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**Digital Production Tools**  
 Buyer's Guide checks out the latest in software and workstations for your production room.

**Spectrum Integrity**  
 Bruce Reese says low-power FM will be a technical and regulatory debacle.

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# Radio World

The Newspaper for Radio Managers and Engineers



March 15, 2000

## INSIDE

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▼ In creating the first full-time news station on the Web, WTOG also hopes to solve some coverage issues.

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▼ Near-field monitors from Hayes, two new mikes from beyerdynamic and a profile of Philly production wiz Jerry Wells.

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Visit RW Online at  
[www.rwonline.com](http://www.rwonline.com)

## Harman: Crown Is 'Good Fit'

by Randy J. Stine

If the first several months of 2000 are any indication, don't expect a slowdown in the rate of consolidation and ownership changes among radio suppliers.

Harman International Industries Inc. announced the purchase of Crown Audio and Crown Medical and Industrial Group from Crown International Inc. for an undisclosed sum in January. The deal was expected to close by the first of March.

Crown's Broadcast division was not included in the sale.

The move surprised some industry observers. For the past year, Harman was rumored to be interested only in scaling back its pro audio division, which includes names such as AKG and JBL. Harman sold Orban Inc. to Circuit Research Labs in December 1999, and earlier sold DAVID GmbH, a computer-based audio software maker.

So why Harman's shift to an acquisition mode?

See DEAL, page 11 ▶

### SPECIAL REPORT

## DAB Rolls On Abroad As U.S. Debates IBOC

by Leslie Stimson

For much of the world, DAB is not yet to come. It's here.

Today, more than 200 million people can receive a DAB signal, according to one industry group.

While the United States is pursuing an in-band, on-channel form of digital audio

broadcasting, large parts of the world have decided to use a different technology, Eureka 147.

DAB equipment manufacturers, broadcasters and other experts say many countries are implementing DAB, and the technology already is having an impact on consumers.

The rollout of Eureka 147 is strongest in Europe, where that system was developed, and in Canada.

In Europe, 25 to 60 percent of the populations of the United Kingdom, Germany and France can hear a digital signal. At 60 percent, the U.K. is regarded as the leader in the rollout. The U.K. comprises Great Britain — England, Wales and Scotland — and Northern Ireland. All four have DAB services.

In Canada, the figure is about 35 percent of the country, with a potential 10 million listeners.

### Potential audience

Coverage figures come from the WorldDAB Forum, a consortium of equipment manufacturers, broadcasters, transmission providers, regulators and governmental bodies promoting implementation of Eureka 147.

The organization evolved from the See DAB, page 6 ▶



An NTL employee operates the multi-plex for commercial radio in the U.K.

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# NEWSWATCH

## Sirius, XM Tackle Interoperability

Two satellite services, one receiver. The two companies developing satellite-delivered DAB services have pledged to work together — and commit funding — to solve their receiver interoperability problem.

The unified standard would represent the second generation of satellite radios for Sirius Satellite Radio and XM Satellite Radio. It would mean consumers could buy one receiver to get either service.

XM and Sirius will fund receiver

interoperability technology development and work together to create a service mark for satellite radio.

Each company has agreed to contribute intellectual property to the initiative and resolve pending patent litigation. Sirius had filed a suit against XM over a year ago claiming patent infringement. XM said the suit was unwarranted.

Receiver and car manufacturers are developing satellite radios. Sirius and XM will work with these companies to integrate the new standard under the terms of their existing agreements. All future agreements with receiver manufacturers and automotive companies

will specify the new satellite radio standard.

## Kennard Meets Goals

WASHINGTON FCC Chairman Bill Kennard has already accomplished his top radio goals for 2000 — passing rules to create a new class of low-power FM stations and implementing new broadcast Equal Employment Opportunity rules. Kennard said both LPFM and EEO “will increase the access of Americans to the airwaves” in a statement on his goals for the year released in January.

Other goals for the year include reviewing the TV industry’s progress in making digital sets compatible with cable and several telecom merger proposals.

Having re-formed its enforcement functions around a single bureau and opening the Consumer Information Bureau, the commission also is working on a possible licensing bureau while internal teams are reviewing electronic filing, merger review and spectrum efficiency for streamlining how the FCC accomplishes these tasks.

See NEWSWATCH, page 3 ▶

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# AUDITRONICS 4.0 NuStar

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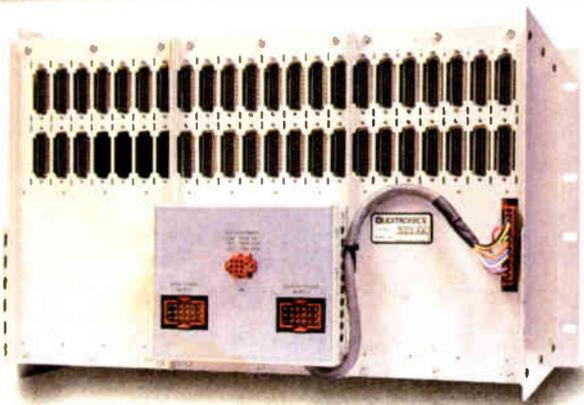
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# WTOP Uses Web to Fix Coverage

*All-News Radio Station Targets Federal Workers, Compensates for Null in Coverage Pattern*

by Tom Foty

**WASHINGTON** Having discovered a new cyber audience in the heart of its coverage area, Washington, D.C., all-news station WTOP-AM-FM has launched "WTOP2," a Web-only channel of news and information programming.

The station claims to be the nation's first transmitterless, Internet-only, all-news radio service.

Although WTOP has been streaming its audio for more than a year, this service

address some of its parent stations' coverage problems.

Long plagued by an inability to penetrate many office buildings with either its directional 50 kW AM signal or its FM simulcast from about 45 miles to the southwest in Virginia, the Bonnevillle all-news combo has embraced audio streaming as one way of getting around signal reception problems (RW, Feb. 16).

## Government constituency

At least since the emergence of FM, Washington AMs have battled for listeners. After WTOP, WMAL(AM) and WTEM(AM), no AMs cover even most of the market with a good signal both day and night.

Jim Farley, WTOP vice president, news and programming, said, "Streaming the audio of WTOP helped us solve the problem of penetration in some downtown office buildings. And it made us realize what a huge constituency we have among government workers and active military."

"Fully a third of the accesses are from e-mail addresses that end in .gov or .mil (for military) or the like. So as we looked for a way to expand on the Internet, we tailored the new venture to appeal to all-news junkies, but those with an interest in the federal government in particular."

Washington is a tough town for receiving quality AM signals, local radio experts say.

The city was a bit late to the spectrum game as signals were being parceled out around it. Washington, like Baltimore and Richmond, Va., received only one 50 kW full-time allocation, while other top markets, such as Boston, Philadelphia, New York City and Chicago, received more.

Also, ground conductivity along the eastern seaboard is poor, causing AM coverage to shrink, according to RW Technical Adviser Tom McGinley, a local radio engineer.

WTOP uses a three-tower 50 kW DA-2 directional array, with different coverage patterns at day and night. The patterns are similar in that most of the energy is beamed across a broad span from the northeast to the southwest. A null to the northwest is formed to protect co-channel stations KSTP(AM) in St. Paul, Minn., and WLQV(AM) in Detroit, McGinley said.

At 1500 kHz, WTOP is high on the AM band, where propagation for daytime coverage is penalized.

WTOP's night pattern has deeper suppression than the day pattern in the northwest direction. The effective radiated power at night is about 2 kW to protect KSTP and WLQV. The day pattern is limited to about 10 kW ERP to the northwest and is not highly directional, McGinley said.

Unlike the over-the-air version of WTOP, which mixes local, national and international coverage clustered around traffic

and weather updates, WTOP2 features live coverage of White House, Pentagon, State Department and other briefings and key House and Senate hearings.

In partnership with the Associated Press, whose All-News Radio service constitutes a significant portion of WTOP2's programming, the new channel stresses national and international news in addition to the live event coverage likely to interest downtown D.C.'s large "policy wonk" community of government and military officials, lawyers, lobbyists, journalists and others.

WTOP2 carries separate advertising. Scott Levy, director of business development for Bonneville, D.C., described initial advertisers as technology companies, with "a common theme with WTOP2: reach targeted people within the federal government."

Farley said, "Some of this is available elsewhere," but expects WTOP's three decades of news-brand identity to draw listeners from competing sources of information.

Those competitors include C-SPAN station WCSP(FM), a university-run "wireless cable" microwave service and a low-power UHF TV station. All three offer extensive federal event coverage.

Levy said there are no current audience target levels for WTOP2, which began service on Feb. 22, but said the stream would be monitored and adjusted on an as-needed basis.

WTOP2 is on the Web through [www.wtopnews.com](http://www.wtopnews.com) and [www.wtop2.com](http://www.wtop2.com)

RW Technical Adviser Tom McGinley contributed to this story.



is a first because it is all fresh content.

WTOP claims to be the first station to use the Associated Press All News Radio as the backbone of a streaming service. AP is looking at this arrangement as a pilot project for similar deals with other stations. AP also offers streaming news in other forms.

WTOP2 may attract listeners beyond D.C., but it also serves to

## ◆ NEWSWATCH ◆

► NEWSWATCH, continued from page 2

### \$7,000 Studio Fine Upheld

**WASHINGTON** The Federal Communications Commission has upheld a \$7,000 fine against Queen of Peace Radio, licensee of WQOP(AM), Atlantic Beach, Fla., and says the station must pay the full amount. The commission said the station "willfully" violated the main studio rule, which says a station must have a "meaningful management and staff presence during normal business hours."

The station had a general manager and four volunteers between August 1997 and January 1999. The general manager left the station for lunch at 1 p.m. each day and ended his workday at 3 p.m. each day. The commission said it appeared the volunteers spent between four to eight hours a week at the station and therefore, WQOP's main studio often was left unattended.

WQOP said the fine should be dismissed because it relied on the commission's Web site for information about the main studio rule. Because they did not know the correct information, said station officials, WQOP was ignorant about the main studio rule, but not willfully disobeying it.

The commission disagreed, saying it has made clear its Web site should not be relied on for all information about its

rules. The commission also said the rules are clear that a meaningful staff and management presence are required during normal business hours.

### CEA Promotes Staff

**ARLINGTON, Va.** The Consumer Electronics Association has made several staff promotions. Karen Chupka has been promoted to vice president, events and conferences. Michael Petricone to vice president, technology policy. Evan Shubin has been promoted to vice president, CES sales and marketing, which combines two previously separate departments.

Chupka serves as vice president, business and industry development. With this promotion, she expands her duties to include all sales, marketing and operations involving the annual Consumer Electronics Show. Show Vice President Robbi Lycett planned to leave the association.

Petricone, previously director of technology policy, will oversee CEA's public policy efforts and guide the technology standards department. CEA Vice President, technology and standards Ralph Justus will continue to have operational responsibility for administering and implementing technical programs associated with CEA standards and industry technical issues.

## WHAT COMES AFTER DIGITAL?

In the beginning, there were stone axes. Then came fire, the wheel, and the steam engine. Then came analog audio and then digital audio. What comes next?

Certainly the stone wheel must have looked to the caveman to be the greatest discovery that ever could be. And to the simple farmer of the 1800's, the steam engine was the most modern contrivance that his mind could imagine. But neither was a terminal technology. Both have been replaced as time marches on.

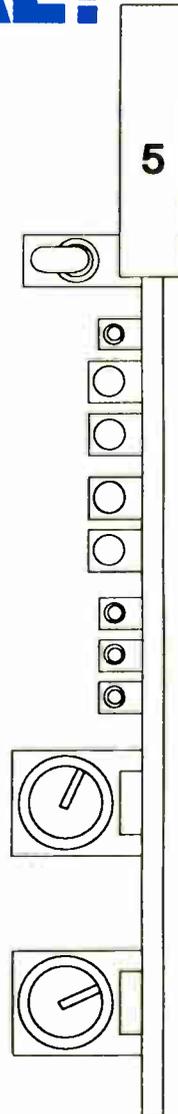
Digital audio is also not a terminal technology. It is simply where we are now.

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# LPFM: The 'Public Access' of Radio

Snips, snaps and slurs from around the world of radio ...

Few issues have riled up our industry like the prospect of dropping a bunch of low-power stations onto the FM band. Last issue, we published four Guest Commentaries from various players. In this issue, Bruce Reese, head of Bonneville International Corp. and the NAB Spectrum Integrity Task Force, checks in.

RW is committed to providing the most comprehensive coverage of the low-power rollout and the surrounding legal fight. Expect many more stories and opinions.

Our masked engineer Guy Wire, who lurks on our Web site, talks about LPFM.

"Bill Kennard made it very clear from the beginning that low-power FM would be a cornerstone of his legacy as FCC

chairman," Guy wrote recently.

"With his mind already made up, my gut told me he would find a way to get it through. It seems that Chairman Bill's own senior legal advisor revealed that he had to deliver for certain religious groups and minority interests. Technical considerations like interference to existing stations would be mostly ignored."

The initiative, Guy wrote, was almost purely political.

Guy wrote that the FCC used flawed thinking in accepting the arguments of airwave diversity.

"Let's face it, most 'under-served' minority and ethnic groups with any significant population base live in large cities. To have any real impact, 'under-served' religious and political groups ... need to have a significant body count in the cover-

age area to justify supporting a licensed radio station. ... Let these groups buy their own AM station, buy block programming on existing stations or light up an SCA."

Guy Wire feels LPFM will not take much money out of anyone's pockets.

"A few equipment vendors and contract engineers will make a few bucks selling and installing instant radio stations," he wrote. "I hope they get most of the money up front."

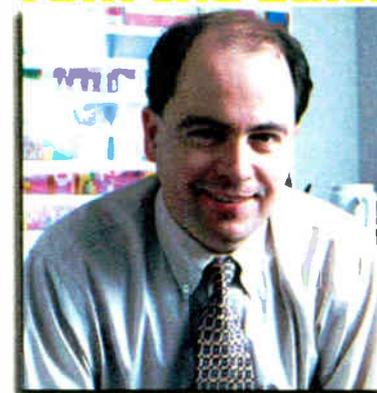
But for the vast majority of us, he wrote, "LPFM will be lost in the din of an already crowded bandscape."

He predicted most licenses will go to hobbyists, schools, churches, fringe political groups and some local governments.

"If you like public access TV, you're gonna love LPFM."

You can read much more from Guy Wire on LPFM and other topics at [www.rwonline.com](http://www.rwonline.com)

## From the Editor



**Paul J. McLane**

could make it easier for would-be engineers to enter the field.

"Total B.S.," he wrote. "If you can't keep your AM station in spec, give up the frequency. There are over 1,000 LPFM fans waiting at the door!"

For this correspondent, the answer is more enforcement, not less. "Require that directional stations have an engineer on staff — not 24 hours, but part time, at least! I spent years getting my FCC First Phone ticket, and it's only good for CB radio repair now."

The writer said he begged one employer, a major group, for over a year for the money and manpower to bring one of their AMs into spec.

"It had been stuck on night pattern since the wires had rusted out underground. A year after I left, it was still like that. The next 'tech' (read: unlicensed) asked for some help with it, and the local engineers gave him a hand. We got quite a good laugh when he leaned on the tower and got zapped. No, there wasn't any safety training for him on that job site."

This engineer says radio engineering is now "an easy outsource job."

"When the largest radio broadcasters cut out their 401(k) match — to zero — why would anyone even want to work in broadcasting? Much less, work in the 'get-your-hands-dirty,' on-call 24 hours, high-stress role as CE?"

He asked to remain anonymous, saying it's hard enough to find work with the broadcast clusters that control his market.

Comments are welcome at [pmclane@imaspub.com](mailto:pmclane@imaspub.com)

### RW's Parent Acquires Publisher

IMAS Publishing Inc., parent company of **Radio World**, has acquired AM Publishing, which produces the magazines **Audio Media Europe** and **Audio Media U.S.A.**

"These are two well-established magazines with great reputations and a great team of people," said IMAS President and CEO Steve Dana.

A new company, IMAS Publishing (UK) Ltd., is located in St. Ives, just outside of Cambridge, England, and will serve as U.K. headquarters for a number of IMAS international publications including **Audio Media Europe**.

Angela Brown, formerly of AM Publishing, was named managing director.

Pro Audio Review Publisher John Gatski was named group publisher of the new IMAS Pro Audio Group, which includes **Pro Audio Review**, **Audio Media Europe** and **U.S.A.**, and **Realisation**, a sound contracting/live sound magazine in France.

Nick Humbert, **Audio Media's** associate publisher, was promoted to publisher of both versions of **Audio Media**.

**Audio Media U.S.A.** will continue to operate from Nashville.

**Audio Media Europe** is a leading high-end professional audio technology magazine in the European market. **Audio Media U.S.A.** was launched in



1997 in the North American market.

IMAS Publishing produces **Pro Audio Review**, **Radio World** and **TV Technology** in the United States, 13 other broadcast, audio and video publications internationally, and several convention show dailies.

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The group, formed in 1964, is limited to 100 members. The usual wait for membership is 18 months, but recently several long-time members sold their stations, so the current list is shorter.

For information, contact T. David Luther at (804) 799-1148 in Virginia or send e-mail to [TDL@mindspring.com](mailto:TDL@mindspring.com)

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Would simpler AM rules help young engineers enter the market?

One radio chief took exception to a suggestion that simplifying such rules — like the proposal to ease proof requirements for multi-tower AM arrays —

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GUEST COMMENTARY

# LPFM: A Bum Deal for Listeners

by Bruce T. Reese

*Reese is president and CEO of Bonneville International Corp. and chairman of the NAB Spectrum Integrity Task Force.*

Most radio listeners probably haven't heard much about the FCC's plan to create as many as 1,000 new low-power FM radio licenses. But if Chairman Bill Kennard is successful in establishing LPFM, it is a sure bet that many of today's radio listeners will be hearing something that they don't like — interference — the kind radio engineers battle every day even without LPFM in the mix.

When the FCC announced its original LPFM plan nearly a year ago, criticisms and cautions about the plan were widespread. While Chairman Kennard claimed that LPFM's goal was to provide "voices for the voiceless," we in the radio business knew the industry's return to prosperity was encouraging greater format diversity than ever before.

Moreover, in its effort to empower those "crying to be heard," the FCC chose the

wrong medium: Why not consider the potential of Internet radio, instead of the already-crowded FM band?

It was this very issue — the scarcity of FM spectrum — that prompted the NAB to appoint a Spectrum Integrity Task Force. For the past year, I have been honored to chair this panel, which was directed to consider the impact that LPFM would have on today's radio listeners.

**Worst fears**

Unfortunately, our worst fears about LPFM's potential to create interference were confirmed. NAB tested 28 common radios of every type — from clock radios costing a few dollars, to sophisticated component receivers — and found that many would experience signal interference if even low-output stations were permitted to broadcast on frequencies now restricted by adjacent-channel protection rules. In short, NAB found that relaxing tried-and-true rules designed to minimize interference would be a recipe for chaos on the airwaves.

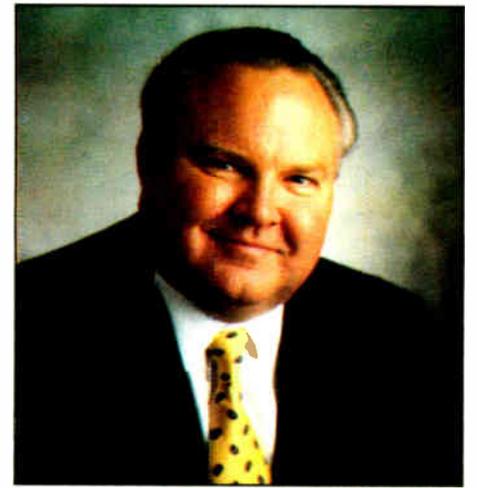
We were not alone in that conclusion. Another study, conducted by the receiver manufacturers themselves, produced simi-

lar results and conclusions. For good measure, noncommercial broadcasters, including National Public Radio, also told the FCC that they opposed LPFM.

