

BROADCAST *Communique*

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EAS with Ease
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Digital Television Era Dawns



ELECTRONIC NEWS GATHERING SYSTEMS



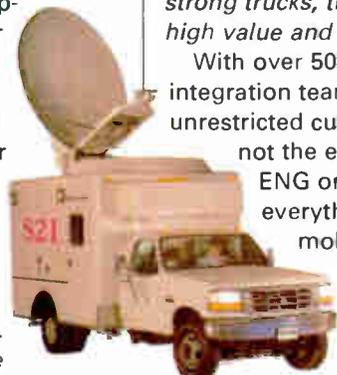
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trical, mechanical, RF and systems engineering. And we offer the broadest selection of electronic equipment, backed by the industry's finest warranty and 24-hour support, worldwide.

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Systems: Electronic News Gathering – Flyaway Satellite – Mobile Production – Radio Studio – Satellite News Gathering – Satellite Uplink
Television Production – Television Transmission – Wireless Cable

TAKING The Lead

It Takes A Vision.

By **MARTHA B. RAPP,**
Public Relations Manager

Moments after WRAL-HD became the U.S.' first digital television station, Harris Engineer Dave Danielsons was interviewed.

It was an emotional time. Only 34 days had passed since the FCC had awarded WRAL an experimental license to become the nation's first HDTV station. Since then, Dave, his Harris colleagues, the WRAL team, and engineers from other equipment suppliers had worked feverishly to get the system up and running as quickly as possible.

Standing in front of the transmitter that had just come up to power, a reporter asked Dave how he felt. "This is the television my children will experience," he responded with awe.

His observation -- caught on film for posterity as well as for over-the-air broadcasting -- captured the near-reverent feeling that sometimes occurs at the precise moment when vision becomes reality. It is a moment when suddenly, the impossible becomes do-able, the impressive becomes expected, and the once-unimagined becomes attainable.

For the Harris team who developed the first HDTV transmitter (and for past Harris teams that pioneered more than 60 major breakthroughs in broadcast technology), the vision had begun years earlier. It was supported by a steadfast commitment to R&D, even when the going was rough. It was backed by the excitement of discovery and the adrenaline of innovation.

The end result was a technology for a new generation -- a technology for our children.

As this issue of Broadcast Communique goes to press, Harris announces it has been awarded a contract to provide a digital television transmitter to WETA, Washington, DC. WETA will use the Harris SigmaCD transmitter to become the U.S.' first digital public broadcasting television station. Operating under an experimental

Appeared in "The Wall Street Journal, Friday, July 26, 1996"

**HDTV
television history
was made on
July 23, 1996!**

Harris Corporation congratulates

WRAL 5 

Raleigh, North Carolina,
for being the world's first
commercial television station to
transmit HDTV signals over the air.

We're proud that a
Harris Digital Television Transmitter
helped make it possible.

 **HARRIS**

license, WETA-HD expects to begin transmission by the end of the year.

"The opportunities with the new technology are tremendous," said Sharon Percy Rockefeller, president and chief executive officer of WETA. "With the wealth of quality programming we create, public broadcasting is ideally situated to use advanced digital television to extend our services for all audiences."

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The latest and greatest from our Studio product line.

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Broadcast Communique[®] is a publication of Harris Corporation, Broadcast Division, which includes four key operations:

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3200 Wismann Lane, P.O. Box 4290
Quincy, Illinois 62305-4290 U.S.A.

RF equipment, RF systems, service, training

Richmond, Indiana
3712 National Road West, P.O. Box 1487
Richmond, Indiana 47375-1487 U.S.A.

Radio studio and satellite equipment, service

Florence, Kentucky
7920 Kentucky Drive
Florence, Kentucky 41042 U.S.A.

Audio, video, and satellite systems, service

Cambridge, U.K.
515 Coldhams Lane, P.O. Box 41
Cherry Hinton, Cambridge CB1 3JU U.K.

RF equipment, radio studio and satellite equipment

Harris Broadcast Division, part of the company's Communications Sector, is a leading supplier of radio and television equipment and custom-integrated systems to broadcasters in more than 150 countries.

Harris Corporation, with worldwide sales of more than \$3.5 billion, is focused on four major businesses: electronic systems, semiconductors, communications, and Lanier Worldwide office equipment.

 **HARRIS**

TV Today

Live from Raleigh, NC WRAL-HD Ushers in New Era of Digital Over-the-Air Television

By MARTHA B. RAPP,
Public Relations Manager

The future of television dawned quietly on Wednesday, July 23, 1996.

At precisely 10:06 a.m. that day, WRAL-HD at Raleigh, North Carolina became the nation's first commercial over-the-air high-definition digital television (DTV) station. Only 34 days earlier, the FCC had awarded the CBS affiliate the United States' first experimental DTV license.

Engineers from WRAL as well as manufacturers who provided equipment for the revolutionary operation watched as the Harris SigmaCD—the world's first commercially viable DTV transmitter—was brought up to power. The 100-kilowatt signal, fed to a new antenna on a 1700-foot tower, was calculated to cover the station's expansive, 23-county service area.

Two weeks later, a crowd of nearly 200 witnessed DTV for themselves at a news conference hosted by WRAL and its parent company, Capitol Broadcasting Co., Inc. Among highlights, WRAL presented video from a baseball game filmed simultaneously in HDTV and NTSC.

The contrast, spectators agreed, was astonishing.

A New Definition in Television

Robert Seidel, CBS vice president of engineering, was on hand to articulate the differences:

Most obviously— even before the



The Wow Factor: HDTV's digital-perfect picture and CD sound is noticeably better than conventional TV.

television was turned on—is the width-to-height ratio of the television screen. Conventional NTSC receivers have screens with the 4:3 aspect ratio used by the movie industry before World War II. DTV receivers, however, have a widescreen 16:9 ratio that approximates today's movie screens and 35 millimeter film.

Once transmission begins, the clarity and sharpness of the picture are startling. The DTV receiver has 1080 scan lines— more than twice today's NTSC receiver with 525 lines— and the DTV signal carries nearly six times the information. Color, which is enhanced by a ratio of 2:1, is far more accurate, and the sound is exceptional. DTV uses a five-channel system of Dolby® CD surround sound. A sixth, sub-woofer channel fills in the bass.

There is another important difference. The analog TV signal becomes poorer as you get farther away from the transmitter. As more interference occurs in the signal path, more ghosting, snow, and other anomalies appear in the picture. With DTV however, you get the same perfect signal whether you are one or 50 miles away from the transmitter— or no picture at all.

Beyond Conventional Measures

Ability to receive a virtually perfect high-definition television signal is the advan-

tage that will, predictably, cause consumers to embrace DTV initially. This, however, is only the launching pad. As a digital technology, DTV will give broadcasters a pipeline to deliver nearly 20 million bits per second of information over the air. What's more, they'll be able to do so on the same 6 MHz spectrum that conventional television has needed to deliver one program. To explain DTV's magnitude, Mr. Seidel observed that today's phone lines carry only about 28 thousand bits per second.

Even today, at the still-primitive threshold of development, DTV's capacity as a terrestrial information conduit is awesome. Already the technology— unimagined less than a decade ago!— will let broadcasters deliver one high-definition television program, or four standard-definition programs (which are still of higher quality than today's programs), or a combination of standard-definition programs and data services.

