial side of that, but can help in the other two areas.
- Training new technical personnel and upgrading the skills of current technical personnel to handle the new services and methodologies. This is SCTE's prime challenge.
- Improving system reliability—another SCTE area.
- Improving customer relations. Not necessarily an SCTE responsibility, but if one considers that the service technician and the CSR (customer service representative) are usually the only contact that a subscriber has with a cable company, then it becomes clear that technical people need to be trained in customer relations as well as how to fix things.

Overall, the technical people in cable are going to have to know how to do a lot more things. They are going to have to improve their image from that of a guy (or girl) in blue jeans who is usually late and become a technical representative, probably in uniform, who is on time, exhibits a professional attitude, and understands the importance of not only fixing a problem but also making sure that the subscriber is satisfied. In these areas, SCTE can serve most importantly.

Ronald Cotten: presidential material

Ron Cotten served as the first president of the SCTE, from 1969-1970.

What were you doing in 1969?

Ron Cotten: I was working at a cable system in the East Bay in Concord, Calif., as a chief engineer of the system. It was a Western Communications system owned by the *San Francisco Chronicle*. It was the first system I built from scratch, started in 1967. I actually got into the business in 1964.

Chuck (Tepfer) had this publication called *Cablecasting*, and there had been some discussion about the need for a professional society as a forum to let people in the industry communicate with one another. At that time, the industry was still quite small, and we were reinventing the wheel every time we built a new system.

The vendors weren't much help. They had their hands full just trying to keep their equipment going. The early generation equipment was just flat awful. That's not a criticism of the vendors. That's more a statement of the technology at that time. The debate was still going on

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then as to whether germanium or silicon would make the best transistors.

The vendors really didn't have much practical information to pass on to the people building systems with their equipment because they didn't know. They didn't build systems and operate systems. They basically built equipment. One exception to that is Jerrold, which later on built out the Rio Grand Valley in Texas.

There had been several issues of *Cablecasting* where a discussion got started with some of the industry technical people on the need to do this, so Chuck Tepfer, Bill Karnes and myself decided to set up a meeting at the national convention in San Francisco. At that meeting, we set up the SCTE and elected officers, and away we went.

The initial goal was one of sharing ideas, and that is one aspect of training, but I don't think any of us envisioned the kind of training being done today.

Later that year, I flew back to Denver and met with Rowland Heib. NCTI (National Cable Television Institute) had started in 1968, and I negotiated a discount structure for SCTE members to take part in NCTI training.

What were the hot items in 1969?

Ron Cotten: There was no solid information available about the theoretical operation of systems and how they should be built. There was no place where you could go to read about how to engineer a cable system, operating levels, operating gain, cascades and all those things. It was kind of a hit-and-miss proposition.

There was very little fundamental knowledge about how cable systems worked, what the limitations were and what the design standards should be. Back in those days, people in the industry built systems and then operated them. Today, when people come into the industry, the systems are typically built. They don't go through that whole process of invention and construction. In those days, the industry was practically brand new, so almost all of the operations people were involved in construction to some degree.

There were a lot of systems built that simply overplayed the limitations of the technologies. Cascades were too long, and the operating levels were too high. Let's put it like this: If Boeing built airplanes the way we built systems in those days, we'd be driving everywhere.

Early cable construction was a hit-and-miss proposition, as little training was available.

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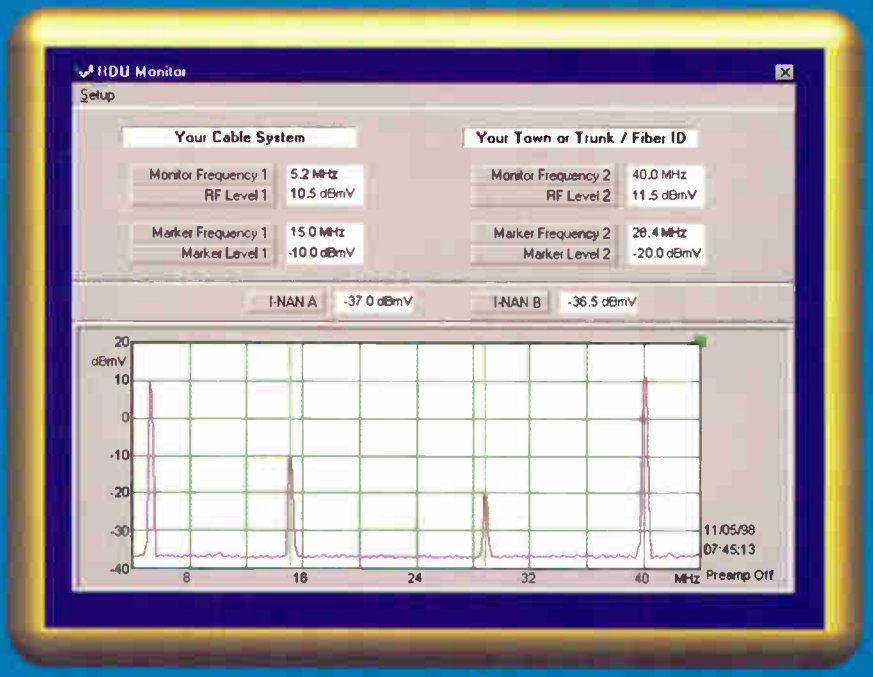

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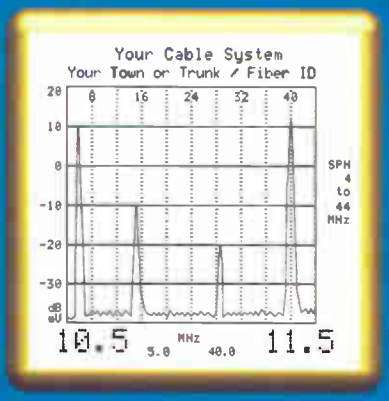

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On the other side of the coin, that was one of the wonderful draws of the industry. There was always this sense of discovery, invention and pride of authorship. We all made mistakes, but we all learned from our mistakes. In a lot of professions, you don't have the luxury of so much invention. It was cool. I don't think the industry has that today to nearly that degree for the average folks working in the trenches today.

What has been the greatest accomplishment of the SCTE?

Ron Cotten: Training. Let's face it, some operators have done some training. Some operators have done a good job of training. Some operators have done no training at all. In the industry, training has been undertaken at the initiative of the person, as opposed to the initiative of the company. There are certainly exceptions to that, but as a general rule, that's just the way things have been. So, if you had to say just one thing, certainly it would be training. In that, I include being a forum within which people can share ideas. That's not training in the formal sense, but it certainly is in a practical sense.

"Let's put it like this: If Boeing built airplanes the way we built systems in those days, we'd be driving everywhere."
— Ron Cotten

Who have been the most influential people in the SCTE?

Ron Cotten: So many people have spoken on this issue for so many years. The Society was run on a part-time basis by working people, and it wasn't easy. We all had other obligations—we all had full-time jobs, a lot of us were going to school on top of that, and most of us had families. It wasn't until Bill Riker came on board as a full-time person with a personal commitment to growing the Society that the Society really blossomed. I think he deserves an enormous amount of credit for taking a society which was held together by the will of the members and really turning it into a world-class organization.

Prior to that, there was a whole string of people who were involved in the leadership of the Society. Tom Polis came along at a critical stage and saved the Society in the 1970s.

What are cable's biggest challenges over the next few years?

Ron Cotten: We have to get philosophical to really answer this about the industry. The cable industry has been wildly successful. I've heard—and I haven't seen the

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exact figures to back this up—that the cable industry in the United States was the largest privately financed infrastructure undertaken in the history of the human species, and that the cable industry produced more millionaires than any other industry in history. I don't know if those numbers are true, but I've got to tell you, if they're not, they have to be really close.

The cable industry has been successful because it was built by people who were very practical. They built systems that were not overkill for entertainment TV. They were built to the level required to build a successful business.

The culture in the cable industry has never been one that has focused on transmission quality and reliability. The cable industry has always focused on getting the biggest bang for the buck and doing what's necessary to deliver a product that people will pay for, as opposed to the mindset of doing everything 100 percent to make sure that nothing ever fails. That philosophy is what has kept rates affordable to the average consumer for all these years, and while I don't think the cable industry has ever received any credit for that, they've gotten plenty of criticism for it.

Looking forward, clearly the telecommunications environment of the future is going to be highly competitive, which means you have to deploy multiple services in order to drive your revenue. That means, by default, the networks have to become much more robust. They have to become, to a degree, self-healing. They have to be automated, in terms of fault analysis and redundancy. In turn, they're going to be much more expensive to build and much more sophisticated from a technical standpoint.

You hear this training issue all the time, and the fact is that without a much greater degree of focus on training, the cable industry is going to have a really difficult time making that transition. The influence of companies like AT&T will probably mitigate that to some degree, at least within their company and by the example they set.

The paradigm that the industry has used in the past with respect to training, developing and retaining people has served the industry well, but it isn't going to work in the future, simply because the complexity is so much greater in advanced networks.

We've got to set our business objectives and set a strategy to accomplish those, and a critical part of accomplishing our future business objectives with much more complex systems and more robust systems is a more effective strategy for training and retaining people.

Ted Hartson: Hall of Famer

Ted Hartson took part in the first meeting of the Society and was inducted into the SCTE Hall of Fame in 1995.

What were you doing in 1969?

Ted Hartson: In 1969, I was the chief engineer of Wolverine Cablevision in Battle Creek, Mich., owned by Time Life Broadcast and some others. That was a precursor to Time Life Cable.

What has been the greatest accomplishment of the SCTE?

Ted Hartson: Without a doubt it's training. The industry had very little organized training. Most of the training at that time took place by the vendors. They would hold a lot of regional meetings that, someplace between chatting each other up and drinking beer, there was some training going on. But for the most part, the industry was devoid of any type of formalized training.

What were the hot items in 1969?

Ted Hartson: Keeping your pictures on the air and good. Simply reliability and quality. Systems were pretty frail during that period of time. They were almost always, without exception, 12-channel systems, and nearly all of the programming got to the cable subscriber through over-the-air antennas located at the headend. So antennae issues, co-channel, noise and fades, and all of the things associated with over-the-air reception were hot issues.

Reliability of the amplifier cascades was always a big problem. Processors in 1969 were primarily vacuum tube. Amplifiers

were solid-state by then, but most of the headend processors were still vacuum tube that required lots of trips to the headend.

Who have been the most influential people in the SCTE?

Ted Hartson: Without a doubt, Bill Riker. Our meetings for the most part took place regionally or took place in conjunction with the national shows.

Getting away from being kind of a social organization that occasionally did training and occasionally provided services to its members and into an organization whose mission was really training and development of its members was what happened in the late 1970s under Bill Riker's leadership.

What are cable's biggest challenges over the next few years?

Ted Hartson: The same things they've faced before: Training. Every MSO (multiple system operator) has high quality people at their senior engineering levels and high quality people that understand the problems and the ethic that it takes to maintain reliable, high-quality systems. But how far down in the organization that degree of excellence pervades is really a function of the internal dedication of the company.

There are always good people in field situations, most of whom have developed their skill set largely on their own. The NCTI has been helpful. Most large MSOs have created their own internal training programs now, but that degree of excellence has had a hard time finding its way deeply into the industry.

As much as training, it's the motivation of the senior management to realize how important it is that their engineers and technicians are well-trained.

When cable systems received marginal quality signals off the air that could fade out because of thunderstorms or things like that, customers were more tolerant. Now the customer expects the same reliability of their cable system as they do of their electric power and telephone, and that means basically 100-percent availability. CT

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

Step Back From the Trees a Bit

The Society's Forest Is Thriving

By the *CT* editorial staff

Given today's hectic schedule of deploying advanced services and upgrading plant, we sometimes forget just how much the Society of Cable Telecommunications Engineers has progressed over the last 30 years—and it's still growing. That being so, SCTE's 30th Anniversary presents a fine opportunity to reflect on the Society's achievements and ponder its future.

In keeping with SCTE's focus on training, certification and standards, *CT*'s editorial staff consulted with SCTE luminaries Alan Babcock (director of training development), Marv Nelson (vice president of technical programs) and Ted Woo (director of standards) and asked them to share their views on the Society's accomplishments and coming challenges.

Without further verbiage, here follow their answers.

Training: top priority

Before becoming SCTE's director of training development, Alan Babcock worked his way up through the ranks. Over his 17 years in cable, he has held technical positions from installer up to area engineer, and he has dedicated 12 of those years to technical training and its development. He also writes a regular column for *CT*.

Communications Technology: ***What do you see as the SCTE's greatest training accomplishments in its first 30 years?***

Alan Babcock: SCTE has become a leading provider of training programs and opportunities for the industry. We have done this by being responsive to the needs of our members.

Thirty years ago, the industry had cable systems that were providing five to 12 channels of television via coax, ladder line or even open-wire transmission line. We provided training opportunities through a few chapters to help the technicians in those systems to learn about things like noise, distortions and decibels. Time has brought significant changes in the technology, and the number and expertise of technicians has steadily grown to accommodate those changes. ➤

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recognition by a number of system operators and other industry organizations. Again, it was a significant achievement that certainly testified to the need for such a certification program.

In 1989, SCTE rolled out the Installer Certification program. This also met with a great deal of enthusiasm. Since its introduction, there have been more than 10,000 candidates participating in the program.

Recently, the Society introduced two new programs: Broadband Service Technician and Telephony Certification. Both of these are still in the formative stages, but again they are generating interest because they are addressing current needs of the industry.

Overall, the most satisfying accomplishment of certification has been its adoption by a number of cable operators. It is not uncommon to see an ad listing certification as desirable or mandatory for hiring. This says to me that the programs have in fact accomplished what they set out to do, "raise the technical competency of installers, technicians and engineers."

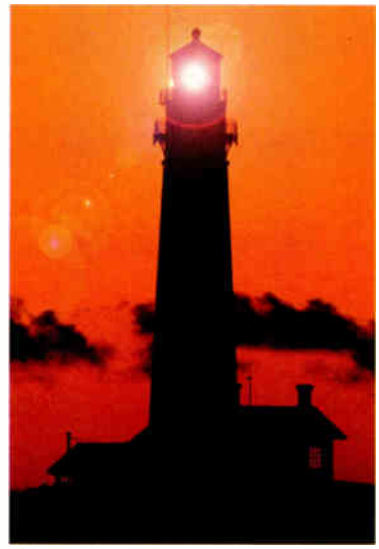
Communications Technology: *Where do you see SCTE focusing most of its certification efforts in the next year?*

Marv Nelson: Maintaining content in each of the programs will continue to be a priority. Without this emphasis, the programs may go the way of the FCC license exams.

The SCTE Training Committee currently is working on a five-year plan for developing much-needed training resources for candidates planning to enter the certification programs. While these training programs will not be developed as prep courses for the exam themselves, we have seen and heard over the last several years a need for building training that will assist the industry in its training initiatives.

We also are looking at ways to begin to use technology to assist in the testing process. With widespread accessibility and acceptance of the Internet, this may provide a vehicle for bringing the exams closer to the candidate and enabling more people to participate. There still are a number of issues to be resolved before this can take place, not the least of which is security of the exam content.

But if history has taught us anything, it has shown us that given a technical challenge, we will eventually solve it. This will no doubt be true going forward. ➤



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Communications Technology: *In terms of certification, what directions and trends do you foresee for cable generally and SCTE specifically in the next five years?*

Marv Nelson: One facet that we are just beginning to look at is the model that certification has been built on. In the past, we had clearly defined roles for field personnel. An installer, for instance, was responsible for installing and disconnecting cable service to the home. When the services offered were limited to TV reception only, this model worked well.

Today, however, we are seeing a rapid explosion of new services and new types of services. No longer can we afford to consider the installer's role to be a simple entry-level position. There is a need for the installer to also be familiar with data services and cable modems, digital video and digital receiving devices. The economic model will not support having a specialist for each type of install, nor does it equate with good customer service.

I can just imagine the install of tomorrow when the installer arrives at my home and says: "I'm here to install the cable wiring. Once I've finished, we'll be able to schedule a computer technician to install your cable modem. Then we'll have to schedule a digital video specialist to connect your digital TV and DVD player. Oh, you'd also like to have us supply your telephone service? Well, I'll have the office call and schedule a telephony technician to come out and activate phone service." It just doesn't work.

Certification programs may well have to adapt to this changing role of not only the installer, but also all levels of technical employees. It is hard to say at this point what that change will mean, but I see it as an inevitable event, and SCTE will be leading the way with its certification programs.

Communications Technology: *What specific effects on certification do you foresee in cable's migration to advanced services such as digital, high-speed Internet access and telephony?*

Marv Nelson: In addition to those already mentioned, the content of each of the programs will need to evolve with the adoption of new services and new technology into the industry.

One of the advantages of the BCT/E Program in particular is that it was built in such a way that it can easily adopt new technology as it becomes a deployed service. The process was split into seven separate and distinct categories (that is, headends, baseband signals, transport systems, distribution systems, data networks, terminal devices and decision-making). Within each of these categories, a new service such as digital TV will have an impact, but each exam focuses on the application of that technology.

For instance, digital TV begins as a baseband signal. It is then processed in the headend for delivery over a distribution system and is received and viewed by the customer with some type of terminal device. The signal may have been

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transported over an optical link to the headend, and the link may well consist of a synchronous optical network (SONET), asynchronous transfer mode (ATM) or Internet protocol (IP) network. So as you can see, this one technology will look different in each of the categories of the exam, based on the application of the technology.

We are not rushing to incorporate new technology into the exam process. There is no need to test knowledge just for the sake of testing it. For certification to be truly meaningful to both the candidates and their employers, it must add new technology as it becomes appropriate.

This would suggest that a new horizon technology such as IP telephony would appear first at the Engineer level of the exam over the next year or so as it becomes the subject of future system capability. Then, as it becomes a deployed technology, it will begin to appear in the Technician level exams. Ultimately, when it is in full deployment, it will be covered in Installer and Service Technician exams.

Standards: improving life for all

As SCTE's director of standards, Ted Woo, Ph.D., is squarely in the forefront of the cable industry's future. Mergers and acquisitions aside, standards are the springboard for the next big jump; all the separate technologies in the world mean nothing without standards to weld them into a cohesive whole.

Communications Technology: *What do you see as the SCTE's greatest standards accomplishments in its first 30 years?*

Ted Woo: There have been many significant SCTE standards achievements, especially during the last three years. If I had to choose only one, the greatest accomplishment would be the growth of national and international recognition of SCTE standards.

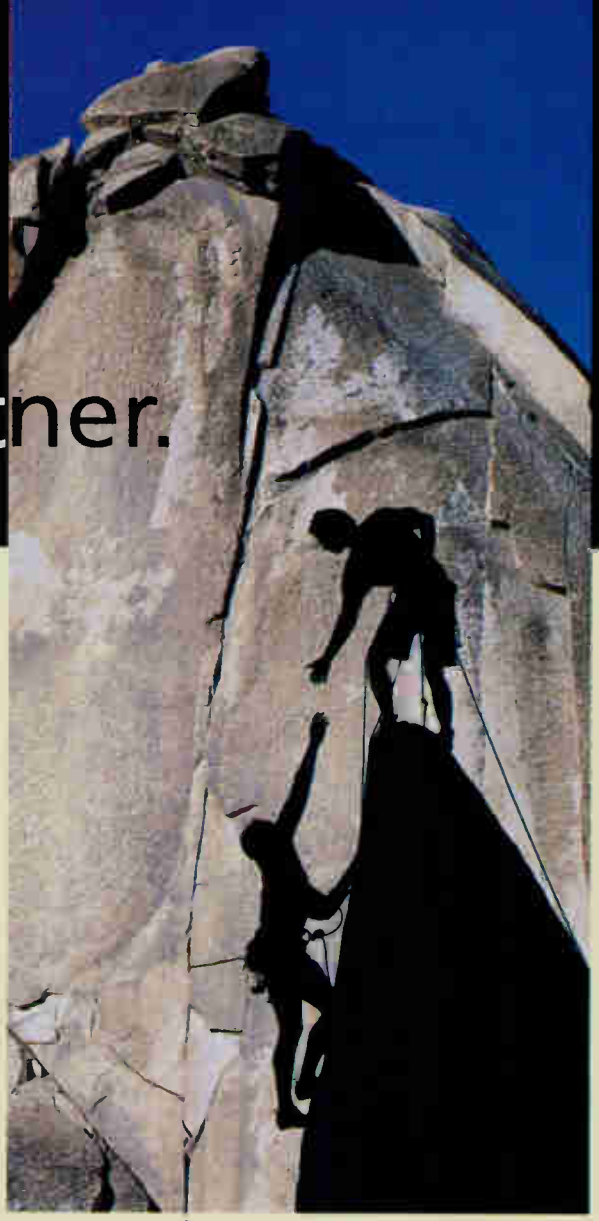
In the early years of the cable industry, much confusion resulted from the differences in physical dimensions for interconnection between cables and connectors. SCTE initiated its first Graphic Symbols document from 1982 to 1985 and then developed physical dimensions of F-connectors from 1993 to 1995. Through SCTE's consensus body standards development process, standardized products have received public recognition.