NAB's extensive filing with the FCC also reminded regulators that their predecessors had experimented before with relaxing channel protections, with disastrous results. Also, the commission had previously outlawed low-power licenses in 1978, calling them "an inefficient use of the airwaves." But the commission on Jan. 20 voted to implement LPFM anyway, ignoring all legitimate interference studies, 50 years of history, and the laws of physics.

In addition to being a technical debacle, the FCC's LPFM plan promises to be a regulatory one, as well. The FCC's order limits the range of low-power stations to 3.5 miles. But the commission cannot guarantee it will be any more effective in policing that limitation than the highway patrol is at keeping drivers going under 55 miles per hour. It takes only a little know-how and equipment to increase the power — and interference potential — of any radio transmitter. Even if the FCC could police this program properly, doing so would consume the agency's scarce resources.

In moving forward with LPFM, the commission has abandoned its most valuable public interest role, that of guardian of the airwaves. The FCC has chosen the interests of a few would-be radio programmers, who by their own design seek to serve the nar-



Bruce Reese

rowest audiences, over the interests of millions of current radio listeners.

NAB has said it will continue to fight the plan in the courts and in Congress, and we, as individual radio broadcasters, should actively support that effort.

One assignment all broadcasters should accept is to ask their members of Congress to co-sponsor the legislation to prohibit the FCC from implementing LPFM. The House bill is H.R. 3439, introduced by Mike Oxley, R-Ohio, and Frank Pallone, D-N.J., while the Senate bill, S. 2068, is sponsored by Sen. Judd Gregg, R-N.H.

If the present commission chooses to make spectrum integrity a lower priority than social engineering, we must fight for it ever harder. We owe our listeners nothing less.

Reese may be reached at (801) 575-7500.

## U.K. Introduces Commercial DAB

by Michael Hedges

**LONDON** The launch of a national commercial digital radio operator in the United Kingdom is seen as the next phase of the digital rollout in a country that has been proceeding with digital radio for approximately five years.

Listeners here were first exposed to digital radio in 1995, when the BBC and Swedish Radio aired the first DAB signals, according to the WorldDAB Forum.

In 1996, the government approved a digital audio service in VHF band III, TV channels 7-13.

Until November 1999, listeners in the U.K. could hear DAB only from the BBC, Britain's oldest nationwide non-commercial service, funded through yearly fees on TV and radio sets.

In November, commercial digital radio operator Digital One launched its network with five services. Digital One is owned by the largest commercial radio operator in the U.K., the GWR Group.

GWR and the WorldDAB Forum are pleased with how the launch has gone.

The WorldDAB Forum is a consortium of DAB receiver and equipment manufacturers, broadcasters, transmission providers, regulators and governmental bodies in European and other countries that promote the Eureka-147 DAB system.

Forum President Michael McEwen sees the Digital One launch as a major step into the digital future.

"The launch of Digital One has marked an important stage in the transition from analog to digital radio in the United Kingdom, Europe and around the world," said McEwen.

"Other players worldwide are closely watching the Digital One strategy, which is an excellent example of a 'best prac-

tice' that includes new services, data, close cooperation between private and public broadcasters, and marketing strategies with consumer receiver manufacturers and retailers."

McEwen said he also believes the digital radio services being launched in other nations, including Canada, Singapore, Sweden, Switzerland and Germany, will have a positive impact on the receiver market — increasing choice and reducing prices.

**National formats**

Digital One is simulcasting three national formats on analog and DAB: Virgin, Talk Sports, both AM, and Classic FM. New digital-only formats are Planet Rock and Core, a pop music service.

A speech-based channel called Plays, Books and Comedy is undergoing tests. Capital Gold, available only on AM, will also be added to the Digital One service.

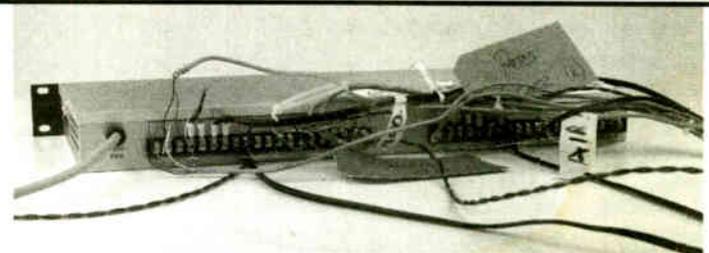
The BBC has five national formats and is planning on adding more, perhaps up to 10 from its own transmission multiplex. The BBC has been assigned a 1.5 MHz block of spectrum space, as has Digital One, for DAB broadcasting.

In the Eureka-147 system, broadcasters share transmission facilities that cover a common service area. For larger coverage areas, multiple transmission sites, or multiplexes, are used.

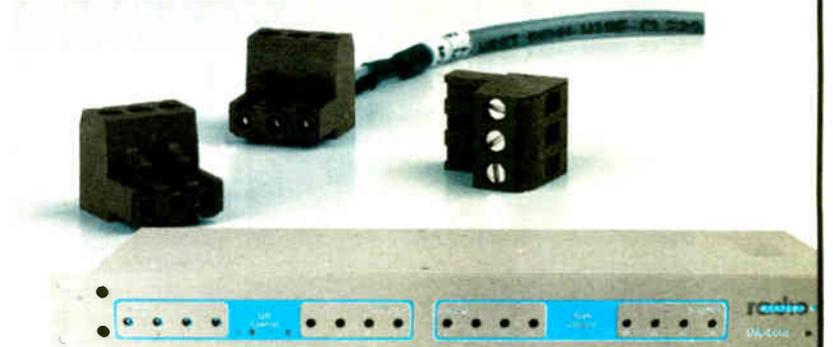
In the U.K., there is capacity for about 10 stations on each multiplex, depending on how each block of assigned spectrum is divided between audio and data services.

NTL operates the multiplex for Digital One. Broadcast Radio Director Jon Trowsdale said NTL uses landlines to send the signal from the stations to its distribution facility.

See DAB UK, page 8 ►



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# Global DAB Rollout

► DAB, continued from page 1  
EuroDAB Forum in 1995, the members of which were strictly European.

Two hundred million represents a potential audience. To hear DAB, listeners must purchase DAB receivers, tuners or DAB PC cards and software. A PC card plugs into a personal computer, allowing the user to hear digital radio and to access data services.

Estimates of actual listening, on the other hand, are hard to come by. Many DAB services are experimental or have been launched so recently that figures are not yet public. Receiver makers are reluctant to share sales figures.

But by any account, it's early in the game. Prices of both home and car receivers remain high in countries now transmitting DAB signals, and therefore receiver purchases are not substantial, sources agreed. Estimates for DAB units put the retail cost at \$500 to \$1,500. (All figures in this story are in U.S. dollars.)

Prices for home and car units in Europe are roughly the same. At-home listening is just as important to Europeans as in-car listening.

"In Europe, people listen to radio every day for longer than they watch TV," said Julie Unsworth, project manager of the WorldDAB Forum. "On average, we spend over three hours a day listening to

radio vs. only two hours a day to watch TV, and not necessarily every day."

## Lower prices

Countries using Eureka 147 want to promote consumer adoption of DAB in order to drive down receiver prices — a goal some participants say would be easier if the United States had decided to use the system.

"Had the U.S. gone along with (Eureka) DAB, the introduction of this new technology would have taken less time because the U.S. market is the main market for manufacturers," said Gerald Chouinard, senior adviser on broadcasting, for Canada's Communications Research Centre.

The CRC recommended bringing the system into that country.

"Had the U.S. come aboard, instead of costing \$900, (DAB receivers) would have cost not much more than analog AM/FM radios," said Chouinard.

Similar economy-of-scale problems may affect the rollout of IBOC receivers, if such a system is approved in the United States.

Instead of creating one type of receiver for listeners everywhere, manufacturers will have to comply with one standard in the United States and another essentially for everyone else. That could mean higher initial development costs, passed

along to U.S. consumers.

With the rollout well along in many countries, consumer education is seen as the next important step.

"We need consumers to understand that this is a new technology," said Peter Cos, marketing manager for Pioneer Electronics, Canada.

"Consumers are so inundated with people talking about digital technology in

of which the United States is a member. ETSI is the European version of the National Radio Systems Committee in the United States.

Eureka 147 can be transmitted on the FM band, but the services introduced in Europe, Canada and Australia are use other frequencies so that DAB does not disrupt analog FM transmissions, which will continue during a

## DAB Around the World

Country Served	Status	Population
Australia	Services to begin second half of 2001	N/A
Austria	One Multiplex transmitting in Vienna	19% of country
Belgium	15 transmitters operating	80% of Flanders
Canada	Services in Montreal, Vancouver, Toronto and Windsor	35% of country
China	Three-station network in Guangdong Province	unreported
Czech Republic	Czech Radio doing experimental broadcasts	12% of country
Denmark	Three transmitters operating	30% of country
Finland	Ten public transmitters, one regional multiplex	40% of country
France	TDF, Sogetec broadcasting programs	25% of country
Germany	100+ programs on in Saxony Anhalt and Bavaria	30% of country
Hungary	Magyar Radio doing experimental broadcasts	60% of country
Ireland	Five-channel pilot system launched Nov. '99	30% of country
Israel	Bezeq began pilot transmissions in 1996	70% of country
Italy	Five transmitters operating	15% of country
Japan	National system expected in 2005-2007	N/A
Mexico	Some experimental broadcasts	N/A
Netherlands	Three transmissions operating	45% of country
Poland	Polskie Radio broadcasting four services	8% of country
Singapore	Regular DAB services began 1999	unreported
South Africa	Seven audio services	10% of country
Sweden	Swedish Radio	85% of country
United Kingdom	BBC, Digital One broadcasting DAB services	60% of country

Other countries, such as Portugal and Spain, have DAB transmissions in some local areas. Chart is up-to-date as of February.

Source: WorldDAB Forum

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every aspect of their lives, that when they hear digital audio, I think the average person just assumes that something about the radio station has been changed to digital and they're not affected by that."

Pioneer is working with a consortium of broadcasters called the Digital Radio Roll-Out Initiative on a digital radio ad campaign in Canada to increase receiver sales. The company also wants to reduce the cost to produce processing chips in the receivers.

"Anything that could take Eureka down is not being able to build it (the chip) and mass-produce it properly. We need to get the cost down to boost uptake."

Cos estimated the price of Pioneer's "black box" DAB adapter that can plug into about 80 Pioneer receiver models at \$999.

Noticeably absent from the list of countries using or planning to use the Eureka system is Japan, which is pursuing a national solution for radio and TV called Terrestrial Integrated Services Digital Broadcasting.

The ISDB-T technology enables stations to broadcast at both narrow and wide bandwidths. Japan proponents predict the system will be available as early as 2005.

Receiver manufacturers said it is not unusual for Japanese manufacturers to develop one consumer electronics technology for Japan and another for export.

## Two decades of DAB

The first DAB development began in 1981 at Germany's Institut für Rundfunktechnik. Since 1987 it has continued as part of a European research project that became known as Eureka 147.

Broadcasters, research institutes, network operators and consumer electronics firms have contributed to Eureka 147 development.

The European Telecommunications Standards Institute set the Eureka 147 standards, which were approved by the International Telecommunications Union,

multi-year transition period.

Some countries, including the United Kingdom, are using VHF band III (around 221 MHz). Others, such as Germany and Canada, are using L band (1452-1492 MHz). These countries chose these frequencies because they were open or could be made available with little displacement of former users.

DAB receivers on the market can receive both VHF band III and L-band transmissions.

Other countries using DAB plan to abandon the analog FM band eventually. A key selling point of the IBOC approach, to U.S. stations, is that it would allow them to remain on the existing broadcast bands, transitioning through a period of hybrid analog/DAB service, eventually to all-digital signals.

Eureka 147 uses the MPEG Layer II compression algorithm. Sources said there has been some discussion within ETSI about upgrading to MPEG-4, essentially a different implementation of MPEG-2 AAC, to handle more data.

Now, stations using Eureka 147 can offer program-associated data, or PAD, such as lines of scrolling text across the receiver display screen. Some units also tie into car navigation systems to display alternate routes on the navigation screen in the case of traffic tie-ups.

Plans call for developing portable units and tying Internet capabilities into the dash.

In the Eureka 147 system, broadcasters share transmission facilities that cover a common service area. For larger coverage areas, multiple transmission sites, or multiplexes, are used.

Some stations own or rent their transmission equipment and usually hire a third party to operate the complex.

Each block of 1.5 MHz of spectrum on a multiplex is divided between audio

See DAB, page 7 ►

► DAB, continued from page 6 and data services. Every station on the multiplex has the same coverage area.

Countries that want to use the Eureka 147 system must adhere to the standards set out by ETSI, because receiver manufacturers wanted a common platform to keep unit costs down and make sure consumers don't need to buy several different units.

Eureka 147 is a single-frequency network. The tuner will stay tuned to the same station all the time, even when crossing European borders, so listeners can hear national stations such as France Info in France or BBC Radio 4 in the U.K., transmitted on the same frequency in Bordeaux, Paris, London or Glasgow.

"Our standard is very specific, said Unsworth. "It is more difficult for us to form alliances unless the parties are prepared to use our standards."

For example, satellite provider WorldSpace and the WorldDAB Forum could not agree on common standards. As a result, the satellite DAB radio technology aimed at third-world countries uses its own receivers to pick up the signal transmitted on a different portion of the L-band with a proprietary audio/data coding scheme.

**Eureka U.S.?**

As it has for years, the issue of IBOC vs. Eureka 147 continues to rankle many DAB participants.

Several proponents of Eureka, watching the U.S. development and regulatory effort, said the United States should rethink its IBOC strategy and switch to the Eureka 147 system. They said IBOC has taken several years to be developed, and it may not work. One source called IBOC "vaporware."

But a switch to Eureka is highly unlikely, U.S. experts say.

"They're scared," said one U.S. DAB participant, referring to the large number of receiver units that could be sold in this country if IBOC is implemented, compared to what some perceive as a limited number of Eureka units sold thus far.

Most U.S. observers find it hard to imagine the process of moving all U.S. radio stations to an entirely new band.

While the U.K. has approximately 240 commercial operators, many of which have multiple transmitters, the United States has about 12,000 stations. Reallocating those stations to new spectrum would be "an enormous undertaking," said one FCC source.

A Eureka-type system in the United States also would entail an economic redistribution.

Part of the political debate over DAB in the United States takes into account the importance to broadcasters of maintaining the competitive landscape, which developed over many years based on widely varied power classes, coverage areas and signal patterns.

Station managers in the United States consider their transmission equipment part of their "real estate," and differing coverage areas have direct impact on ad revenue.

Mass station relocation was one reason the United States rejected Eureka 147 in the early 1990s. Another was that the government allocates L-band for military telemetry and aeronautical communication, and did not intend to reallocate that spectrum for broadcasters.

"The L-band issue is dead," said one DAB government source.

But could U.S. radio stations possibly use a Eureka system in the spectrum that TV stations are expected to surrender as

they make their own transition to digital? There's been no serious discussion of implementing Eureka 147 in VHF band III.

"The IBOC approach meets the business, regulatory and technical requirements to implement a digital system in a world with existing broadcasters," said USA Digital Radio Vice President Jeffrey Jury.

"What good is a system that cannot get the necessary business support or for which there is no spectrum to implement? IBOC offers a realistic path to implementation."

**IBOC update**

Eureka, like any new technology, is still in the rollout stages around the world. If implemented, IBOC would face similar implementation challenges.

The NRSC is evaluating systems from USA Digital Radio and Lucent Digital

Radio to see if they are "significantly better" than analog. The NRSC hopes to have a preliminary report ready for its March 24 meeting of the DAB subcommittee.

But critics say IBOC misses the far greater potential of digital radio.

"IBOC is not a technical solution," said Chouinard. "It's a technical solution to a strategy, as broadcasters want to keep their real estate."

Quentin Howard, chief executive officer of Digital One, the operator of the U.K. national commercial DAB network, said, "If I was CEO of one of the big radio groups, I'd say I should bundle all of my stations into a single multiplex (in one market) and transmit it as a single- and multiple-brand entity."

Howard said, "Why did Lowry Mays buy eight stations in New York? He bought them because they were available.

He would want to make them all the same class, the biggest class. If you were honest, everybody would want to do the same. If you broadcast in New York, do you really want some of your stations reaching Staten Island, and some of them don't?"

There is some collaboration among DAB proponents, however. For instance, USADR and Digital Radio Mondiale are working together on developing a global DAB standard for AM (see story, p. 12). Sources agreed a single standard would be best for the developers, broadcasters and consumers.

**Canadian DAB**

U.S. observers are watching Canada with particular interest, in part because of the lengthy common border, neighboring markets and shared radio signals.

See DAB, page 8 ►

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# DAB Signals Cover 60% of U.K.

► DAB UK, continued from page 5

Using software co-developed with England-based Radioscape, NTL distributes the signal to the multiplex transmitters via satellite. Terrestrial landlines are used as a backup distribution means. Digital One is sharing antennas with the BBC.

## Europe is watching

Digital audio broadcast proponents here believe the rest of Europe is watching this rollout as they develop the transition to digital in their own countries.

The terrestrial transmitter networks of both the BBC and Digital One currently cover more than 60 percent of the U.K. population, or a potential audience of 30 million people, said both companies.

Several receiver manufacturers have home units and aftermarket auto DAB receivers on the market. Supporters hope that as more countries progress in DAB development, consumer demand will increase and receiver prices will drop.

Two years of planning, a year-long application process and another year of organizing propelled Digital One and its lead shareholder, the GWR Group, into worldwide prominence as the most ambitious commercial DAB enterprise thus far.

By contrast, public broadcasters have driven DAB implementation in other countries.

The Radio Authority granted Digital One a 12-year license for its DAB multiplex, with a 12-year renewal option, in late 1998. It officially began broadcasting on

Nov. 15, 1999.

The GWR Group founded the Digital One consortium together with transmission services provider NTL and Talk Radio UK.



Digital One promotes the Arcam Digital Radio Tuner.

Talk Radio UK dropped out of the consortium when the channel changed ownership.

Simon Cooper, director of policy and public affairs at the GWR Group, said the channels actually are available on three platforms: via L-band or VHF channels using the Eureka-147 DAB system, satellite and the Internet.

"Sky Digital satellite service reaches 2 million homes and much of the response from listeners so far has certainly come from people subscribing to Sky," he said.

Sky Digital is similar to DirectTV in the United States. Owned by entrepreneur Rupert Murdoch, the satellite TV service

also offers audio channels, much like cable radio in the United States. Sky Digital is a home service only, with no portable receivers. Under the Broadcasting Act,

Cooper said, Digital One must provide programming for the greatest possible audience without overlapping formats.

Therefore, Core is designed for a young, female listener, while Planet Rock, a guitar-based rock format, is for older males.

The Radio Authority, the regulatory body for commercial broadcasters in the U.K., has awarded the first seven of a total of 26 local DAB licenses. The first local multiplexes for London, Birmingham, Glasgow and Manchester are planned to go on the air this spring.

Digital One expects listeners to make the switch to digital, according to Cooper, in large part for the extra choice.

"In May, when the local digital multiplexes go on air, listeners will have from 35 to 40 different DAB channels to choose among, including the seven from the BBC."

Other reasons for adopting DAB, he said, include improved quality and, looking to the future, portability and ease of use.