In a recent article, Harris Senior Scientist Bob Davis stressed the immense programming flexibility DTV will offer to broadcasters. Programming possibilities will be endless! For example, a station might choose to transmit four channels of afternoon programming at lower resolution then switch to a single high-definition 1080-line picture for national news. News might be followed by a couple of hours of a return to four channels, then

the prime-time schedule might conclude with a hit movie transmitted at full-channel capacity in stereo surround sound.

From Gigabits to Megabits

Digital compression is the key to DTV's capacity and flexibility. Compression allows a vast amount of data—in the case of high-definition television, *gigabits* of a raw, quantized television picture data or other information—to be reduced to less than 20 megabits per second for transmission.

DTV handles information much as a computer does. The television picture is broken down into minute elements, and each element is converted to a digital "word" composed of 0's and 1's. Through digital signal processing, each picture element (digital word) in one television frame is compared to those in the next frame. Picture elements that stay the same are identified and thrown away. Only elements that have changed are transmitted.

"With digital transmission, in most respects the transmitter does not care what the underlying data represents, as long as the receiver and the data source agree on the meaning and interpretation of the bits transmitted," Mr. Davis explained. "This is the principal reason why digital transmission is so flexible."

Preserving Free Over-the-Air TV

According to Jim Goodman, president and CEO of Capitol Broadcasting, DTV offers another significant benefit to broadcasters—a future.

"We have all known that with digital technology, we're going to get a high-definition, improved TV signal," he told WRAL's news conference attendees, "and we're in the business of broadcasting. More homes than not in this country do not have cable and rely on us for free over-the-air TV.

"We knew high-definition was coming. But what if cable had come up with a wider bandwidth signal, or satellite had?" he asked. "We could have been left out

continued on next page

Harris Announces Plans To Establish Digital Television Center of Excellence

Center To Unite Critical DTV R&D and Selected Sales, Marketing, and Administration Resources

Harris will establish a new research and development facility to speed the introduction of equipment for the emerging digital television market—formerly known as HDTV.

Harris' Broadcast Division recently announced plans to establish the Harris Digital Television Center of Excellence. The Center, which will serve as Harris' hub for all of its development of digital television transmission equipment and systems, will be located in the Greater Cincinnati/Northern Kentucky area. Harris Broadcast already operates a systems business in the area.

According to Harris Broadcast Vice President and General Manager Chester A. Massari, the DTV Center will bring together all of the division's resources involved in digital television—including key television product management, advanced digital television engineering, and selected sales, marketing, and senior administration functions.

Mr. Massari stressed that while some resources will be redirected from Quincy to support the DTV Center, there are no plans to reduce the division's heavy reliance on its Quincy operation. "Quincy will continue to be the division's only U.S. radio and television transmitter manufacturing facility—and we anticipate making future investments to bolster our digital production capabilities," Mr. Massari said. "Radio transmitter product management, engineering and general administration functions also will continue to be based in Quincy."

The Harris DTV Center is part of Harris Broadcast's long-term vision to be the dominant DTV supplier worldwide. "The market for digital broadcast transmission equipment and systems is growing rapidly as television stations transition from analog to digital technology," Mr. Massari observed. "Establishing this Center will enable us to build on our current technology to develop next-generation systems capable of providing even more services."

Cox Broadcasting Selects Harris to Provide DTV Transmitters

Cox Broadcasting, Inc. has signed an agreement for Harris to provide digital television transmitters for its 11 owned and operated stations nationwide. Terms of the agreement were not disclosed.

Under the agreement, Cox Broadcasting will purchase television transmitter equipment for digital broadcasting (formerly HDTV) from Harris Corporation's Broadcast Division.

Cox Broadcasting, based in Atlanta, owns and/or operates television stations in nine major markets, including WSB, Atlanta; WSOC and WKAY, Charlotte; WHIO, Dayton; KFOX, El Paso; WFTV, Orlando; WUPL, New Orleans; KTVU, Oakland/San Francisco; WPXI, Pittsburgh; and KAME and KRXI, Reno.

A major group broadcaster, Cox Broadcasting also includes FM and AM radio stations, three television sales representation firms, a television programming and theatrical movie company, and a research firm, in addition to television stations. Cox Broadcasting is a subsidiary of Cox Enterprises, Inc., which is a media leader in broadband communications/cable and newspaper publishing, as well as broadcasting.

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of the game— along with more than half of all U.S. viewers who rely on us for over-the-air TV.

“With DTV, the FCC has adopted a standard everyone’s going to use— broadcasters, cable, and satellite. More important, the standard’s been designed so we can broadcast it in [the current allotted] 6 MHz and stay in band,” he added.

Noting that with the DTV standard, US broadcasters are not going to have a technical deficit, Mr. Goodman said, “If we have a problem, it will be in programming.”

To Market, To Market...

With the first experimental station on air, it’s logical to wonder when sets capable of picking up the signal will be available? WRAL is hoping to have 15 to 20 receivers available in early 1997 to place in shopping malls and at other locations in its Raleigh-Durham-Fayetteville service area. Some sets could become commercially available by Christmas 1997.

As with any new technology, the first receivers are expected to be very expensive for three to four years. Once production ramps up with growing consumer demand and increasing program availability, however, DTV receiver prices should be comparable to today’s.

How long the transition will take is, as yet, undefined. Estimates range from seven to 15 years for the transition phase. The process could be accelerated by a public that is already highly sensitized to the improvements in audio wrought by digital technology. DTV’s full potential aside, its ability to deliver HDTV should have at least the “wow” factor of CD sound. 

For a copy of the new Harris Guide to DTV, please fax your request on your company letterhead to 217-222-0581.

Harris Wins Contract to Provide One DX 2000 and Three DX 500s to Government of Vietnam

Harris has been awarded a contract to provide high-power AM medium wave solid-state radio transmitter systems to the government of Vietnam. Under the one-year contract, the Broadcast Division, based in Quincy, Illinois, will provide one DX 2000, 2000-kilowatt transmitter and three DX 500, 500-kilowatt transmitters for use by the Voice of Vietnam. The transmitters will be installed in a southern province of Vietnam.

Harris was awarded the contract on the basis of tests conducted by the Voice of Vietnam during 1994 and 1995 on DX Series 10- and 20-kilowatt transmitters in Vietnam. According to the Voice of Vietnam, testing proved that DX transmitters’ reliability, technical quality, and high efficiency were especially suitable for the tropical and highly-humid climate and the poor power supply conditions in Vietnam.

Systems Operation Announces Two Promotions

Joe Mack has been promoted to systems business development manager for Harris Broadcast’s Systems Operation in Florence, Kentucky. He becomes responsible for systems sales and proposal activities, and also will manage the satellite, microwave and mobile systems product line.

Joe has nearly 25 years’ experience in systems engineering and sales. He joined Midwest Systems Division (now Harris Broadcast’s Systems Operation) in 1981. Named satellite products manager in 1984 when Midwest began offering satellite communications systems, he helped to develop the S-1, one of the world’s first truly portable Ku-Band uplink systems. In 1992, he became video satellite and sales specialist for Harris’ Systems Operation. He was promoted to manager of systems sales— his most recent position— in 1993.



Joe Mack



Chip Schneider

Chip Schneider has been promoted to studio systems product manager, with responsibility for developing opportunities for digital audio and video systems for the broadcast, cable, production and entertainment markets. Since joining the Systems 15 years ago, Chip has held positions of increasing responsibility in service and sales. For the past four years, he has worked as proposal supervisor.