Key words in this achievement are "interoperability" and "reliability." Because of interchangeability, consumers can now have hardware, software and network products from various suppliers globally. Quality from the specifications guarantees product performance and reliability between manufacturers and industries.

SCTE became an American National Standards Institute Standards Development Organization (SDO) in August 1995. SCTE is the only ANSI-accredited standards developer for the cable telecommunications industry.

From 1996 to 1999, the number of our ANSI and International Telecommunications Union standards increased from zero to six. Our industry standards surged from 28 to 154. Our standards participants

There are moments when you really appreciate a reliable partner.



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Cheetah Technologies' Phasor System can analyze more than 500 spectral data points on a single node– from 5 to 42 MHz – in a 20 millisecond sweep. That's three times the resolution of competing systems, at the fastest rate in the cable industry.

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Flexible configuration capabilities let you deploy the Phasor System in a variety of price/performance models. And, importantly, Phasor works as a best-of-breed standalone or as an integrated component in a Cheetah network management solution, sharing critical resources with the rest of the system.

With Phasor, there's nowhere for ingress to hide.

Your Guide for "Find and Fix" in the Home

Preparing Subscribers for Advanced Services

1

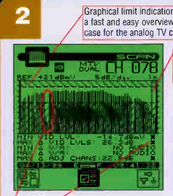
Parameter	FCC-Rule: 76.605USA	CENELEC-Rule: EN 50083-7 Europe
Minimum visual carrier level	0 dBmV at subscriber terminal 3 dBmV at end of 100 ft. drop cable connected to tap	60 dBuV at subscriber terminal (57 dBuV for systems with 8 MHz channel spacing only)
Visual carrier level 24 hour variation	Not vary more then 8 dB within any six month interval (measured before the converter).	N.A.
Maximum signal level of adjacent channel	Within 3 dB of any visual carrier	Within 3 dB of any visual carrier
Minimum/maximum level delta visual carrier level	10 dB up to 300 MHz + 1 dB for each additional 100 MHz of frequency bandwidth	12 dB from 47 to 862 MHz 6 dB for any 60 MHz range
Maximum visual carrier level	Is maximum level of subscriber terminal or receiver	80 dBuV at subscriber terminal (77 dBuV for systems with 8 MHz channel spacing only)
Sound carrier level	10 to 17 dB below the associated visual carrier level	11 to 18 dB below the associated visual carrier level
Digital TV carrier level	-10 dBmV at subscriber terminal -7 dBmV at end of 100 ft. drop cable connected to tap *	50 to 70 dBuV at subscriber terminal

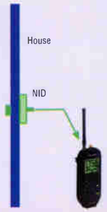
(* not a FCC rule.)

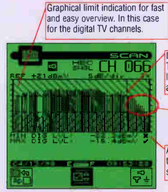
Limits for Proof-of-Performance

Know the measurement limits and the limits of your equipment! Quality of service is built in, not added. The FCC (US) and CENELEC (Europe) have provided rules to ensure sufficient quality of service to satisfy the communication needs of today's subscriber. To avoid mistakes, a modern signal level meter should test according to pre-selected limit sets (for analog and digital signals). Make sure your instruments' limit sets are set to appropriate FCC and CENELEC standards and regulations.

2







Be Prepared for Both Analog and Digital Signals

First *fix* problems before performing the final test

A spectral-scan is the best tool to view trouble in one shot. It indicates frequency response, notches, roll-offs, standing waves, etc. It will also show if a final "auto test" makes sense. If signals are outside the limits already, the network should be fixed first, before performing any final testing.

To save time, a spectral scan with on-line limit check gives a quick real-time indication that the channel plan is passing or failing.
Note: It must be easy to differentiate between analog TV and digital TV signals.

3

Carrier-to-Noise (C/N) Problems in the Home

When analog TV carrier levels are too low, they commonly create a "snowy" TV picture. Bad Carrier-to-Noise (C/N) is the result.

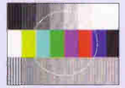
Intermodulation (CTB/CSO) problems

When carrier levels are too high, they commonly create intermodulation distortion products in home amplifiers or the input of the TV. Second and third order intermodulation products cause the bad TV pictures shown below.

Level measurement indicates:
- *Improper level setups.*
- *Too much tap or cable loss.*
- *Not enough amplifier gain*

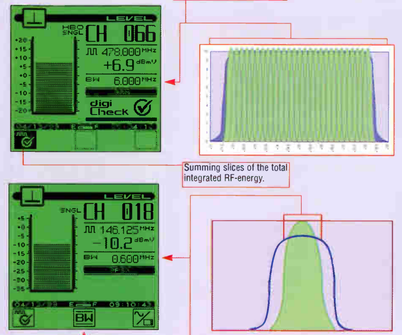
Bad C/N appears as "snow;" Signal levels too low

Bad CTB (Composite Triple Beat); Signal levels too high



Bad CSO (Composite Second Order); Signal levels too high

4



Making Accurate Digital Average Power and Performance Measurements

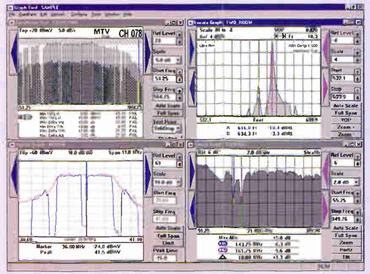
Digital-TV and forward cable modem signals

The digiCheck™ average-power measurement method takes small slices of the integrated RF-energy, summing them together to provide one total power reading. This method of measuring the total integrated RF-power under the haystack is very reliable, repeatable and accurate. It takes into account the in-channel flatness of the digital carrier itself.

Reverse path digital signals like cable telephone carriers

The digiCheck™ feature offers a time average as well. This is mainly for small-band digital carriers, where a 'scanning" measurement filter does not give incremental accuracy.

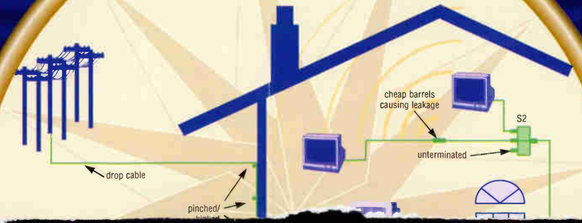
11



Manage Channel Plans, Setups, and View Signals Historically

With StealthWare, paperless management of all test results is possible. Report generation (according to the rules of FCC and CENELEC) can be performed and printed out. Maintaining setup and channel plans of all test equipment ensures repeatability.

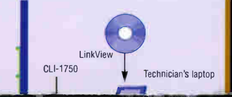
75% or More of Ingress is in the Home



5

New: Making digital power measurements on bursty cable modem signals with the CLI-1750

The spectrum analyzer mode of the CLI-1750, in combination with peak-hold, makes it possible to capture the peak power of the bursty cable modem signal. After the peak-hold trace is built, a marker can be used to read the level in dBmV or dBuV. Specialized software (such as WWG's LinkView) on a laptop makes control of the cable modem possible. This ensures that the proper cable modem is measured. At the same time this software can perform protocol analysis and check for double IP-addresses.



LinkView network protocol and traffic

10

Automatic Measurements Saves Time

To certify that the network termination and the home network are within specifications, an auto-test can be performed. Results can be viewed instantaneously. A statistical view indicates if there are any errors, the channel table view indicates which channels fail, and the detailed view indicates what the error is on that specific channel. These results can be printed out directly or downloaded into the PC for report generation.

Auto-test statistics view

- All test points are measured the same
- Print or view history

Auto-test detailed view

Auto-test channel table view

9

Verifying Frequency Response

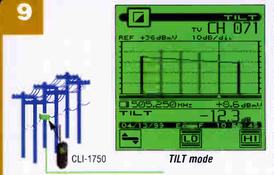
For digital and Internet services, check the frequency response. Two modes can be used: TILT (MicroStealth and CLI meters) and sweep (home wiring test kit). TILT measurement is a fast and effective method to balance line extenders and in-home amplifiers.

Checking for frequency response

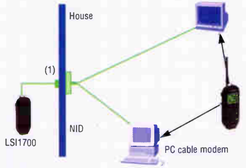
The "best" measurement and check of a signal path is with frequency reponse. It shows proper gain, too much loss, standing waves, parameters indicating problems with the cable, connectors, line extenders or in-house amplifiers, taps, splitters, and so forth. All relevant problems will appear in a response trace.

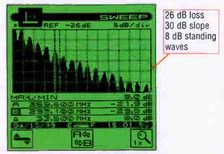
Connecting the Home Wiring Test Kit to sweep is easy

Connect the LST-1700 at the beginning (1) of the network. Put the LST-1700 in MiniSweep-mode. The CLI-1750 can now be connected at any test-point in the network. After selecting the MiniSweep-mode, the receiver will synchronize automatically and present a normalized sweep trace.



TILT mode





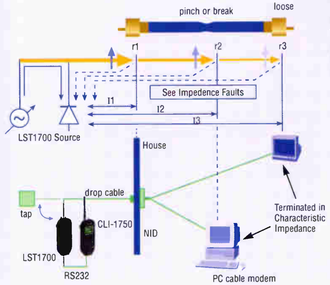
26 dB loss
30 dB slope
8 dB standing waves

Freq. response in MiniSweep

8

Find Physical Faults

If a cable fault is buried, inside a wall, or otherwise hidden, use the FDR mode of the CLI-1750. More accurate than TDR, the LST-1700 is used as a sweep generator, injecting a sweeping signal into the beginning of the network (street, home, apartment building). Bad cables, connectors, taps, splitters, etc. will cause reflections or standing waves. Analyzing these standing waves by the CLI-1750 gives a distance-to-fault diagram; reflection in dBrl vs. distance in feet or meters.

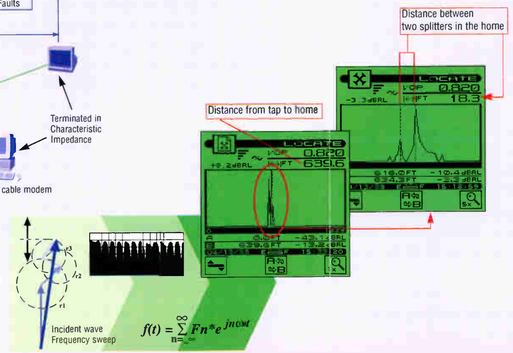


Cable Compensation

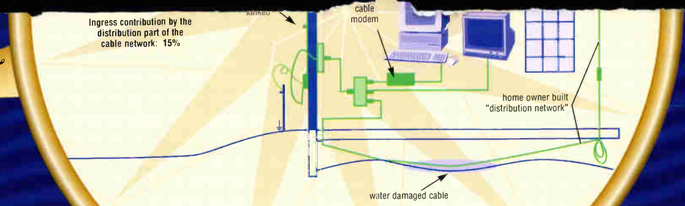
The displayed reflection includes the cable insertion loss. The Home Wiring Test Kit (HWTK) offers automatic cable loss compensation vs. frequency.

Advantages of FDR vs. TDR

Excellent event resolution - no "dead-zone". Higher dynamic range = further distance. Measure through multiple taps, splitters, etc.

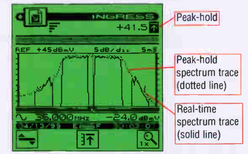


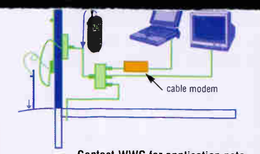
Ingress contribution by the distribution part of the cable network: 15%



Ingress is considered to be one of the biggest obstacles in deploying interactive services over the reverse part of the cable network. Most ingress originates in the home and distribution network.

- *Cable modem control*
- *Internet monitoring*



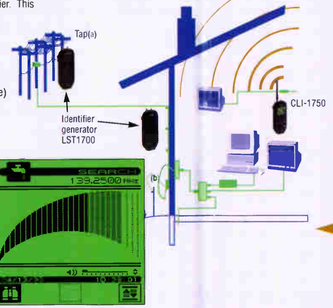


Contact WWG for application note.

7

Proactive Leakage Detection in the Home

Leakage and ingress are directly coupled problems; a leak "out" can also be an "opening" for ingress to enter the system. Any time a tech is in a home and can take time to do a quick RF radiation measurement, he is also fixing "future" ingress problems. To find a leak, use the LST-1700 as a signal identifier. This ensures that the CLI-1750 leakage receiver is always detecting the known leaks from the network under investigation. The LST-1700 should be temporarily connected to the tap(s) (the beginning of the drop cable) or to the beginning (ground block)(s) of the home network.



Leakage detection mode

Leakage search mode

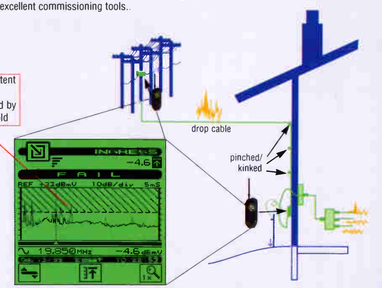
6

Measuring ingress: POP for the reverse path

For the entire return path node, each home's noise and ingress combines and accumulates at the headend. It is therefore important to maintain "POP", such as limits for each individual home under a certain ingress threshold.

At the tap (the beginning of the drop cable) you can get the total ingress signature of that home. Moving the instrument toward the ingress source (deeper into the home) will eventually help you zoom in on the error. With graphical limit thresholds, WWG's meters are excellent commissioning tools.

Intermittent ingress captured by peak-hold



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Reader Service Number 62

went up from 75 to more than 660, representing 177 organizations in 25 countries.

Communications Technology: ***Where do you see SCTE focusing most of its standards efforts in the next year?***

Ted Woo: SCTE standards development efforts will focus on market-driven technologies. With all of the modern technologies and advanced applications that are available to the cable business, there are more development needs to be addressed in the standards documents.

For example, standards initiatives generated from various industries such as the telephone, Internet and motion picture and television associations are having a direct impact on our business. These changes have most of the membership's attention, and that is where our standards efforts will be focused. SCTE Video Compression Format (DVS033) and Digital Video Transmission for Cable Television (DVS031) are typical examples of approved standards for which we spent our efforts and received global recognition.

After the successful launching of the cable modem standard (DSS97-2r1) Data Over Cable Service Interface Specification (DOCSIS) last summer, the focus is now on technology development between cable TV, telephony and data Internet technologies such as OpenCable and PacketCable. Standards development will be focused heavily on, but not limited to, these areas. The Outside Plant Element or Hybrid Sub-Layer Management is another area that is

BOTTOM LINE

SCTE Directions—Past and Future

Do you know the feeling? Out of nowhere, it rips through your solar plexus, to the very core of your being: "How in the world did I get here? And where do I go next?"

The feeling's roots are simple enough. In the headlong rush of today's projects, we sometimes become so rooted in the "now" that we neglect both past and future, to the detriment of the present.

On this, the 30th Anniversary of the founding of the Society of Cable Telecommunications Engineers, we face these same questions. We need to take stock of where we've been and where we're going. To that end, *CT*'s editorial staff has asked Alan Babcock, Marv Nelson and Ted Woo to share their perspectives on the past and future of SCTE's efforts and accomplishments in training, certification and standards.

These three luminaries provide some answers to our literal (if not quite philosophical) questions of direction. They show us exactly how we got here, and they also point out several promising paths to the future for our industry and our Society. If you want to know what it's all about, these are the guys to ask.

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new this year. A surge of international interest is working on the SCTE standards development of technical specifications for the status monitoring transponder.

Communications Technology: *In terms of standards, what directions and trends do you foresee for cable generally and SCTE specifically in the next five years?*

Ted Woo: Because the telephone, computer and satellite industries are leaning toward hybrid fiber/coax (HFC), plus the common ground of IP as a signal transportation tool, standards business in the cable industry will be substantially expanding.

With SCTE being the sole accredited standards developer in this industry, there will be a multifold workload. For example, the number of SCTE-approved standards documents is projected to increase by 300 percent just by the end of the next two years.

Business mergers will push cable operators to use standards more as guidelines or policy for interoperable products. This is particularly crucial to cost savings in training, equipment maintenance, and central purchasing and inventory control.

Communications Technology: *What effects on standards do you foresee in cable's migration to advanced services such as digital, high-speed Internet access and telephony?*

Ted Woo: Cross-industry players call for standards harmonization and cooperation. Institute of Electrical and Electronics Engineers 802.14, Advanced Television Systems Committee, Bellcore, Society of Motion Picture and Television Engineers, and the ITU-T Study Groups 9, 11 and 15 have contacted SCTE's Standards Department for cooperation. They would like to share in the latest standards development information for the best interests of all as they generate new standards.

This means standards may be used across the industry. For example, the Bar Code standard (MMI001), which is being implemented in the cable industry, originated in the telephone industry for packing and shipping. It will be interesting to see what the new interconnects will be like between the F-connector from the cable industry, the "Twisted Pair" plug from telephone, and the RS232 port from the computer industry. After all, standards are a public tool for making specifications common, to bring a better life to all. CT

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Reader Service Number 67

Video-on-Demand: Fact or Fiction?

VOD's Bells and Whistles Are Closer Than You think

By Arthur Cole

It's baaaaack. Less than a decade after video-on-demand (VOD) was written off as a pie-in-the-sky dream of billionaire media moguls, it is making a serious comeback, with all indications pointing to major rollouts by the end of this year.

Now that the heavy investment in fiber optics has been made, leading cable operators are eager to reap the benefits of their efforts by introducing new digital tiers with all the bells and whistles. And not only is VOD shaping up to be one of the most lucrative digital services, but it's also one of the least expensive to implement.

Cost per sub

That's right. The same service that was derided less than a year ago as light years beyond the budgets of all but the wealthiest subscribers is now available at a price well within the reach of the average consumer.

"Last year, the cost per stream for VOD—including modulation, network management, equipment and software—was in the thousands. The set-top itself was a mini-computer," said Ray McDevitt, senior vice president of marketing and product management at Diva Systems Corp., one of the half-dozen or so VOD systems manufacturers on the market. "Now that the digital set-tops are down under $300, the cost of the solution is less than the value of the service."

Diva and other providers can deliver VOD at roughly $350 per stream. With one stream serving 10 households, that comes to only $35 per subscriber, less than 10 percent of the cost of the box for a service that could provide the lion's share of digital revenues.

So how did this rapid change come about? Well, the first clue comes from those famous "failed" experiments at Time Warner's Full Service Network in Orlando, Fla., in the early '90s. Hindsight now shows that the experiments didn't fail as much as show what needed to be done to implement an effective, affordable VOD platform.

"VOD is a terrific business based on our experience in Orlando," said Jim Chiddix, vice president and chief technical officer at Time Warner.

If anything, the Orlando experiment demonstrated two things: the need for a low-cost set-top box, now or soon to be available from General Instrument, Scientific-Atlanta, Philips and others; and the need to replace analog, coaxial systems with fiber-based digital services.

In Time Warner's case, both elements are in place, and the company is comparing VOD systems from SeaChange, Concurrent and others for select rollouts by the end of the year followed by full-scale deployments in 2000.

Video server systems, like this one from SeaChange, play a key role in VOD.

"We like the price points that some companies have achieved in the server side," Chiddix said. "The new server systems are end-to-end, ready to plug into billing systems, media management, modulators.... They meet our target of less than $400 per stream. Assuming 10-percent usage, we can support one digital customer for $40."

From dream to reality

Not only have the servers and set-tops come down in price, but much of the support system also has been simplified now that VOD has emerged from a showcase technology to a viable solution.

"We've gotten away from having to outfit a headend with 100 channels of encoding equipment," said Mark Schaszberger, president of the media division at Imake Consulting, which recently sold its suite of VOD support applications to Americast. "We even work at a centralized headend. We don't need to deploy at every headend."

Of course, implementing VOD is not necessarily a simple plug-in-and-go procedure. There's a lot of integration involved. The VOD server has to talk to the set-top box, the billing system, traffic management, encoders, modulators and so on.

"There are no real technical issues as far as getting the video out of the server and into the system," said Pete Smith, senior vice president of engineering and advanced technology at RNA Management Lcc., parent corporation of Cablevision of Atlanta, which has been testing VOD sys-

Diva Systems' OnSet Demo truck features a viewing lounge as well as a server and sample headend.

tems for the past few months. "The weak point we have with all these services is with management and billing systems."

Because most billing systems are designed to run on the traditional pay-per-view model, in which bills are generated according to the schedule of events, VOD will require additional tweaking. VOD has no schedule—movies are queued at the viewer's request.

Integration essential

That's why, at least for the time being, it makes sense to work through a vendor that can put together an integrated, end-to-end system—complete with billing, media management, set-tops and other support devices—unless you want to deal with the headaches and bugs that come from assembling a system piecemeal. The task in installing a complete system is to provide an adequate platform to support not only the early adopters this year, but also the expected growth in subscribership next year and the year after.

"Make sure you have enough fiber," said Yvette Gordon, director of interactive technology at SeaChange International, a VOD systems manufacturer. "30,000 VOD subscribers will need 3,000 VOD streams at 9 Gbps. Be ready for that, and make sure you're upgrading to two-way real time."