Can consumers buy DAB receivers now?

World Radio Network, which broadcasts its English-language programs on the BBC multiplex, is promoting a portable digital receiver from Roberts.

Grundig, Clarion, Blaupunkt, Pioneer and Kenwood are producing units for the automobile market.

According to Julie Unsworth, project manager of the WorldDAB Forum, Fiat dealers in the United Kingdom are offering the Grundig DCR 2000 installed for approximately \$795 in U.S. dollars, less than the tuner price at major retailers. The typical tuner price is about \$1,000.

Arcam, a Cambridge-based sound reproduction manufacturer, jumped into the in-home digital market in 1998 with the Alpha 10 Digital Radio Tuner. Managing Director John Dawson said the company "wanted to get ahead of the Japanese and to take advantage of the digital marketing campaigns."

The Alpha 10 DRT was awarded Best Buy in the category of tuners priced at £600 and above (approximately \$956 U.S.) at the 1999 What HiFi? Awards.

Crystal and Meridian are developing in-home tuners, but these are not yet on the market.

"Since the BBC tests began in 1995, the promoters of digital have been desperate for receivers. Several car receivers are out there, but we were only interested in the home business," Dawson said.

Saying that the Arcam tuner, which retails for approximately \$1,275, "does not have much margin," Dawson said that the company has recovered its initial investment.

Cooper, who surveyed London electronics retailers during the 1999 holiday season, found Arcam tuners sold out.

Arcam welcomes interest in its tuners from early adopters of new technologies, but older, affluent consumers — BBC Radio 3 and Radio 4 listeners — are the target market for the Alpha 10 DRT.

"Classic FM is the star, the prize," Dawson said. The national classical music station is owned and operated by the GWR Group.

BBC Radio 5 Live, a national news talk/sports channel, has listeners "thrilled to bits" with DAB, Dawson said. Sports, a significant part of 5 Live programming, attracts listeners to digital radio and thus, he said, "flexing the multiplex" will attract more sports listeners.

The Digital One multiplex has the capacity and capability to add additional channels for special sports broadcasts, such as World Cup matches and auto racing.

## Signal quality

While saying the Digital One signal quality is "stunning, clean as a whistle," Dawson warned broadcasters that the increased fidelity of DAB means "production at the station level is critical."

"The extended dynamic range of the tuner brings out every flaw," he said. "Serious listeners will notice. But with these tuners even the compression can be adjusted by the listener."

Consumers are not the only ones who need new equipment for DAB.

London-based RadioScape supplied NTL with a range of upgradeable DAB technology to handle operations at Digital One, including the main ensemble multiplexer for overall transmission of the signals, the packet multiplexer for signal coordination/error correction, and the program associated data multiplexer for datacasting.

Digital One uses RadioScape Broadcast Management software to control these products and other transmission equipment. NTL adopted RadioScape receiver products for remote signal test analysis and monitoring at its DAB transmission sites across the U.K.

To listen to GWR on the Internet, go to [www.gwrgroup.musicradio.com](http://www.gwrgroup.musicradio.com) and click on "Web sites," click on the format you want to hear, and then click on "listen in."

## DAB Rollout

► DAB, continued from page 7

Canada is using a "tweaked" version of Eureka 147. Canada, with its large spaces between population centers, compared to the packed-in populations of Europe, is using transmitters with power of approximately 400 watts, rather than the 200-watt level being used in Europe, said Howard McClure, vice president of North American Operations for Iteco.

The company is one of several transmitter manufacturers selling DAB products in Canada. McClure estimated the cost of a 400-watt transmitter at \$116,000. That cost would be split by a number of stations sharing the transmission facility, or "pod" as it is called in Canada.

Some experts believe Canada could eventually switch to IBOC, or use both Eureka 147 and IBOC DAB, if the United States adopts the in-band, on-channel approach. Receiver manufacturers, they say, would be attracted to selling a common product to both markets. Others say Canada has invested too much time and money into Eureka to switch.

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## SPECIAL REPORT

# Canada Sees Data With DAB

by James Careless

**OTTAWA** With the Canadian launch of digital radio now official (RW, Jan. 5), Canada is looking to the datacasting capabilities of digital audio broadcasting

As their U.S. counterparts develop ancillary data services for in-band, on-channel DAB, so too is Canada's Communications Research Centre for that country's Eureka-147 L-band system.

"The next step is to augment digital radio with ancillary services, be it program-associated or non-program-related," said Gérald Chouinard, CRC

senior advisor on broadcasting.

Program-associated data such as on computer monitors affixed to high-

and the morning crew would be seen

**Technically, the greatest challenge lies in how data broadcasts perform in a mobile environment.**

— Gérald Chouinard

station identification, song titles, artist names, as well as photos of CD covers

er-end digital radios. Non-program-related data consisting of weather and

traffic updates, news headlines and tourist information could be sent to listeners as well.

The Broadcast Technologies Research Branch of the CRC is working on a mobile multimedia datacasting project in which prototype data applications are broadcast to a research minivan from digital radio repeaters in Ottawa and Hull, Québec.

## Challenges

Technically, the greatest challenge lies in how data broadcasts perform in a mobile environment, Chouinard said. In particular, CRC wants to find out if datacasting requires "higher protection against errors" than digital audio.

At the heart of the research lies datacasting capacity. Unlike digital television, which has enormous spectrum assigned to each TV channel, Eureka-147 digital radio has about 256 kilobits per second allocated per present-day FM station.

Because broadcasters typically use 192 kbps to transmit stereo audio, "each broadcaster can go as high as 64 kbps for sending data," Chouinard said.

Such data capacity is the equivalent of each broadcaster having access to a single ISDN line for transmitting data.

"The multiplex structure is flexible," said Chouinard; "the capacity of each of these channels can be changed 'on the fly.' For example, an hour-long interview program stream can be dropped down to 64 kbps, freeing capacity for any data transmission."

## Shared bandwidth

Each digital radio transmission pod can supply five radio stations, sharing excess bandwidth as needed, an attractive benefit, given that many Canadian markets are home to groups that own three or more stations. For example, a group of four stations could coordinate the program schedules to ensure the availability of extra spectrum for datacasting.

The CRC, along with service providers PSR Group and Globis Data, has already experimented with datacasting real-time traffic information in Ottawa and Toronto. Other datacasting applications include e-mail, paging and even in-car sales.

The latter application involves installing a low data-rate packet radio transceiver in a car, said Chouinard. Although relatively small and basic, the transceiver would enable users to send "buy" commands to the station transmission site.

"We are working on an interactive link using Mobitex (a packet-switching technology developed by Ericsson and in use on 29 networks worldwide), which Research In Motion implemented in Canada," he said. "Each digital radio would be equipped with buttons that would 'talk' to this packet radio.

"For instance, say there is a concert advertised you would like to go to. Pressing a 'buy' button would send your request back to the station, including credit card and address information."

The CRC is using a minivan to test these applications on the streets of Ottawa. Graphics are displayed on a built-in 15-inch computer monitor, while two digital radios have been installed to pick up program and non-program-related datacasts, as well as audio.

See DAB CANADA, page 12 ►

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# Harman International Adds Crown Amps

► DEAL, continued from page 1

"Crown Audio gives us a missing part of our business portfolio — the power amplifier business," said Mark Terry, president, Harman Pro Group North America. "We also looked for quality and Crown has it."

Terry called the JBL line of speakers "the cornerstone of (Harman's) business. We think Crown is a good fit into our audio chain of products."

Terry said Crown Audio's microphones would also be a nice complement to Harman's AKG line of mics and headphones.

The two sides had an "ongoing dialogue for some time," Terry said. "Crown wanted to develop different alliances. With the consolidation going on, it's a good deal for both Crown and Harman."

Harman plans to operate Crown as a separate business unit. Terry said production of the Crown Audio lines would remain in Elkhart, Ind. The current Crown management team remains intact, with CEO Richard Newberry becoming president of the unit.

Crown International has 700 employees. The company's sales were approximately \$70 million last year.

Clyde Moore, chairman of the board of Crown International, stated in a press release the RF division would continue to operate as a privately held company.

for both companies. You add the power amp business to Harman's offerings of mic and speaker lines and it's a great complement," Woods said.

"Harman has been moving more into the OEM market for cars and computers. And you need amps for that. Crown brings a very good reputation for that."

Current Chairman Sidney Harman founded Harman International Inc. He still owns 7 percent of the company. According to filings with the SEC, it had sales of \$807.6 million in the last six months of 1999.



Crown CEO Richard Newberry, Left, and Harman Executive Mark Terry

**Crown Audio gives us a missing part of our business portfolio — the power amplifier business.**

— Mark Terry

"The Broadcast Group will continue to design and manufacture FM transmitters and RF amplifiers," he stated. "Plans call for the Broadcast Group to move into new facilities in the near future."

### Name change?

A name change could be coming for Crown Broadcast.

"As part of the deal (Harman) retains rights to the Crown name," Terry said.

Clarence Moore founded International Radio and Electronics Corp. in 1947. The company changed its name to Crown in 1975. According to a Crown press release, "The company grew from a chicken coop to what is now a 235,000-square-foot manufacturing facility."

Radio customers of Crown Audio should see little change in sales or service. Terry said the normal channels of distribution and service for Crown products will remain unchanged.

Jim Woods, vice president for Harris Corp., said he doesn't expect Harris' relationship as a distributor for both Harman and Crown product lines to change.

"I think the deal makes a lot of sense

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### THE OPTIMOD-FM 2200 is

everything you'd expect from Orban engineering: superior design, a big, loud OPTIMOD sound, plus Bob Orban's proven processing know-how. In fact, about the only thing unexpected

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## SPECIAL REPORT

# USADR, DRM Now AM DAB Allies

by Michael Hedges

**GENEVA** New attention is being given to the question of a worldwide AM digital standard in light of an alliance between two digital audio broadcasting proponents, one European and one American.

Digital Radio Mondiale, a consortium dedicated to the development and promotion of a worldwide standard for digital AM broadcasting on long-, medium- and shortwave (below 30 MHz), signed an agreement in January with in-band, on-channel digital audio broadcasting proponent USA Digital Radio Inc.

The agreement combines the international strength of the DRM consortium with the financial leverage of top U.S. radio groups, which are investors in USADR, as well as investment bankers and equipment manufacturers tied to USADR.

## Promotion

DRM, based in Geneva, Switzerland, at the headquarters of the European Broadcasting Union, promotes the digital AM standard among broadcasters with national and international distribution goals. The consortium was founded in 1998.

DRM's membership includes most of,

but not all, the world's leading international broadcasters. The DRM system is in-band, on-channel, as is the USADR system.

The Voice of America is promoting a different standard: in-band, using 10 kHz bandwidth, but not on-channel.

In announcing the agreement with USADR, DRM Chairman Peter Senger emphasized audio quality advantages and additional data services, as well as economic factors that accompanied the agreement.

"Our aim is to ensure that a receiver bought anywhere in the world will work anywhere in the world," Senger stated in a press release.

"Just as important is ensuring that the transition from analog to digital is as smooth and as low-cost as possible both for the industry and the billions of listeners around the globe."

The DRM system, its supporters say, merges the power and reach of conventional AM transmitters with the digital advantages of high-quality sound and a range of text, data and radio data service features such as command controls.

USADR Senior Vice President Jeffrey Jury stressed the strategic value of the agreement with DRM.

"This agreement provides a mecha-

nism for USADR to work with other standard-setting bodies to ensure that our technology is incorporated in international standards. USADR is always looking for ways to ensure that our system becomes a broadcasting standard," Jury wrote via e-mail in response to RW.

## A great solution

"We believe that IBOC is not only a great solution for the United States, but also for many other countries. For the past three years, USADR has been actively working with the International Telecommunications Union to have IBOC accepted as an international standard," he wrote.

The DRM Technical Committee submitted the final details of the standard specification to the ITU in December 1999. Test transmissions are taking place at several locations in Europe and the Caribbean.

Development of an IBOC DAB system, Jury stated, depends upon a coordinated technical effort.

Agreement on a worldwide AM digital standard would allow manufacturers to produce the equipment that will drive digital implementation.

"How it will specifically impact receivers and transmitters, I cannot say yet. The meetings are on-going. From a development perspective, we are working to roll out IBOC as soon as possible, and we want to keep on schedule," Jury wrote.

USADR and DRM, from a technical perspective, want the most cost-effective solution for transmitters and receivers, he said, which would be facilitated by a global standard.

"We will be looking at the technology from a perspective of how we can achieve everything we need to do in IBOC and also be consistent with the needs of the DRM," Jury wrote.

Receiver development, said DRM Marketing Coordinator Catherine Charras, will proceed once the technical specifications are accepted.

"Receivers for the digital era are under development and will be ready once the standard is ready. This will not be before the end of 2001," said Charras. "The aim is for a price is between \$25 and \$50."

The target prices refer to units sold outside the United States after demand and sales volume increases.

## Support

Continental Electronics Corp. is a founding member of DRM and a testing partner of USADR.

In announcing support for the DRM/USADR agreement, Continental Vice President for Engineering Dan Dickey emphasized the need for worldwide support for a standard.

"Digital broadcasting and receiving on frequencies below 30 MHz represent significant technical challenges. The resources that can be brought to bear on these issues by USADR and DRM are significant and necessary to address these challenges," stated Dickey in a press release.

"AM radio currently enjoys the same technical format around the world. If digital radio broadcasting is to displace AM analog receivers, then designers must work



Jeffrey Jury

Photo by Roger Miller

on a worldwide scale. This is exactly what the USADR/DRM alliance is designed to do. The advantages are obvious."

And as for what the DRM/USADR agreement means for the overall progress of DAB, Catherine Charras said she sees no competition between the DRM IBOC AM system and Eureka-147 DAB technologies.

"They are complementary systems working in different frequency bands. DRM is working in frequencies that provide wide area coverage, DAB is not so wide," she said.

"They serve different purposes and, to a certain extent, different markets. DRM will allow broadcasters without DAB access because of frequency shortage to enter the digital era as well."

## Canada Looks to Data

► DAB CANADA, continued from page 10

CRC is also testing a Web browser-style interface that combines a touchscreen, voice recognition, voice synthesis, a keyboard and a mouse — everything the well-equipped digital radio aficionado might want on the road.

Notwithstanding bandwidth, there are other limits to multimedia mobile datacasting. Debate ensues about drivers being exposed to potential distractions while driving.

Canadian government officials are discussing possibly banning the use of cellular telephones when driving, due to the increase in traffic accidents. Consequently, mobile datacasting may get a chilly reception.

Nevertheless, these services could be available to passengers, and to the driver when the car is not in motion.

But these are regulatory issues, which lie outside the scope of the CRC. Instead, its role is to foster new technologies in Canada and bring new products to market, and to act as a "neutral honest broker," Gérald Chouinard said.

One thing is clear: now that Toronto, Montréal and Vancouver are broadcasting in digital, the spectrum is available. What remains to be seen is what Canadians will be willing to pay for.

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\* Source: *Duncan's Radio Market Guide*, 1999 edition

\*\* Source: *The American Radio* by Duncan's American Radio; based on Arbitron Spring 1999 12+ TSA Cume, Mon-Sun, 6:00am-12 midnight

\*\*\* Source: Arbitron Fall 1999 12+ TSA Cume, Mon-Sun, 6:00am-12 midnight

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**FEED LINE**

# What to Do When DA Parts Fail

**W.C. Alexander**

*This is one in a series of articles about troubleshooting and repair of AM antenna systems. The previous part appeared Feb. 16.*

From time to time, parts do fail in directional antennas. Lightning is the most common cause, although many other factors can cause components to fail outright or change value.

Frequent causes of damage to AM antenna systems include thermal cycling, insects, animals, wind and water.

When a problem arises with a directional antenna system, and the sample system and other indicating instruments have been ruled out as the cause, look next at the components in the system. These components consist of capacitors, coils, contactors, tubing, strap and insulators.

## Vulnerable 'caps'

The most common failure component in any AM antenna system is the mica capacitor.

While we should consider such capacitors in our list of suspects, they are not always the problem. A well-designed system will use capacitors with "headroom" that is more than adequate. These capacitors are better able to withstand the maximum voltages and currents that may be applied under high-VSWR conditions with 125 percent positive modulation and a static DC component.

In many circumstances, however, economics dictate the use of capacitors that are only adequate under normal conditions. These capacitors are most vulnerable. When the voltage or current rating of most mica capacitors is exceeded, quick destruction or damage can result.

Vacuum capacitors are, as a rule, much

## Critical components of your AM directional system include capacitors, coils, contactors, tubing, strap and insulators.

beefier than their mica counterparts. They are also much more expensive. While a vacuum capacitor will handle significantly more voltage and current than a mica capacitor of the same size, a vacuum cap also is subject to damage or destruction if the voltage or current rating is exceeded.

## Coils and tubing

Coils (inductors) are chosen for their current handling capability and, in some cases, for voltage rating. Coils that must operate in high-voltage, high-current situations are larger and have wider turn spacing to prevent arcing between turns.

While coils do not have a breakdown voltage or maximum current rating that will quickly destroy the component if exceeded, consistently exceeding a coil's ratings will lead to long-term damage.

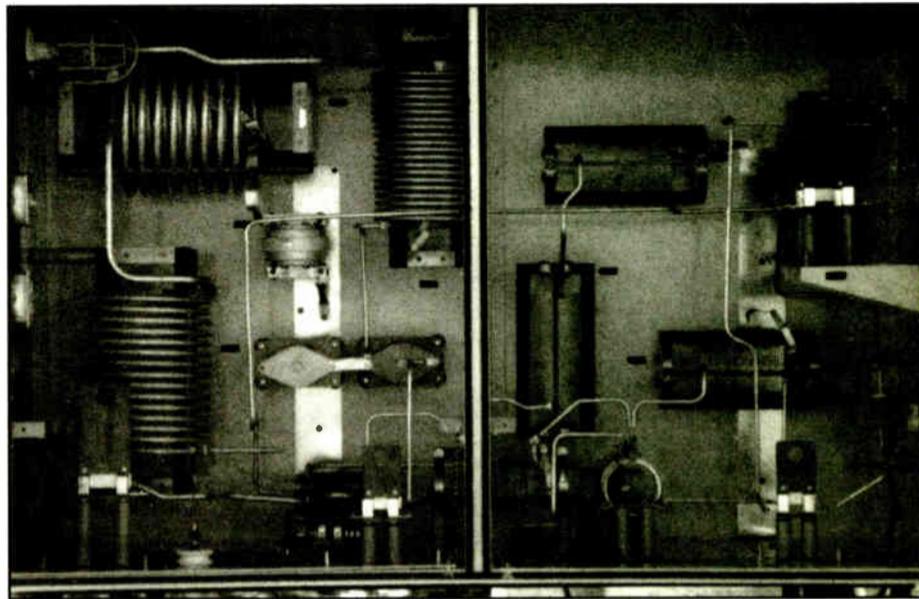
Plated tubing is the material of choice for connecting the components together in phasors and tuning units. Designers select tubing for its current-carrying ability, with larger sizes used for higher cur-

rents. Occasionally, plated or unplated copper strap is used for such connections, but its current-carrying capacity is considerably lower than tubing of the same cross-section.

Planners use ceramic or porcelain insulators to mechanically support capacitors, coils and tubing while maintaining insulation from the chassis or components of different potential. Such insulators have a definite voltage breakdown

tion and an intermittent connection. Stainless-steel hardware often turns black under such conditions.