Harris Wins Two Illinois Pollution Prevention Awards

Harris was one of 23 Illinois businesses and community organizations to win the 1996 Governor’s Pollution Prevention Award. Applicants in the statewide competition were evaluated for innovative strategies and use of alternative technologies to reduce the volume and the toxicity of waste. Judging criteria included technological innovation, environmental significance, economic benefits, and commitment to pollution prevention. Harris also won in 1993. In addition, Harris received the Continuous Improvement Award for long-term pollution prevention results.

According to Andy Edgar, Harris’ program has had even more benefits than waste elimination. Since the program began six years ago, related pollution control, waste disposal and raw material costs have been cut by approximately \$125,000 per year. “We’ve found that going green not only benefits the environment, but it makes good business sense,” he said.

Telos

DIRECT CONNECTION

Zephyr On The Beach

Two years ago a new format burst onto the Carolina coast. It was dubbed "beach, boogie and blues" by its creators at WWBZ-FM in Charleston, South Carolina.

Now, thanks to the Telos Zephyr, this fresh and funky mix is hitting the airwaves in Savannah, Georgia; Columbia, South Carolina and Wilmington, North Carolina too. While the network carries the same programming, creative management and the Telos Zephyr allow each station to air localized advertising.

The four-station Breeze Radio Network format is the brainchild of radio veterans Leo and Woody Windham.

Tired of all the consultants, the research, and formulas, the brothers decided to follow their instincts, honed after decades in the business. Their original recipe calls for a bracing blend of R&B, Stax classics, Motown, and traditional and contemporary blues, with a helping of regional artists stirred in for good measure.

The 24-hour format is simulcast to all four stations from a central control

room at the Charleston station. On-air talent select from more than 1400 cuts stored on hard drives at the Charleston hub where the liners, legal IDs, spots and programming originate.

Three Zephyr transceivers at WWBZ's main studio feed the signal over dedicated 64 kbps circuits to a Zephyr located at each of the three remote transmitter sites. To minimize possible audio degradation, each Zephyr directly feeds the broadcast processor before the signal reaches the

transmitter. Zephyr's ability to serve as both a transmitter and receiver is also tapped when programming originating from one of the other stations or a remote site is sent back to the hub for distribution to the network.

Once an hour the station runs a common network break for regional advertisers who want to blanket the area. Twice an hour, the operator activates separate computer systems that feed localized commercial stop-sets over the Zephyr network.

"I felt it [Zephyr] was the only codec for us," says Network Coordinator Michael Hart. "I've looked at other codecs,

but there's no way I'd want to get involved with all those buttons. Zephyr was perfect for our current application and offered flexibility for what ever comes down the road."

That flexibility was tested when Hart and his trusty Zephyr rescued

Oliver North. The syndicated talk-meister found himself in Charleston with an ISDN line but no codec just an hour before air. Hart rushed over to the Colonel's makeshift studio, plugged in the Zephyr and dialed up Washington. Because everything needed for the ISDN connection is included and connection to the telephone network takes just one modular cable, we got him on the air with time to spare recalls Hart.

In the dual mono mode, Zephyr let North take and respond to calls fed from Washington on one channel, while the other channel was used for cues. "Watching it all, then hearing it over the local outlet I was amazed by the audio quality. It was incredible."

"I call them (Zephyrs) 'magic boxes' because of what they can do," Hart says as he anticipates using Zephyr for fall sports and a host of other possibilities.



"I've looked at other codecs, but there's no way I'd want to get involved with all those buttons."

d.c.15
Fall 1996

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**HARRIS
ALLIED**



ASK PROF POTS PhD

Take advantage of our resident expert on Plain Old Telephone Service. Prof. Pots is a "PhD," professional hybrid designer. Here are some of the questions presented to him recently at his desk at Telos Customer Support. Got a question? Prof. Pots can be reached by e-mail at support@zephyr.com, by phone at +1.216.241.7225, or by fax at +1.216.241.4103.

**professional hybrid designer*



Q I saw an ad for your ONE-x-Six talk show system and it appears to switch six phone lines to one digital hybrid. I know that for best performance, I should have one hybrid for each caller. Can I add a second hybrid?

A Although designed primarily for single hybrid applications, there are three ways to install a second hybrid on the ONE-x-Six. Here is an overview of the three methods:

1. Connect the second hybrid to the phone jack normally used for the screener telephone. This option compromises many of the screening functions.
2. Loop the second hybrid through one of the lines connected to the ONE-x-Six. This creates a guest conference line within your six-line hunt group.
3. The most popular option for a guest conference line is to install the second hybrid as a stand-alone system on a separate phone line.

For more details, see our Web site or contact Telos Customer Support.

Q How can I share lines between my PBX and your multiline telephone talk systems?

A An electronic phone system, commonly referred to as a Private Branch Exchange or PBX, can be a real boon to your business operations. Unfortunately, today's digital PBXs communicate line status via a serially-encoded digital bit stream, interleaved with the digitized audio. This process is a "closed system" — the serial data format is proprietary to each PBX manufacturer. Since there are so many different PBXs out there, it would be very difficult for us to support every PBX in a digital manner (even if they'd "shared" their code with us!). So, we broadcasters are forced to work around these constraints.

Ideally, phone lines used for broadcast should not be connected to another telephone system. We know that

sometimes this cannot be avoided. Virtually all PBXs have analog (or 2500) ports for single line devices (answering machines, modems) that appear like Ma Bell trunks, with ring voltage, talk battery, and (most importantly) analog audio. This creates a number of installation options, each with its own tradeoffs.

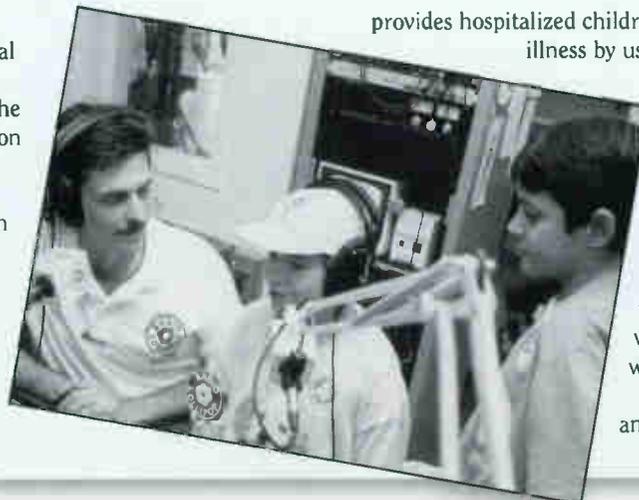
Be aware that operational features on both systems can be sacrificed when phone lines appear on both a PBX and Telos hardware. Line supervision (the ability of one system to prevent a line in use from being accessed by the other system) varies among electronic phone systems. Also, a PBX can both introduce noise and degrade audio levels — factors that must be considered when installing Telos hardware after your PBX.

More details on workarounds for Telos-to-PBX connections can be found on our Web site or by contacting "Prof. Pots" at Telos Customer Support.

KIDS DISCOVER RADIO CAN BE

The kids, parents, doctors and nurses at Miami Children's Hospital are discovering just what "good medicine" radio can be now that the first US-based Radio Lollipop station has gone "on-air" at Miami Children's Hospital. A complete Telos ONE-x-Six Talk Show System donated by Telos Systems makes the hospital's new closed-circuit station fully interactive.