Beyond that, most VOD systems will work seamlessly with almost any network architecture.

"We don't need high-end processing. We're not using ATM (asynchronous transfer mode)," said Bob Gaydos, an engineer at Vivid Technology. "We use Ethernet for our network servers, but we can stand alone and support any number of streams of broadband video."

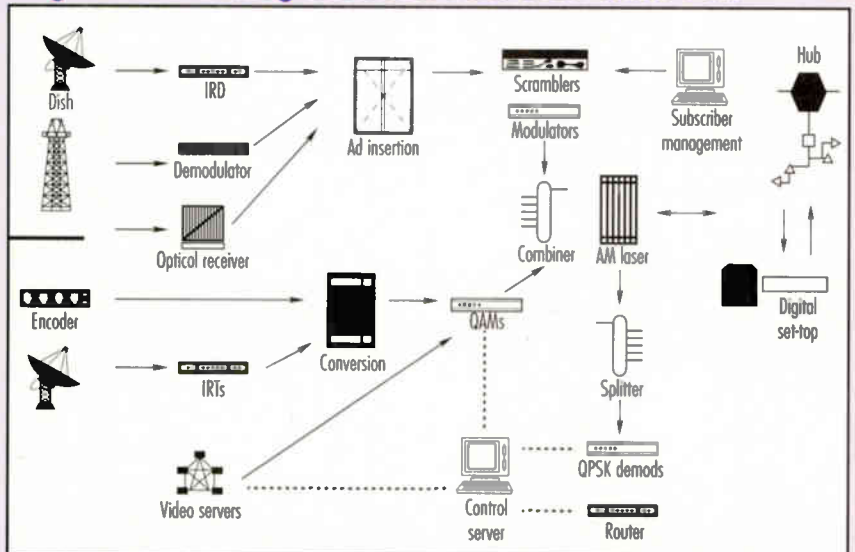
And the set-top? As far as VOD systems are concerned, it seems that most will have built-in compatibility with the popular models out there. With only a handful of set-top vendors and VOD providers, it doesn't appear there will be a need for independent standards.

"We provide an open platform and let the operator pick which VOD service they want to operate," said Denton Kanoff, vice president of marketing of digital network systems at General Instrument. "All of the VOD providers have different interfaces. From GI's side, we can interface with all of them."

Standard interfaces needed

But that's not to say that compatibility issues will not exist elsewhere in the chain.

Digital and analog network overview with VOD



Source: SeaChange International

BOTTOM LINE

The Case for Video-on-Demand

Video-on-demand (VOD) is making a strong comeback as fiber optics and two-way service hit the mainstream this year.

Costs per subscriber now are well within the targets set by Time Warner and others earlier in the decade, and it now appears that VOD is going to become the cash cow that delivers the return on all that fiber that's been put into the ground.

A merry handful of manufacturers has stepped up to the plate offering integrated systems that combine the server, billing systems, traffic management, encoders and set-top compatibility, providing what some early adopters say is practically a plug-and-play system.

Sure, some interface issues still exist, but they are not serious enough to delay introduction of the service.

The best part: buy rates among the few wired subscribers are high, pointing to a lucrative business ahead.

Is "Nearly" On Demand Good Enough?

So why upgrade to a full video-on demand (VOD) system? After all, near-video-on-demand (NVOD) offers virtually the same service with only a few minutes of lag time to start a movie, rewind and so on. And the operator can save on server and channel space that could be devoted to some other whiz-bang technical offering.

The overriding reason to back full VOD is competition. Yep, like it or not, you've got competition in the form of satellite providers, all of whom already are pushing several hundred channels of digital programming.

But they can't do VOD.

On a national scale, with millions of potential orders, VOD would overwhelm even the most powerful servers, not to mention all the support gear that would be required.

"Cable could do well with NVOD. We could make a lot of money with it," said Pete Smith of RNA Management, Cablevision's parent. "But when I look down the pike at what I can do that others can't, I can do well with VOD, while the others have trouble doing it."

VOD also has the most revenue-generating potential of all the digital services. That income would only be put in jeopardy if subscribers are told that they have a near-perfect solution, rather than a perfect one.

"There are a lot of undefined interfaces that need to be defined," Gordon said. "There are issues surrounding streaming control, navigational interfaces and controls.... We've been working pretty extensively with the OpenCable consortium and individual cable operators to standardize interfaces, but we're not there yet."

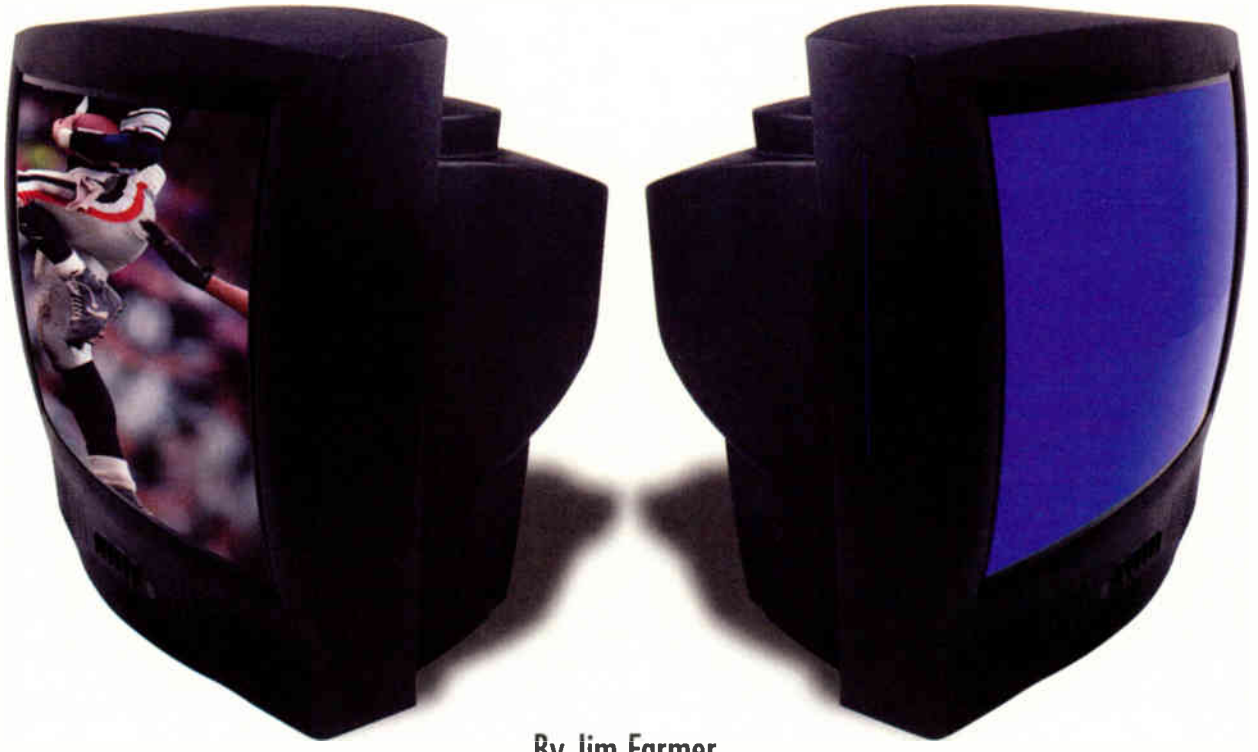
In the final analysis, adding VOD to a digital tier should be a no-brainer. Operators that already are up and running say the systems were installed and software debugged with little fuss. And early indications are that buy rates are better than expected, and customer satisfaction is high.

After all those years of putting fiber in the ground, it's payback time. CT

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

Digital Signal Trouble Versus Analog

It's Very Much an "All-or-Nothing" Proposition



By Jim Farmer

Your engineers and subscribers must be aware of some differences between digital video and analog transmission. When an analog picture is on the blink, it deteriorates gradually. Not so with digital—it's rather like falling off a cliff. And mind the speed while surfing. Let's walk through the adjustment period.

The industry is getting further along with digital video rollouts by now, but many people still have not experienced digital video and the unique issues it raises. Digital signals have some interesting properties that we exploit, but which can seem strange when you first encounter them.

Those of us who grew up with analog transmission are a bit surprised at the way digital video signals fail when the carrier-to-noise ratio (C/N) gets too low.

The figure (on page 94) shows what happens with analog video and with digital video as the C/N drops (moving to the left side of the graph). The x-axis plots the C/N, and the y-axis plots subjective quality of the signal. Intentionally, there are no scales. The important thing is to understand what happens as C/N degrades.

Start on the right side of the graph, where C/N is high. As we move to the

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left, C/N is degrading. Analog video will begin to noticeably degrade though the degradation will be gradual, and for a rather wide range of C/N, the picture still will be good enough.

As the C/N continues to degrade, there will come a point at which we start to judge the signal quality to be unacceptable, though we can still see the picture. How bad a signal we will tolerate depends on a number of things, not the least of which is our degree of interest in the program.

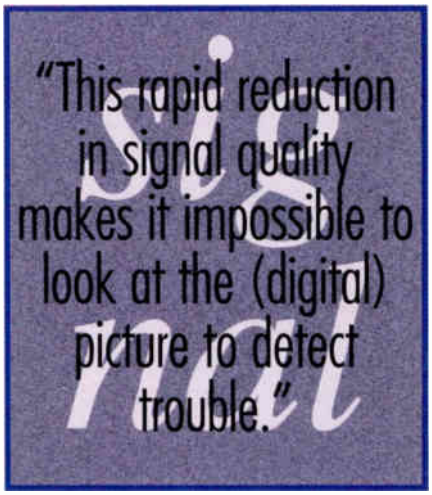
On the other hand, the digital signal maintains its high level of quality over a much wider range of C/N. The reason is that, if the C/N is adequate to allow the demodulator to correctly recover the state of all bits, then the picture can be reproduced as well as it could be with even higher C/N. However, at some point as the C/N drops, it gets so low that the demodulator simply cannot correctly distinguish between states. When this happens, you "fall off the cliff," with the video quality going from perfect to completely naught in a matter of only one or two decibels.

Getting to picture perfect

If the video is not compressed, the data rate usually will be above 120 Mbps for a single video stream. However, we would be able to tolerate more errored bits in the received signal than if the video were compressed. Noncompressed video has redundancy, in that one bit received in error will affect only a small part of the picture, and only then for one field. So it might not be too noticeable. If a bit is received in error in a compressed signal, however, it will influence a much larger area of the picture and may influence it for up to perhaps one half-second.

With digital signals, we can employ error correction. There are various techniques for doing so, but all involve sending extra bits in the signal, which can be used to detect and correct errors in the received data. Error correction will allow us to receive good signals down to somewhat lower C/N than if it were not used. This "stretches" the range over which we can see a good picture as the C/N decreases (as can be seen in the upper left corner of the figure).

However, there still comes a time when we are getting so many bits in



error that the picture goes away. The slope of the degradation without error correction is very steep, transitioning from perfect picture to no picture in only a very few decibels. With error correction, the slope will be steeper yet,

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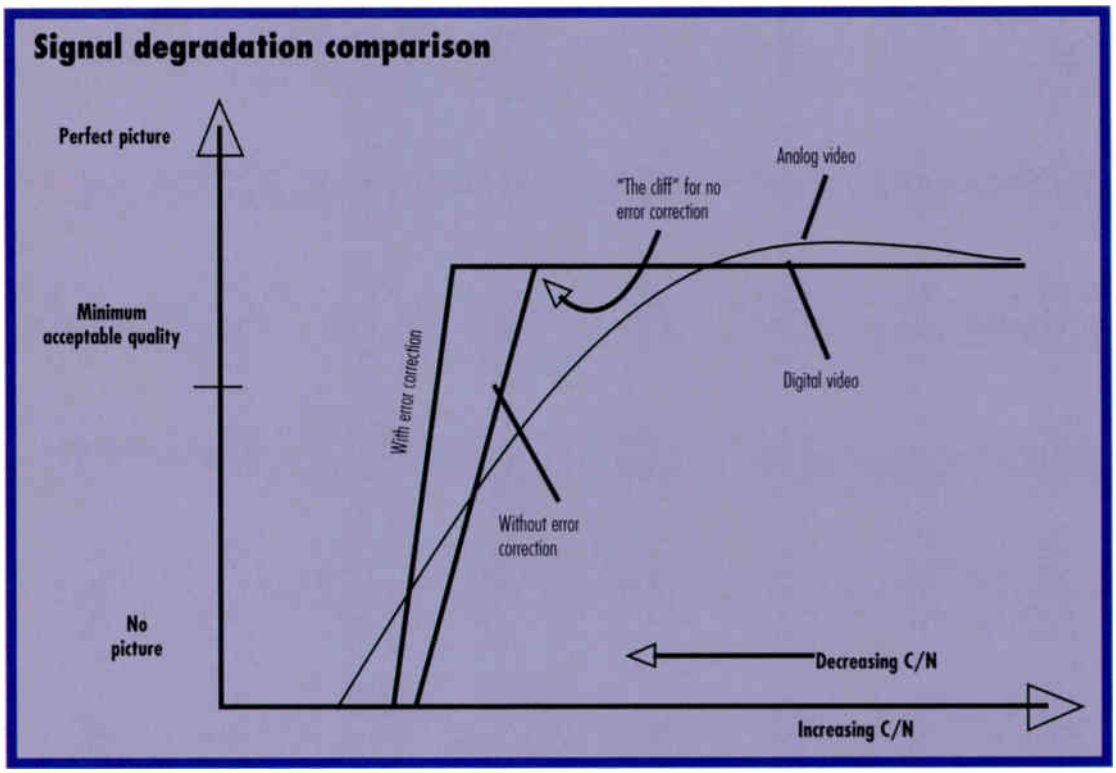

possibly transitioning from perfect picture to no picture in less than a 1-dB spread in C/N.

With digital transmission, the picture doesn't get bad as it does with analog transmission; it completely disappears. The first symptom may be pictures that "freeze" on the screen because often digital decoders repeat the last picture or parts of the last picture if they receive too many errors. Alternatively, the picture may just go away, often to be replaced with a blue screen or something else generated by the decoder.

This rapid reduction in signal quality makes it impossible to look at the picture and detect trouble. With analog, we can look at the picture and tell very quickly if we have a problem with low C/N or several other types of problems. With digital transmission, however, we can have low C/N and be within 1 dB of "crashing," and the picture will look just fine. Then as soon as you leave the customer, something happens to reduce

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the C/N by what would be an imperceptible amount in analog transmission, and the picture disappears completely.

It is possible to measure the C/N or other distortions using several techniques, but test equipment is required.

Channel surfing slows down

One thing that the consumer will have to get used to is that when he or she changes channels, it takes longer for the picture from the new channel to appear. The reason is that a compressed digital signal takes advantage of the frame-to-frame redundancy of a typical TV picture. Most of the scene from one frame to the next is unchanged, so the compression system transmits only the changes.

About twice each second (absent a scene change), a new complete picture (called an I-frame) is transmitted. When you change channels, you must wait for a new I-frame before you get a picture. One-half second delay in displaying a picture will slow down "channel surfing," in which a viewer pauses just long enough to see if the picture interests him or her.

When engineers first view a digital signal on a spectrum analyzer, they might wonder where the sound carrier is. The answer is that there is no sound carrier because the sound also is digitized and put in the same data stream as the video. It is simply assigned another program identification tag, which identifies the video with which it is associated.

The entire spectrum will look different from an analog TV spectrum. Rather than a picture carrier, a color carrier and a sound carrier, there is a single "noise-like" spectrum extending over most of the channel. Noise-like means the signal has a flat spectrum. We measure a digital signal by its average value, rather than its peak value as in an analog signal. Because the peak level of a 64- or 256-QAM (quadrature amplitude modulation) signal is several decibels higher than the average, the signal level at times will be higher than what we measure.

Digital transmission will require us to change our expectations of television and to test signals differently. But its addition is the next logical step in TV technology. We'll learn to accommodate its differences and to provide our customers with the best of both the analog and digital worlds. CT

Jim Farmer is chief technical officer for ANTEC Inc. He can be reached via e-mail at jofarmer@mindspring.com.

BOTTOM LINE

Ride the Digital Learning Curve

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Digital signals have some interesting properties that we exploit, but which can seem strange when you first encounter them. Those of us who grew up with analog transmission are a bit surprised at the way digital video signals fail when the carrier-to-noise ratio (C/N) gets too low.

Your engineers and subscribers must be aware of some differences between digital video and analog transmission. When an analog picture is on the blink, it deteriorates gradually. Not so with digital—it quickly goes from "all" to nothing, sometimes with only a 1-dB change.

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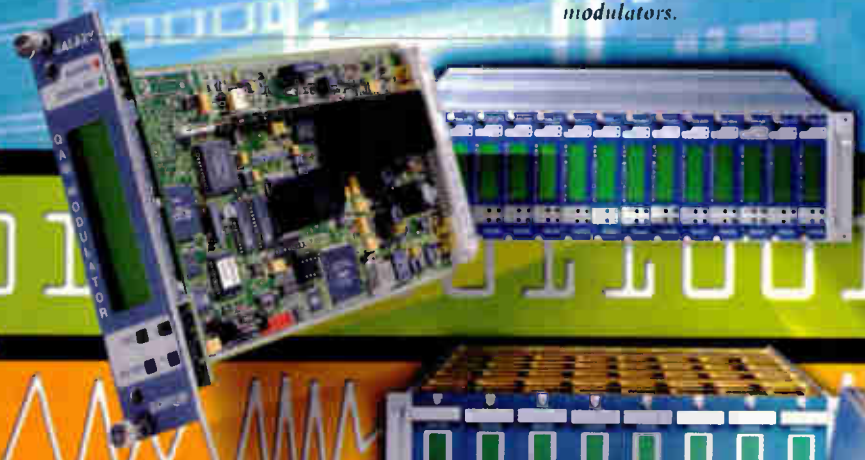

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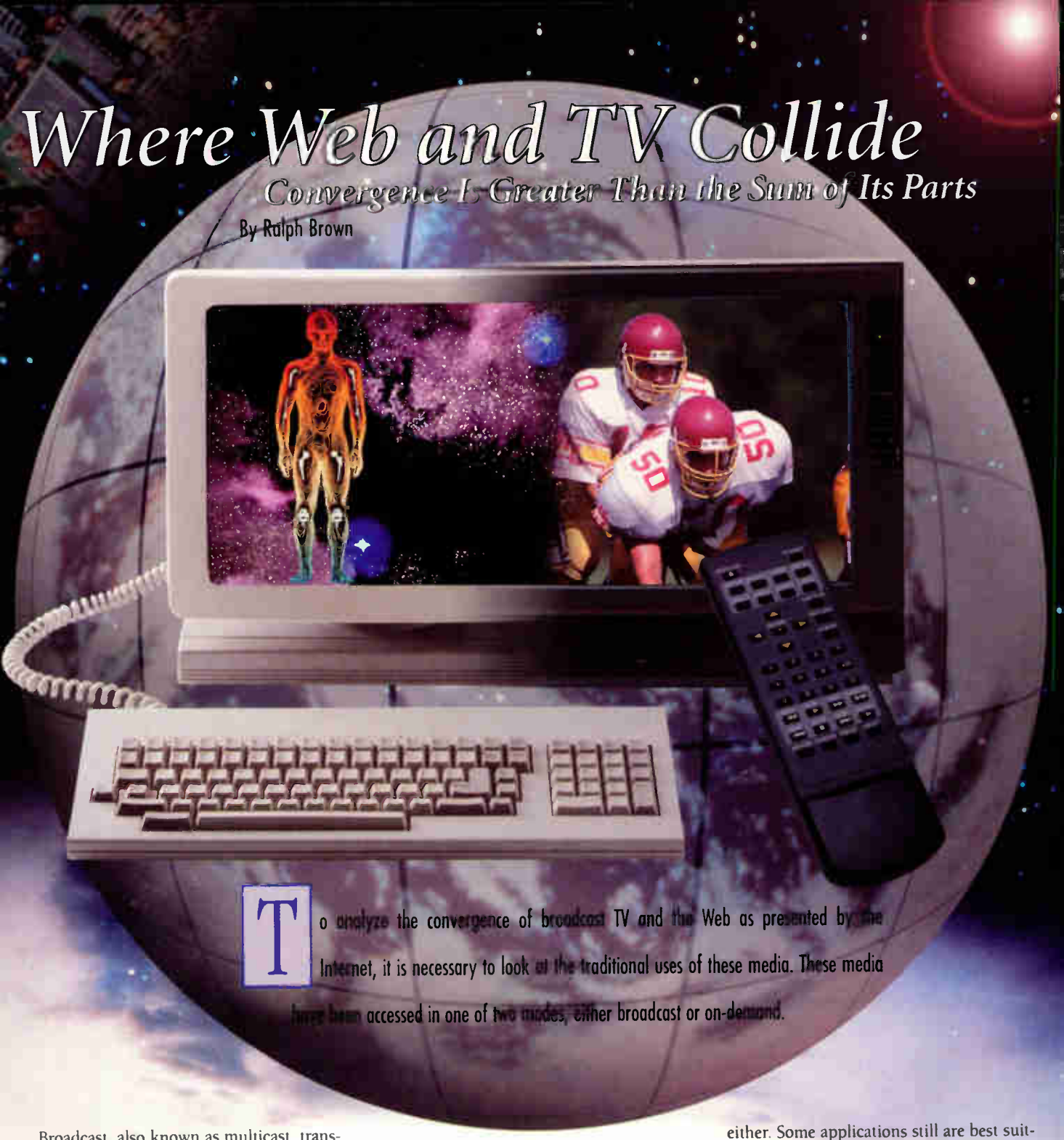
Where Web and TV Collide