Arcing is often indicated when operation is normal at reduced power or without modulation but VSWR trips or overloads occur at full power or with modulation. In such cases, try looking for the problems after dark. Have your helper turn the transmitter on while you look in each tuning unit for flashes of light that



This is an antenna tuning unit at 50 kW station KLTT(AM) in Denver.

rating. If this is exceeded, the insulator may break or a carbon trace can form that permanently lowers the breakdown voltage of the insulator.

Contactors, used to switch in different networks or components for different modes or to switch between transmitters, are rated for current-carrying capability. Many contactors operate at a low-impedance point, so voltages are relatively low, but a few operate at higher impedances

would indicate an arc.

Quite often, arcing will be audible as well. Use your eyes and ears to track down the arc.

## Impedance check

If nothing turns up on a visual or heat inspection, try a bridge to measure the impedance of system components. Such measurements will have value only if the proper component values are known.

Capacitors generally are easy, because their value usually is marked on an ID plate or stamped right on them. Coils often are unmarked and it is difficult to ascertain their adjusted values, but coils seldom fail without providing some visual cue.

Measure the resistance and reactance of any suspect components. Capacitors and coils should not have any significant resistance. A resistive component in their impedance indicates a problem.

Many stations have the old-style "magic eye" capacitor checkers handy. Use these to check suspect caps. A capacitor of known value should be used to test the checker before testing the suspect cap. Many of today's better digital multimeters (some in the under-\$100 range) have a built-in capacitor check function, and these can also be used to check suspect capacitors.

Make all capacitor measurements out of circuit, and take lead inductance into consideration.

Once you have isolated the faulty component, continue your search to other components around it. Quite often, a failed component in a circuit can result in stresses on surrounding components that may be damaged as a result. Don't stop with the first faulty component you find.

Also, try to determine the cause of the failure. Sometimes, components fail for no apparent reason, but in most cases

See FEED LINE, page 26 ▶

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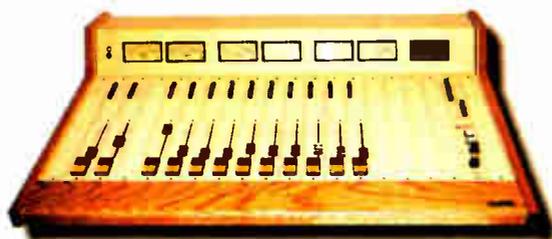
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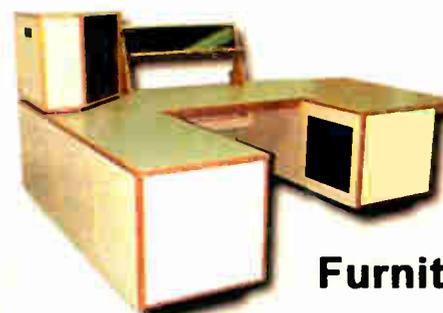
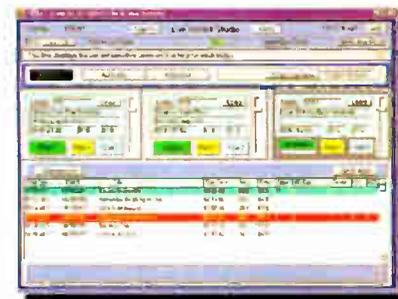
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# Workbench

Radio World, March 15, 2000

## EAS and Other Money-Saving Tips

John Bisset

\*\*\*

How, you ask, do you save money with EAS?

The money you'll be saving is in the fines your station won't be paying if everyone knows the EAS drill. It seems

Al Kazlauckas at WZAK(FM), WZJM(FM) and WJMO(AM) in Cleveland related that they keep a separate EAS log.

Not to say that the transmitter log is

got around to checking the logs, three weeks of EAS weekly tests were missed.

\*\*\*

So how do you guard against such mistakes? Education is the first defense. Get your GM's support and meet with the on-air staff and the traffic folks. Explain that this "ain't no joke," that field inspectors will ask operators to send a test, or show what to do when a test is received.

session explaining the importance of EAS, how and why tests are sent and received, is certainly time well spent.

By the way, Al Kazlauckas ended his note to me saying he still maintains maintenance logs! Perhaps we show our age by relating to this, but a paper trail can not only help in spotting equipment problems at the transmitter site, it sure puts an inspector at ease when he observes that kind of diligence.

I recall early in my career being at a station that was inspected. When asked to see the logs, the chief opened up a file cabinet. Inside was the neatest display of folders, color-coded for AM and FM,



Figure 1: Here's an inexpensive equipment mount, using blank rack panels.

the FCC field offices are on the prowl again, searching for operators who don't even know what an EAS test is, say nothing of how to send or relay a RMT.

I've spoken to a number of engineers who have reported surprise inspections recently by the FCC just to check Emergency Alert System compliance. If you haven't taken the time to organize your EAS records, please do so.

Especially at consolidated stations, this job can be daunting. Talk to your GM and see if his or her administrative assistant can lend a hand.

After all, the financial consequences can be huge, and you don't want that problem falling on your shoulders!

abandoned, no! Al requires the jocks to take one set of transmitter readings per shift. This lets them know what the transmitter is all about, so it doesn't become a "mystery" box. Good advice.

Al attaches the EAS strips to the logs when they are reviewed. Remember, that's another rule that didn't go away. Keeping a separate EAS log also lets you spot holes, or missed tests quickly. A note will suffice, explaining why the test was missed, but don't make a practice of missing the tests. This is serious stuff, folks.

I'm reminded of the traffic person who would routinely bump the EAS test, at a salesperson's request, to get an extra spot in the stopset. By the time the engineer

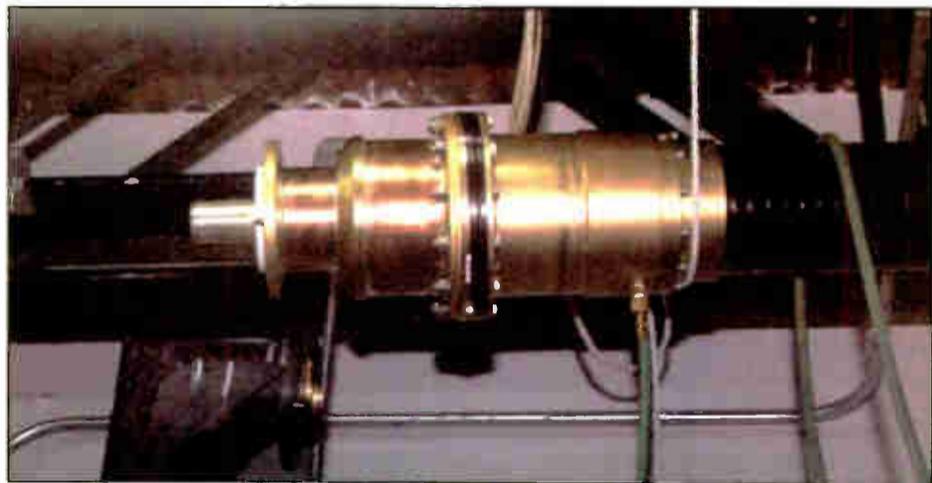


Figure 2: Start at the nitrogen fitting when searching for gas leaks.

Keep in mind, the operators don't have to have each step committed to memory. A procedures book, showing step by step instructions, can be followed; but the jock needs to understand the steps.

A market chief asked me recently if there were any instructional videos on the EAS system. I'm not aware of any, but if your state broadcasting association or SBE has prepared one, let me know. Seems like a good idea.

But video or not, a brief instructional

tabs listing each month, going back for the last two years.

The inspector grabbed one folder, flipped it open, glanced at a log for maybe five seconds, handed it to the CE and left. His parting comment was he could always spot the stations that were in compliance by the way they kept their logs organized.

I know times have changed, and many of us wish for a chance to even get to the

See WORKBENCH, page 18 ▶

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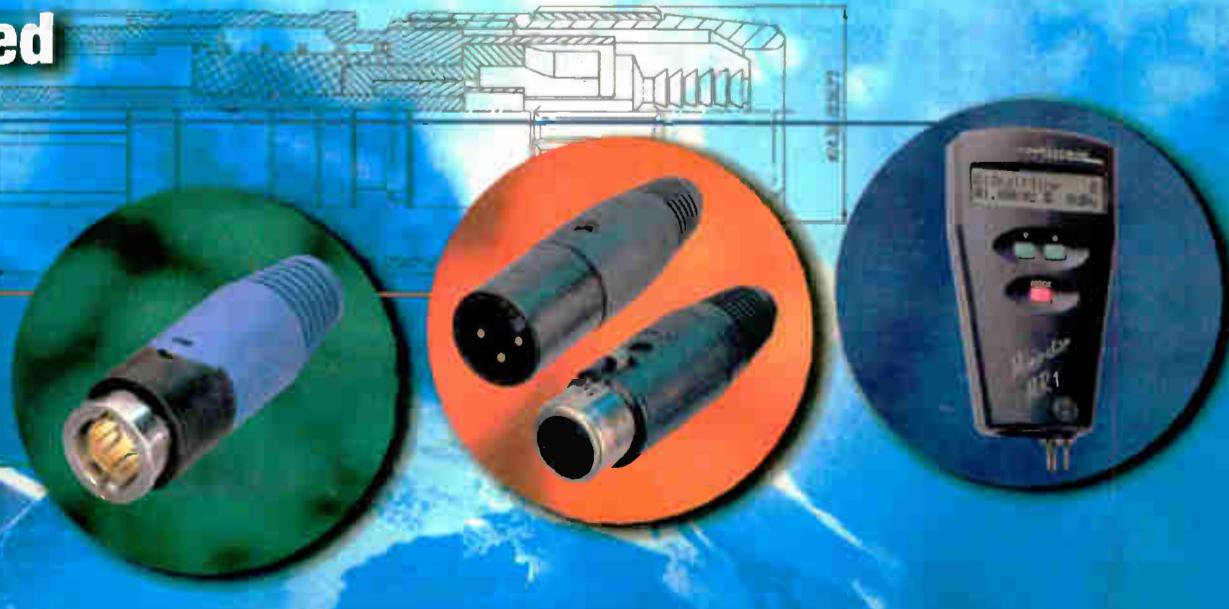
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# Alaska Station Skirts the Band

**Bruce F. Elving**

Ever tune to 87.7 MHz on the FM band, and hear Channel 6 audio? Some TV broadcasters, such as WPSD-TV in Paducah, Ky., and KBJR-TV in Superior, Wis. (with studio and transmitter in Duluth, Minn.), actually promote tuning to 87.7 as a station to wake up to.

Long before the days of digital tuning, the old analog car radios and most home radios would get 87.75 audio. It even worked in reverse to some extent.

When I was manager of WAER(FM) on 88.3 in Syracuse, N.Y., I discovered that many of the black-and-white TV sets of the late 1960s without intercarrier sound could produce the urban programming of WAER when I merely twirled the fine-tuning control after Channel 6 was locked in.

The picture was a series of diagonal lines that danced to the music.

## Edge of the band

We've become dependent on the digital, synthesized tuning of today's radios and TVs. Visiting an out-of-band frequency, whether TV, FM or AM, is infrequent these days.

Oh, there have been reports of pirates in the New York City area using 87.9 and 87.7, and I have heard of 87.5 being tried. Presumably, there is or was an audience to follow those emanations.

Now comes an innovative Alaskan low-power TV station that is nurturing its audio to the utmost.

"The End," KZND-LP on Channel 6, is a licensed low-power TV station. It's not a pirate run by hobbyists or political anarchists; indeed, it traces its heritage to KYES(TV) and associated radio station KNIK-FM in Anchorage. It's sort of a kissing-cousins type arrangement.

I stumbled upon the story when calling other stations, some new on the air, to learn their formats and whether they have stereo. As publisher of a newsletter pertaining to FM radio, I wanted all the latest information for the readers.

While talking to a secretary at KNIK-FM, I was told about their other station, The End.

"Who is in charge of The End?" I asked, and was directed to Engineer Wolfgang Kurtz. He told me that the call letters are KZND-LP, and that the station was using only the audio. That has apparently since changed.

The signal is in stereo, most likely FM

stereo, not TV audio stereo, which is incompatible with FM stereo radios, although such radios will reproduce the audio as monaural.

"We have been lying low, not doing

ent site). Only a low-power station will fit in Anchorage on Channel 6," he told me late last year.

KZND-LP signed on in August, according to the Anchorage News. I e-

## This is the story of a low-power TV station that thinks it's a radio station.

anything with the video because of opposition from local broadcasters," Kurtz said.

"Yes, we are commercial and 940 watts vertical, directional, using a Channel 5 transmitter that was modified for Channel 6 use. It was used by local Channel 5 until they moved (to a differ-

mailed Kurtz for further information, such as which system of stereophony the station employs.

I did not hear again from Kurtz, but later spoke to Aaron Wallender, operations director, and Mike Robbins, general manager of KZND-LP and KNIK-FM.

# Money-Savers on the Workbench

► WORKBENCH, continued from page 17 transmitter site for a quick inspection, much less organize logs.

If you need help, don't be afraid to ask for it. Get a secretary to lend a hand, or arrange for an intern. At the very least, put your problem on paper and give it to your manager. Nothing is more disconcerting than running a hundred-mile race and being tripped up by a twig.

Get your EAS house in order!

★ ★ ★

Manufacturer's rack mount kits are nice, but if your budget won't allow them, Figure 1 on page 17 shows an alternative. In this case, C. B. Gaffney of the Adventure Stations drilled four holes in a Middle Atlantic rack panel, mirroring the chassis mount holes on his two Comrex HotLine POTS codecs.

Spacing another blank panel below the control surface hides the XLR ins and outs. When they are mounted at shoulder-level, the tasks of programming and reading the screen are simple, and the units look nice.

An alternative is to place the HotLine in a drawer or on a rack shelf. The drawback here is that if the units are not bolted in place, they may move around. Connectors can come undone, wires can get pinched — you know the

story. The end result is you get paged!

★ ★ ★

Time for a brief commercial.

NAB2000 is right around the corner, and the popular transmitter workshop that I've hosted during the last three fall NAB Radio shows is being offered in a condensed form this spring.

If you have an assistant or a MIS person who is shaky on transmitters, this is the course for them. (It's also a good refresher for the more seasoned engineer, too!)

Attendance will count toward SBE recertification. We'll discuss transmitters in simple terms, move into troubleshooting and wind up with some useful maintenance plans. Not to brag, but the workbook that Harris provides to each attendee has gotten some nice comments, and should be something you or your assistant will find as a useful reference.

★ ★ ★

Next time you visit your FM transmitter site, check on your nitrogen. This is another "out-of-sight, out-of-mind" problem waiting to happen. If you're a high-powered AM, you might use nitrogen as well.

Both believed the system to be FM stereo, because they get audio separation on stereo radios tuned to 87.7.

## Alternative transmission

The music is modern rock. It's not the format that is so "alternative," it's the method of transmission.

"So where's the FCC and its crackdown on crackpots?" asked John Anderson, writing on the Internet. Anderson says KZND-LP continues to operate, "and make some serious cash in the process."

Asked if KZND-LP is profitable, Robbins said, "What station do you know about that's been profitable in its first 12 months on the air? Our sales have exceeded revenue projections."

KZND apparently has capitalized on a quirk in the rules, allowing for audio and video to be operated separately.

Doug Smith of WSMV(TV) Engineering in Nashville, Tenn., who follows TV standards issues on a Web site,

See LPTV, page 19 ►

If you have spotted a decrease in pressure, if the tank volume is substantially reduced, or the dehydrator runs all the time, check your fittings before calling in the tower crew. The brass fitting at the air inlet port on the transmission line is your first checkpoint; see Figure 2.

Buy a bottle of Fantastic or 409 and spray the fitting. If bubbles appear, you've found your leak.

No bubbles? Then wipe down the fitting and hose to keep it clean. It goes without saying that you must have some pressure in the system for this test to work!

Check the length of the hose, and then the regulator, manifold, gauges and valves in a similar way — spritzing along until you find bubbles.

Rubber gaskets can dry-rot, and cause a leak at any of these spots. A check of the dry-air system on the ground first might just disclose the problem, and save you the expense of a rigging company.

■ ■ ■

John Bisset has worked as a chief engineer and contract engineer for more than 30 years. He is a district sales manager for Harris Corp. Reach him at (703) 323-8011.

Submissions for this column are encouraged, and qualify for SBE recertification credit. Fax your submission to (703) 323-8044, or send e-mail to [jbisset@harris.com](mailto:jbisset@harris.com)

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**We Build Solutions**

► LPTV, continued from page 18

mentioned FCC rules that might apply.

Section 73.653, "Operation of TV aural and visual transmitters," states that the "aural and visual transmitters may be operated independently of each other or, if operated simultaneously, may be used with different and unrelated program material," Smith quoted.

Section 73.665, "Use of TV aural baseband subcarriers," is "pretty lengthy," Smith said. "It looks like it would actually be legal to use the FM stereo system on a TV station, provided you attenuate any energy within 20 Hz of 15734.234 Hz by a sufficient amount," he said, referring to the TV stereo pilot.

"I suppose a good low-pass filter on the incoming audio would do the trick."

Smith could not find any indication that either of those regulations apply to LPTV stations, but noted that for full-power stations, the audio injection is to be between 10 and 20 percent of the visual.

Part 73 of the FCC rules covers full-power stations; LPTVs are considered an "auxiliary service" and covered under Part 74.

**Loophole**

"This would appear to be an interesting loophole that would permit the construction of 'fake LPTV' stations in certain places," Smith wrote via e-mail.

"Of course, you would have to be far enough from any Channel 5 or 6 station to not cause interference. I'll bet KZND would never exist if it wasn't commonly owned with the Channel 5 station; I'll bet KYES would have (successfully) objected to the LPTV application if it didn't own the station."

FCC rules allow a certain amount of latitude in selecting the exact decimal frequency. At last report, KZND-LP audio was veering toward 87.74 MHz, using a minus offset from the nominal TV audio of 87.75.

Smith, checking the FCC database, found no full-power Channel 6 anywhere in Alaska, with only six LPTV stations within 800 km of Anchorage, the nearest being K06MF in Kenai, 100 km away.

"I don't think they're worried about co-channel interference!" he wrote.

KZND-LP's operation is "probably a much more valuable use of a TV channel than about 90 percent of the rest of LPTV stations. I'm no lawyer, but a quick review of the FCC regulations doesn't show anything illegal about this," he wrote.

"Nor do I see any problem with KZND-LP using the FM stereo system" instead of the TV system, Smith added.

The Anchorage Press, in a series of articles, quoted FCC agent David Charlton as saying the station's license is "under investigation. Technically it's not a radio station. Most FM radios won't hit 87.7."

But Kurtz, the engineer, claimed that most car radios can be made to tune to the European FM standard, which means 100 kHz increments, and frequencies down to about 87.5. Either by flipping a switch or entering a code from the owner's manual, the radio can be forced to get 87.7, Kurtz contended.

He told the newspaper that KZND-LP has found a legal loophole in the FCC regulations.

Fireweed Communications holds the KZND-LP license, and has joined in a local marketing type agreement with KNIK-FM.

The program director and morning-show host at KZND-LP is J.J. Michaels, "the man behind the rebirth of local modern-rock titan KWHL (106.5) a few years back," according to the Anchorage Press.

Jeremy Lansman, one of the pioneers of the community broadcasting movement, is listed as majority owner and chief engineer of KYES/Fireweed Communications.

In response to complaints that KZND-LP was being run as an audio-only station, the newspaper reported in early December a "no-frills video complement on Channel 6: a rotating series of public service announcements laser-printed onto paper, then shot with an inexpensive but serviceable studio camera."

Barbara Kreisman, the FCC video service chief, sent notice in November that "Fireweed Communications Company is HEREBY ORDERED TO IMMEDIATELY DISCONTINUE operation of low-power television station KZND-LP as an aural-only service."