The state-of-the-art equipped station, built by Miami's Hero Productions, is run by patients and trained volunteers. "It



provides hospitalized children a way to escape the boundaries of their illness by using their imaginations and becoming an

active participant in the programming," says Renay Blanchette Rouse, Radio Lollipop project manager.

For two hours, three evenings a week to start, the station offers welcome entertainment and encourages interactive play through call-ins, games, story-telling, and contests. As more volunteers join in the fun, programming will expand to seven nights a week and weekend days.

A call to the Radio Lollipop station from any telephone in the hospital sounds great

Telos ONE Behind the Screens of HotWired

To collect live bulletins from the front line of the digital revolution, Internet broadcasting pioneers at the HotWired Network (www.hotwired.com) rely on Telos ONE digital telephone hybrids.

The HotWired Network aims to marry leading edge content to leading edge technology. Launched in 1994, the HotWired Network is a community of Web sites created by Wired



Ventures Inc. featuring original content on politics, travel, arts, technology, media, entertainment, health, careers, and online reporting for Wired magazine, including state of the art technology as well as a premier search engine and a Java-based chat session.

Behind the screens, the HotWired Network netcasts real-time audio chats (a.k.a. live talk shows) plus pre-produced interviews with newsmakers and celebrities that are often conducted the "old-fashioned way" - via telephone.

Audio Engineer Brian Benitez says when it came to choosing a telephone hybrid "Nothing else but Telos would do." Of particular importance was that all hybrid functions, gain control, and filtering are performed completely in

the digital domain.

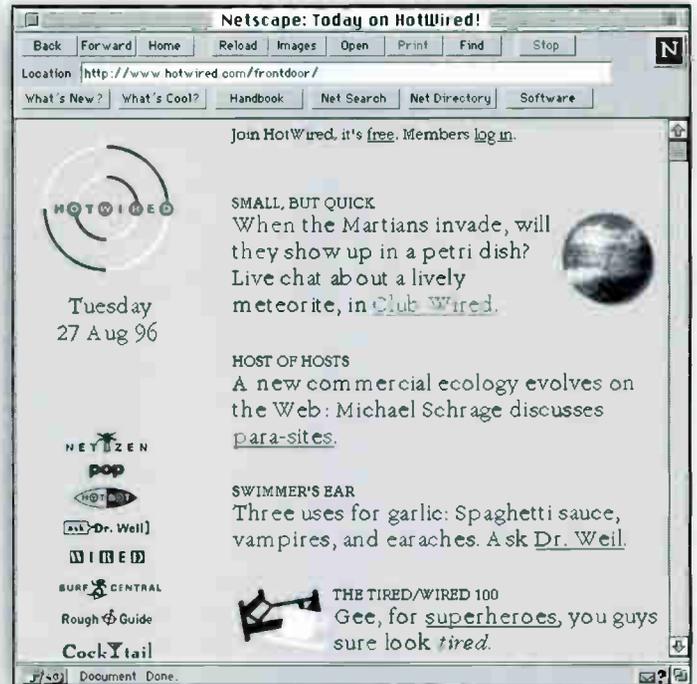
At the San Francisco studio, a Telos ONE is plugged into a Mackie mixer with an outboard audio processor. Phoners are recorded on hard disk or DAT for later editing on a digital audio work station. "Installation was a breeze," Benitez recalls. "You just

plug it [Telos ONE] in, do a little calibration and it's ready to go."

The Telos ONE's sophisticated automatic gain control on input and output audio is "especially useful" given the nature of our studio, says Benitez.

"It allows us to do some processing we couldn't do otherwise."

The HotWired Network adds an interactive electronic dimension to the traditional call-in show. For example, when a member of the



HotWired's home page launches a family of sites that rely on the Telos ONE digital telephone hybrid to gather news heard on the web

HOTWIRED NETWORK

heavy metal band the Scorpions called in from the road for a chat, his global audience logged on with questions pitched in the Club Wired chat space. They heard the answers in real-time thanks in part to the Telos ONE.

The HotWired Network also presents live events from remote venues. In September, using Telos Zephyr to feed its studios, the site netcast daily reports and performances from the world's premier digital arts gathering, the Ars Electronica Festival in Austria.

GOOD MEDICINE

thanks to Telos' talk show system. The Telos gear lets a DJ screen and juggle as many as six calls at once all at the touch of a button. The ONE-x-Six, like all Telos digital hybrids, produces natural-sounding, two-way conversation without upcutting. Calls can be monitored through open speakers without feedback. A Telos Switch Console is used to place outgoing calls, put callers on hold or on the air, and to conference. A standard telephone is used for call screening.



Radio Lollipop is an international not-for profit organization that has brought the magic of radio to more than 17 major children's hospitals around the world since it was launched in England in 1979. Miami Children's Hospital is the first in the United States. Others are located in Great Britain, Australia and New Zealand.



Whadda Ya Tawk? NYC Accents Telos Hybrids

No matter how you pronounce it, talk has always been at the heart of WNYC's programming. When the fledgling non-commercial AM signed on in July of 1924 the idea was to capture the dynamism, diversity and drama of the Big Apple. Seventy-two years later WNYC-AM, and its younger FM counterpart, are still brimming with 3-D voices captured with the help of Telos digital telephone hybrids.

The station's ambitious schedule of local and national programming and production is supported by seven control rooms, all equipped with Telos gear for more than a decade.

Whether juggling cellular phone calls on hot-button topics *On the Line* with Brian Lehrer, inviting callers to chat with renowned authors, actors and directors on *New York & Co.*, or soliciting street wise comments on *New York Beat*, Telos hybrids are excellent performers says Director of Radio Operations Steve Shultis.

In the station's three main control rooms Shultis recently exchanged Telos ONEs for 100 Deltas. "Upgrading was painless because all the 1A2 equipment was already in place," he says.

To meet expanding demand for live national phoners and two-ways, Shultis wanted more sophisticated gain control, dynamic digital equalization and "the best reason - improved transhybrid loss." With the Telos 100 Delta hybrid he got that and more.

The Delta provides a way to control the balance between the talent and the caller. It's duplex depth subsystem inserts a controlled loss onto the inactive audio path. The result is what Shultis calls "smooth ducking" - that is the ability to give the announcer more presence over callers. "Its [the 100 Delta] intuitive front panel lets you easily diagnose any problem." And Shultis notes initial adjustments to the 100 Delta's processing "took just one touch at the start. We haven't had to touch the null since we installed it."

In each of three identical studios, hosts and guests can choose from eight incoming lines divided between two 100 Deltas. An additional two lines for calling out are routed through a third Telos hybrid. Custom panels



Telos' 100 Delta gives On The Line host Brian Lehrer and callers the advantage they need to match wits with well-known satirist Al Franken.

mounted in each control room's PR&E console, complemented by switch consoles in the studios, put telephone line selection and related functions at the finger tips of either the board operator or host.



Whether from the east side, west side or anywhere around the town, "Cell phone calls, especially from cars are really increasing," notes Shultis. "But the [Telos] hybrids handle them like any other call, easily adjusting to the noise level regardless of the line's characteristics." Meanwhile, economical Telos ONE's remain workhorses in WNYC's four production studios. In the field, Telos LINKs are used extensively for interconnecting production intercom systems with dial-up phone lines.

Until July of this year, the AM station along with its FM sibling, born in 1943, were municipally owned. Now flying solo, both are licensed to and run by the not-for-profit WNYC Foundation who purchased them from the New York City government.