Convergence Is Greater Than the Sum of Its Parts

By Ralph Brown



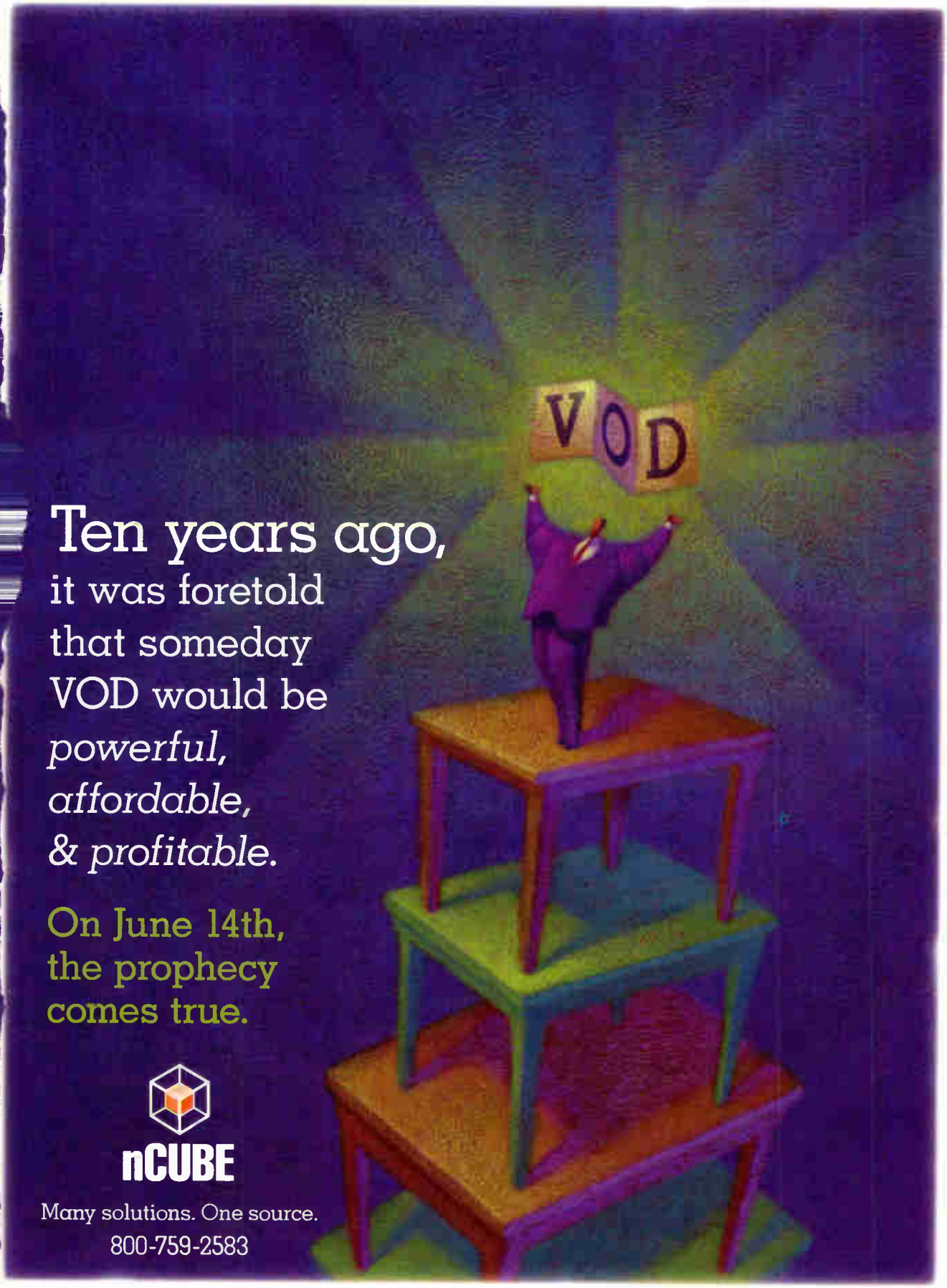
To analyze the convergence of broadcast TV and the Web as presented by the Internet, it is necessary to look at the traditional uses of these media. These media have been accessed in one of two modes, either broadcast or on-demand.

Broadcast, also known as multicast, transmits a single version of the content to multiple viewers simultaneously. On-demand transmits a single version of the content to a single viewer at the request of that viewer.

Television traditionally has been a broadcast medium and recently has been growing into an on-demand medium; the Web traditionally has been an on-demand medium that recently has been growing into a broadcast medium. The collision of TV and Web involves not only the combination of these media but also the combination of broadcast and on-demand forms of transmission. The questions of how and when the two media can complement or augment each other is the core of the debate.

The convergence of television and the Web is not simply browsing the Web on your TV set or watching a movie on your personal computer (PC). This convergence represents a medium that is greater than the sum of its parts. The convergence of television and Web is not 100 percent, either. Some applications still are best suited for the TV environment ("laid back" applications), and some are best suited for the PC ("lean forward" applications).

For example, you're not likely to work spreadsheets on your TV set, nor are you likely to watch a full-length feature film on a PC. However, it is very likely that you would read e-mail or conduct e-commerce on either platform. This convergence can be best represented by the intersection of the Web and TV space. (See Figure 1 on page 101.) ➤



The future of VOD arrives at the NCTA show, booth 3345.

"The collision of TV and Web involves not only the combination of these media but also the combination of broadcast and on-demand forms of transmission."

Broadcast vs. on-demand

First, it is necessary to understand the underlying differences between broadcast and on-demand transmission and the common transports used for each. Broadcast implies that the same content goes to many viewers simultaneously. In the TV world, this is known as broadcast TV. In the Web world, broadcast transmission is called multicast. In either world, the same principle applies: Everyone watches the same content at the same time.

On-demand implies that a dedicated stream of content goes to each viewer individually at that viewer's request. In the TV world, this is called video-on-demand (VOD), and in the Web world, this is called Web browsing. Regardless of which world, the same principle applies: Everyone watches something different at any given point in time. Broadcast transmission appeals to our community nature, on-demand to our individual nature.

The broadcast model

The traditional medium for broadcast is television. Broadcast TV is carried in one of two forms, analog or digital, and in cable TV networks it is represented by its subscription, pay-per-view (PPV) and near-video-on-demand (NVOD) forms. Broadcast analog TV is transported in NTSC, phase alteration line (PAL) or Systeme Electronique Couleur Avec Memoire (SECAM) formats. Broadcast digital TV (DTV) is transported using Moving Pictures Experts Group (MPEG) encoding over MPEG transport streams.

The evolving medium for broadcast is Web content. Generally, this means streaming video and audio content over Internet protocol (IP) networks. Streaming video and audio over IP networks typically uses proprietary encoding formats over IP multicast transport.

The on-demand model

The traditional medium for on-demand is Web content. Traditional on-demand Web content is accessed using hypertext transfer protocol (HTTP) over transport control protocol (TCP)/IP transport.

Video and audio are the evolving me for on-demand transmission. While so initial VOD trials and most hotel guest services systems use analog transmissio VOD typically is done in its digital form using MPEG encoding over MPEG tran port in TV networks. In IP networks,

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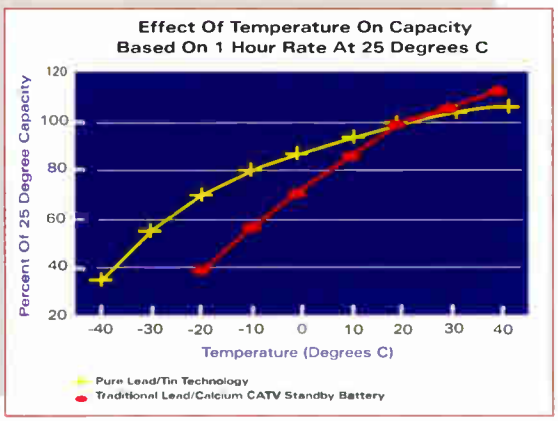

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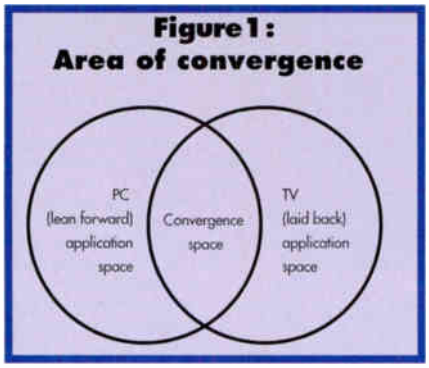

on-demand streaming video and audio is carried using proprietary encoding formats over proprietary transport protocols using user datagram protocol (UDP)/IP.

Unlike Web pages, the on-demand model for streaming video and audio places requirements on the network for time-critical delivery of its content. In addition, VOD often will have videocassette recorder (VCR)-like control features allowing the viewer to pause, fast-forward and rewind the video.

This raises the issue of stream control for these functions. There are a number of alternatives in this area. There is a standard stream control protocol defined as part of the MPEG specification known as DSM-CC User-to-User. On the Internet, a number of the streaming video providers have their own proprietary protocols. Still others have proposed standard extensions to HTTP to provide stream control. Naturally, a common protocol understood by both clients and servers is the best alternative.

Another issue with MPEG video encoding is that it does not lend itself to scalable playback in on-demand applications. That is, the bit rate used typically is constant bit rate (CBR) and cannot be adjusted based on the channel bandwidth available at playback. This means that on-demand MPEG video delivery requires a quality-of-service (QoS) guarantee or extremely large buffers to absorb network jitter.

Consequently, delivery of MPEG encoded video typically is restricted to networks that provide QoS guarantees, such as asynchronous transfer mode (ATM) or MPEG transport-based networks. Delivery of digitally encoded video over "best effort" networks, such as IP, typically use scalable video encoding formats. Until QoS protocols are widely adopted on IP networks, it is unlikely that MPEG video encoding will be used over them.

Convergence application models

Essentially, four application models can be achieved with the combination of the two media in the broadcast and on-demand forms:

- Broadcast TV with broadcast Web content
- Broadcast TV with on-demand Web content
- VOD with on-demand Web content
- VOD with broadcast Web content

Broadcast TV with broadcast Web content: When people discuss the convergence of TV and Web, the combination of broadcast TV with broadcast Web content is the most common application model. This often is called enhanced TV or program synchronous applications. The Web content often is related to the broadcast TV content. ➤

For example, enhanced ads might provide more information on the product being advertised. The Advanced Television Enhancement Forum (ATVEF) specification provides the definition of how Web content is used to enhance broadcast TV. This application model requires only a one-way broadcast network.

The implementations of enhanced TV differ between analog and digital broadcast TV. The issue with analog broadcast TV is how to carry the digital Web content along with the analog TV signal. The digital Web content is carried in the vertical blanking interval (VBI) using the North American Basic Teletext Specification (NABTS) and a Draft Internet Standard IP over VBI.

Digital broadcast TV offers higher speed

Convergence Transport

	Broadcast	On-demand
Analog transmission	**Video**—NTSC or PAL **Web**—IP multicast over VBI	**Video**—used in hotel systems **Web**—no standards defined
Digital transmission	**Video**—MPEG transport or IP multicast **Web**—IP Multicast over MPEG transport or IP	**Video**—MPEG transport or IP **Web**—TCP/IP

delivery of Web content using MPEG and Advanced Television Systems Committee (ATSC) standards. The MPEG encoding and transport specifications define how audio and video are to be encoded and transmitted. The ATSC Digital Television Standard and Society of Cable Telecommunications Engineers Digital Video Subcommittee specifications define how digital audio and video are transmitted. The ATSC data broadcast specification defines how IP data is carried in MPEG transport streams.

Broadcast TV with on-demand Web content: This model is the second most common application model in the convergence space. This model essentially is Web browsing while watching broadcast TV. This also is called "watch-and-surf." This application model assumes access to a real-time, two-way network. The Web content requirements are much like those defined in the ATVEF specification; however, the delivery of the Web content is accomplished over an out-of-band (OOB) channel (the real-time, two-way network). This OOB channel could be implemented using a local area network (LAN), a telephone modem or a cable modem.

VOD with on-demand Web content: This application model is most closely aligned with the current Web browsing model. For example, there is streaming video embedded in a Web page. This application model also assumes access to a real-time, two-way network. In general, the streaming video is encoded and controlled through a proprietary set of protocols.

VOD with broadcast Web content: This application model is the least exploited of the convergence application models. It is essentially on-demand enhanced TV. The Web content is related to the VOD. This

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application model assumes a real-time, two-way network.

TV vs. PC display

The PC display differs from the TV in several key areas:

Resolution—TV display resolution is less than PC display resolution. Not all PC content will fit onto the TV display. In addition, the sharpness of the PC images may not translate to the TV set. Image scaling and anti-aliasing are techniques typically used to deal with these issues.

Scan format—TV displays use interlaced scan, and PCs use progressive scan. Interlace scan works well for moving images, but flickers badly with sharp rectangular static images typical on PC displays. Anti-flicker filtering is the technique most frequently used to deal with this issue.

Color space—TV displays use YUV color space, and PCs use RGB. Not all colors displayed on a PC map well to colors on the TV set. Color space conversion and avoiding certain colors are methods to deal with these problems.

Viewing distance—TVs typically are viewed from 8 to 10 feet away, and PCs typically are viewed from 18 inches away. This limits the resolution perceived by the viewer, worsening the resolution problem.

In general, we can break the Web content of interest down into four categories:

Text—There really is no inherent problem in displaying text on a TV set once you have dealt with the anti-aliasing problem. It is important to realize that only certain font styles and sizes will be legible on the TV screen. This means it is not reasonable to get as much text on the TV screen as you can on the PC and still have it be legible. This also will affect page layout, as it will be displayed differently on the TV than on the PC.

Static images (pictures and graphics)—The issues of image resolution and color space conversion come into play here. Typically, the image will have to be scaled, filtered, and perhaps the color will have to be adjusted. This all affects the perceived image quality.

Audio—Audio content is more dependent on the software performance capabilities of the set-top. In general, there isn't enough memory in the set-top to support lots of different audio compression algorithms or enough memory to download audio clips for playback. This generally means that audio content will have to be converted to one standard format and streamed from the cable headend.

Video—The TV set is very good at broadcast video content; however, for Web delivered video content, the same issues as for audio content apply. In addition, the image quality issues apply. In general, streaming video content (other than the broadcast TV channels) will have to be converted to a single format and streamed from the headend.

To have the best quality TV display of Web content, you need to be aware of several things when authoring content for TVs:

- Which colors look good on a TV screen
- Which text fonts and sizes look good on a TV screen
- Which image formats and resolutions look good on a TV screen
- Which audio and video capabilities the set-top supports

Given that, it is likely that content

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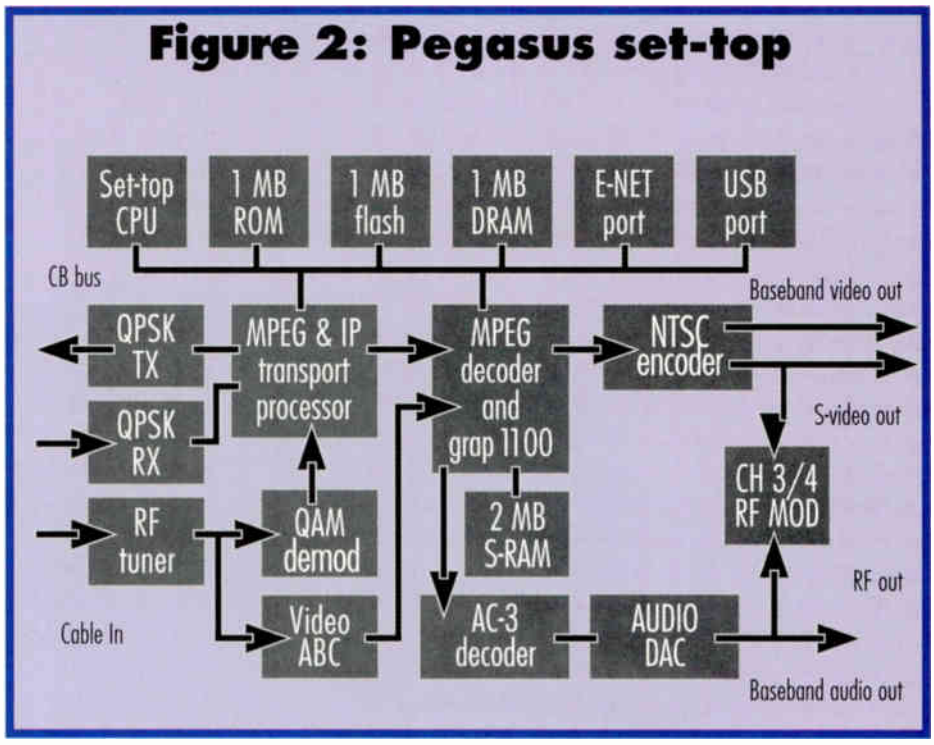
developers will want to author specific content for television that looks good on the set. Some of this content will map directly to the PC without any problem.

However, other content may not look very good on the PC (doesn't effectively use the PC display resolution or capabilities).

Content developers are likely to break down their content into three areas: content authored for TV viewing only, content authored for both PC and TV viewing (a compromise), and content authored for PC viewing only.

The content developer may actually choose both the first and third options—author content twice, once for each display. Ultimately, the content developer will need to prioritize content development according the audience of greatest interest.



Current Web-top architectures

As further evidence of the arrival of Web and TV convergence, an increasing number of Web-based devices intended for TV display, Web-top boxes, are appearing in the market. Among the more notable are:

- NCI DTV Navigator
- WebTV Plus
- Pegasus
- Scientific-Atlanta Explorer 2000
- Pioneer Voyager
- General Instrument DCT-5000
- Microsoft Entertainment PC 98 Specification

NCI DTV Navigator: Network Computer Inc. has developed a portable software package that spans both client and server devices to provide Web-based interactive services to the TV set. Navigator supports the ATVEF specifications for enhanced TV applications.

This software has been ported to a number of client devices, including the S-A Explorer 2000 and the Pioneer Voyager.

WebTV Plus: WebTV Networks is both an Internet service provider (ISP) network and set-top box technology provider. The WebTV Classic and WebTV Plus set-top devices are produced and marketed by a number of consumer electronics manufacturers including Sony, Philips Magnavox and Mitsubishi.

The WebTV Classic and WebTV Plus set-top devices rely on a built-in telephone modem to provide them with access to the WebTV ISP network.

The WebTV Plus set-top includes an analog TV tuner capable of tuning clear analog TV channels and a graphics compositing chip that enables the blending of the Web content with the broadcast TV signal.

Time Warner Cable Pegasus Architecture: The Time Warner Cable Pegasus Program was a result of the TWC Orlando Full Service Network VOD trial. The Pegasus Program defined the functional requirements for an interactive TV system including set-top hardware, network architecture, client and server software, and back office business systems.

The S-A Explorer 2000 and Pioneer Digital Voyager set-tops are the first two implementations of Time Warner's Pegasus architecture.

The key features of the Pegasus set-top architecture are:

- Hybrid analog and digital TV set-top
- Real-time, two-way IP-based cable modem
- Graphics compositing over analog and digital video
- Scaling of analog and digital video

Figure 2 (on page 106) shows a block diagram of the Pegasus set-top terminal.

Time Warner Cable issued the first Pegasus request for proposal (RFP) in March 1996 and awarded the Phase 1.0 to Scientific-Atlanta as primary provider, with Pioneer Digital and Toshiba as second sources for the set-top.

In April 1997, Time Warner Cable issued a subsequent request for quotation (RFQ) for a hypertext markup language (HTML)

BOTTOM LINE

Web and TV Convergence

The subject of convergence of television and the Web is a common theme today. In reality, this convergence deals essentially with the integration of full motion video, either broadcast or on-demand, with Web content. The resulting multimedia experience can take many forms. Key to successful convergence is understanding the various transport and encoding technologies, as well as evolving software standards for the transmission, control and display of combined Web and TV content.

engine and applications to bring Web technology to the Pegasus platform.

S-A Explorer 2000 and Pioneer Voyager: The Explorer 2000 and the Pioneer Voyager represent the first implementations of the Time Warner Cable Pegasus set-top.

These set-tops are intended to be connected to a cable network represented by three primary communications channels:

- Forward application transport (FAT) channel
- Forward data channel (FDC)
- Reverse data channel (RDC)

The FAT channel delivers MPEG-2 transport streams to the Pegasus set-top. The MPEG System Information Tables are defined by the ATSC standard. The FAT channel supports both 64- and 256-QAM (quadrature amplitude modulation), using the International Telecommunications Union-Telecommunications (ITU-T) Annex B QAM standard as updated by SCTE-DVS. This channel provides 26.97 Mbps with 64-QAM and 38.81 Mbps with 256-QAM in 6 MHz.