Lansman said the station was now broadcasting video in order to comply with

the FCC's order. However, the station planned to appeal the order, as it has obtained a working camera which is trained on the announcer in the studio 13 hours a day, from 6 a.m. to 7 p.m. After that, the video reverts to character-generated public service and classifieds-type announcements during the rest of the 24/7 operation.

"We had a cease and desist order to start doing something with the video. We plan to put up local artwork," Robbins said. "Of course, it will be in good taste, and it will be in color. I have never seen the video. It's not on cable, and we have no plans to go on cable," he said.

He said the video has only 20 watts, compared to the audio's 940 watts.

"We are not listed by Arbitron because we're not in their call letters' listing in the radio station database. It's interesting that Arbitron has defined lis-

tening based on call letters, rather than on actual radio listening!"

Complicating the tuning for anyone who wants to hear KZND-LP is KRUA(FM) at 88.1 in Anchorage, owned by the University of Alaska. That station apparently is not among those complaining.

But at least one broadcaster, Chester Coleman, has complained. He has a new station, KRPM(FM), at 96.3 in Houston, Alaska, with an old-rock format called "Pure Retro." Coleman also owns new station KFAT(FM) in Anchorage, with a stereo signal containing CHR and rhythmic music, known as "K-Fat."

Robbins told RW that he's paying the price for pioneering something new.

"It's viewed as an outlaw, as something outside the box. This happens whenever a person starts something new."

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FIRST PERSON

# Live From the John F. Kennedy

Brian Clark

This is a tale of how KIIS-FM went to sea.

I am an engineer working at Los Angeles-based stations KIIS-FM and KXTA(AM). In my position, I am involved with many forms of electronic technology such as transmitters, microwave and satellite equipment.

As an engineer, I also am involved with coordinating and setting up remote broadcasts. I have been involved with many unique projects, varying from a

allow digital video to be sent at 24 frames a second as well as audio.

But the problem with this system is that it would require a gyrostabilizer to keep the dish on track with the satellite. This system would also require at least one, and possibly two, satellite hops depending on where our ultimate destination would turn out to be in the middle of the sea.

All of this would cost upwards of \$60,000, not including satellite time. So I spent some time researching a means of accomplishing this task at a much-

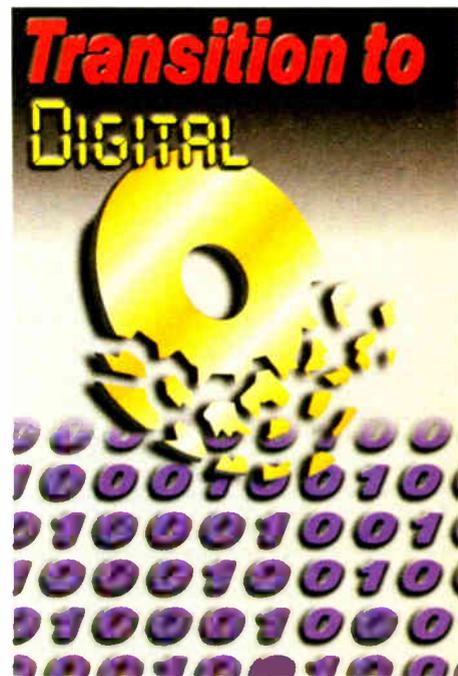
Inmarsat B system and if it would work in conjunction with a Telos Zephyr using the V.35 card merely as a codec.

After configuring the satellite phone for 56 kilobits per second, 32 kHz with the protocol of my portable Zephyr set for TX: L3DUAL RCV: G.722 and the protocol of my studio Zephyr using TX: G.722 RCV: L3MONO, I was ready to dial our studio facility.

After a few stressful seconds, I saw the most wonderful words on the phones handset I had ever seen, "HSD DIALING." A couple more seconds went by and the display read "HSD CONNECTED."

At that moment I wanted to jump in the air, but I had to look at my codec to see if I had a lock. And when I saw the lock light lit on my Zephyr I was ecstatic.

I didn't see any audio on the LED display, so I asked my partner Jerry Burnham



Once he had restored the audio feed, I saw the audio input meter moving, then immediately spoke on the microphone and said, "If you can hear me, please



The remote setup is at the lower left, at the base of the John F. Kennedy's superstructure.

live remote at a nudist colony to a bungee-cord wedding to a show from a Metrolink train.

But I had never been approached with a venture as complicated as the one suggested at a recent promotions meeting.

**In the Gulf**

A few months ago, I was approached with an interesting challenge.

Our promotions director asked if we could do a live radio broadcast from the USS John F. Kennedy aircraft carrier. And this would be no simple remote from dockside. We would be covering Warner Bros. recording artists the Goo Goo Dolls during their European USO tour, as the big ship cruised in the middle of the Persian Gulf.

I replied, without much of a pause, "No problem." I didn't fully realize what I had gotten myself into.

I had done some work with the U.S. Army a few years ago, helping them develop a satellite system that would

reduced cost, and one that would give me the quality I was striving for.

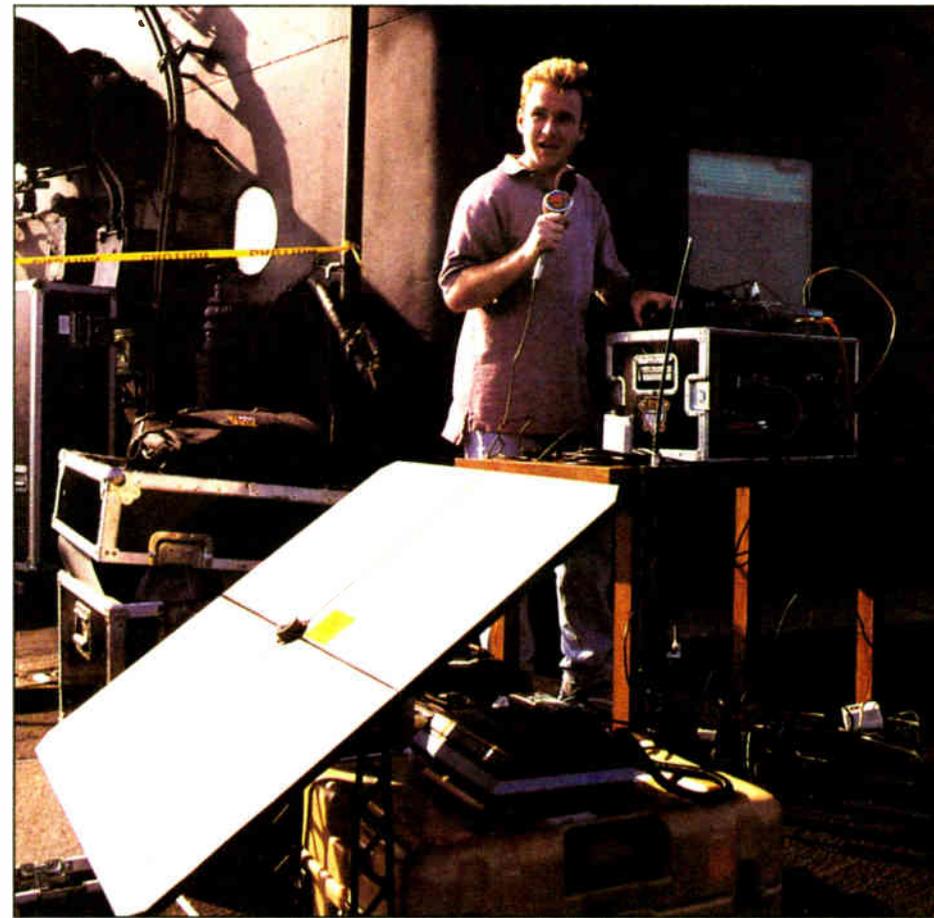
My research led me to an Inmarsat B Terminal with a 64 kpbs High-Speed Data port.

Normally in Los Angeles, I use ISDN to do remote broadcasts, and I was looking for that kind of digital audio quality. So I called Telos Systems and asked them if they had ever used a Zephyr with its optional V.35 card in conjunction with an Inmarsat B Terminal.

The engineer with whom I spoke replied, "We have never done anything like this before." That comment led me to believe that I was onto something, so I rented an Inmarsat B Terminal from MacKay Marine for \$4,000 for a month's lease, not including access time.

This was much more to my liking.

Up to this point, my idea was just a theory and had not been tested. I was happy to see the unit arrive in Los Angeles so that I could test my idea, and see what the reliability factor of an



KIIS-FM afternoon air talent 'Valentine' works the flight deck.

to go downstairs to check the studio unit to see if it was being fed audio.

At that point Jerry had noticed that the air talent running the board had turned down the backhaul feed on the console.

bring me a pair of headphones."

Moments later, I saw my partner with a set of headphones. Maybe it wasn't Alexander Graham Bell calling Mr.

See JFK, page 25 ▶



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World Radio History

# Questions of Digital Connectivity

**Jeff Johnson**

With technology evolving at an incredible rate, and digital radio and Internet radio prompting broadcasters to "get with it," new questions arise about how we do our jobs.

For instance, we test or monitor pure digital audio differently than we are accustomed to. One cannot evaluate AES3 or S/PDIF audio by placing a meter, analog scope or headphones across the lines. A new class of equipment is required.

The glamorous peripherals, though plentiful, will be relatively easy to choose depending on what a station wants to do. The more difficult task is finding the proper test gear.

**Fact or fiction**

Alan R. Peterson, in his Jan. 5 *Studio Sessions* article "Hi-Ho, Come Back to the Fair," observed that sober prognostications of the future are an extension of known technology and not leaps into possible new technology. Those leaps are called science fiction.

**With digital, we have exchanged concerns such as wow and flutter for a new zoo of troubles.**

Some changes, though, are obvious and already under way. The nature of remote control and monitoring of broadcast facilities, for example, has become simplified in recent years due to relaxed regulations. But we still must operate legally and be able to prove it.

Manufacturers constantly look for ways to improve remote control tools and make them more powerful. Bill Sepmeier is a prominent industry guru and former head of National Supervisory Network (NSN), a company involved in remote transmitter monitoring.

He sees transmitter manufacturers offering more functional features like the ability to be monitored by the supplier's service department, Sepmeier said.

The connectivity involved in implementing such systems is a paramount concern.

"Analog dial-up telco connections are adequate for small-group or small-market operations," said Paul Jellison, engineering manager for Clear Channel, Cincinnati Region.

But special needs require special connections. "Tunneling protocol could be used for secure Internet monitoring."

The choice will depend on the user and the application. Jellison envisions more large broadcast groups using corporate intranet connectivity to implement IP-based monitoring of transmitting facilities located far from each other.

The burgeoning world of digital

interconnectivity may serve older technology in this manner.

**On the boundary**

Preston Hauck, president of Real Time Integration (RTI) in Kirkland, Wash., said his company's product, NetAcquire, "sits on the boundary between the real world and the Internet world."

With NetAcquire, voltage and status information of a transmitter is buffered and subsequently fed to an integrated Web server. A remote Web browser would connect via TCP/IP to the IP address of the NetAcquire. Bi-directional monitoring and control are thus accomplished.

"If the remote site does not have full-time Internet access, the NetAcquire dials up a local ISP. Thus there are no long-distance costs," said Hauck.

Digital connectivity also raises concerns about "algorithm stacking" in the way audio is moved around the station.

When analog audio is converted to a digital format, the subsequent handling of the data determines its accuracy. The goal is to obtain the lowest possible degree of "artifacting" due to any data reduction through multiple stages of editing, storage and transmission.

Digital audio is encountered in two broad realms: as streams of data in AES3

or S/PDIF formats, or as files on a hard-drive for LAN or Internet use. The testing and monitoring of these varied forms is a challenge to contemporary audio and broadcast engineers.

Portable devices are available to monitor both digital and analog audio, not only for presence of a correct, usable signal, but for important characteristics of that signal such as sampling rate, "confidence," lock and so on.

All these elements were previously unknown in the analog realm and now we have exchanged such concerns as wow and flutter for a new zoo of troubles.

**Troubles beginning?**

Misconceptions of digital technology are common and to be expected.

It is commonly understood that sample  
See CONNECTIONS, page 24 ▶

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# Connectivity in the Digital World

► **CONNECTIONS**, continued from page 23 rate determines high frequency response, but it is less understood that word length — such as 8- or 16-bit — determines signal-to-noise ratio. Similarly, an understanding of the new testing equipment is required. But how do we develop this new understanding and gain this new knowledge?

Debra Brimacombe, application support engineer at Audio Precision, Beaverton, Ore., said, "It is important to keep in mind that the technology is always changing, and to rely on the growing knowledge of industry developers and manufacturers."

Don't be afraid to ask suppliers and

other experts for any educational material or white papers they might offer. Consider investing in training sessions to learn more about digital audio and modern broadcast facility design.

## Jitter and stacking

For instance, among the unexpected and most troublesome problems encountered in the digital realm are "sample clock jitter" and algorithm stacking.

Sample clock jitter is encountered in the digitization process, or the analog-to-digital conversion. It must be considered separately from AES interface clock jitter. Jitter in the AES3 realm can be reclocked with equipment such as a

Ward-Beck POD12 Digital Reclocking Distribution Amp.

According to information from Benchmark Media Systems, this jitter is "potentially inconsequential" as it accumulates only in the digital domain and "therefore does not degrade the audio signal."

Sample clock jitter of 16 picoseconds (16 trillionths of a second) introduces phase modulation effects resulting in sidebands within the resolving ability of 20-bit converters. Sample clock jitter can be measured to a resolution of better than 2 picoseconds using Fast Fourier Transform (FFT) at the output of the A-to-D converter.

Equipment with this capability is among the new gear we must understand.

Codecs perform a function different than that of a pure A-to-D or D-to-A. "Encoding" is the key concept.

Non-lossy encoding/decoding results in a data output identical to the input. A lossy process discards information considered redundant or inaudible.

This is the concept of perceptual coding, illustrated by the analogy of the freight train passing a purring cat. The nearby listener will not hear the cat. Perceptual coding eliminates unnecessary audio data and attempts to reduce the data bit stream to levels low enough to be transported and stored conveniently.

These encoding schemes must also be considered in light of the data rates available for their transfer and their performance when used one after another, or "stacked." Eventually such stacking will produce unacceptable artifacts. How many conversions are acceptable, however, is a matter of dispute.

"Testing of the effects of various data transfer rates and algorithm stacks remains in the subjective realm," Brimacombe said. "How it sounds is still a human testing function."

## Tools of the trade

Without question, broadcasting has become a computer-driven profession.

The storage, transfer and automation of digital audio, with the exception of real-time AES3 or S/PDIF connections, takes place by means of computer-based hardware.

Broadcast facilities use the talents of computer specialists to a greater and greater extent. Often these specialists are the same people who were swabbing cart decks only a few years ago.

Certainly, test equipment and software for LAN and server monitoring is of primary importance. It is not uncommon for the most important test gear to be a wallet of CD-ROMs containing drivers, utilities and the all important virus killers.

## Know your technology

Dead air can result from a software virus or bug just as readily as a bad console pot or expired final in the transmitter. And with the advent of Web streaming, computer technology support will become even more dominant.

There remains, however, an interim phase employing digital hardware such as DAT, MiniDisc and CD players and burners. The miniature nature of the components in this equipment dictates a jeweler's set of tools and magnifiers.

Specific service manuals and special test gear, such as laser power meters, are necessary to troubleshoot equipment. The days of analog tape machines are nearly over.

The ultimate tool is knowledge. Awareness that the technology of radio is changing rapidly requires stations to have the latest digital and computer troubleshooting and servicing equipment, both in the minds of their personnel and in their tool kits.

■ ■ ■

The author is network engineer for X-Star Radio Network and WVXU(FM) in Cincinnati.

How have changes in digital technology affected the way you test and operate your radio equipment? Tell us via e-mail to radioworld@imaspublish.com



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# A Live Valentine From The Persian Gulf

► JFK, continued from page 20  
Watson, but I knew we were in business.

The first hurdle was behind me. It was time to go to my intended destination.

After 23 hours of travel, I finally arrived in Bahrain, my stepping stone to the carrier in the Persian Gulf. Once in Bahrain, I met my Navy contact, Ensign John Perkins. He escorted me and our station's on-air talent, "Valentine," onto the base for our first broadcast from the Navy base in Bahrain.

I set up my gear and after less than a minute I had acquired the satellite. Things were going great and the servicemen and -women were lining up to speak with relatives live on the radio.

After a successful show on dry land, it was time to pack up for our early-morning helicopter ride to the carrier to really see how this system would work on open seas.

It was a beautiful day on the Gulf, with mild winds. Once on board the vessel, I had to locate my gear, then find my bunk on the ship so that I could drop off my bags and begin setup on the flight deck.

The moment of truth was just around the corner. The satellite system was in place, as was the Zephyr and potpourri of cables.

Again, I was fortunate enough to

acquire the satellite in less than a minute. Boy, was I relieved. But my codec was acting strange, and after listening to the sounds it was making and looking around at the ship's superstructure, I noticed the radar making its sweeps.

I quickly determined that the radar was indeed the culprit. I spoke with the communications specialist on the carrier to see if we could secure the offending radar system for the duration of the broadcast. The communications specialist on the JFK got the necessary approval and we were on our way.

The Goo Goo Dolls performed for us, and our show lasted four hours on board the JFK, allowing ships personnel to speak with their loved ones. All of this occurred without having to realign the dish at all.

This entire project was one of the best experiences of my professional career, and I would like to thank the U.S. Navy personnel for all of their cooperation.

I would like to challenge readers to be willing to experiment, and follow their ideas. You may be as happily surprised as I was.

■ ■ ■

Tell us about your unusual remote experiences. Send e-mail to radioworld@imaspub.com

## MARKET PLACE

### Audio Toolbox Goes to the Rack

TerraSonde has built onto its popular Audio Toolbox, winner of a Cool Stuff award from RW in 1999, by creating a rack-mount version.

The new Audio Toolbox is in a standard 2U anodized-aluminum chassis. The company is targeting remote trucks, broadcast studios, live sound rigs and recording rooms.

The DSP-powered device includes numerous functions: acoustical analysis tools like a 1/12th RTA with memories, sound level meter, energy-time graph with delay calculation, and speaker polarity and noise criteria.

Test Functions include a sweep signal generator with pink and white noise, stereo dB level meter (accurate to 0.05dBu), frequency counter, impedance meter with sweep, distortion meter and a digital sample scope with X-Y phase capability.

Session Helpers include a time code reader/generator, a MIDI analyzer and generator, tempo computer and a reference tuner.

The Utility Functions add a cable tester, phantom power tester, headphone monitor amplifier, user preferences and setup and calibration functions.

Current software supports the uploading of 40 data memories to the PC or Mac, with software available free on the TerraSonde Web site.

A single knob operates functions using a point-and-click interface. The backlit graphical LCD display incorporates a cursor to simplify readout.

Connectors and the power switch are on the front panel. Its external mic clips on the front panel or attaches with a six-foot cable. The unit includes PC and Mac interface cables and mic windscreen.

Connections are balanced and unbalanced XLR, 1/4-inch, and RCA, MIDI and external mic BNC. An internal speaker allows signal monitoring. The Audio Toolbox is software-based and can be upgraded by the user. It retails for \$1,785. A rechargeable battery system is optional.