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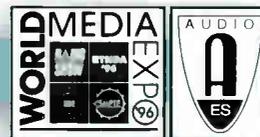
Telos on the Road

Break out your suitcase and be sure to pack your walking shoes. The fall trade show season is upon us and Telos is getting ready to catch up with old friends, match phone voices with faces, and show-off our products.

Among other offerings, you will have a chance to check out the ZephyrExpress, which combines a full-featured codec, an ISDN terminal adapter, and an audio mixing/monitoring system - all in a road-rugged chassis. ZephyrExpress is slated to ship later in 1996.

This fall's big shows are both at the Los Angeles Convention Center. Booth 2145 in the Radio/Audio Hall will be our home for the World Media Expo, October 10 through 12. Then, from November 8 through 11, the Audio Engineering Society has placed us in booth 160. Year after year, the AES proves to be a great way to get solid solutions for your audio applications.

For more information on the WME, call contact NAB's fax-on-demand at 301.216.1847 or visit <http://www.nab.org>. AES information may be obtained by calling 212.661.8528 or visiting <http://www.aes.org>.



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Data shuttle wheel, extremely fast shuttle search and programming. AES/EBU and S/PDIF digital I/O.

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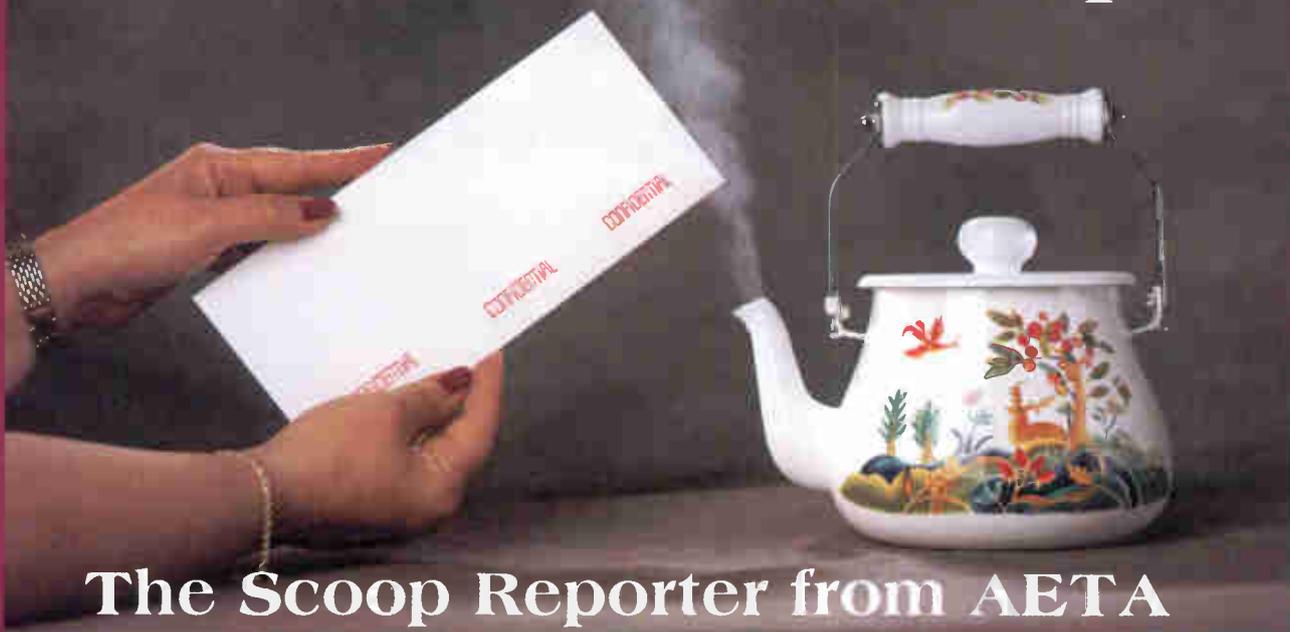
- Random access
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Perhaps the most advanced recording editing and playback machines utilizing MiniDisc Technology. Ideal for broadcast, theme parks, museums or other environments requiring frequent, continuous or unattended playback of program material.

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We've Got the Scoop!



The Scoop Reporter from AETA

Scott Beeler
Harris Corporation
Richmond, Indiana

Dear Scott,

It's not very often that I get to be one of the first to really try and talk about an exciting new product like the Scoop Reporter. I hesitate to share my enthusiasm with you. I am really afraid that once people find out about this, you will be out of stock for many weeks when I try to order a second or third set.

For years I've been hearing stories of people developing a digital product that would provide voice quality audio down a single dial telephone line. A few weeks ago at NAB, I saw the Scoop Reporter at your booth and it really seemed to work.

When I returned to the office after NAB, I learned that the ISDN line we needed to do a broadcast from New York City wouldn't be available for several weeks. The broadcast was for our talk station WRKO. As it turned out, when it came to broadcast time we had only one dial telephone circuit to use (we had ordered four, but there was a facility problem in the building). Enter the Scoop Reporter for it's first real on the air test. I was very concerned about what the program would sound like. In order to hear the show that our listeners would, I went home and listened on a portable radio. The recorded show intro seemed to last forever, then came the moment of truth. We had one host at our studio in Boston, while the other was in New York. When they both started to chat, it was hard to tell who was where. The quality was outstanding! It stayed connected with no change in fidelity for the entire three hour show.

An added bonus to the Scoop Reporter is full duplex audio, so mix-minus audio can be fed back down the line to the remote. It is a full remote package in a lunch box. Just provide the microphone, headphones and dial tone. Because it can run on conventional batteries, you don't even need to plug it in. We can't wait to try it on a cellular phone jack.

Already others have shown up in my office wanting to give the box a try (We can't let them because it is tied up with our weekly New York Show.) There is no question about whether we will buy more Scoop Reporters. The only question we have is: How many will we need to meet the demands of our American Radio System stations?

Sincerely,

Paul Donovan
Director of Engineering
American Radio Systems



The Scoop Reporter is a portable CODEC that lets you send and receive up to 7.5 kHz quality audio over dialup telephone lines. It offers the convenience and low cost of the dial-up telephone with the quality that you have come to expect from your higher cost digital communication. News reports, sportscasts and on site promotional broadcasts can now be done from practically anywhere and on a minute's notice. The Scoop Reporter's exceptionally low delay, makes it ideal for live voice* broadcast situations. The Scoop Reporter enjoys one distinct advantage: it works!

*voice on y, not music

Call your Harris Representative today!

TEL: 800-622-0022
FAX: 317-966-0623
<http://www.broadcast.harris.com>

HARRIS

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Please fill out the reverse and fax it to 1-317-966-0623 for more information.

Scoop is the P.O.T.S. codec that works!



Please FAX this form to request immediate Scoop Reporter information from

Harris Broadcast

FAX to Harris Broadcast FAX USA 317-966-0623

— PLEASE TYPE OR PRINT WITH A BLACK PEN —

Yes, I'd like more information on Scoop Reporter.