The FDC delivers IP messages to the Pegasus set-top. The FDC uses quadrature phase shift keying (QPSK) modulation providing 1.5 Mbps in 1 MHz bandwidth. The FDC is located in the 70-130 MHz region and is frequency agile. The FDC is used to transmit commands and IP messages. The advantage of the FDC is that it has 100 percent availability, unlike the FAT, which may be tuned to a different digital or analog channel.

A second tuner could potentially make available a dedicated QAM channel for data transmission.

The RDC transmits IP messages from the Pegasus set-top. The RDC uses QPSK modulation providing 1.5 Mbps in 1 MHz bandwidth. The RDC is located in the 5-50 MHz region and is frequency agile.

The FDC and RDC communication channels conform to the Digital Audio Visual Council (DAVIC) 1.1 standard for the lower layer protocols. Higher level signaling, messaging, and download functions are performed using the Digital Storage Media Command and Control (DSM-CC) protocols.

The NCI DTV Navigator has been ported to the S-A Explorer 2000 and Voyager set-tops. The WebTV browser also has been ported to the Explorer 2000. In addition, a number of Web technology solutions from Worldgate and Interactive Channel are available on these platforms. These represent some of the first implementations of convergence in the digital cable set-top space.

General Instrument DCT-5000: The GI DCT-5000 set-top represents an advance over the existing GI DCT-1000/2000 digital broadcast set-top terminals.

The DCT-5000 increases the processing power, graphics capability, memory footprint and networking capabilities over the previous GI set-tops.

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The GI DCT-5000 provides a DOCSIS cable modem for IP connectivity and a separate 6-MHz tuner for broadcast analog and digital video.

This permits high bandwidth IP delivery combined with a dedicated MPEG video path. This offers the highest level of performance for combined on-demand Web content and broadcast video content.

Microsoft Entertainment PC 98: The Microsoft PC 98 System Design Guide details the requirements for the Entertainment PC 98.

This PC is targeting the home entertainment market and is intended to enable the integration of Web content with broadcast analog TV.

The required features of the Entertainment PC 98 include:

- Two USB Ports
- Two IEEE 1394 ports
- Remote-control pointing device
- V.pcm data/fax/voice modem
- DVD-ROM drive and DVD-Video playback
- PC 98 hardware acceleration for 2-D and 3-D graphics
- Analog video input and capture capabilities
- Analog TV tuner

With these capabilities, the Entertainment PC 98 can provide the same services as the WebTV Plus and more.

What's it all mean?

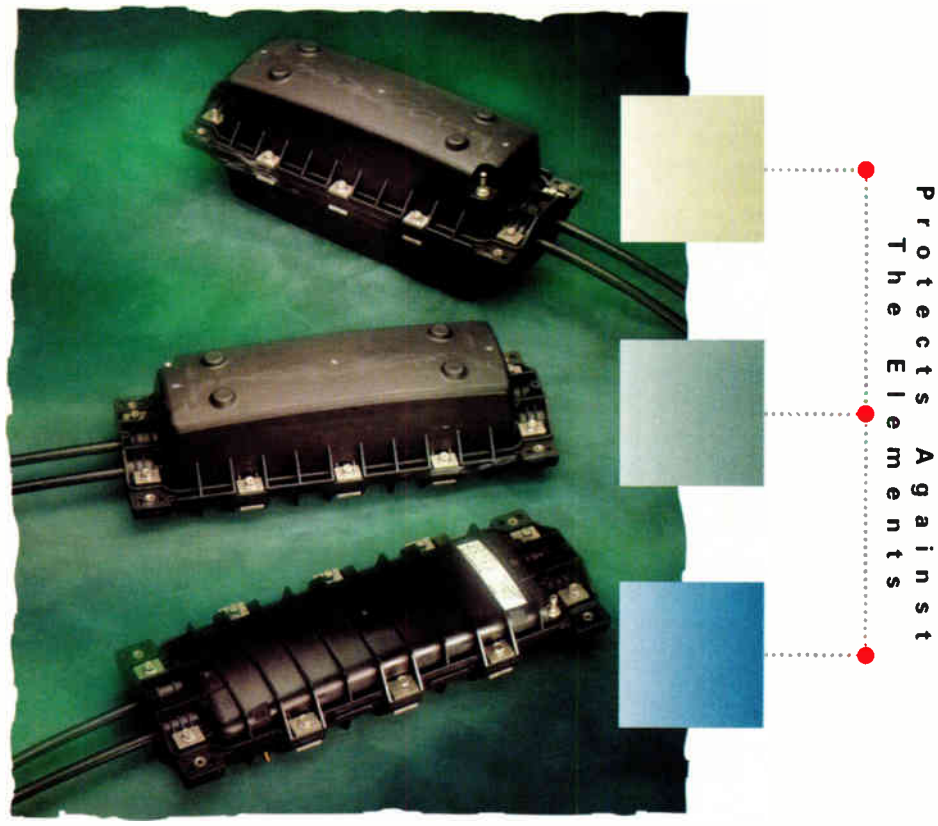
Clearly the convergence between Web and TV is happening. Standards are being developed to facilitate this, as well as a wealth of new platforms that support the integration of the two media.

Some of the conclusions that we can drawn are:

- The Web and TV convergence is more than just Web browsing on a TV screen.
- The Web and TV convergence can be expressed in a number of application models.
- The ATVEF standard is common to these application models.
- Broadband cable networks offer the best opportunity for carrying the coming convergence.

This article originally appeared as a white paper in the proceedings for SCTE's 1999 Conference on Emerging Technologies, Dallas, January 1999, pages 95-102. CT

Ralph Brown is chief architect of set-top systems at @Home Network Inc. He can be reached at 303-661-3795.



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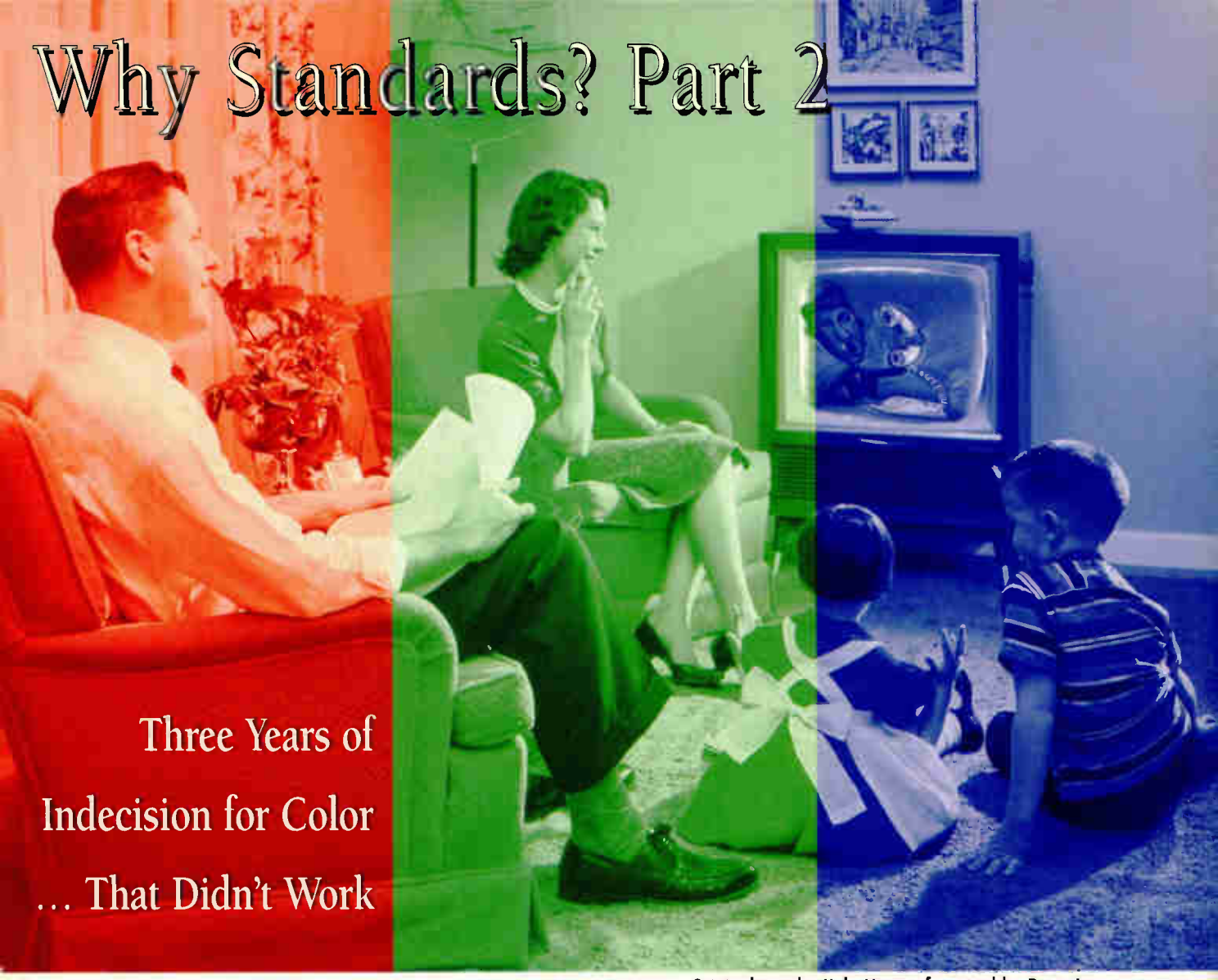

Three Years of Indecision for Color … That Didn't Work

Original text by Kyle Moore; foreword by Doug Larson

The completion of the first round of Data Over Cable Service Interface Specification (DOCSIS) certification was a watershed moment in the evolution the cable TV industry. This process has served to establish a new touchstone for cooperation among operators and vendors and underscores the commitment of this industry to grow and meet the challenges of a rapidly advancing telecommunications environment. However, despite the successes, some remain skeptical.

In the hope of swaying some naysayers, we revisit the color TV standard fiasco of a half-century ago. Originally published in "CATJ" by Kyle Moore (then president of CATA) and edited for publication in "CT," this article provides a blow-by-blow account of how politicians and TV set manufacturers almost set television back on its heels.

In the first installment, Moore took us ringside as 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. At the time, the RCA Sarnoff system was described as experimental, while the CBS system had been around for nearly 10 years. Both suffered problems.

Following a private demonstration of its color system at the Armory in Washington, D.C., during the regular hearings, the FCC challenged CBS to "show off its color." 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.

All the while, the Commission was under the relentless attacks of Colorado Sen. Edward Johnson, who badgered the Commission to approve a color standard without further delay. ➤

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The greatest show on earth

In the fall of 1949, at the urging of the Commission, RCA set up their owned-and-operated WNBW in Washington, D.C., to start limited schedule colorcasting. Six custom receivers were placed in "typical locations" and used under "typical home conditions."

During the fall 1949 hearings, others appeared on the scene for the color TV standards prize. One hung in there until the end: Color Television Inc. of San Francisco. The CTI system also was all-electronic, but its major contribution to the color squabble would be nearly a year later.

Late in 1949, the FCC announced the game plan and rules for color demonstrations before that body: "The demonstrations will include color TV camera equipment, color TV receivers, monochrome receivers, and converted monochrome receivers (that is, converted to receive CBS color in black and white). The receivers to be demonstrated will include four receivers receiving color only in a 6 MHz wide band, one receiver for demonstration of 6 MHz color vs. wider (12 MHz) color; one conventional black-and-white receiver converted for color reception and one black-and-white receiver not converted.

"The demonstration will include slides, test patterns, dancing, singing, juggling, fashions, near and far shots, different types of lighting and backgrounds. In one demonstration, the camera equipment will be located at a local (Washington) high school football field."

CBS, the company first slated for demonstration, really put on a show. One Commissioner said: "This was the darnedest three-ring circus you ever saw. TV studio equipment was all over the hearing room. We had to thread our way to our seats through cables, lights and jugglers rehearsing."

The RCA demonstration had a little less P.T. Barnum. Set up in the studios of Washington, D.C.'s WNBW in the Wardman Park Hotel, they consisted of two color cameras for live (TV studio) presentations, a color film camera and a color slide camera. Two color TV monitors in the studio, plus a special 16-inch receiver, were set up for the observers.

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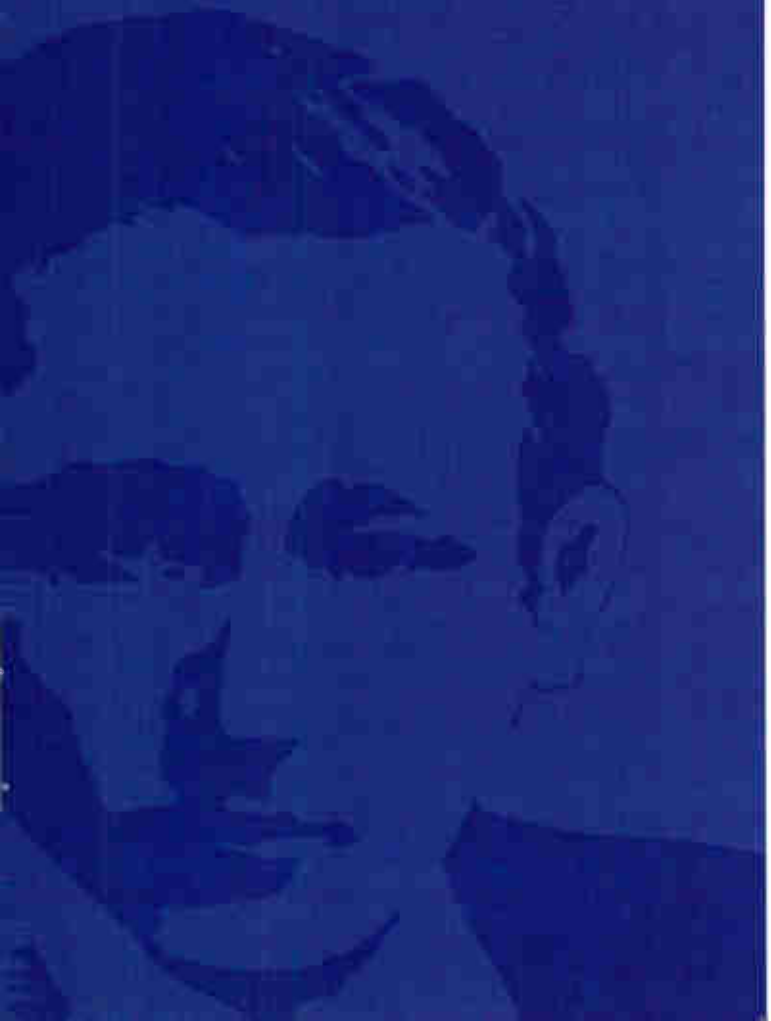

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RCA put on an elaborate, tasteful program consisting of solo performances by network stars of that era and a musical program staged with 19 musicians, all brightly attired in colorful costumes.

After the two shows, the general attitude was that the RCA demonstration produced impressionable black-and-white (compatible) pictures, but that color pictures were flawed. RCA had not developed a single-gun picture tube for the receiver at that time, and to produce a 16-inch picture, RCA had to custom build a large cabinet that housed three separate black-and-white picture tubes, arranged with dichroic type mirrors to focus the three separate red, blue and yellow images on a single 16-inch screen.

The RCA tests lasted a full week, and as the week wore on, the picture quality improved considerably. Unfortunately, FCC personnel were among the first to see the show. Sen. Johnson came late, toward the end of the week, and after he saw the RCA demonstration he said: "I am impressed by the demonstration, and I was surprised because of what I had been told to expect. I think the RCA method has some vital features."

Devil's advocate

While the demonstration attracted only RCA and CBS at that point, testimony and evidence being taken simultaneously by the Commission were not limited to the two contenders. Many firms had a vital interest in the hearings. One of these was DuMont.

DuMont's contribution to the early TV era (pre-war until the early 1950s) cannot be overestimated. DuMont originally owned and operated TV stations in New York (WABD), Washington, D.C., (WTTG) and Pittsburgh (WDTV). These stations were among the first on the air in the nation, and DuMont also operated a TV "network" in that era, competing with NBC (RCA) and CBS for station affiliations and audience.

DuMont had no direct interest in color development, and Dr. Allen B. DuMont, as we shall see, seriously questioned the importance of color at that point. For its role in the color hearings, history must award to DuMont the title of Devil's Advocate. DuMont personnel submitted briefs and testimony, and for one fleeting, highly entertaining moment, put on a memorable demonstration for the FCC. The occasion was late in the fall in 1949. DuMont personnel, headed by Dr. Goldsmith, sat through the CBS demonstrations and apparently got madder by the day.

As scientists and electronic engineers, they saw through the technical mumbo-jumbo that CBS was dishing out to the nontechnical Commissioners. One thing really stuck in the craw of DuMont, and that was the CBS glib dismissal of big-screen color TV utilizing the spinning wheel that was a part of the CBS system. Because the wheel was more than twice the diameter of the picture tube screen, large screen receivers became physically very large very soon. A 20-inch screen, for example, would require a disc more than 48 inches in diameter, protruding not only far to the side of the screen itself, but also

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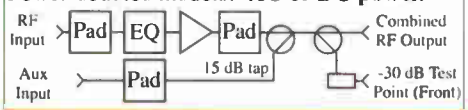

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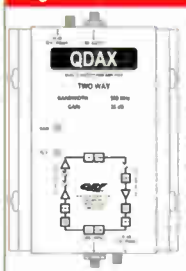

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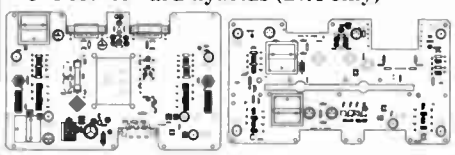

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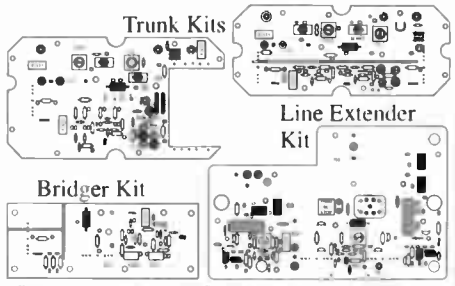

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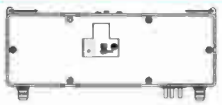

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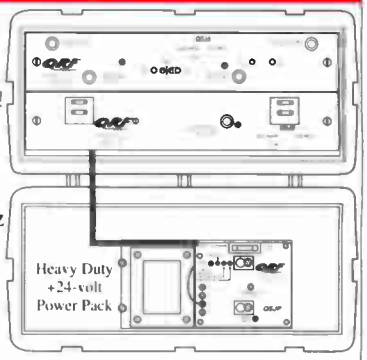

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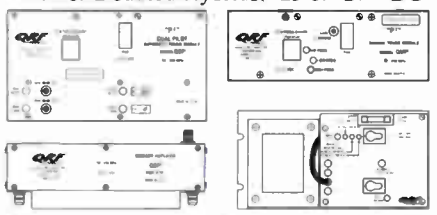

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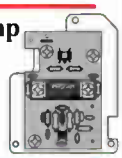

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far above the screen. DuMont had hoped that this point, and the fact that CBS demonstrated no receivers with larger than 12.5-inch screens, would become apparent to the Commission.

When it did not, DuMont's Goldsmith asked for and received time on the program for a demonstration. At the appointed time, DuMont personnel rolled in a huge cart. On the cart was a 700-pound apparatus consisting of a color spinning wheel, motor to turn the wheel and the associated receiver. The machine, carefully constructed to be representative of the true situation and as modern as the CBS color wheel art would permit, measured 6.5 feet long, 4.5 feet thick, and 4.5 feet high. The end result was 700 pounds of motor, whirling wheel and a then-giant 20-inch picture tube. When the huge 4-foot-plus wheel began to spin at 210 miles per hour, the load on the electrical circuit in the FCC hearing room became too great, and the fuse blew, throwing the system into darkness.

FCC Chairman Wayne Coy became irate at this point and shouted at Goldsmith to "stop this side show." FCC Commissioner Frieda Hennock also blasted Goldsmith and called the demonstration "a ridicule of CBS and completely unfair to CBS." Coy called a recess, and the room cleared. Two Commissioners, Jones and Sterling, stuck around as Goldsmith re-ignited his machine. Over the roar of his huge whirling

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The experience of those who toiled to establish a color TV standard is sure to make believers out of cynics and skeptics alike. The three-ring circus that was the color standards process revealed a critical need for standards, while at the same time exposing the unpleasant underbelly of one of the first standards processes.

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disc, Goldsmith told the two remaining Commissioners, "We just got sick and tired of all the claims about easy conversion of present receivers to CBS-type color and decided to show folks how ridiculous such conversions really are."