For information contact TerraSonde in Colorado at (303) 545-5848 or visit [www.terrasonde.com](http://www.terrasonde.com)



# Does Your Neighbor Sound Better?

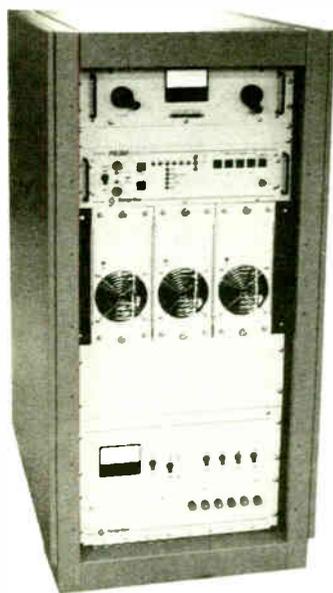
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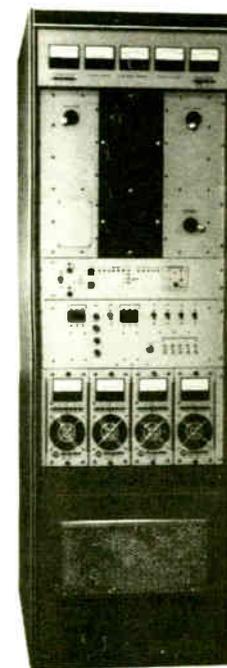


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**Panduit In-Line Bulletin**

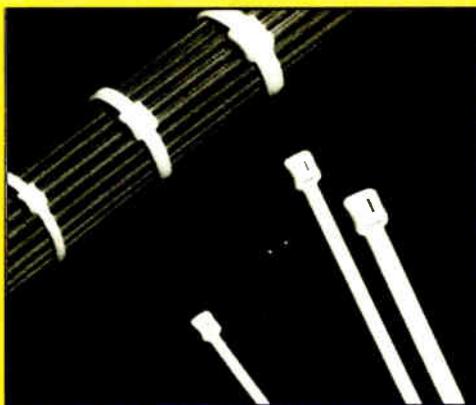
A new bulletin from Panduit Corp. provides information about the company's new In-Line Cable Ties.

The new ties offer "parallel entry," threading like a belt at 180 degrees.

This design eliminates the protrusion of the cut-off tie, protecting other cables as well as workers' hands. It also reduces the overall bundle size.

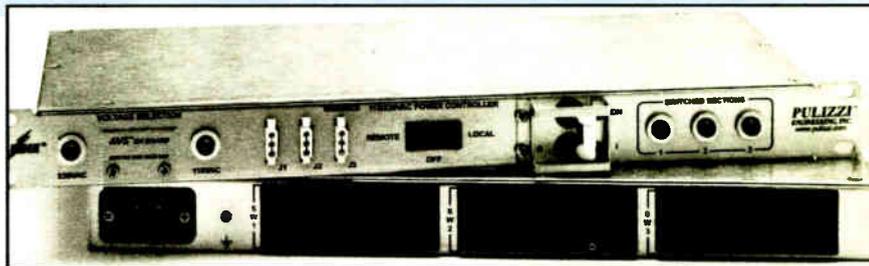
The bulletin includes part numbers, dimension and other useful data.

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# "My Two Stations Save \$130,000 per Year Using Scott Studios Voice Trax"



Ron Castro, co-owner and GM, KRPQ Q-105 and KMHX MIX 104.1 Santa Rosa, California

A former San Francisco and nationally syndicated Concept Productions air personality, Ron has recorded 300,000 voice tracks for automated stations across three decades. Ron's own stations have used Scott Studios' Voice Trax systems for several years.

(Continued from upper right) "I wouldn't ask the staff to use anything I don't use myself. If it didn't work great, it wouldn't be here."

Scott Studios has money-saving features you can't get anywhere else. Scott's exclusive Voice-Music Synchronizer guarantees every voice track plays only with the intended songs, in spite of log updates. Worst case, you'll still sound great because your Scott system airs replacement tracks with the right voice for the shift. Scott has exclusive watchdog circuits that make our systems more self-healing than any other. Scott also predicts most problems before they occur, usually as soon as logs are done. Scott also pages people who can make last minute adjustments off-site by modem if needed. After years of trouble-free operation, Ron Castro says his two "Scott Systems are truly 'lock-the-door-and-go-home' reliable."

Ron's "two station combo saves at least \$130,000 a year using Scott Studios' Voice Trax. When we put our second station on the air 3 years ago, we debuted with the best ratings of any sign-on in the history of the market!"

Scott Systems are delivered with pre-dubbed custom music libraries, time-saving CD rippers that digitally transfer music to hard drive in seconds, no-dub instant LAN spot uploads from Sonic Foundry multi-track production, MPEG and uncompressed digital audio (at a compressed price) and a week of staff training at your station. You get Cart Walls for instant requests, a phone recorder and minimize re-cuts, title and artist displays for your website, time announce, plus Cat. 5 audio wiring for fast installation. Our SS32 System plays 8 simultaneous recordings thru 8 separate console channels, feeds different spots to webcasts or second stations, plus auto-transfers spots and Voice Trax to distant stations over Internet or WAN. Scott Studios offers optional temperature announcers, wire capture and newsroom editors, unattended school closing reports and 24/7 live support via toll-free cell phones.

Scott Studios' unequaled money-saving features mean more U.S. stations use Scott than any other digital air studio systems (5,500 workstations in 2,250 U.S. Stations and nine of the top ten groups). See our web site and toll-free phone at the right.

Ron Castro says his KRPQ and KMHX, Santa Rosa, California *save serious money* because "Scott Studios' Voice Trax automation cuts voice-tracking time to 5 minutes per hour for a 'live-sounding' show. Our Air Personalities are freed up to do other work at the stations, drastically reducing the need for additional management, music, production and promotion staff. That cuts boredom, burn-out and turnover, while increasing productivity.

"Scott Studios' Voice Trax lets the talent hear their music, spots and voice-over, running the show the way they would live, including air-tight talk-ups. Scott's whole recording process is handled with just one button. We hardly ever use a mouse or keyboard. Each voice track takes only seconds.

"Not only am I an owner and GM, but I'm also an Air Personality. I produce 34 hours each week of voice tracked programming using Scott Studios' Voice Trax.

9:23:13 On-Air 2	<b>Breathe Faith Hill</b> :11/3:30/F HIT HM9834 9:23 #1 for 2 weeks in January, 2000	Born Country Alabama L 6/28 2p N 7/10 3p	Close En...Perfect Alabama L 7/5 5p N 7/13 6a	Dixieland Delight Alabama L 7/2 3a N 7/9 3p
Start 3	<b>When I Said I Do Clint Black</b> :17/4:13/F HIT HM2608 9:27	Down Home Alabama L 7/9 4p N 7/12 7a	Face To Face Alabama L 7/6 11a N 7/18 8p	Feels So Right Alabama L 7/4 2a N 7/12 7p
Start 3	<b>Clint Black Backsell Ron Castro</b> :00/0:13/C VT JU1094 9:31	Forever's As Far... Alabama L 7/7 4p N 7/10 2a	Forty Hour Week Alabama L 7/2 7p N 7/13 8a	Give Me One More Alabama L 7/1 5a N 7/8 10p
Start 3	<b>Dodge Trucks Q: Your Dodge Dealer</b> :00/0:60/F COM DA2215 9:32	Here We Are Alabama L 6/30 5a N 7/13 9a	High Cotton Alabama L 7/2 8p	Hometown Honey Alabama L 7/4 3a N 7/11 5p
Start 3	<b>California Country Cookin' Q: Kids Eat Free Tonight</b> :00/0:60/C COM DA1234 9:33	If I Had You Alabama L 7/2 9p N 7/15 4p	If You're Gonna Pi Alabama L 7/2 10a N 7/15 3p	I'm In A Hurry (& I Alabama L 7/1 3p N 7/13 7a
Start 3	<b>Q-105 Fast Jingle Q: Q-105</b> :00/0:13/C JIN DA4315 9:34	In Pictures Alabama L 7/4 10a N 7/12 11a	It Works Alabama L 7/1 9p N 7/20 10a	Jukebox In...Mind Alabama L 7/2 2a N 7/14 3p
Stack		Lady Down On Lo Alabama L 7/5 8p N 7/13 5a	Love In the 1st De Alabama L 7/5 12m N 7/9 11	Mountain Music Alabama L 7/5 7p N 7/18 8a
Stack		Once Upon A Life Alabama L 7/3 1p N 7/17 9p	Pass It On Down Alabama L 7/3 7p N 7/12 5a	Reckless Alabama L 7/1 11p N 7/12 3p
Stack		Roll On (18 Wheel Alabama L 7/6 1p N 7/14 8a	Say I Alabama L 7/4 12m N 7/13 3p	She Ain't Your Ord Alabama L 6/27 1p N None
Stack		Small Stuff Alabama L 7/9 2a N 7/10 7p	Straight Tequila N Alabama L 7/2 3p N 7/16 6p	Song of the South Alabama L 7/1 10a N 7/15 6p
:08				
A B C D E F G H I J K L M N O P Q R S T U V W X Y Z				

The Scott System is radio's most user-friendly. You get instant airplay or audition of any song simply by spelling a few letters of its title or artist. You see when songs played last and when they'll play next. You also get voice tracking while listening to music in context, hot keys, automatic recording and graphic waveform editing and scrub of phone calls, all in one computer!

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## Fix DA Troubles

► FEED LINE, continued from page 14 there is another cause that should be located and dealt with to prevent a recurring failure.

With the new component(s) in place, the array parameters should return to something very close to normal. If they do not, double-check the value of the replacement components or look for other failed components.

**Phasor touch-up**

It is possible that a component with a slowly changing value has been "chased" with phasor controls over the years. In this case, some phasor adjustment may be required to set things right. This is where good maintenance records, including turn counter readings following any array touch-up, serve you well.

Those records will show such a trend and help you get back to where you need to be. As a rule, very little phasor adjustment should be required after a component replacement.

Finally, if you are reading this while your array is working normally, here is a bit of advice: With the transmitter off, disconnect the transmission line to each tower from the phasor and with everything connected at the tower end of the line, measure the static input impedance to each transmission line at the phasor.

Don't worry about what this number is; it could be anything. But record it, so that when something does go wrong, you can repeat the measurement and quickly get a good idea of which tower (including line and tuning unit) the problem is in. That way, you can focus your troubleshooting efforts in the most likely problem area.

In the next article, we will locate and repair problems in transmission lines.

■■■  
Cris Alexander is director of engineering for Crawford Broadcasting.

Contact him via e-mail at [cbceng@compuserve.com](mailto:cbceng@compuserve.com)



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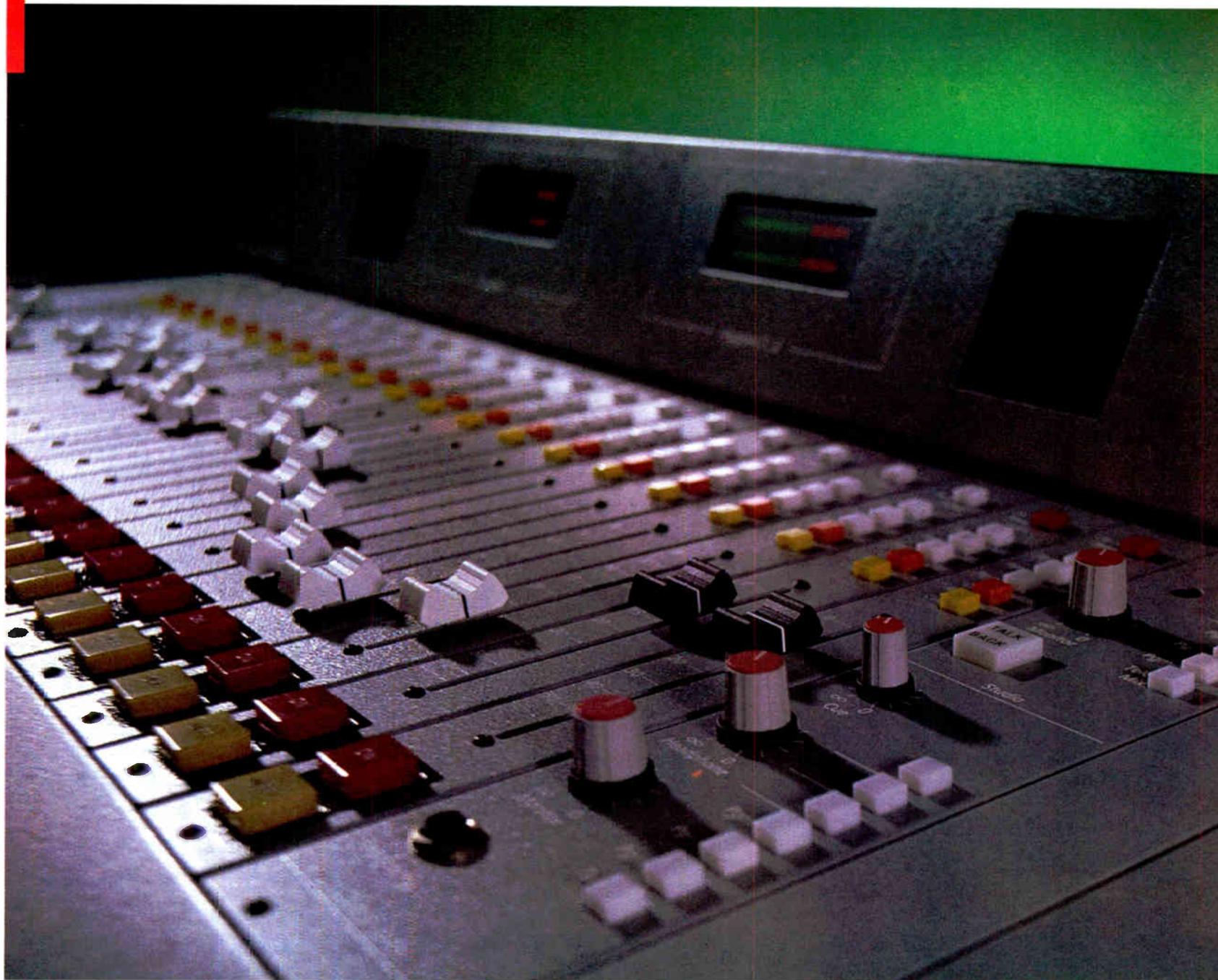
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The AirWave Digital broadcast console is available in 12 or 20 input models.

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NEWS MAKER

## An Interview With Walter Cronkite

He has interviewed presidents, generals and royalty, and has experienced and interpreted the 20th century's major events. More than any other person, he has defined the role of the TV news anchor. In private life, he has raced Lotus racecars and sailboats.

Walter Cronkite's calm and sympathetic demeanor helped America through the Kennedy assassination, and his clear explanations and unbridled enthusiasm made him the perfect interpreter for America's forays into space.

Americans were reminded anew of Cronkite's unique career when he chronicled it four years ago in the autobiography, "A Reporter's Life." For anyone interested in the early days of wire service reporting, radio's infancy, and the growth of television, this is a "must-read" book.

RW contributor Read Burgan interviewed Cronkite recently about his career and his thoughts about radio news today.

**RW:** What stands out in your mind from your earliest days of radio in Kansas?

**Cronkite:** What stood out in my mind in those earliest days — and we're talking now about the mid-'30s — was the fact that news was a pretty schlock performance at most stations. It seemed to be done by people who really didn't have much news experience, or old-timers who couldn't make it in the newspaper business.

There was kind of a "loose" editing. In fact, at many stations, there was no editing — a one-man news staff who wrote the stuff for a trained voice to announce. They weren't terribly proficient newsmen. I kept running into it across the country, and I got quite unhappy with radio news in those early

days because of that.

By the time I went back into radio news in 1950 coming back from overseas, that had changed a great deal. There were some very professional news staffs around in the country. I was broadcasting for a group of stations in



Walter Cronkite

the middle west from a Washington, D.C., bureau, and I remember some very distinguished stations: WMT(AM) in Cedar Rapids, Iowa, with a fellow named Boorman, who was a top-notch newsman and knew how to use a Washington bureau.

There was a fellow managing at WOW(AM) in Omaha, Neb., by the name of Lyle DeMoss who was another one who understood news. The staff at KNBC(AM) in Kansas City was very good. And KOMA(AM) in Oklahoma City was a "Daily Oklahoma and Times" station and they really understood how to do news.

So they had made a lot of improvements in the 15 years since 1935 to 1936.

**RW:** Why do you think that radio doesn't do a better job of reporting news today?

**Cronkite:** It depends on management. If management gives the news department enough time, radio news can do a superb job of compressing but still giving an adequate amount of information and carry voice bites from the principals making the news that are compelling listening.

But too many of these stations are doing the same thing television does: The sound bite rules, and the sound bite consists of a few words that don't even have a noun or a verb in them.

On radio, the one-minute newscast is an abomination. I think it is a lack of responsibility to the public and a failure to utilize the great benefits of the media.

### Best jobs today

**RW:** If you were starting out as a young man today and were interested in journalism, where would you want to be?

**Cronkite:** I think one of the best jobs is as a press service reporter or a desk editor with a press service. There you still have the old drive of a deadline every minute. There's some paper or some radio station client that is going to bed around the world just as you are writing the story.

If I didn't do that, I think I'd want to be in press journalism. But then I started that way. I spent nearly the first 20 years of my reportorial life doing that and I'm probably a little old-fashioned about it.

**RW:** In the beginning, you were essentially an anonymous reporter. Eventually you became a celebrity in your own right. How do you think that changed the way you interviewed people and covered stories?

See CRONKITE, page 38 ▶

### GUEST COMMENTARY

## Lee Abrams: The Promise Of Satellite

When the new digital satellite services launch commercial operation, with 100 channels each of subscription audio, what kind of programming will they offer?

During a panel at the recent CES show, Lee Abrams, senior vice president of programming for XM Satellite Radio, summarized his company's offerings.



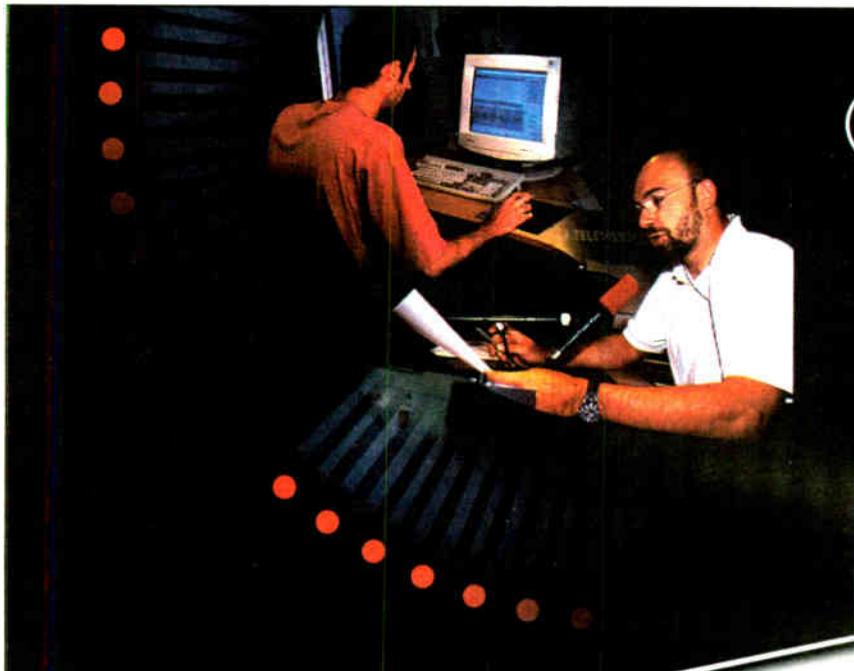
Lee Abrams

The formats themselves are going to be branded. In our case, it won't be channel numbers, it will be channel numbers plus a name.

Our heavy-metal channel might be called "Liquid Metal" and it'll have the T-shirts and the bumper stickers and all the other swag that goes along with great radio.