I need information for a:

- Radio Station
- TV Station
- Other _____

I need:

- Prices
- Product Specifications
- Ideas or help
- An on-site demo

I also need a:

- _____
- _____
- _____

Please:

- FAX to me by return
- Telephone me
- Visit me

Name: _____ Phone: _____

Title: _____ FAX: _____

Company/Station: _____

Street address: _____

City: _____ State: _____ Zip: _____ Country: _____

7 KHZ is now a reality over a P.O.T.S. line!

Mackie

CR1604-VLZ

Mixer

WHAT IS THIS thing? Is it a PA mixer? Or is it an 8-track recording console...16-track recording console...or a side-car with 16 mic preamps...or, uh, is it an auxiliary PA monitor mixer? Plus, maybe it's a headphone mixer providing separate mixes, or it's a line mixer for stage and studio applications, or it's a portable... I could go on, but EQ only gave me limited word count for this review, so the answer is, "Yes."

Without a doubt, the Mackie CR1604-VLZ mixer has got to be one of the best sounding, most versatile pieces of equipment to hit my studio in a while. This is a mini mixer with major capabilities. Greg Mackie and his staff instituted at least 13 significant upgrades to the original CR1604. Seven big additions are:

- 16 mic/line inputs and preamps (ten more mic inputs than the original CR1604)
- True 4-bus assignment switches and main mix outputs
- Inserts on every channel that are prefader and pre-EQ (so they are not at the mercy of your fader level)
- 3-band EQ with swept mids
- Low cut on every channel
- Mono output with level control for sending a separate mono mix in addition to your stereo mix
- Inputs that can accept virtually any output impedance.

The CR1604-VLZ packs a mighty punch in a small area. Even though Mackie covers the entire surface with knobs, sliders, switches, LEDs, and jacks, the ergonomics make perfect sense. After a short time on the board you get the feeling that a recording engineer actually had a hand in the 1604-VLZ design and layout. For instance, many cheapo boards fail to include status LEDs. You'd locate Atlantis easier than finding a muted or soloed channel on other low-cost mixers. Not so with the CR1604-VLZ, which contains individual Solo status, Mute On/Off, and activity/overload LEDs—a terrific pro touch.

Here are some of the uses I found for the board:

- A portable recording console for remote gigs. Use the 16 channel inserts to record and monitor 16 simultaneous tracks. The CR1604-VLZ plus two digital 8-tracks make for an ultra-compact, high



quality, 16-track live recording setup-if EQ to tape is not a requirement. Note that for 8-track recording you can get EQ comin' and goin' (8 dedicated direct channel outs with EQ on channels 1 through 8 and then use channels 9 through 16 for your returns).

- A preamp side car. There's nothing like lush-sounding outboard mic pres. The Mackie mic preamps can make your tracks sparkle with detail, plus you can leave your main console in mix mode. Just patch out of the inserts (mono 1/4-inch plug pushed all the way into the insert jack) and you access the 16 acclaimed Mackie mic preamps on a straight wire path that avoids EQ and faders.

- A real-time headphone mixer for hard-disk recording. Hard-disk recording can be a true time saver. If, though, you've attempted to record a band using a hard-disk set-up and have had to rely on the hard-disk recording computer program with its layers of screens, mouse moves, and scrub wheels to create multiple headphone mixes that'll satisfy a room full of rockers who came to do 14 songs on limited budget on a blow-and-go schedule, you may enjoy trying the real-time flexibility and speed you get when you connect to the CR1604-VLZ. You can make cue changes as quickly as the musicians request them and stay focused on the recording aspects of your hard-disk program.

Many people in the audio business talk about the Swiss army knife (SAK) school of design for audio products. These boxes are advertised as all singing, all dancing, all the time. But hook them up, and many lack the performance you desire. Mackie avoids the SAK syndrome. For most applications, the CR1604-VLZ does it all. In other instances, you'll use it in conjunction with additional equipment. For once, here's a mixer that's equally at home in studio settings and live-sound venues.

If you've thought about assembling a remote recording setup or finally want

to put together a small project recording studio or just want to enlarge your current layout (outboard mic pres, multiple headphone mixes additional mixdown channels), the Mackie CR1604-VLZ Compact Mixer is a foolproof choice.

A final word to the owner's manual writers: excellent job (funny, informative, and concise). This is one great piece of gear.

-Bennet Spielvogel
Reprinted, with permission, from August 1996 edition of EQ Magazine



Make Your Mackie Broadcast Ready Console Controller II

Broadcast Interface for Non-Broadcast Consoles
Console Controller II (CCII) provides the solution for interfacing non-broadcast consoles or digital workstations to the broadcast studio. It offers three channels of insert switching to turn on or off console input channels or other source equipment (i.e. mic pre's) as indicated by a bright red LED on each switch. Additionally, the CCII offers monitor amplifier mute control, front panel monitor level control and the ability to switch between internal or external (program/off-air) monitor input sources.

Contact your Harris Representative today!

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Complete reverse and fax to Harris for more information!



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Harris Broadcast

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I need information for a:

- Radio Station
- TV Station
- Other _____

I need:

- Prices
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- Ideas or help
- An on-site demo

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Please:

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Name: _____ Phone: _____

Title: _____ FAX: _____

Company/Station: _____

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City: _____ State: _____ Zip: _____ Country: _____

RADIO Today

The Transition from Tube to Solid State FM Transmitters

By RICHARD J. FRY,
FM Applications Engineer

Until the last few years, the broadcast industry has relied on vacuum tube technology to generate the radio frequency power needed for FM broadcasting. However, solid state transmitters are now replacing vacuum tube FM transmitters. There are five main reasons for this move:

Greater Amplifier Reliability. Solid state devices have extremely long life. A vacuum tube uses a high temperature filament that wears or burns out, like a light bulb. A typical RF power tube must be replaced after two to four years of operation, at a cost of thousands of dollars — and some off-air time to make the change, as well. Solid state devices have no filament or other failure-prone architecture. The projected life of a solid state amplifying device is typically over thirty years. A solid state amplifier just keeps working.

“Soft Failure.” Solid state FM transmitters use many relatively low-powered amplifier sections combined together to develop the total output power required. Loss of one or several of the low power stages has only a minor effect on the output power of the transmitter. In most cases, the coverage area of the station is hardly effected. In today’s solid state FM transmitters from Harris, an inexpensive low power amplifier section can be replaced at any time of day, without going off the air. However, a typical tube transmitter will be off the air completely whenever the tube goes bad. And this could happen unexpectedly — even in prime commercial time.

Reduced Maintenance. For the reasons outlined above, solid state FM transmitters seldom require service. It has been estimated that a solid state FM transmitter

needs only about 10% of the maintenance time and cost of a comparable vacuum tube transmitter. Solid state allows better staff utilization and fewer “emergency” trips to the transmitter site. Maintenance can be scheduled to coincide with site access issues, avoiding trips to the transmitter site when it might be difficult due to the ice and snow conditions.

Bandwidth. Harris solid state FM transmitters use broadband circuits that have negligible effect on the quality of the FM signal as it is amplified. Harris transmitters can be easily and quickly changed by the owner (or new buyer) to operate on any FM frequency, 87.5 through 108MHz. This feature is valuable for group owners who may want to send a transmitter from one site to another for a facility upgrade. It also is useful as a frequency-agile standby transmitter for all other FM’s in a given market. This bandwidth capability increases the inventory and resale value of the transmitter for the owner and buyer. Tube amplifiers are more narrow band, and can limit the quality of the FM signal as it is amplified. And, while the frequency of tube transmitters can be changed, it is a more complicated process sometimes

requiring parts changes and careful settings and adjustments by a skilled engineer.