There also were cooler, calmer heads present. One, David B. Smith, vice president of research and development for Philco, told the Commissioners the view of his company regarding the establishment of color TV standards: "The standards must be such as to permit the public, individually, and at their personal option, to be able to have either black-and-white or color reception with no loss of programming service either way. Both color and black-and-white must be transmitted on a single set of standards so that each type of signal can be received interchangeably on either black-and-white or color receivers. The standards must provide a quality of service at least as good as that now provided by the present commercial standards. The continuity of existing service to receivers in the hands of the public must be maintained. Any proposal of noncompatible standards must include a detailed program to accomplish this purpose. In arriving at these standards, there shall be no experimenting at the expense of the public. The Commission must assure the public that the system has been thoroughly proven before authorization of commercial service."

> "By mid-spring of 1950, the hearings had ground down to who could claim they would do the most for the public."

Seemingly, this type of statement should or would have come not from a member of the industry, but from the Commission itself. Alas, it did not, and aside from its historical perspective on the right and wrong ways to do things, it apparently had very little impact on the Commission at the time. It was probably too sane, and made too much sense to be seriously considered.

In the field

Because the RCA and CBS systems were viewed by the Commission under different circumstances, the Commission then decided to spend more of the two applicants' and the public's money. They would ask for so-called field trials, side by side comparisons. Thus, the stage was set for the next round of the sideshow.

Throughout the tests the quality of the color was the ladder rung on which the Commission stood. Public interest seemed to be the interest of getting good quality color, and no one seriously considered the noncompatibility aspect of the problem.

Most of the official remarks sound pret-

ty much like this quote: "The images were far brighter and truer in color fidelity than in earlier tests. Operation was stable and completely free of flicker."

During the course of the field trials, others became embroiled in the controversy. The Radio Manufacturers Association put out a booklet that was titled, "Is Color Television Ready For The Home?" This was a blunt, no-holds barred booklet that stated: "... the majority of television set manufacturers urge that no color broadcasting standards be approved by the FCC until all proposed systems have been thoroughly field tested. When standards are set, all future improvements must be within the framework of the basic original standards. The original standards must be sound and suitable for decades to come. The proposed CBS system uses only 405 lines for picture definition; this is a 45 percent reduction in picture detail and clarity."

As the tests wore on, DuMont chastised Sen. Johnson and FCC Commissioner Robert F. Jones. The Doctor said: "Commissioner Jones condemns private interests who question the Commission's handling of color TV standards to date, simply because these private interests think it would be a grave mistake to foist unsatisfactory color on the American public. The Commissioner condemns more than 100 manufacturers of TV receivers, TV broadcasters and TV transmitter manufacturers because we think it is a criminal mistake to make the future allocation of additional channels for black-and-white wait for a decision on the matter of color. A truly intelligent and lasting decision on the matter of color may take years, and spokesmen for our industry do not think the public will be willing, or should be forced, to wait these years to enjoy adequate TV reception."

Neither ready for prime time

Of the two primary contenders for the color prize, DuMont said: "Neither system is adequate. In one the color changes every minute (RCA), and in the other the color fidelity is poor (CBS)."

By mid-spring of 1950, the hearings had ground down to who could claim they would do the most for the public. NBC's John H. McDonnell told the Commission his network would immediately start regular colorcasting from New York. McDonnell stated his network would extend color service to places like Providence, R.I.; Philadelphia; Toledo, Ohio; and Davenport, Ind., by the end of the summer (1950). CBS's Stanton promised 20 hours of color programming per month within 90 days of authorization of its system.

McDonnell countered Stanton's hours claim by stating: "Broadcasters would be unable to transmit color during the choice evening hours with the CBS system because they would lose virtually all of the black-and-white-only audience, something that is not economically feasible when programming must be paid for by advertising dollars."

In May, RCA's General Sarnoff created a bit of a stir when he stated that if the RCA system was approved, RCA would share all of the data with every manufac-

turer and that anyone would be free to manufacture and sell compatible system color receivers. This took CBS back a step or two because they had been quite blatant about their plans to be the primary source of their own receivers and to allow secondary royalty paying receiver sources to develop only after CBS tooled up.

Boiling point

Finally, it all came to a head: more than 10,000 pages of testimony and 250 exhibits of material, diagrams, data and engineering studies. Very late in the race, Donald K. Lippincott, representing the California firm CTI, shook the FCC with several statements. He said:

1) The RCA system and the CBS system were too complicated for the average service technician to handle or the average viewer to adjust.

2) The CBS system would be financially difficult if not disastrous to all but a handful of the largest TV manufacturers.

3) And why has no one looked into the matter of interference in color reception?

This last point created a first-class rhubarb. RCA and CBS in particular moved that CTI field experience (it had been testing its system over KPIX in San Francisco and perhaps had more actual on-the-air time, through a nontest facility, than CBS and RCA combined) not be allowed into the record. RCA and CBS contended that no one else had conducted field trials in medium signal and fringe areas, as CTI claimed to have done, and the CTI results of these tests should not be considered as evidence when they alone had conducted the tests. CTI's interference evidence was quite harmful because it showed that color transmissions were much more susceptible to interference (man-made and weak signals) than black-and-white transmissions.

This plainly upset FCC Chairman Wayne Coy, who recalled quickly that all of his problems with an allocations freeze had come from the emergence of interference as a limiting factor in station coverage zones. He saw the potential of a whole new set of interference problems (now color-related) leading to another allocations fiasco.

That nobody had sought to prove color's transmission characteristics outside of the secure in-town reception areas is incomprehensible today. It accentuates, however, the Commission's concern only with "color fidelity" and its almost complete ignorance of the real questions involved in approving a color transmission and reception standard.

Backpedaling

After the clamor died down in the hearing room, Coy remarked: "I would like to comment that this exhibit brings into sharp focus the difficult problems that the Commission faces. It is apparent that a successful TV system cannot be maintained unless a sound allocation (of channels) program is established.

"A sound allocation program is not possible unless the Commission has adequate interference data. It has been the consistent

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experience of the Commission in this and other proceedings that it is virtually impossible to get the parties to submit adequate interference data.

"So far as the parties are concerned, no adequate interference data was offered by any of the parties at the outset. Moreover, when, after extensive prodding by the Commission, the parties did produce some interference data, it is apparent (from the extensive CTI exhibit) that not nearly as much effort and ingenuity went into the preparation and presentation of such evidence as compared with other aspects of the parties' cases.

"I hope that this proceeding will teach all of us the importance, not only to the Commission, but to the industry and the public, of securing and offering adequate data on interference, so that sound decisions can be made on an allocation basis, under which the (TV) industry can build with reliance on the fact that unforeseen interference conditions will not severely limit the service areas which have been anticipated, and thus deprive many rural viewers of the service. People who live in rural areas are important people."

Will the Commission delay?

Seemingly, the Commission now had plenty of reasons to delay the decision on color for quite a while. To restate them:

- The leading contender system, CBS, was not compatible; people could not watch CBS color programs in black-and-white without special converters.
- In spite of CBS statements to the contrary, the CBS color system was limited to relatively small picture tube sizes, and, as DuMont demonstrated, even 20-inch pictures with the giant wheel were impractical.
- The two electronic systems, CTI and RCA, had made dramatic progress in the period 1949-1950. Even the Commission was aware that every week brought improvements.
- The CTI and RCA systems were compatible; that is, people could see colorcast programs in black-and-white on the nearly 9,000,000 existing receivers.
- Based upon CTI evidence, the question of color picture quality in areas outside principal cities (where interference and weak signals could be a problem) was largely unresolved. CTI said that pictures in rural areas went downhill faster in color than in black-and-white and that satisfactory service areas for color were much smaller than with black-and-white.

Seemingly, with the exception of Sen. Johnson, most everyone could agree that a further delay was in the best interests of the public.

Stay tuned for the third and final installment when the U.S. Supreme Court and Korean War join the cast of characters and a color standard victor is crowned. CT

Doug Larson is senior editor at "Communications Technology." He may be reached via e-mail at dlarson@phillips.com.

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OnePoint Targets MDUs in Phoenix

By Reed Miller

SBC Communications and cable TV providers in Phoenix better take note — OnePoint Communications Corp., a national provider of bundled communications services, is about to start offering video services, local voice service, long distance, and high-speed Internet access in the city.

OnePoint plans to stake its claim to new markets from now on using the "smart building" concept. The carrier will run a T-1 line from a point-of-presence (POP) to a multi-dwelling unit (MDU) and offer the customers who live there services over the T-1.

"We can extend IP (Internet protocol) telephony right to the property and don't have to convert it to TDM (time division multiplexed) service," says Mark Fuller, president of network services at OnePoint. "We use a packetized service all the way from the apartments to a OnePoint switch in a point-of-presence."

OnePoint won't divulge the type of switch it will use in its POPs, but company execs say it can handle IP, asynchronous transfer mode (ATM) and digital subscriber lines (DSLs).

"The switch can process up to 10,000 simultaneous calls," Fuller adds.

Everything but video will be provided over the T-1 line that OnePoint will run between its POPs and the MDUs. OnePoint will use satellite-based services to provide its video for customers.

"The premise behind the smart building is to sign seven- to 10-year contracts with property developers to have access to their property for our services and to have the right to market through their property leasing agents," says OnePoint President Bill Wallace. "The target customers are condos, apartment buildings and a few military bases."

OnePoint will not jump on every opportunity that comes its way, however. The company will carefully estimate whether it will gain enough customers at a particular site to warrant installing a T-1. To buy some time, OnePoint will even resell the voice and Internet services of incumbent local exchange carriers and competitive local exchange carriers until it can determine how many customers it is likely to have in a given area.

Seventy buildings planned initially

OnePoint currently has more than 55,000 subscribers for the services it resells and has signed agreements that allow it to market services to 280,000 residences.

"On all our properties, we are at about a 13-percent penetration rate, and that includes service areas we have just launched in," Wallace says. "Some properties have a 40-percent take rate."

In Phoenix, OnePoint execs plan to offer service to approximately 70 buildings in the initial roll-out. This represents a potential customer base of 14,000 to 15,000 residences. OnePoint services now are being marketed in Phoenix, but the company's switching facilities will not be installed in Phoenix until later this year.

Other markets that OnePoint has penetrated with resold services include Washington, D.C.; Baltimore; Atlanta; Chicago; Raleigh-Durham, N.C.; and Denver.

"Our goal from day one has been to limit the number of markets we focus on and to do a good job in those markets before we expand," Wallace says. "We are following through on that strategy even with our move into Phoenix." TB

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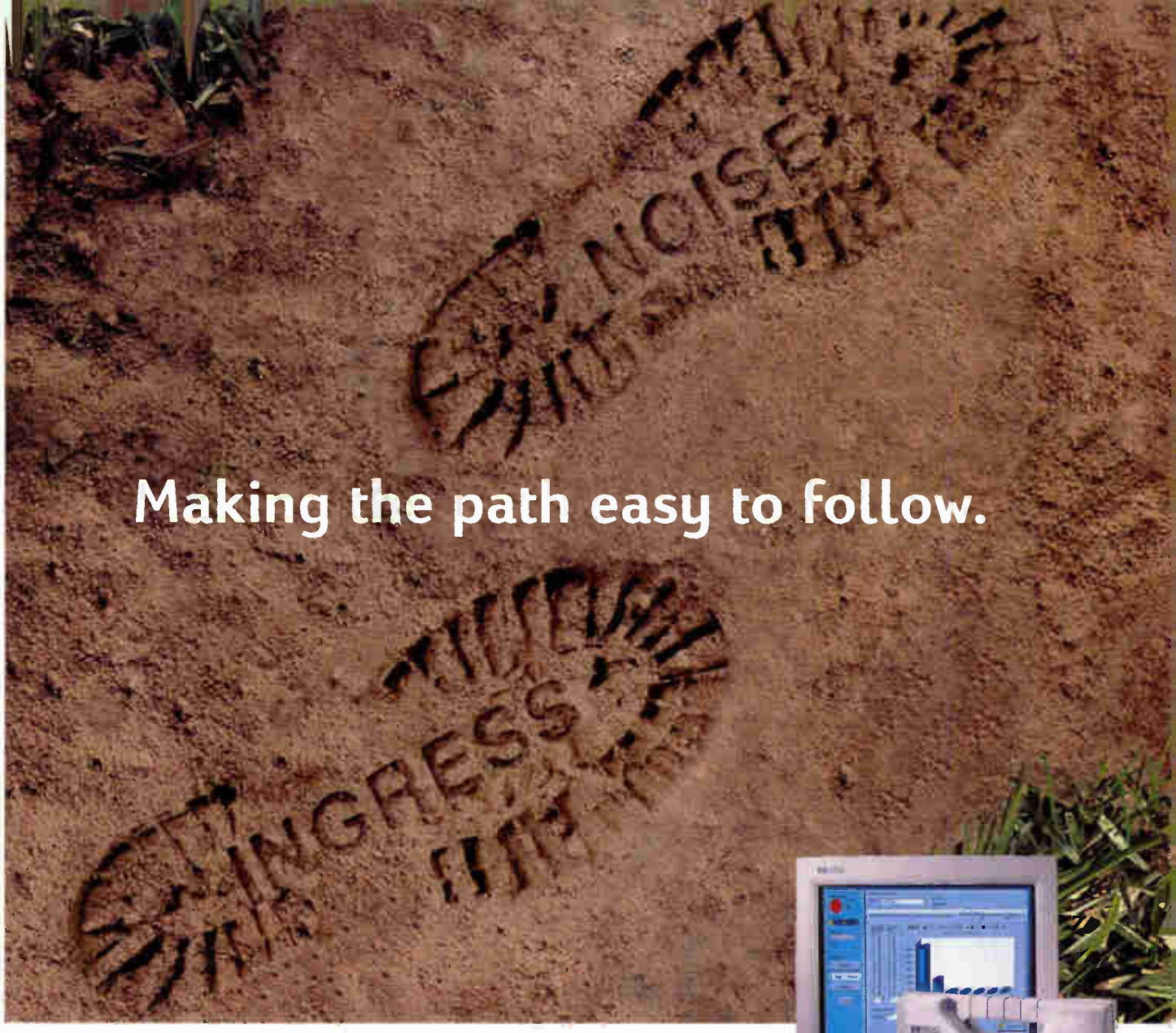

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Reader Service Number 107

HEWLETT® PACKARD

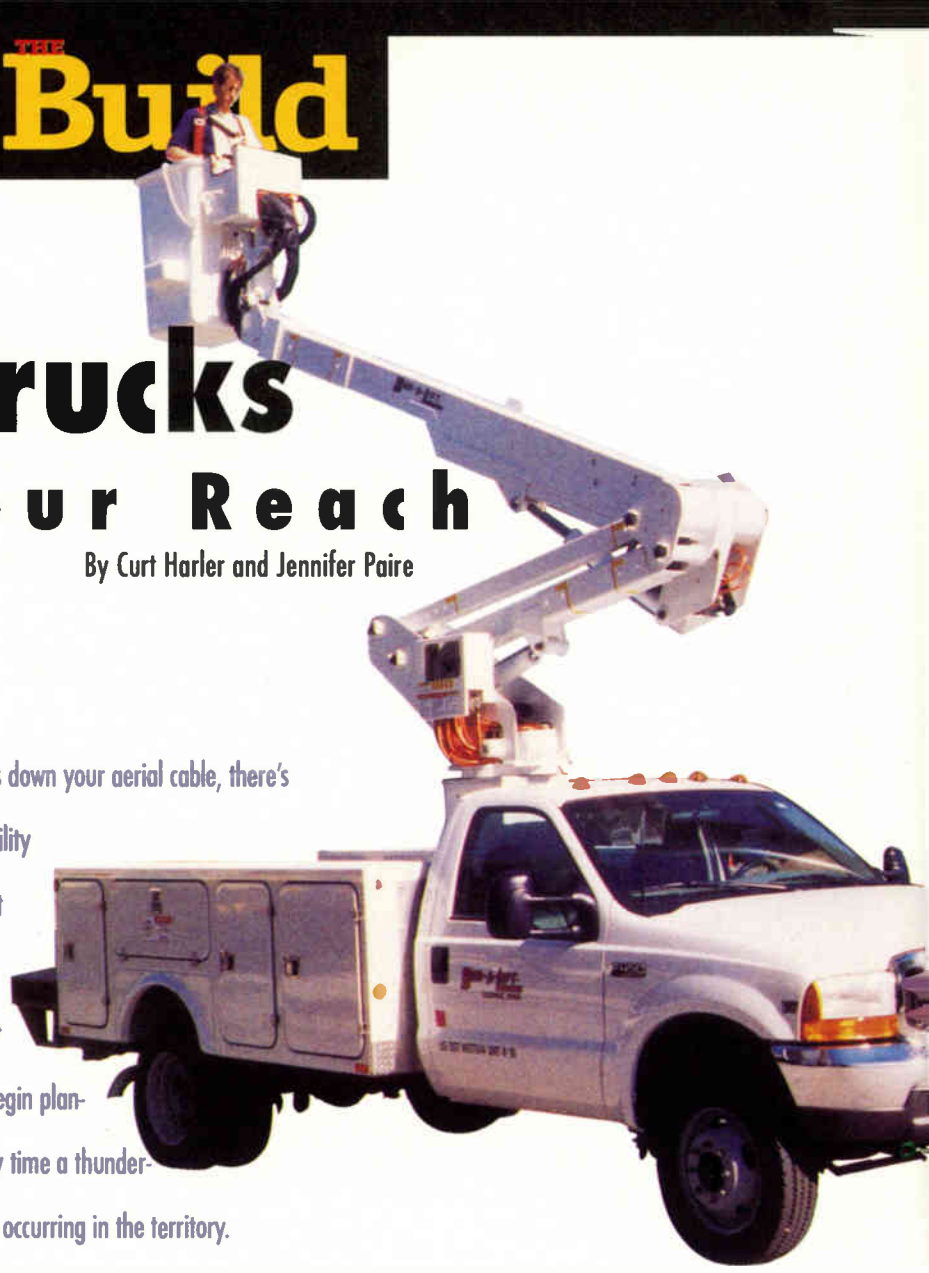
Expanding Possibilities

THE Build

Bucket Trucks

Extend Your Reach

By Curt Harler and Jennifer Paire



When a summer storm hits and knocks down your aerial cable, there's no time to wonder about the availability of bucket trucks and aerial lifts. Fleet managers know they need reliable lifts that are flexible and strong, and they need them immediately. Fleet managers agree that "yesterday" is the best time to begin planning to meet the worst-case scenarios that can occur any time a thunderstorm, hurricane, blizzard or even a major build-out is occurring in the territory.

BellSouth has streamlined its budgeting and planning process by forming an alliance with Altec Industries of Birmingham, Ala. Altec provides the telecom company with a standard bucket truck, which is developed with input from users in the field. Of the company's 25,000-vehicle fleet, about 8,000 are bucket trucks.

When that much of a telco's operation relies on one type of machinery, it is vital that both the field craft workers and management be at ease with the operations and efficiency of the bucket trucks.

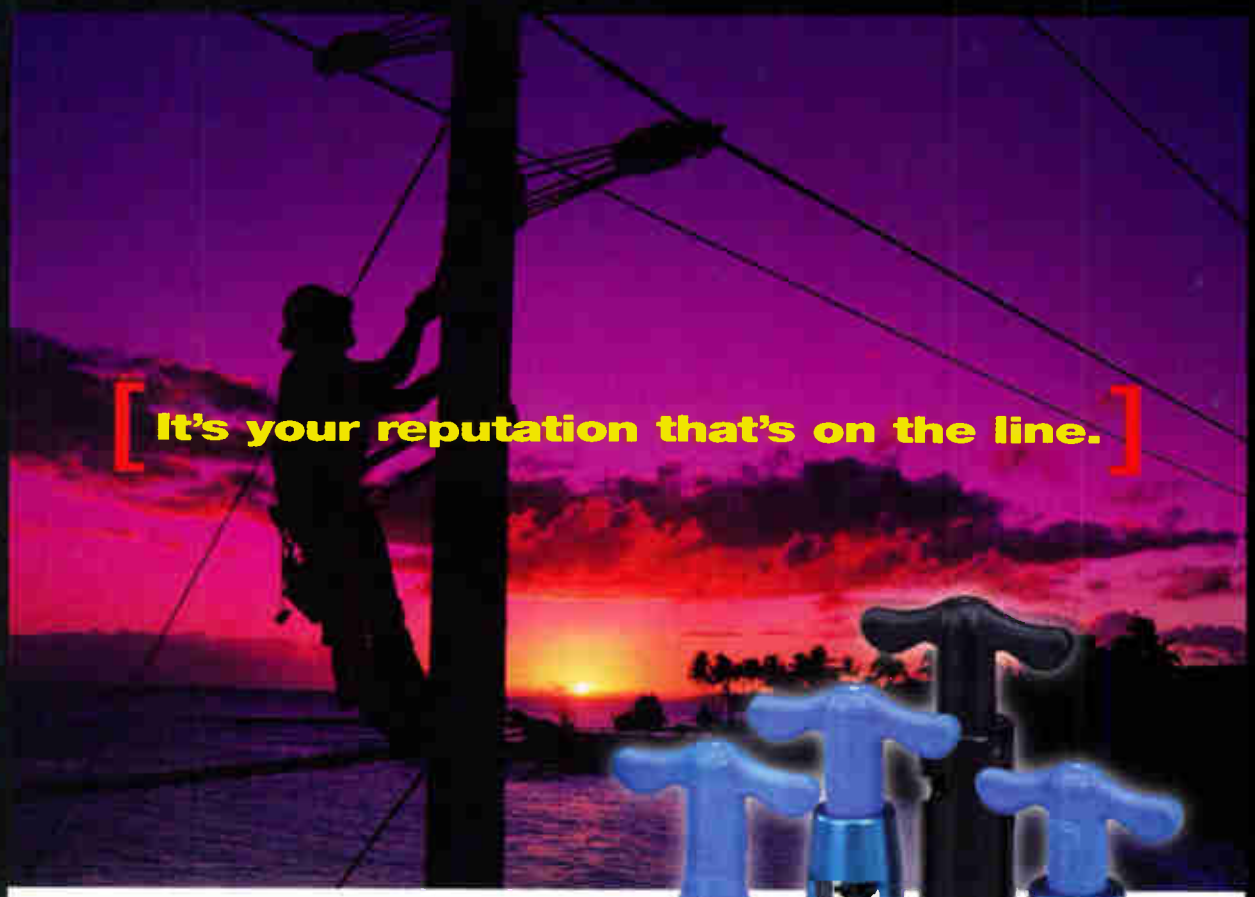
"Our budgeting process takes place nine months ahead of the fiscal year, so we know how many aerial-type units we need," said John Vinson, BellSouth's director of fleet management. "This helps to make that process more efficient."