Seventy percent of the formats

See ABRAMS, page 43 ▶



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## BOOK REVIEW

# 'Sports on New York Radio'

**Peter King**

There are two kinds of people who will enjoy this book: people who grew up listening to sports on the radio in New York, and radio sports nuts with a sense of history.

David J. Halberstam, the former voice of the Miami Heat and St. John's Redmen, has assembled a veritable encyclopedia of who's who and what's what in sports radio in New York City.

"Sports on New York Radio" not only encompasses sports radio at the local, five-borough range, but also at the

national level as well, which makes this volume appealing even to those who have no personal connection with New York.

"Sports on New York Radio" is full of gems, like the story of a New York Rangers color commentator who became one of the best-known game show hosts of all time (Monty Hall). Or the downfall of one of the great raconteurs of radio sports attributed to substance abuse decades before the term became a common reference (Bill Stern). And the 21-year-old broadcaster who almost didn't make it into the Boston Garden for his first Knicks game because security didn't

believe he could possibly be the Knicks play-by-play man (Marv Albert).

While most sports books detail rivalries between teams on the field, Halberstam writes of major-league feuds in the broadcast booth.

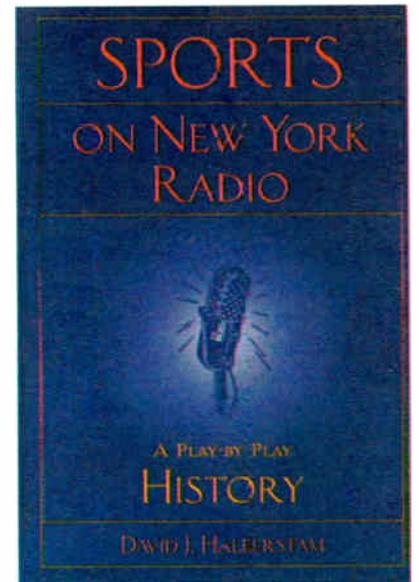
## Booth battles

Pioneers Ted Husing of CBS and Bill Stern of NBC were the biggest stars of their day, and often broadcast the same events. In the late '30s, the pair showed up for competing broadcasts of an Army-Illinois football game.

Stern, who had a physical disability resulting from an automobile accident years earlier, detested his rival so much that he crawled out on a narrow ledge with a pair of pliers to snip what he thought were Husing's broadcast cables. Unfortunately for Stern, when air time came, he learned the hard way that he had cut his own lines!

"Sports on New York Radio" also provides a good history of the business of sports broadcasting. Broadcast booths at major events were often chaotic and crowded in the early days because those events were not exclusive properties. For example, the 1933 World Series was broadcast by six different outlets.

It's hard to imagine not being able to



of the first confrontational hosts, on WMCA(AM), and now the voice of the Yankees. Or Jack Spector of WMCA(AM), Marv Albert of WNBC(AM), Art Rust Jr. of WABC(AM), the short-lived Enterprise Radio Network, and finally, the birth of WFAN(AM), the country's first all-sports outlet, complete with growing pains.

But this volume contains more than just the stories. Halberstam has included charts tracking the history of New York radio sports by category, listing each team's radio broadcasters and station, year by year. (I guarantee this is the only place outside of an old Yankees yearbook where you'll find Phil Rizzuto's name next to "immortal" Yankee radiomen Bob

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## Monty Hall was a New York Rangers color commentator before he became one of television's best-known game show hosts.

sell NFL football, but in 1956, WINS(AM) actually ran pre-season games as sustaining, or unsponsored, broadcasts. When the regular season arrived, there was no broadcast at all.

By the end of week two of the season, Sports Director Les Keiter went on the air to ask listeners to call him if they knew of any potential advertisers.

## In the beginning

Halberstam takes us through the birth of sports-talk radio, from Stan Lomax's comprehensive and literary daily 15-minute sportscasts on WOR(AM) from 1931 to 1977, to Ed Ingles' tightly edited "sports capsules" on WCBS(AM), now the preferred form for all-news and sports radio.

Halberstam tells us about Howard Cosell, arguably the first true sports broadcast journalist, the man unafraid to "tell it like it is," much of the time on radio. And Bill Mazer, still a mainstay on WEVD(AM), New York, who is generally considered the first telephone sports-talk host, anchoring afternoon drive on WNBC(AM) from 1964 to '68.

Mazer, a walking sports reference book, would encourage listeners to call and stump him to win prizes. Very rarely did that happen, and Halberstam writes that NBC's management asked Mazer to "take a dive" once in a while to make listeners feel as if they had a fighting chance of winning.

Others followed, like John Sterling, one

Gamere and Dom Valentino, each of whom lasted one season with the "Scooter.")

Halberstam has included similar charts for major network sporting events. There's a reference section on the "Founding Fathers" of radio sports, mentioning major contributions by pioneers, from Red Barber, the Dodger and Yankee broadcaster, to J. Andrew White, who called the first sporting event, a heavy-weight boxing match on CBS Radio in the '20s.

Another chart details "first broadcasts" for the New York teams. There's a ranking of the "Baker's Dozen of Most Dramatic Calls in New York Radio History," "The Ten Most Popular Phrases," "The Five Most Dramatic Talent Decisions," "The Seven Best and Worst Moments of Radio Sports," and a biographical who's who of New York sports broadcasting.

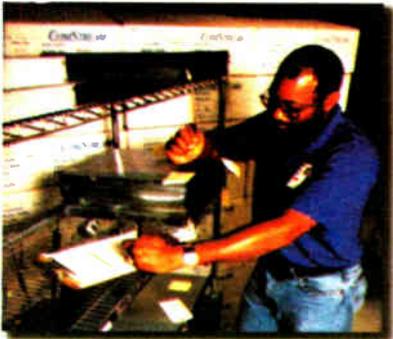
Add to that a year-by-year review of radio sports in New York, beginning with the first play-by-play broadcast done, not by voice, but by Morse Code in 1920 — a football game between Texas and Texas A&M on WTAW(AM) — and you've got it all.

There's a square peg in this huge round hole of knowledge, and that's Chapter 13, titled "Making Unwanted History," which details the incident which cut short the author's own on-air play-by-play stint with the NBA's Miami

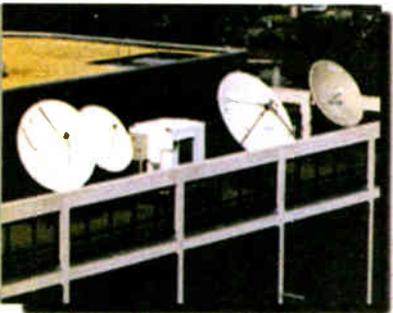
See HALBERSTAM, page 40 ►

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HOLLYWOOD

World Radio History

## ONLINE RADIO

# Net Radio: On Home Stereos Soon

**Kim Komando**

If you think that this whole convergence of the Internet and radio is limited to streaming your station or show so that listeners can tune in on a home or office computer, you're terribly wrong. For starters, there's an audio revolution taking place on the Internet as you read this — thanks in no small part to a relatively new computer file format called MP3.

The MP3 file format preserves high-fidelity sound while compressing sound files to about one tenth their original size. Instead of 10 megabytes per minute with a format like WAV, you can figure on

about 1 megabyte per minute with MP3.

The MP3 format is the cause of fits at

against Diamond Multimedia more than a year ago when the company introduced

## Imagine waking up to Internet radio programming on your clock radio.

the Recording Industry Association of America. They filed suit (and lost)

the first of what was to become a long succession of portable MP3 players.

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More recently, the RIAA filed suit against Napster Inc., when that company introduced an online service to facilitate the free exchange of MP3 files over the Internet—whether the material was copyrighted or not. That suit is still pending as of this writing.

Despite its popularity among hardcore Internet users and the growing concerns of the RIAA, MP3 and other competing sound formats have not caught on, say, like e-mail or the World Wide Web. One reason is that computer playback is limited in a number of respects.

### Weak link

First of all, most computer users don't invest a whole lot in their PC speakers. Most get by with the speakers that come with their computers (typically cheapies), and those who do upgrade, generally don't invest enough to get true hi-fi quality out of their computers.

Second, computers aren't normally situated where it's convenient to use them for radio playback — unless you want to listen while you're computing.

In short, at least until recently, there's been no easy way to pump Internet streaming stations through your home stereo system. That's changing now, thanks to product introductions by a number of companies.

These developments are particularly important to anyone interested in the Internet radio market. The reason is that the products I'm about to describe are primarily hardware solutions. In other words, although they've been designed mostly with MP3 in mind, they can be used to bring any Internet audio to home stereo systems — including Internet radio.

Early last year, home-automation pioneer X-10 introduced "DVD Anywhere." The idea of the product was that instead of buying a DVD player for your home entertainment system, you could transmit DVD movies wirelessly from your DVD-equipped PC to your television.

### Connections

The transmitter plugged into your sound card and video-out on the PC, while the receiver plugged into the appropriate connections on your television.

Well, when MP3 started to catch on, the X-10 decided to repackage DVD Anywhere as MP3 Anywhere. The MP3 Anywhere package ships with the same transmitter and receiver; you just don't need to use the video cables for audio — only playback. The net result, once the components are in place, is that anything that comes out of the computer's speakers is also piped through the stereo. Clearly this sort of technology offers the opportunity to push Internet radio off the computer desk and into the living room.

While intriguing, though, this approach still places some limitations on the user. Changing the station still requires a trip to the personal computer. And the programming can be played only over one device, namely, your home stereo system. What about something like waking up to Internet radio programming on your clock radio?

### Truly anywhere

A company called Sonicbox is pushing this concept of "Internet radio around the home" even further with a product line called imBand. What makes imBand so different is that it was

See KOMANDO, page 36 ►

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# Net Content Comes to Home Stereo

► KOMANDO, continued from page 34 designed specifically for Internet radio playback anywhere in the home.

The imBand line consists of three components. First, there's tuning software that taps into Internet radio programming. Second, there's a transmitter that broadcasts Internet radio content over unused FM frequencies so that any FM radio or receiver in the house can pick it up. Finally, there's a handheld remote that you can use to change stations and such.

From a radio station and show's standpoint, there is, of course, a catch. The imBand tuner doesn't just randomly select Internet radio programming. If

you want to play, you have to pay to be a part of the program. In other words,

participating in the imBand program. However, that's actually a good thing.

**Internet broadcasting needs to be made as much a part of everyday life as traditional TV and radio.**

the imBand tuner software only tunes in to Internet radio stations that are partic-

Why? Although imBand was designed as a consumer product *per se*, the

underlying program was designed to create a revenue stream for Internet radio broadcasters.

For starters, imBand offers programmers targeted ad insertion with closed-loop feedback. What's more, a "Tell Me More" feature allows users to access additional information about products and services they hear about during the broadcast. This feature can be tied directly into your existing e-commerce initiatives to really boost income. It also can be used to enable the purchase of CDs, books, products, services, and the like. With programming broken down into 25 different genres, it's also easy for listeners to find you.

## Streaming support

With support for Microsoft Windows Media, Real Audio and streaming MP3, Sonic box promises that imBand integration into your existing Internet broadcasting program is extremely easy.

A number of major Internet broadcast players have already signed up to participate in the imBand program. Among them are iBeam Broadcasting, a service bureau of sorts that facilitates more full audio/video broadcasting. Of more relevance to the radio crowd is the participation of NetRadio.com, which offers a wide variety of music programming, and LouisianaRadio.com, whose programming has a Cajun flavor.

With 25 genres and 32 stations per genre to fill, Sonicbox is actively seeking partners for the imBand program. In addition to making its own products, Sonicbox has a licensing program for other original equipment manufacturers (OEMs) as well. You can expect to see these hit the market in the next few months. There's more information available on the company's Web site ([www.sonicbox.com](http://www.sonicbox.com)).

## Top dog

The Internet offers the opportunity for broadcasters to deliver best-of-breed programming to a global audience. The down side is that in the past, listeners have had to choose between listening to this best-of-breed programming on their second-rate personal computer speakers, or listening to traditional local radio programming on the devices (stereos, portables, etc.) that they're comfortable with. That's all changing now, giving listeners the best of both worlds.

As interesting as imBand is, I suspect it only marks the start of a trend. It seems clear that for Internet broadcasting to really take off, it indeed does need to move from the computer desk and into the living room, and eventually, into the car. It needs to be made as much a part of everyday life as traditional TV and radio.

In the months ahead, I'm confident that there will be no shortage of companies who want to help you do just that with your Internet broadcasting operations. Different companies will offer different technologies and different business models. And in the end, the radio stations and shows wise enough to start investing now in the future of the Internet that will benefit the most.

■ ■ ■

Kim Komando hosts the weekend and daily feature computer talk radio show syndicated by WestStar TalkRadio Network.

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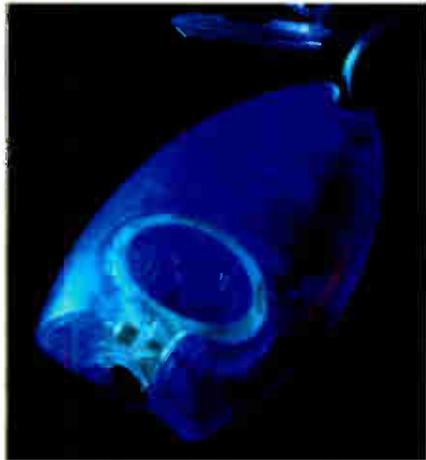
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**WEB WATCH**

Web Watch items are collected and reported by Carl Lindemann.

**Xenote iTag Ties Web and Airwaves**

How do you get listeners to make an online connection with the least effort? Xenote, a California-based company, has developed the iTag, a key chain-sized Internet device that lets listeners "bookmark the real world."



User trials are underway at KKSF-FM in San Francisco, KRBE-FM in Houston and WKLS(FM) in Atlanta.

When listeners hear something on air that they'd like to know more about — an advertisement, song title or event — they click on the portable device.

When they return home, the queries are uploaded into their computer and communicated to the station online. A personalized Web page then displays all the associated information — song titles, artist names and CDs, plus the ability to listen to music clips, buy music from an affiliated online retailer and read additional information such as an artist bio or album review.

Carolyn Moore, CEO of Xenote, said the company has created a way to make direct connections between "offline" interests and relevant online information.

**Funding for 21st Century NPR and PBS**

The Carnegie Corp. and The Century Foundation commissioned Newton N. Minow, who chaired the FCC during the Kennedy administration, and Lawrence K. Grossman, former president of NBC News and PBS, to lead a project that will create an alliance of public service media and educational institutions.

The effort will be named Digital Promise.

Minow said the goal is to create specific policy recommendations for the mission, structure and financing of public radio and television.



Newton Minow

"The finance issue is key. Financing has to adapt to the vast changes underway. Since the inception of public broadcasting, there's never been a good funding mechanism. We want to come up with a very practical idea for funding — not some study that sits on the shelf," said Minow.

"The Internet and new digital telecommunications technologies are challenging every aspect of radio and television," said Vartan Gregorian, president of the Carnegie Corp. "We believe the new technology should serve the public interest. This work will help inform future public policy decisions," he said.

Richard C. Leone, president of The Century Foundation, said the next president and Congress will need to address the "vital public interest requirements" of the digital information age.

**Cumulus Buys Sales Training Biz**

Cumulus Media Inc. has purchased The AdVisory Board Inc. (TAB), dba The Lytle Organization, the largest sales training company serving the radio broadcast industry.



CUMULUS

TAB will be operated as a wholly owned subsidiary of Cumulus. TAB and

its founder Chris Lytle will provide training services to the Cumulus sales organization, other non-competing broadcasters and the general business market.

TAB is more than double the size of its nearest competitor, according to the company. In addition, over the past two years, TAB has taken its core sales training concepts and has begun to market them to the general business population.

Perhaps the greatest change planned to TAB is extending training services to the Internet. Cumulus Executive Chairman Richard Weening said, "A top priority will be the conversion of TAB's excellent materials to a Web-based interactive environment to serve our own organization and others."

**Mandelbaum to Head Globalmedia.com**

Global Media Corp., an Internet company providing radio stations with e-commerce and streaming interface services, appointed Jeff Mandelbaum as its president and director on Feb. 1.

Mandelbaum had been vice president of media systems sales for RealNetworks Inc.

Michael Metcalfe, chairman of Global Media, sees Mandelbaum's leadership as critical to bringing rapid growth to the Vancouver-based company.

For Mandelbaum, his mission is clear. "Our highest priority is to 'bulk up' our business and to grow extremely rapidly. We see a lot of benefits that accrue to all of our customers and network associates by having a much larger company.

"The greatest growth in inquiries we're seeing is from the largest broadcast groups. What we're hearing is that stations want to provide their own branded, differentiated experiences for customers on the Internet. They want to combine that with both advertising and e-commerce.

**AP, RealNetworks Launch New Service**

The Associated Press and RealNetworks Inc. formally launched their real-time audio and video news service for media Web sites.

"AP Streaming News" gives AP newspaper and broadcast members easy-to-use, cost-effective audio and video to enhance their Web sites.

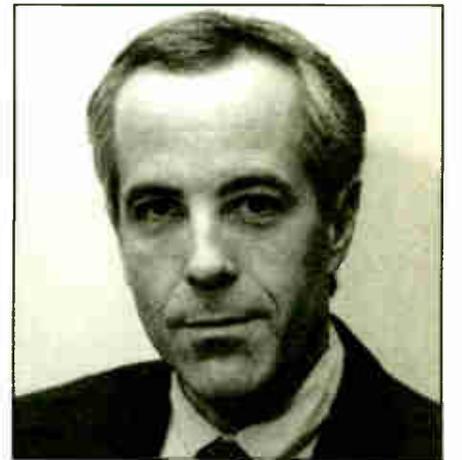
"This has been in the works for a year. It's been up for beta testing on seven newspaper Web sites to work through the technical issues and also to clarify what kinds of content work best," said Jim Kennedy,



director of AP multimedia services.

According to Kennedy, "AP Streaming News" provides three basic feeds. The first is similar to a radio version of the wire service: anchored audio news summaries of general news, business and sports updated throughout the day.

The next level offers multimedia audio/video content to enhance text stories



Jim Kennedy

posted on AP Web sites. Finally, "AP Streaming News" will provide full coverage of live events like space shuttle liftoffs.

Kennedy said that the partnership with RealNetworks was the best way to leverage their content.

"We knew we had content and the ability to edit it. But we didn't have a way to host it online on a national scale for us or for our clients. This gives members access without having to make this huge investment in infrastructure. Newspapers and broadcasters get instant access to credible audio and video clips," he said.

The Washington Post, the Los Angeles Times, the New York Times and USA Today were among the member newspapers that participated in the beta testing of "AP Streaming News" on their Web sites. Kennedy indicated that a business

See WEB WATCH, page 42



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# 'Uncle Walter' Looks Back at Years in Radio

► CRONKITE, continued from page 31

**Cronkite:** In the first place, it makes it easier to get the interview than being anonymous — even when you are anonymous and representing a major news organization.

It's a lot easier if they think they are dealing with a "celebrity," I believe. I think that's probably the wrong set of values for them to use, but nevertheless

it's true.

The thing that worries me about the celebrity status today of news broadcasters, and the anchor people particularly, is that the salaries are so high that they really aren't living the kind of life that gives them a day-to-day understanding of the common folks out there and their problems.

In the old days of newspaper work,

our salaries were the equivalent of the cops and the firemen and the postmen. It was at their bars that we drank and we suffered with them the pangs of budgeting our limited money. I think that gave us a little better understanding of our readers out there.

## Regrets?

**RW:** Do you regret having left your position as CBS news anchor in 1981 at the age of 65, when you could have continued for another 19 years or more?

nailed me down by time, you know.