Safety. Harris solid state FM transmitters use safe, low DC voltages inside the cabinet. In fact, the DC voltages are so low that U.S. and international safety standards do not even require the use of interlocks on Harris solid state FM transmitters. Use of low voltage gives a safer working environment for station personnel, and also reduces dust attraction within the transmitter. In contrast, vacuum tube transmitters use dangerous, high DC voltages that can be a safety hazard, and which do attract dust to those components — increasing the need for routine maintenance.

Solid state FM transmitters can be somewhat more expensive initially than tube transmitters of equivalent power. This is the result of the costs of the many low power amplifiers required and necessary combining circuits. However, when adding up the savings and service benefits provided by a well-designed solid state transmitter over its lifetime, it is clear to see why so many broadcasters are finding it very profitable to switch to a Harris solid state FM transmitter. 

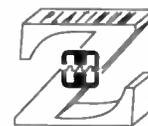
Introducing the Z10CD— the Newest Dimension in FM

For years, FM’ers knew they would have to pay more for higher-power solid state FM transmitters. At NAB ‘96, Harris began to change this with its new Platinum Z FM transmitters. The first in the family was the Z5CD, a 5kW transmitter with a fourth-generation solid state design and Harris’ DIGIT digital FM exciter.

This fall, Harris extends its Z line to the 10kW level. Like the Z5CD, the compact Z10CD offers no-compromise reliability and performance. RF power amplifier modules use the same solid state devices that have achieved an MTBF greater than



250,000 hours in Platinum FM transmitters. Multiple, hot-pluggable modules operate in parallel, ensuring continued transmitter operation even if a module is removed. Z-line transmitters also feature redundant power supplies, and are available with an optional, redundant IPA.



The broadband transmitters require no tuning from 87 through 108MHz. This N+1 capability allows frequencies to be changed in less than five minutes with simple switch settings, or in less than half a second with an optional external controller.

DIGIT, the world’s first digital FM exciter, is standard in the Z10CD (and all Harris FM transmitters with the CD suffix). DIGIT has become the industry-standard digital exciter, with more than 700 on the air worldwide.

To learn more about Harris Z5CD or Z10CD transmitters, please phone 217-222-8200 or fax 217-222-0581.

PRODUCT Showcase



Under FCC rules, every U.S. broadcaster will be required to install equipment that complies with the new emergency alerting system by this coming January 1, 1997.

The United States are lining up on the Sage side. Arkansas, Ohio, Utah, California, New Jersey, Indiana, Kentucky, Texas, North and South Carolina, Florida, and the 39 others have made major commitments or have already purchased Sage ENDEC.

Groups and individual stations including Jacor, SFX, Viacom, Clear Channel, Nationwide, CBS, Greater Media, TBN, and Gannett...thank you! for making the ENDEC choice.

There is an optional remote control that performs all the tasks that the box itself can perform. Sage also offers an optional video character generator, multi-station relay panel, receivers and Chyron Codi. Call 800-622-0022 to find out more.



20 bit analog to digital and digital to analog conversion plus sample rate conversion.

Now you can make the perfect connection between your analog and digital audio equipment. The A2D2A shatters price barriers to bring 20 bit A/D and D/A conversion technology to production and broadcast studios. The internal 16 and 18 bit converters found in today's work stations, signal processors and digital

multi tracks can't deliver the transparent sound quality demanded by leading artists, producers, and savvy listeners. If you suffer from bititis, try a 20 bit A2D2A. It'll make an immediate and dramatic improvement at an unbelievably low cost. Now taking orders for delivery this fall.



The Scoop Reporter has become the standard for POTS remotes. Leaders like Paul Donovan at American Radio Systems know how well the Scoop performs in real radio situations.

In a story from a major broadcast trade publication, Paul was quoted as saying "the Scoop Reporter has performed flawlessly since the beginning of May. I recently ordered a second pair of Scoop Reporters as my first pair of units is constantly tied up with regular assignments. With these new units, we'll begin to enjoy the flexibility of doing spontaneous broadcasts with real studio quality."

The Scoop is optimized for speech only. If a 24 kb/s path is available, expect great 7kHz audio. 28.8 kb/s will yield 8.4 kHz audio. The Scoop Reporter operates on 100 to 240 volts AC or optional D cells. Only 10 lbs. light. Comes with standard carrying case.

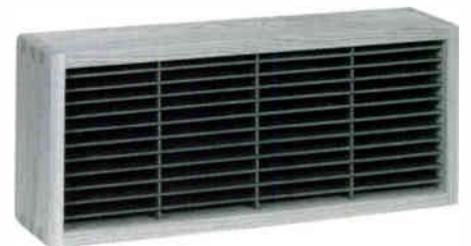
The most accurate on planet earth! Belar completes its precision line of AM, FM and TV monitors with their new *digital* BTSC TV stereo monitor/analyzer. This new model TVM-230 digitizes the television composite base band signal and decodes the stereo



multiplex portion using digital signal processing techniques. We'll be happy to send you a thorough spec sheet. Belar...the only monitors you'll ever need.



This very efficient and isolating shock suspension will fit all the microphones pictured and your budget. An extra set of rubber band isolation suspensions is included with your order.



Natural wood CD storage in three sizes. one or more to fit your storage needs. Choose the 48 CD capacity (225/8" X 921/32"), the 100 CD capacity (225/8" X 187/8) or the 220 CD capacity (225/8" X 325/8"). Solid oak construction with tempered masonite slots and dove-tailed, boxed ends. Beautiful!



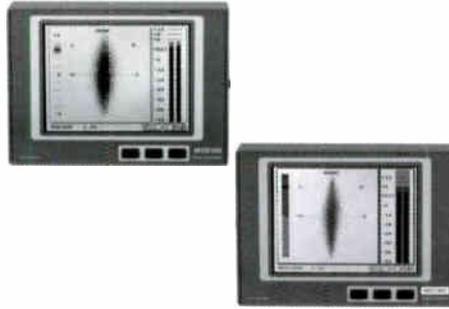
Harris Dracon is the name to look for when you want the best butt pack test sets available. They're compact, light weight and tested in drops of up to 20 feet. Available with or without speaker phone. DataSafe units also available. Test clips and cords supplied optionally.



Squeeze Play, "the skimmer," has several useful applications. The most obvious is to skim a competing station, quickly and painlessly gathering useful information on playlist and rotations. Or a PD may wish to skim his own station to perhaps determine if the all-night jock is really following the music rotation, or just to evaluate the effectiveness of the music rotation scheme. An enterprising PD might swap skimmer tapes with colleagues in other markets, studying successful stations who employ similar formats. The skimmer is also a good way to telescope a shift, a day part or an entire day of the competition.

See what you Hear...Hear what you see!

DK Audio Master Stereo Displays combine a level meter (PPM and VU scales) with a phase correlation meter and audio vectorscope in one compact (10x7x1.6in.) package. Available in 2 channel (analog or digital inputs) and 4 channels versions (digital), the MSD series



includes monochrome and color models. Optional FFT 1024 band Spectrum Analyzer available.



This sign helps you comply. Constructed of long life material for outdoor or indoor posting. Black letters on white with required yellow triangle. 18" by 24". Let us ship you one today.



Gentner's new GSC3000 Site Control System takes the concepts introduced by Gentner's VRC2000 remote control to the next level. For almost a decade, the VRC product line has provided micro processor based "smart" units that established the ability to operate

transmitters from many locations (the radio "walkaway" mode). Although still very popular, the VRC2000 (along with most other products in the industry modeling the VRC concept) cannot be expanded beyond the system's basic capabilities. The concept of the Gentner Site Control (GSC) is to provide a system that meets the needs of customers who require extensive control abilities as well as to accommodate the needs and budget of current VRC users. Operation can cover a single site with minimal requirements, a large number of sites with extensive requirements, and anything in between. The GSC3000 is ideal for duops, LMAs and similar configurations.