The changing nature of the business

The appetite of telecommunications users across the country is driving new construction, as well as new standards for reliable services. Homes across the country are using multiple phone lines, and many want the luxury of high-speed lines for Internet access and data transfer.

Consider one slice of the electronic activity expected to take place across lines built and maintained by communications construction crews: Forrester Research

> "Cable modems and all that fun stuff we are dealing with now require more materials on the vehicle."



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Reader Service Number 108

Inc. of Cambridge, Mass., expects worldwide electronic commerce sales to go as high as $3.2 trillion by the year 2003.

This type of activity is prompting cable operators and contractors to consider all kinds of trucks and lifts that make their jobs easier and faster.

For example, Vinson has seen growing interest in small service trucks, which can allow technicians to move between jobs quicker without having to spend extra time on assembling ladders and buckets.

"It allows you to do a universal number of work orders," Vinson said. And he said there is more talk in the industry about battery-powered lifts that are not as noisy as some traditional models. BellSouth has not employed these, but he said they could be especially helpful in residential areas. Maintenance and charging of the batteries are factors in BellSouth's decision not to use battery-powered units at this time.

Some service providers such as Cox Enterprises Inc. now need a truck that can transcend the telecommunications industries that are converging. Cox is one of the largest media conglomerates in the United States with 16 daily newspapers, about a dozen TV stations, more than 50 radio stations and about 75 percent of publicly traded Cox Communications, which is one of the nation's largest cable systems. Cox Communications has partnered with Sprint, TCI and Comcast to offer personal communications services (PCS) and has started a unit to develop products and content for the Internet.

"We're in telephony now and cable," said Patsy Brownson, fleet manager for Cox Enterprises in Atlanta. "We're trying to get a vehicle that will accommodate all of those services. That is our outstanding challenge. They require the same things, but there are certain aspects that are unique in each of the areas."

For example, some jobs require that a vehicle carry more material than was needed when the system had only cable.

"There are different types of switches and equipment that you need for the telephony," Brownson said. "Cable modems and all that fun stuff we are dealing with now require more materials on the vehicle."

Brownson's fleet of more than 6,500 nationwide is leased and includes Telsta, Versalift and Altec products. The decision to lease, rather than to buy, was made purely for economic reasons. The company has chosen to lease its fleet and to use its current cash flow to invest in building out its fiber-optic infrastructure, Brownson said.

Coming down the road

Dave Hill, director of marketing for Altec Industries, said he expects to see more lift products that are able to prelash two cables together before they are installed. Altec's AP45 handles heavier placements for communications companies that may require the simultaneous installation of two types of lines.

"Each telecom company has its own work methods, and they are always looking for ways to make shortcuts," Hill said. "With the tremendous growth in telecom, this allows operators to do this in an effective manner."

Commonwealth Edison, which provides service to more than 3.4 million customers in northern Illinois, speeds its jobs by maximizing the weight capacity of its material handlers. The Chicago-based electrical utility has between 40 and 50 Holan Bronco 805s, which have a material handling capacity of 2,000 pounds. This means one or two technicians can go up in the truck and complete a job without the assistance of another vehicle.

Ultimately, time and money are saved. "While a man is working, you don't have to reposition the boom each time you want to move material," said Dave Schiller, supervising engineer for the utility.

The 805 has working heights of 47 to 60 feet. There are configurations for single, two-man and double baskets.

Weight capacity is key to the company. Schiller said his company rates trucks according to weight capacity minus the weight of technicians and materials.

Construction outfits shopping for a lift will find they fall into two general types: scissorlifts, for lower height applications and heavier platform loads with larger working area; and telescoping booms, targeted at applications where reach and mobility are key. In most cases, telcos are looking for units with the telescoping booms.

For jobs in confined areas and hard-to-reach sites, telescoping booms with a jib boom, articulating/telescoping booms, and articulating/telescoping booms with articulating jib booms are available, notes Don Roach, vice president of marketing at Snorkel in St. Joseph, Mo., a manufacturer of aerial work platforms for maintenance or construction applications worldwide, and fire truck water tower and rescue apparatus.

Jib booms, used after the telescoping boom is extended, allow workers to reach out and over obstructions to the work area. While Snorkel's market isn't exactly the same as those catering to telecommunication and utility fleets, the company's wisdom on the use of lifts is universal.

"Always beware of overhead electrical or phone lines when extending a lift," Roach said.

The fireworks display you'll get when you extend a boom into power lines is impres-

User Reports

Telsta Helps Media General Reach for the Sky

Telephones and electricity don't reign supreme over cable during blackouts anymore. "If there are outages, just like the phone and power company, people want their cable," says Kimberly Brown, transportation manager for Media General Cable in Fairfax County, Va.

Brown, who buys, sells and maintains Media General's fleet, has to be certain that technicians can reach cable wires to make sure blackouts are a temporary thing.

"Anybody in the systems group who does any preventive maintenance or demand maintenance on the aerial plant, they have to be able to get there," Brown says.

To "get there," companies like Media General need a lift that gives the height and side reach to do the work. Brown believes she was one of the first to purchase the Telsta A37, a trouble truck with a side reach of 28 feet and a 42-foot working height when fully extended.

She had used trucks by other manufacturers before that didn't have the same reach. In Fairfax County, lines are "going higher and not coming lower," and they are moving farther away from the road. The A37 was designed specifically for telephone poles that are taller and farther from roadways.

Brown has been using the trucks for about a year and sees them go out on jobs daily. "These can still be put on a 450 or 550 chassis and still have the height we need," Brown says.

There is a high level of comfort with the familiar, too. Brown says she is glad to use the A37 because "we buy almost all Telsta products, so I already knew what I was getting."

In addition, Telsta has a large nationwide service network with mobile field service representatives and seven facilities.

Altec Pulls its Weight for Mountain Cable Construction

Placing cable above phone lines and below power lines can be tricky business.

But White Mountain Cable Construction Corp. of Epsom, N.H., has found it easy to accomplish using the Altec AP45 Aerial Cable Placer. White Mountain handles telephone, broadband and fiber-optic cable construction splicing, testing, strand mapping and emergency restoration.

"It came in handy for height and side reach capacity, and also side pull," said Mike Scofield, White Mountain's fleet manager. "We have to feed the cable and weave it through the lines as we go. With fiber optics so big and us putting up 30,000-foot reels ... we need 300 lbs. of side pull and can do it without compromising the safety of the man in the bucket."

Scofield's fleet includes three of the AP45s. He said another reason White Mountain chose the product was that the company needed something bigger and stronger than what it had been using.

The AP 45 has a working side reach of 30.7 feet. Other features include smooth and total control of all cable stringing operations from the platform, continuous rotation and single or dual station reel lifters.

"We have breakaways that tell us how much stress and strain we are putting on the cable," Scofield said. "Without the cable truck, and with smaller units, we were right at the window where we were afraid we were putting too much strain on it." —*JRP*

sive. But the price you pay—in dollars, in potential injury, and in fury from a justly enraged utility supervisor—is not worth the price of the show. Look up, especially when working a rig in dense foliage or in foggy conditions.

The regulatory environment

Failure to train aerial work platform operators can result in litigation and Occupational Safety and Health Administration citations, warns Roach. In some cases, job-site safety requirements in particular localities may be more stringent than those dictated by OSHA. Some tips worth remembering:

- High-reach telescoping booms must be fitted with tilt alarms that sound when the base unit is out of level.
- Machines with expanding axles need a boom/axle interlock that prevents the boom from being raised above horizon-

tal unless the axles are properly extended and locked.

- Slab-operated scissorlifts need a pothole protection device that reduces the likelihood of tipping if a wheel is accidentally driven into a hole or off the edge of the slab.
- Scissorlifts must be equipped with a warning alarm that sounds when the platform is being lowered and a built-in safety support beam to hold the scissors arms when the machine is being serviced.

For those who deal regularly with OSHA regulations, it is important to note that OSHA's provisions for aerial lifts are now grouped with those for scaffolding. At OSHA's Web site, www.osha.org, a search with keywords "aerial lift" should pull up standards, said Jule Jones, an OSHA specialist.

"OSHA thought it would be more useful," Jones said. "It's more convenient with other scaffolding regulations."

Curt Harler and Jennifer Paire are contributing editors for "Communications Technology."

The Bottom Line

Up in the Air

When your aerial cable's down, there's no substitute for bucket trucks and aerial lifts. You need reliable lifts that are flexible and strong, and you need to be ready for storms or major build-outs.

The appetite for telecommunications nationwide is driving new construction, as well as new standards for reliable services. People across the country want or have multiple phone lines, and many want high-speed lines for Internet access and data transfer. Good bucket trucks can help you meet this burgeoning demand.

Such machines do carry certain safety and training requirements, though. Failure to train aerial work platform operators can lead to unpleasant and costly contact with the Occupational Safety and Health Administration. In some localities, job-site safety requirements may be more stringent than those dictated by OSHA.

Here follow some tips worth remembering:

- High-reach telescoping booms must be fitted with tilt alarms.
- Machines with expanding axles need a boom/axle interlock.
- Slab-operated scissorlifts need a pothole protection device.
- Scissorlifts must have a warning alarm that sounds when the platform is being lowered, as well as a built-in safety support beam to hold the scissors arms when the machine is being serviced.

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Reader Service Number 110

11 Steps To Perfect Fiber Termination

By Truc Nguyen

Get Your Connectors Right Every Time

As cable TV and telephone companies continue to push fiber optics deeper into their networks and closer to the home, it becomes essential that your crews understand the ins and outs of properly installing terminating connectors.

Step 1: Load the ferrule into the ferrule holder.

Step 2: Prepare the cable by sliding the stair-step boot, small end first, down the "field" fiber until it is out of the way. Next, slide the pre-assembled crimp body inner housing assembly, small end first, down the fiber.

Step 3: Strip the 900 µm buffer. Clean the bare fiber with an alcohol wipe.

Step 4: Place the fiber in the cleaver. Slowly close and press the lever to cleave the fiber to 6 mm. Check the length to ensure that it is between 6.0 mm and 6.5 mm.

Step 5: Slowly pivot the "Z" arm to insert the "field" fiber into the entry funnel of the connector lead-in tube. Once the "Z" arm clicks into the closed position, the cleaved end of the fiber should be within the splicing slot of the ferrule.

Step 6: To fuse the "field" fiber to the ferrule, close the splicer cover and clean the fiber with a brief arc. Following the prompt, fuse the fibers.

Step 10: Slide the boot into place over the rear of the connector assembly. Push the blue shroud over the front of the white housing.

Step 11: Clean the connector with high-grade isopropyl alcohol and lint-free wipes. This step removes any fragments or dirt remaining on the fiber.

All photos courtesy of Siecor

Step 7: Crimp the lead-in tube around the buffered fiber by pressing down firmly on the crimp lever.

Step 8: Align the key of the inner housing with the key of the ferrule. Push the ferrule into the housing until it snaps into place.

Step 9: Using the crimp tool, apply an additional crimp to the ferrule assembly to further secure the fiber.

Increasingly, you'll find these connectors when terminating fibers at headends, optical network units (ONUs), and in fiber-to-the-home (FTTH) applications.

Admittedly, fiber connector installation is not rocket science. However, it's critical that it be performed carefully in the field because improperly installed connectors can result in poor insertion loss and back reflectance.

To help your crews terminate the fiber correctly every time, we've provided these 11 simple guidelines. By following these procedures, your crews will save themselves hours of repair time and eliminate the potential for angry customer calls if the connections should fail. **CT**

True Nguyen is marketing specialist for Siecor in Hickory, N.C. He can be reached at true_nguyen@siecor.com.

Evaluating Multiple Outlet Requirements, Part 3

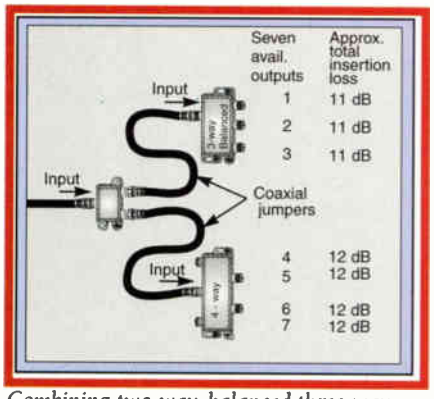
This month's installment continues a series on evaluating the requirements for multiple outlets. The material is adapted from a lesson in NCTI's Installer Course. © NCTI.

The previous installments in this series provided approximate worst-case signal loss values for two-, three-, four- and eight-way splitters that can be used to easily make rough estimates in the field. This installment deals with combining splitters to customize the number of output ports.

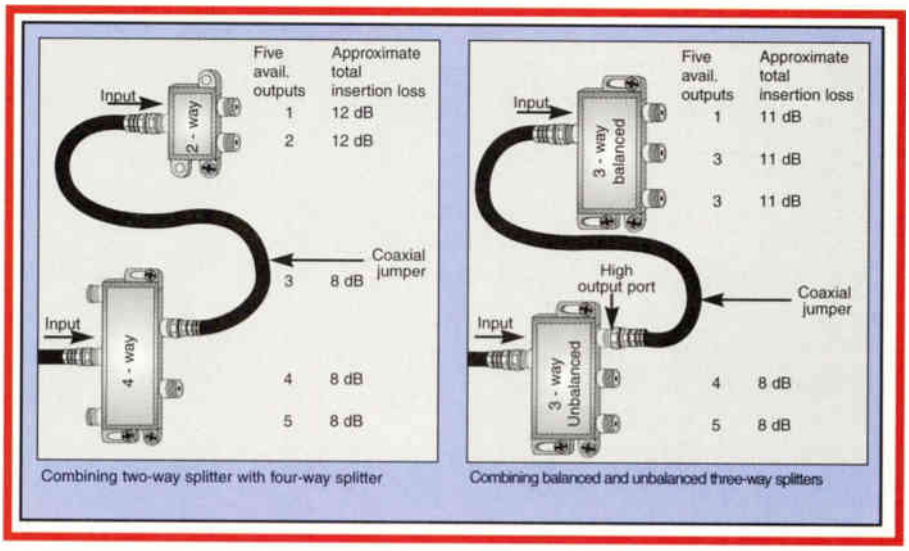
To provide broadband signals to between four and eight cable outlets, a variety of splitter combinations can be used. Five, six and seven output ports can be easily achieved by connecting together different combinations of two-, three- and four-way splitters with a short coaxial cable jumper(s), as shown in the accompanying figures.

Some cable systems provide an eight-way splitter and terminate the unused ports. However, the eight-way splitter does cause more signal loss for some of the output ports, compared to some combinations. TB

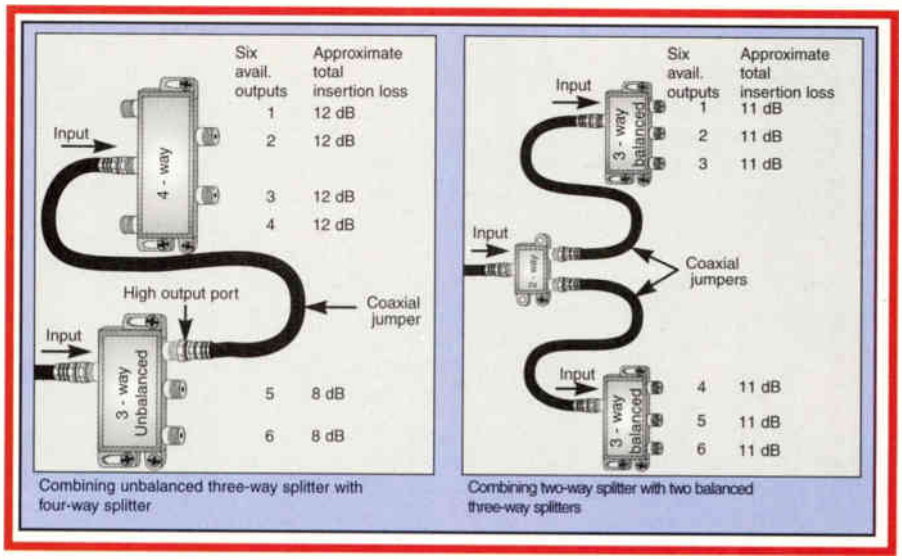
The next installment will provide information on using auxiliary house amplifiers.



Combining two-way, balanced three-way and four-way splitters to provide seven output ports

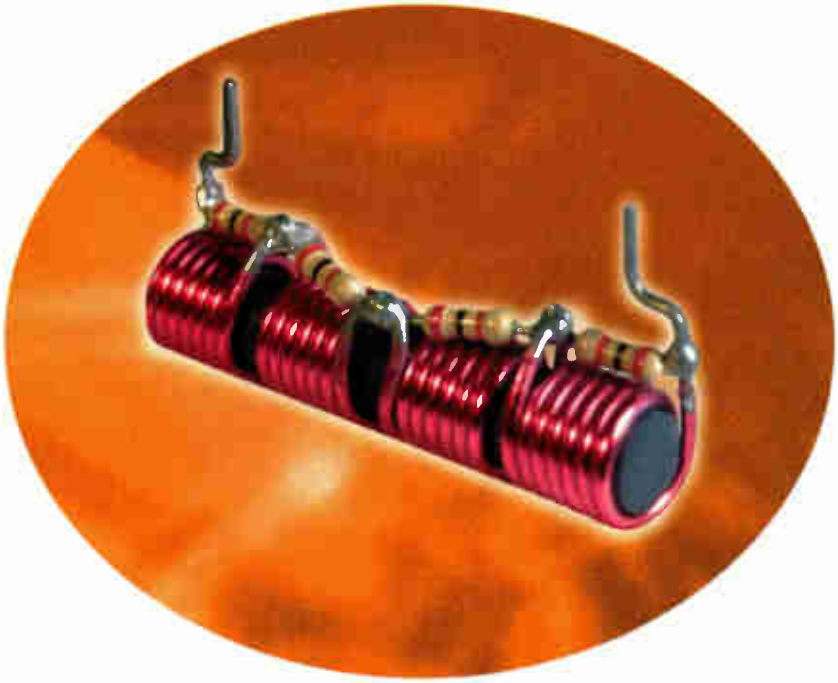


Combining various splitters to provide five output ports



Combining various splitters to provide six output ports

HUM MODULATION?



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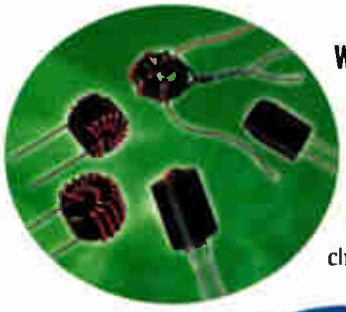

Wound baluns, beads & toroids are available in production quantities from MMG, providing economical circuit protection and noise suppression components that include high-frequency splitters, matching transformers, parasitic suppressors, chokes and inductors.

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Reader Service Number 111

• MARKETPLACE •

Here's a sampling of products from at last month's Cable-Tec Expo. Watch for more in our next issue.

Fiber Splice Closures

Tyton Hellermann has designed a line of fiber-optic splice enclosures for protection in aerial, underground and pedestal applications.

According to the company, CableTyte closures are compact and work with a variety of fiber counts; they're designed for installation and re-entry without special tools.

The product's nonheat-shrink sealing system provides a watertight seal without a heat torch, but heat-shrink sealing also is available for those who prefer it.

Closures include an optional curved splice tray. Other closure styles and tray options are available for low and high fiber counts. Accessories include mounting brackets and hardware for stability, a port cutting tool, shield bonding products and fiber splice protectors.

Tyton Hellermann also manufactures cable management products including cable ties, tools and accessories, wiring duct and raceway, cross connect devices and identification labels.

Reader Service #311

Fiber Fault Locator

The FiberHawk from GN Nettest's Fiber Optic Division locates a break or fault in an optical fiber cable. It reports distance and references the fault to a known splice location in the fiber.

FiberHawk is battery-operated, weighs seven pounds and is compact in size. It can locate faults at a distance range up to 110 km. The unit also is available with a floppy drive to allow fiber trace data storage and recall on the company's emulation software. Fiberhawk comes in 1,310 nm, 1,550 nm or dual-capability single-mode optics.

According to GN Nettest, the product is designed for compatibility with future releases to include a fiber trace display, full feature analysis, integrated loss test set and visual fault locator.

Reader Service #312

Two TDRs Take Tests

Two Riser Bond waveform time domain reflectometers (TDRs) are designed for cable technicians with varying needs.

The Model 3200 (shown) aids technicians in two-conductor metallic cable applications. According to the company, the unit identifies opens, shorts, splices and other cabling challenges. It also verifies lengths of new cable reels and manages inventory of partial wheels.

The TDRs design features include display and storage capabilities, and rechargeable batteries. The Model 4200 TDR tests power cables and components such as low-voltage networks, service connections, joints, tees, street lighting, de-energized medium and high-voltage cable. Design features include standard storage of up to eight waveforms and an upgrade option that enables 32 waveforms to be stored.

Reader Service #310

Bark Up the Right Tree

As the fiber-optics closure family continues to grow at Performed Line Products, the company delivered another addition to the Coyote litter.

Runt measures 14.75 inches long, 8.50 inches wide and stands 3 inches high. Its size allows it to fit into most pedestals and hand holes; its design allows it to be used in aerial and underground environments.

There are three cable entry ports, to afford versatility in fiber management. The system is molded into the bottom shell half and provides separate areas for routing and protecting the buffer tubes from loose cables or bare wires from unitube cables, making it more convenient to handle loose-tube and unitube splicing in the same closure.

Runt is manufactured in accordance with International Standards Organization 9001 procedures and meets Telecordia's GR-771-CORE spec.

The individual 12-count splice tray kits used by Runt are compatible with Coyote's Pup closure and allow plenty of room for future upgrades.

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Please Print:

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
- ☐ 99. Telecom Network/Carrier (RBOC, LEC, CLEC, Long Distance Provider, Wireless/Satellite Carrier, ISP)
- ☐ 19. Public/Private Utility
- ☐ 20. Systems Contractor
- ☐ 21. Hardware/Component Manufacturer/Dist.
- ☐ 18. Other (Please specify) _____

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
- ☐ 42. Engineering Manager
- ☐ 43. Director of Engineering
- ☐ 44. Engineering Supervisor
- ☐ 45. Corporate Engineer
- ☐ 46. Senior Engineer
- ☐ 47. Regional Engineer
- ☐ 48. Divisional Engineer
- ☐ 49. Plant Manager
- ☐ 50. Installation Manager
- ☐ 51. Network Manager
- ☐ 52. Construction Manager
- ☐ 53. Field Services Manager
- ☐ 54. Technical Manager Engineering
- ☐ 55. Engineer
- ☐ 56. Headend Engineer
- ☐ 57. Const. Engineer
- ☐ 58. OSP Engineer Technical
- ☐ 59. Headend Technician
- ☐ 60. Line Technician
- ☐ 61. Bench Technician
- ☐ 62. Sweep Technician
- ☐ 63. Other Technical Title (Please specify) _____

Installation
- ☐ 84. Installer
- ☐ 85. CSR
- ☐ 86. Other (Please specify) _____
- ☐ 30. Other (Please specify) _____

C. Are you a member of the SCTE (Society of Cable Telecommunications Engineers)?
- ☐ 01. Yes
- ☐ 02. No

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. Compression/Digital Equip.
- ☐ 42. Computer Equipment
- ☐ 43. Connectors/Splitters
- ☐ 44. Fleet Management
- ☐ 45. Headend Equipment
- ☐ 46. Transmission/Switching Equipment
- ☐ 47. Networking Equipment
- ☐ 48. Vaults/Pedestals
- ☐ 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 Supply. (Batteries, etc.)
- ☐ 56. Video Servers

F. What is your annual cable equipment expenditure?
- ☐ 57. up to $50,000
- ☐ 58. $50,001 to $100,000
- ☐ 59. $100,001 to $250,000
- ☐ 60. over $250,000

G. In the next 12 months, what fiber-optic equipment do you plan to buy?
- ☐ 61. Fiber-Optic Amplifiers
- ☐ 62. Fiber-Optic Connectors
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- ☐ 64. Fiber-Optic Splicers
- ☐ 65. Fiber-Optic Transmitter/Receiver
- ☐ 66. Fiber-Optic Patchcords/Pigtails
- ☐ 67. Fiber-Optic Components
- ☐ 68. Fiber-Optic Cable
- ☐ 69. Fiber-Optic Closures & Cabinets

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I. In the next 12 months, what cable test & measurement equipment 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

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- ☐ 84. up to $50,000
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- ☐ 86. $100,001 to $250,000
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K. In the next 12 months, what cable services do you plan to buy?
- ☐ 88. Contracting Services (Construction/Installation)
- ☐ 89. Repair Services
- ☐ 90. Technical Services/ Eng. Design

L. What is your annual cable services expenditure?
- ☐ 91. up to $50,000
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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 to10 miles
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Circle Numbers for Free Information

1	25	49	73	97	121	145	169	193	217	241	265	289
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7	31	55	79	103	127	151	175	199	223	247	271	295
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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
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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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41. Engineering VP
42. Engineering Manager
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The following is a listing of some of the videotapes currently available by mail order through the Society of Cable Telecommunications Engineers. The prices listed are for SCTE members only. Nonmembers must add 20 percent when ordering.

- *Regulation and The Cable Industry*—Featuring Steve Ross, John Wong and Alan Stilwell from the Federal Communications Commission, Dave Large, and Wendell Bailey. The program covers topics such as regulations for compatibility between cable equipment and subscriber equipment, short- and long-term compatibility requirements, single channel vs. simultaneous access, decoder interfaces, alternatives being negotiated with consumer electronics industry including disagreements, how impact of the rules being developed can be carried out, anti buy-through and must-carry arrangements, rate regulation rules and broadcasters' petition for second channel. (90 min.) Order T-1150, $45.
- *Advances in System Architectures*—Featuring moderator Jim Ludington, J.R. Anderson, John Mattson, Karl Poirier, Don Gall and Doug Wolfe. Issues discussed include how deep fiber should go into the network, how many fibers should go to the node, hybrid fiber/coax (HFC) architectures, fiber-rich design, fiber-deep design, the current status of system architectures, the addition of switched and interactive services, impact of digital networks, evolution toward a future architecture, radial distribution node, and how to control the costs of fiber splicing and testing. (90 min.) Order T-1151, $45.
- *Convergence*—Larry Lehman serves as this videotape's moderator, with speakers Ken Matz, Chuck Merk and Andy Paff. This videotape provides an overview in addition to trends in telephone and video systems, characteristics and distribution networks. Also discussed are the evolution of services, distribution architecture and trends towards regional interconnects. (75 min.) Order T-1153, $45. CT

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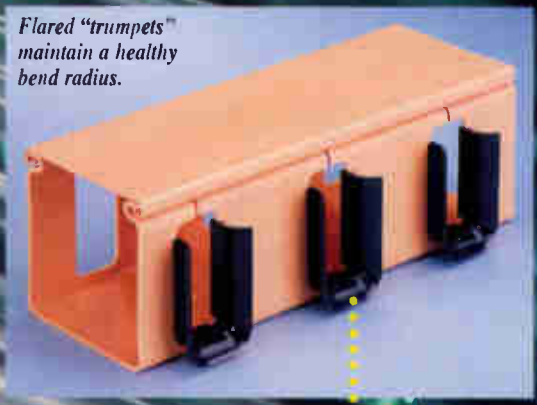

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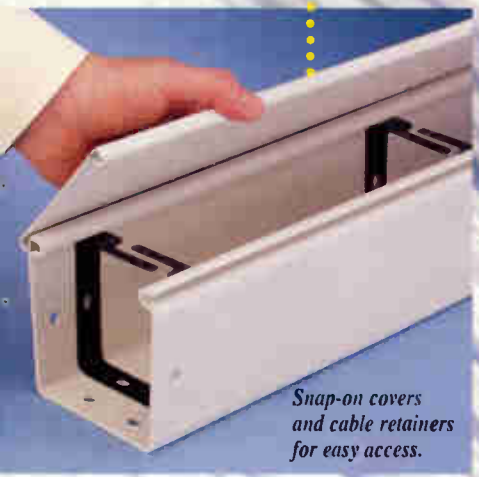
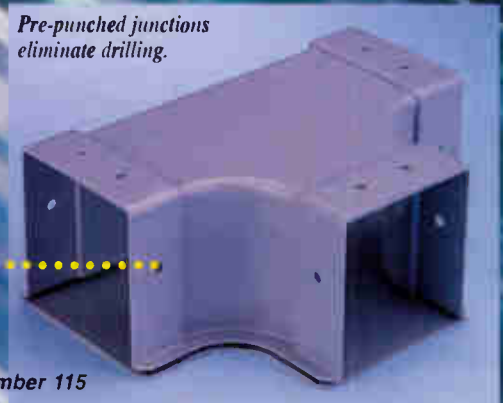


Snap-on covers and cable retainers for easy access.



Pre-punched junctions eliminate drilling.

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CALENDAR

June

2-4: Washington State Cable Communications Association Summer Convention, WSCCA, the Inn at Semi-ah-moo, Blaine, Washington. Call (360) 629-0520.

5: Llano Estacado SCTE Chapter technical seminar, Cox Communications, Lubbock, Texas. Topic: "Safety Practices & OSHA Standards as Applies to Cable Television" with Bob Baker of TCA Cable TV. Contact David Fielder at (806) 793-7475.

5-8: CAB Local Cable Sales Management Conference, Cable Television Advertising Bureau, Hyatt Regency, Chicago. Call (212) 508-1229.

9-11: Women in Technology International, Santa Clara Convention Center, Santa Clara, Calif. Contact WITI at (800) 334-9484.

6-10: Supercomm '99, Telecommunications Industry Association, Georgia World Congress Center, Atlanta. Call (703) 907-7700.

6-10: International Conference on Communications: Institute of Electrical and Electronics Engineers' symposium on multimedia and wireless communications, Vancouver, Canada. Call (604) 681-5266.

7-10: BICSI Summer Conference, Building Industries Consulting Service International, Opryland Hotel and Convention Center, Nashville, Tenn. Call (813) 979-1991.

13-16: Cable '99, the National Cable Television Association's 48th Annual Convention and International Exposition, McCormick Place Convention Center, Chicago. Contact the NCTA at (202) 775-3669.

22-24: International Conference on Consumer Electronics, Los Angeles. Contact Diane Williams, (716) 392-3862. CT

Planning Ahead

July 12-14: Wireless Communications Association '99, WCA, New Orleans. Call (202) 452-7823.

July 18-21: CTAM '99: Cable and Telecommunications, CTAM, San Francisco. Call (703) 549-4200.

July 18-22: Annual Multiplexed Telephony Conference '99, San Diego Marriott, San Diego. Call (925) 556-0810.

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

Sept. 15-19: National Association of Telecommunications Officers and Advisors, NATOA, Atlanta. Call (703) 506-3275.

Oct 12-14: Atlantic Cable Show, Baltimore. Call (609) 848-1000.

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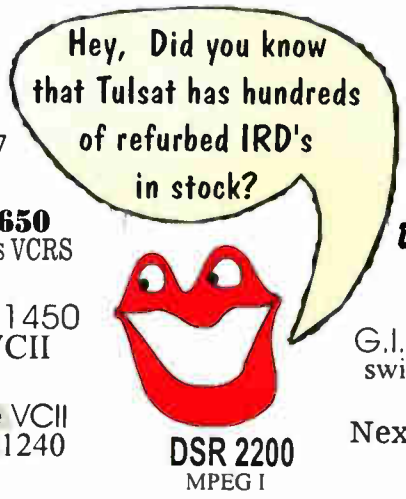

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27002 Vista Terrace
Lake Forest, CA 92630
(949) 586-3196, Fax (949) 586-3952
GASIGVIS@AOL.COM
Gary Adams
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Reader Service #96

Silicon Valley Communications
3515 Monroe St.
Santa Clara, CA 95051
(408) 247-3800; Fax (408) 247-8689
www.svci.com
sales@svci.com
Ed Feghali (408) 245-8800
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SkyConnect
1172 Century Drive, Suite 200
Louisville, CO 80027
(303) 218-9100; Fax (303) 218-9112
www.skyconnect.com
Ron Barracks (303) 218-9100
rbarracks@skyconnect.com
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(800) 326-8754; Fax (800) 776-3972
www.sprintnorthsupply.com
sarah.goodman@mail.sprint.com
Debbie Nelson (913) 791-7000
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Standard Communications Corp.
P.O. Box 92151
Los Angeles, CA 90009-2151
(310) 532-5300; Fax (310) 532-7647
www.standard@standardcomm.com
Bob Cunningham
Standard Communications Corp. is a global manufacturer of complete cable system solutions offering analog and digital satellite receivers, frequency agile modulators, BISC generators, and the STRATUM Modulation System.
Reader Service #6

Stanford Telecom
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(408) 745-2685; Fax (408) 541-9030
www.stanfordtelecom.com
William Patton
Bill.Patton@stelhq.com
Stanford Telecom produces modulator and demodulator ASICS and assemblies for transmission and reception of return path data in HFC systems. Included is a subscriber modem modulator/demodulator in HFC systems. Included is a subscriber modem modulator/demodulator on one chip.
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Stephen Skoulalos (215) 953-0480
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mail@dropsupplies.com

Ronnie Cox and Jim Marzano
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Englewood, CO 80112
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www.telewiresupply.com
Mark Howard
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John Hamburger
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www.internet.toshiba.com
fred.berry@tais.toshiba.com
Fred Berry
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Indianapolis, IN 46235
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By John Clark

Northern Cal Vendor Days: SCTE's Mission at Work

I recently returned from the Northern California Vendor Days. With 748 attendees and 132 exhibitors spilling out into every available hotel inch, including hallways, it was a sight to behold. Members formed lines fairly early. Even parking space was at a premium.

This two-day event epitomizes the uniqueness of the Society and its mission. Since returning, I have continued to reflect on the sights and sounds that I observed while attending.

Focus on the front line

Society of Cable Telecommunications Engineers Vendor Days were created to bring technology products, services and information to frontline personnel at the local level. This distinguishes SCTE from all other cable associations. The breadth and depth of our membership can be seen right down to the members who interact with our customers in person on a day-to-day basis. These frontline members were able to interact with our vendors, see and touch the latest in new equipment, attend informative sessions, schedule certification testing and connect with their peers.

These benefits are directly transferred to the people in our industry closest to our customers. Those multiple systems operators (MSOs) that schedule times for their entire field force to visit must be commended for their foresight.

Vendor foundation

Where would vendor days be without vendors? It's another example of the spirit of partnership that our vendors bring to the Society. Their support of events such as these provides industry field personnel with a wide variety of first-hand learning about the latest hardware trends.

These events feature tabletop displays and hands-on demonstrations, plus comprehensive technical training seminars. This directly translates to more professional knowledge and skill for our members because the focus is on education rather than sales.

Proctors as real-life heroes

All of us admire people who have the initiative and self-image to study and pursue career advancement through testing and certification. Certainly, the number who took advantage of the testing opportunities was large.

And in an ever-changing world, the value of clearly identified and certified skills and qualifications has never been higher. But equally admirable were the proctors, both at these vendor days and throughout the country, who volunteer their free time so that others can advance. These are real-life heroes for the dedication and commitment they exemplify.

Quality of chapter leaders

The chapter leaders who plan vendor days are to be commended for their innovation and creativity. These events could not occur without the strategic planning of the chapter leaders. Each time one of these shows goes on, it is a tribute to the many hours these leaders have worked to make sure it all runs smoothly.

Other scheduled vendor days for the summer include:
June 24: New Jersey Chapter
July 7-9: Rocky Mountain Chapter (Breckenridge, Colo.)
Aug. 10-11: Snake River Chapter (Idaho Falls, Idaho)
Aug. 17: Northern New England Chapter (Boxborough, Mass.)
Aug. 25-26: Central Florida Chapter (Orlando, Fla.)
Sept. 15: Oklahoma Chapter (Oklahoma City)
Sept. 16: Piedmont Chapter (Winston-Salem, N.C.)

Recognition through Cable-Tec Games

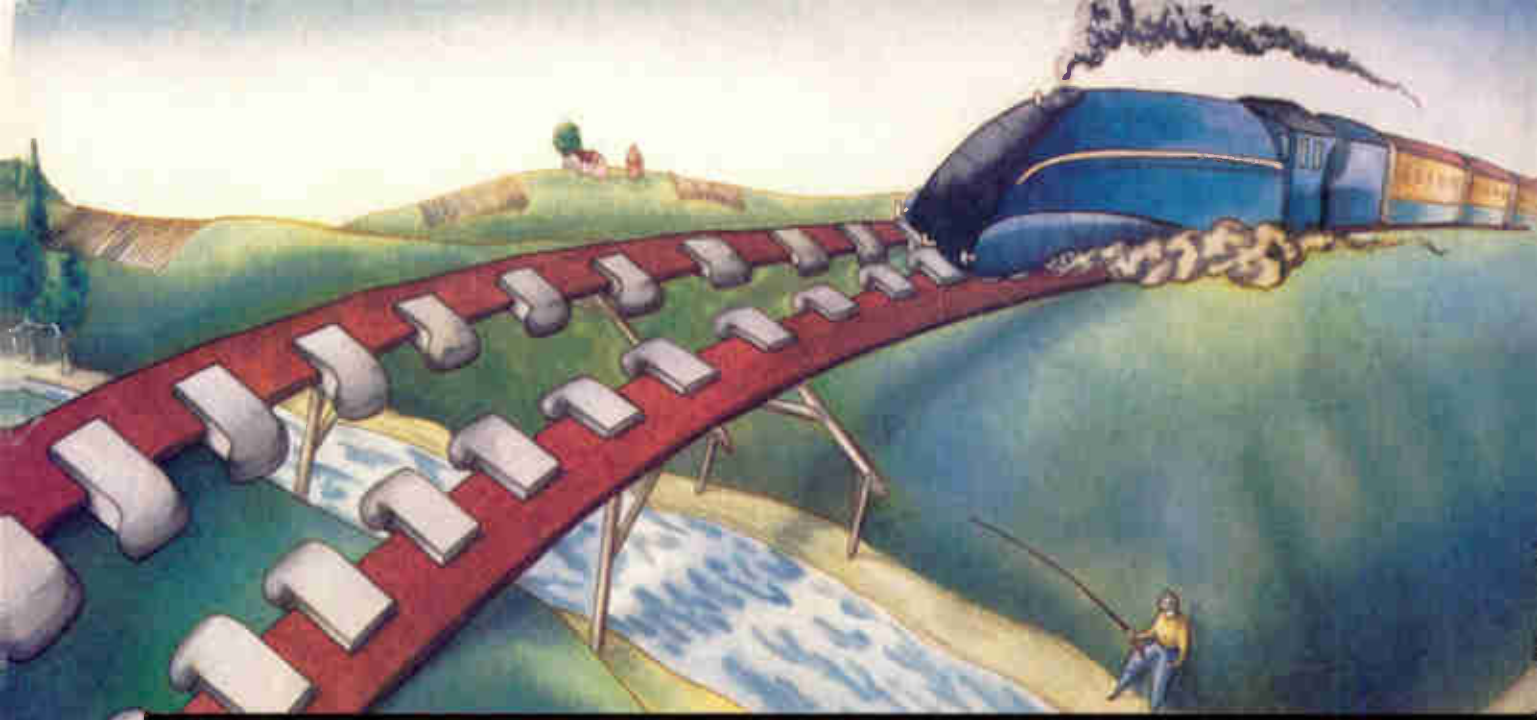
Cable-Tec Games offer our members the opportunity to showcase their hard-earned skill and knowledge. They also add the element of friendly competition and fun. Winners earn the recognition they deserve, not only from their peers, but also often from their employers.

Woody Cash, this year's winner of the Cable-Tec Games at the Northern California Vendor Show, was an advanced technician when he first won at the games. Today, after winning twice at the Northern California Show and once at the national competition at Expo, he is a plant manager. In a recent interview, Cash said that winning "plants the seed that you're one of the best. You definitely gain the respect of your peers and employer."

Closing comments

When I attended the Southern California Vendor Days last fall, I left with the same positive impressions. Whether as a stand-alone event or working closely with state association events, vendor days help our members to increase their knowledge and experience. For attendees, vendor days are a valuable chance to share experiences with industry peers through networking and "problems-and-solutions" exchanges. This translates into benefits for attendees' employers and customers. CT

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



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