New, cool stuff from our acoustical treatment bag of solutions includes the new 2 x 2 drop in T-Fusor™. Its full bandwidth diffusion breaks up that old standing wave gang of gremlins that plague most studios. T-Fusors drop right into your 2 x 2 ceiling. White standard—paintable. Velcros to walls. Four to a box.

Lenrd™ is a quiet guy that traps bass full time with not a sour sound. Overall NRC of 1.35. Lenrd comes 8 to a box. Talk with us for recommended number, dimensions, and placement per room. 800-622-0022



Harris Line Conditioner electrical protection and distribution provides the 1RU solution in three different packages. Model 3002 features slide out light tubes and digital volt meter. Model 2006 includes light tubes but no metering. Model 2005 with no lighting or metering offers economical protection. Ten-foot cord, 8 rear apron outlets and 120 volts AC standard on all models.

EAS Clinic: Using Sage's EAS ENDEC to Solve Special Problems

The FCC's deadline for mandatory EAS compliance is rapidly approaching. Many broadcasters are beginning to feel the heat—especially since the FCC continues to maintain there will be no extension beyond the January 1 deadline.

Since the scramble for equipment began several months ago, many broadcasters have asked us how the Sage ENDEC—the leading EAS system—can address their special problems. In this issue of Broadcast Communiqué, Sage Alerting Systems President Jerry LeBow (a.k.a. The EAS Doctor) shares six applications.

CASE 1 Our area's LP1 (primary EAS station) and an LP2 (the backup) have different philosophies on alerts. The LP1, an all-news station, carries all important watches and warnings from the National Weather Service and local authorities. The LP2, a music station, carries the most severe warnings. If the LP1 is off air, the



ENDEC

LP2 will carry warnings the LP1 would carry. Can ENDEC accomplish this automatically?

Yes, if the LP2 has ENDEC's Modular Receiver. The receiver has outputs to indicate the presence of both the carrier and modulation on the station being monitored. If ENDEC's manual override is set to the LP2/LP1 function, the following happens: As long as the LP1 is on the air with modulation, the LP2 carries only the alerts it has agreed to run. If the LP1 goes off the air or loses modulation, ENDEC senses the condition and switches the profile of the LP2 to the LP1. This enables the LP2 to act as a full backup to the LP1, carrying all significant warnings and alerts.

CASE 2 A triopoly (three stations in the same facility) has an automated news and talk program on AM and two live music programs on FM. How can one ENDEC and the relay panel get appropriate alerts on the AM first, without delay, then allow the two FMs to run the alerts at an appropriate time?

By using ENDEC and a two-station relay panel, the unit can independently

switch the audio of three radio stations. The first station is directly into the ENDEC and the second two stations are on the relay panel. By programming the profile of each station separately, ENDEC can be commanded to automatically put the appropriate alert on the AM immediately upon receipt, and then allow the two FMs to preset which will carry



Remote Control

the alert next. This ensures that the alert will get on the AM immediately and fit into the programming of the two FM music stations during appropriate commercial breaks.

CASE 3 A totally automated FM music station wants to carry appropriate EAS alerts for its area but doesn't want to constantly cut into its music format to put the alerts on the air. Can ENDEC do this?



Receiver

Yes. With ENDEC's commercial tally function, it's a snap. The ENDEC has a number of programmable relay functions that allow closures, latching closures, and pulse closures at every stage of an incoming or outgoing alert. In the case of this automation system, a relay is programmed so that it closes in an appropriate sequence when a valid incoming message is stored in the ENDEC. This tells the station's automation system to make the next event the emergency message stored in the ENDEC. The automation system sends back a relay closure or voltage to the ENDEC, holding off transmission of the alert until the next event is ready. At that time, the ENDEC automatically interrupts the program line, sends the alert, then returns control to the automation. The result is perfect program continuity in a totally unattended automated station with the alert getting on as quickly as possible.

CASE 4 An AM news and talk station has four studios, any one of which could be on the air at any time. How do you control the ENDEC in the manual or timed relay mode from all of these locations if the ENDEC is mounted in the control room rack near the STL?

ENDEC can support up to five full-featured remote controls simultaneously, allowing access to all of ENDEC's functions from up to five independent locations. In this case, the ENDEC is installed in the engineering space about 150 feet away from each of the four studios. Each studio is equipped with a remote control that is mounted on the side of the console where the operator can

easily read the 8-character display and activate all the buttons. Once one of the studios has seized control of the ENDEC to send or relay the alert, other users purposefully are locked out until those functions are completed. At this time, all of the stations can again control the ENDEC. The remote control makes it possible to push a single button to listen to the message stored in ENDEC, to send weekly and monthly tests, and to put an alert on the air immediately. With the remote control, you also can store dozens of area-specific messages—one to a button—on the programmable keypad.



Optional Video Character Generators



CASE 5 The National Weather Service in our area sends a lot of watches and warnings on the NOAA Weather Radio System. Our station is the news and talk authority of the town. We pride ourselves on keeping the public up to date on all important events. However, the announcer at the National Weather Service is just awful. His pronunciation and diction sound awful on the air. How can we take these messages, get them on the air, but replace the audio with our own announcer?

ENDEC makes it easy to replace audio on an incoming stored message. Once the message is received, the operator can read the text on the printout or the display screen. The operator can also listen to the audio

and make notes about the alert. By connecting a non-program output of the console (cue or audition) to ENDEC's encoder, it is possible to replace audio in storage with audio from a local announcer yet still retain the digital codes and end of message sent by the Weather Service.

If you are using the remote control, you simply hit the record button and send audio from the console to the ENDEC via the encoder in connection. This will replace the audio stored in the ENDEC, even if lengths of the original message and your replacement message are different. When you re-send the alert, the digital data will be exactly what was sent by the National Weather Service, but the voice will be your announcer doing the alert in a clear and concise manner.

CASE 6 Our TV station has three newsroom areas and a master control. All areas need to know about incoming alerts and warnings. However, since we only control ENDEC from master control, we don't need remote controls in newsroom areas. How can we get information out to all these locations?

ENDEC supports up to five multicolored LED signs that crawl the text of incoming and outgoing messages as long as the alert is valid. Designated colors give news crews and operators information about a message's urgency: Green indicates tests; orange is used for watches, and red indicates warnings. Signs can even be made to beep when a message arrives! Signs come in many sizes, and are ideal for radio stations as well as TV stations.

To learn how ENDEC can meet your special needs, please phone Harris' Broadcast Center TOLL-FREE: 800-622-0022.

Got the Whole Picture?



Not All EAS Encoders and Decoders Are Created Equal.
Put The **SAGE ENDEC** To The Test.

It Wins Every Time!

- **PRICE**
- **EASE OF USE**
- **FEATURES**

For an independent viewpoint read the SBE EAS committee report titled "EAS equipment operational characteristics" in the 7/24/96 issue or look it up on their web site at <http://www.sbe.org>.

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This ad is one of a series brought to you as an industry service by Harris Broadcast Division. Sage has contracted with Harris to provide 24-hour hotline, warranty, and continuing service for EAS products. Harris has been serving broadcasters for 74 years.