There's still too much out there I want to do. I'm working like a fool today. I do documentaries and I speak around the country quite a lot. I do eleemosynary (charity) stuff.

**RW:** What was the most important story of the 20th century that you covered?

**Cronkite:** The landing on the moon. It's the one story of all of our great scientific and technological developments and political and economic developments and

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**'I think the one-minute newscast is ... a lack of responsibility to the public and a failure to utilize the great benefits of the media.'**

**Cronkite:** (Laughter) Yes, I regret it. I don't know if I'd have continued for another 19 years, but I regret it mostly because CBS did not live up to our post-"Evening News" contract, which would have included me in special coverage, documentaries and things of that kind.

**RW:** Have you thought of returning to broadcasting like Daniel Schorr did with National Public Radio?

**Cronkite:** No, I really don't want a daily schedule again. I might have thought about it 19 years ago, but I don't think about that anymore.

**RW:** Is there something you might do if you didn't have to do it on a daily schedule?

**Cronkite:** I can think of some things. I would be very pleased to do documentaries for CBS, for instance, and that kind of reporting. I wouldn't like anything that

of all of those stories that will be remembered — and the date will be remembered as well by school children 500 years from now.

Even as our school children memorize Oct. 12, 1492, as the date that Columbus landed in America, it'll have possibly even a greater significance to them. They will be living out there on distant planets and they'll wonder in amazement at that crazy little rocket and that funny little spaceship that men took three days to get out to the moon on.

The escape from our own environment to a distant moon has got to be the story of the 20th century.

■ ■ ■

"A Reporter's Life" by Walter Cronkite is published by Alfred A Knopf, New York, 1996, 384 pages, ISBN 0-394-57879-1.

Read Burgan is a free-lance writer and former public radio station manager.

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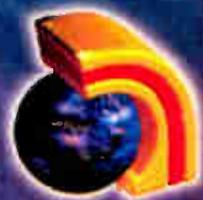
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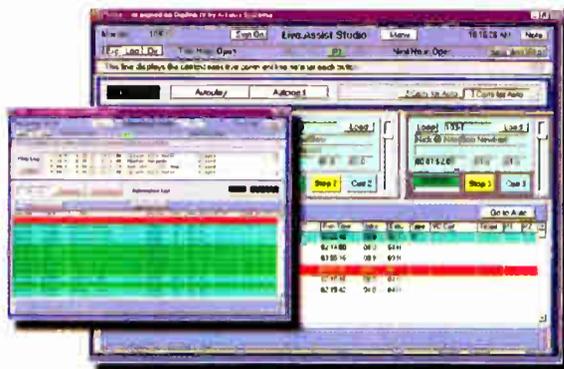
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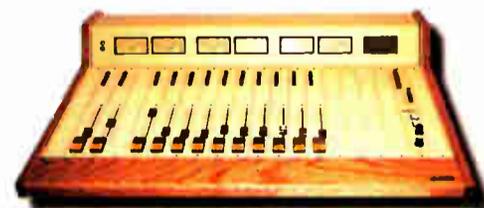
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# From Courtside to the Sales Suite

**Peter King**

March 19, 1997, will live in infamy for David J. Halberstam. In his quest to thread interesting stories into his broadcasts for the NBA Miami Heat, he stepped over the line, making what he calls "unwanted history."

In linking Heat guard John Crotty to his alma mater, the University of Virginia, Halberstam mentioned that the University was founded by President Thomas Jefferson, then added "basketball wasn't invented at the time of President Jefferson, but those slaves on his farm, I'm sure they would have made great basketball players."

Halberstam became the first announcer ever fined by the league, and the remark ultimately cost him his job. He says he regretted the remark immediately, and he has written about his feelings and what subsequently happened to him in "Sports on New York Radio."

After 27 years in play-by-play, Halberstam is off the air, but remains a player in sports radio as vice president of sports sales for Westwood One. He wrote that moving from play-by-play to sales is not as far a stretch as some might think.

His sales experience includes time as a Katz Communications executive, and running his own company that worked with Madison Square Garden on broad-

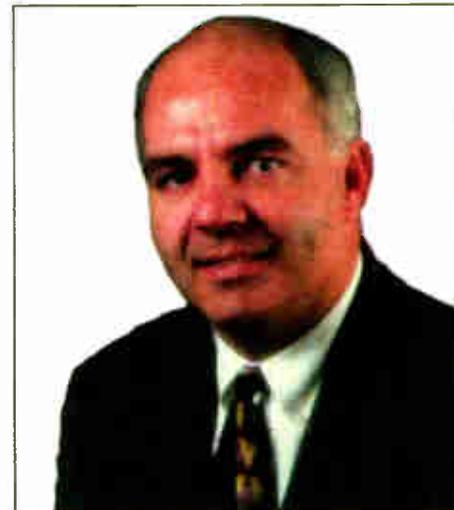
casts of the Knicks and Rangers.

He likes sports sales, he said, because it's "exciting and motivating."

"When I called games for St. John's (University) and the Heat, I always did sales and always enjoyed it," he said.

Even with the truncated 1998-99 NBA season, he said, "I had an empty feeling not being involved. Play-by-play is a most difficult habit to break; it becomes a part of your life, part of your culture, and being off the air was a sobering and sombering feeling."

But he also said it was the right time for him to get out. He said he loves sales and working for Westwood One CEO Joel Hollander. He's able to work at



David J. Halberstam

home and at Westwood's offices in Miami. He only travels a couple times a month, which gives him "family time" he missed in the years he was a broadcaster. It also gave him time to write "Sports on New York Radio," which he calls a true labor of love.

"Nobody had written this kind of book before, and I especially wanted to narrow the focus to radio and (radio sports') founding fathers. I wanted to memorialize those who might not have gotten their full due, the publicity, in the early days," he said.

Why write about his own unwanted history, which had nothing to do with the title of the book? Halberstam said it was cathartic.

"I wanted to portray what somebody goes through after something like that." He said it's the first chapter most of his friends and family read when they got the book.

Peter King is a reporter for CBS Radio News.

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## History of NY Sports

► HALBERSTAM, continued from page 32 Heat. This chapter provides a look at how Halberstam effectively ended his on-air career with an offhand remark, but it has nothing to do with the subject matter of New York radio. While interesting and a lesson for all air talent, it doesn't belong in this volume.

The only other disappointment is that a broadcast mystery remains unsolved: why the Yankees fired Mel Allen in 1964. Many of those involved went to their graves without telling the story, and those still living don't want to talk about it. The author does write, though, of a series of circumstances that probably contributed to the legend's dismissal.

"Sports on New York Radio" is a volume worthy of comparison with Curt Smith's history of baseball broadcasting, "Voices of the Game." The subject matter here is treated with reverence and objectivity, a rare combination.

"Sports on New York Radio" is published by Masters Press, a division of NTC/Contemporary Publishing Group Inc., Chicago. The suggested retail price is \$24.95.

For a listing of the "Baker's Dozen of Most Dramatic Calls in New York Radio History," visit the RW Web site at [www.rwonline.com](http://www.rwonline.com)



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## WEB WATCH

► WEB WATCH, continued from page 37  
plan tailored for broadcasters would be announced soon.

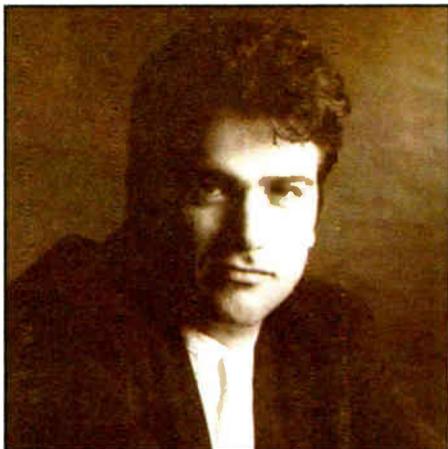
### WBCN(FM) and Trellix Partnership

In what the companies hail as a "first-of-its-kind deal," Trellix, a Web site software design firm, and WBCN(FM) in Boston are offering free Trellix Web software through station's site, [www.wbcn.com](http://www.wbcn.com)

The software helps anyone build, publish and maintain a Web site. An on-air, online contest to create the best site with the software promotes the new relationship.

Larry "Chachi" Loprete, WBCN's creative services director, said the partner-

ship was a natural evolution from their previous advertiser/client relationship.



Chachi Loprete

"We came up with the idea for the

contest when they were an advertiser with the station. It made sense to have a contest to show how simple it was and to make some excitement on air," he said.

The shape of the contest was driven by the nature of the Boston market.

"Our research shows that our listeners are very computer-savvy — it makes sense given the tremendous numbers of colleges and universities in our listenership. We get thousands and thousands of hits on the Web site. So this is a natural extension," said Loprete.

The contest will reward the builder of the "Coolest Web Site," the "Best Band or Music Fan Web Site," and the "Best Small Business or Entrepreneur Site" with their choice of a \$5,000 shopping spree at a consumer electronics retailer or at Guitar Center.

### AMFM and Traffic.com Hitch a Ride

AMFM Inc. and traffic.com Inc., an online provider of real-time traffic and logistics information services, have created a strategic alliance.

In April, traffic.com will begin to act as a national representative for a portion of AMFM's active information spot inventory and provide traffic reports to AMFM radio stations. In turn, traffic.com will receive future advertising and promotional time on AMFM's radio properties.

Gary Lee, AMFM vice president of media partnerships and initiatives, said the decision to go with traffic.com was based on technological and financial factors. "We looked at several companies in this emerging market. Traffic.com had the wherewithal to establish themselves in 40-50 major markets."

According to Lee, the initial rollout in Philadelphia and Pittsburgh will vary station-to-station depending on the status of existing contracts for similar services from other vendors.

"As of April 1, the traffic.com component will be available to AMFM stations in those markets," he said. That includes online information that can be posted on station Web sites.

Traffic.com's ability to provide real-time information comes from a network of probes that monitor conditions. The information provides actual travel times; comparisons to a historical database quantify delays. The information is available to broadcast, cable, Internet, wireless providers and in-vehicle navigation units.

### Standalone Net Radio Unveiled

Kerbango Inc. introduced what it hopes will be the next stage in the evolution of the radio at a trade show in February.

The Kerbango Internet Radio adds an "IM" band, for Internet Music, to its AM and FM bands.

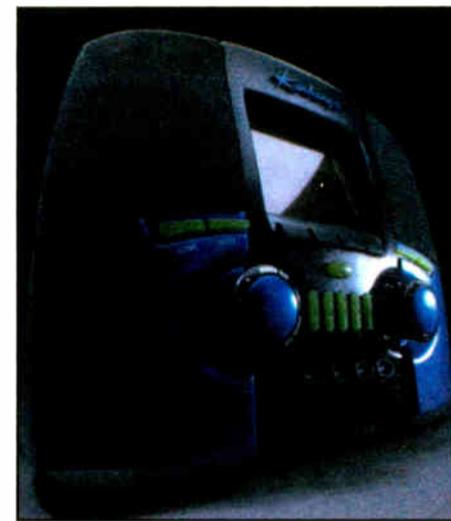
As reported here (*RW Web Watch*, Nov. 24, 1999), this device is the second stage in the streaming music portal's business plan. The initial rollout was a Web site featuring the "Kerbango Tuning Service." The service directs visitors to the multitude of online audio streams available.

The device works in tandem with the Web site. The idea is to take away the confusion that computer hardware and software can add when consumers just want to listen to the radio.

The Kerbango Internet Radio needs only an AC outlet and a Net connection such as dial-up, cable modem, DSL or home net-

work. The interface to the company Web site makes searching for online music something like searching the standard radio dial. Inside the box, RealNetwork's RealAudio decodes the streams.

It is unclear what consumer response



Kerbango Internet Radio

will be to the unit. The estimated selling price is \$300.

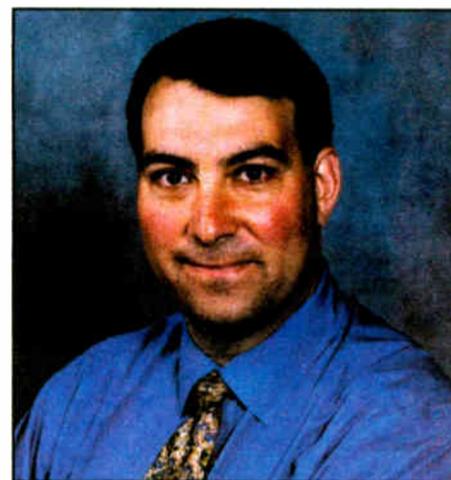
### HSI Goes Mainstream — Slowly

Broadband access is required for the Internet to match the high-quality audio/video capabilities of radio and TV. How long will it take before the average American household has such access?

According to a new study by the Yankee Group, the market for residential high-speed Internet (HSI) services will grow to 3.3 million subscribers this year, and will reach 16.6 million subscribers by 2004.

The report, "Cable Modems and DSL: High-Speed Growth for High Speed-Access," showed the installed base of domestic HSI subscribers stood at 1.4 million at the end of 1999.

Despite the fast growth projected, HSI is far from being a mass medium, according to Bruce Leichtman, director of the Yankee Group's Media & Entertainment Strategies practice.



Bruce Leichtman

"It's really a matter of degree. It's not going to be 'mass' for a while. Even today's Internet isn't 'mass media' in comparison to TV and radio. They have 90 percent-plus penetration, while the Internet is still below 50 percent. We need to see that evolve as a consumer product before HSI follows," he said.

Even so, the HSI consumer is likely to be the most valuable to target.

"They've got a lot of money and less time," said Leichtman. "The typical online household is earning \$60,000 — compared to \$40,000 offline. That income gap gets even wider with HSI subscribers."

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# Nationwide and Proud of It

► ABRAMS, continued from page 31  
we will produce ourselves. We have broken ground on an 86-studio, 140,000-square-foot facility in Washington.

About a third of the programming will be delivered to us by partners. One is a NASCAR Channel. We have arrangements with CNN, USA Today, Sports Illustrated, Sporting News and a wide range of other experts in various areas to deliver original programming for us.

Also we have deals with BET to help us with urban programming, and Heftel, which is the leader in Hispanic. They're providing five 24-hour Hispanic formats for us. They have the No. 1 and No. 2 stations in Los Angeles

## Musical dark ages

In many respects we're in the golden age of talk, and the dark ages of music radio.

Talk radio is really thriving. Talk radio's got the Sterns and the Rushes and the Lauras, and that's great. Our goal is to recruit the next generation of those people, and talk to those people too. Everybody's contract comes up at some point in time.

And we're scouring the Tulsas to find that guy who's got the 63 share and is the next Rush Limbaugh.

Our talk programming, between our partners and the people we recruit, is going to be amazing.

We're kind of in the dark ages of music programming. The playbook for most music radio was written 30 years ago, and it hasn't been changed since.

If you listen to most music radio stations, there are some great ones out there, making more money than ever.

**In many respects we are in the golden age of talk, and the dark ages of music radio.**

But we've spotted a lot of vulnerabilities that we're going to capitalize on.

(XM will offer) a whole new generation of new music formats. I can't go through all the 100 channels right now, but there are eight different types of channels.

One is mainstream channels. Take a mainstream format like oldies — every market's got one. Right now you hear train wrecks, where Abba collides into the Platters. There's a 40-year difference there.

We have a luxury because our band space is dedicated, to '50s, '60s, '70s and '80s channels. When you tune into the '50s channel, it reeks '50s. It's Eisenhower drop-ins and it's all-Platters and Coasters and that music. You'll never hear KC and the Sunshine Band.

Album rock, for example, is about 30 years old and there's three genera-

tions of it. You can't play Slayer next to Bob Dylan. It doesn't work. So we'll be able to segment, and have what our traditional mainstream formats really sliced up.

## Underserved

A lot of major niches are out there that can't be served or aren't being served by radio.

**Damn right, we're not local. MTV is giving away islands while radio stations are giving away pizza certificates. Why? Because MTV is national.**

— Lee Abrams

One of my favorites is heavy metal. You can't sell it locally. It has a ton of fans, 16- to 30-year olds. But we can do an all-Satan weekend and not have to worry about Ace Hardware complaining. *(Laughter)*

It's one of those freedoms that we have, formats that are serious musical niches that just cannot be delivered by terrestrial radio.

(There are) lot of AM-only formats. Poor Frank Sinatra — the guy's a God. And the only place you can hear him is at 1590 on the AM dial on some nostalgia station. But for the first time in history, nationwide, you'll be able to hear guys like Sinatra in crystal-clear digital sound — as well as traditional country and all these artists that are now sent to the AM band.

You want the blues right now,

you've got two choices. Go to Sam Goody and spend 16 bucks for a blues CD, or wait till Sunday night at 3 a.m. when a college station runs their blues hour. With this service, you want blues, it's there 24/7.

Several jazz formats, ranging from diet jazz or Kenny G all the way to traditional jazz, Miles Davis. Reggae. The list goes on. A lot environmental formats that we call "audio Valium." Again, they're tough to sell put on terrestrial radio. New Age, even earth sounds, crickets and waves crashing. You might think we're nuts, but I saw a focus group that was unbelievable. We'll be able to do those.

Dedicated events channels. We could have a channel that's all-Ricky Martin, figuring every 13-year-old girl in the world will have to have the channel or they'll run away and disown their parents. Six months ago, it

would have been an all-Back Street Boys channel.

XM is going to sound great. It's going to be digital. It's going to be revolutionary coast to coast. We know that. It's a given.

Beyond that, we look at music, character and muscle. Bringing musical passion back to the radio dial. Radio has given it away to MTV and

the Internet and then the press; we're going to bring it back to radio.

## Character counts

The second thing is character. If you listen to radio stations in the '50s and '60s, they were nuts. They were eccentric. They were out to lunch. It was great radio. We're going to bring that same eccentricity all the way to the bank back to the radio dial.

When you're tuning and listening,

windows down, you won't have to hear a jock; if XM is on, you'll know, because it will have a distinct, unclichéed XM sound.

The third thing is muscle. "Hey — how come you're not local?" Damn right, we're not local. We're national and proud of it.

MTV is giving away islands and radio stations are giving away Pizza Hut certificates. Why? Because they're national. And we're going do MTV-type promotions and absorb all the benefits of national radio and what we can deliver, such as contests — east of the Mississippi River vs. west.

The big three — music, character and muscle. It's going to be a whole new world, and the ones who are really going to be able to benefit are the radio listeners.

■ ■ ■

*Lee Abrams is a founding partner of consulting company Burkhart/Abrams and is credited with inventing or designing numerous radio formats including album rock, classic rock, urban/dance and new age/jazz.*

## Reader's Forum

is now found

on page 70.

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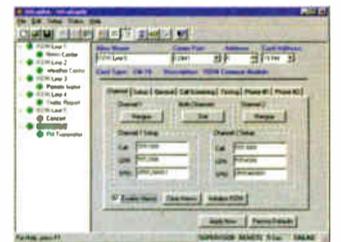
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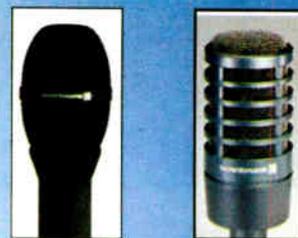
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# Studio Sessions

beyerdynamic Mics



See Page 46

Radio World

Resource for Radio Production and Recording

March 15, 2000

PRODUCER PROFILE

## Wells Is in Touch With Audience

Ken R.

AMFM Inc. owns WDAS-AM-FM, but according to Production Director Jerry Wells, the station really belongs to the black community of Philadelphia.

"We are involved as advocates for Afro-Americans. We work closely with political, social and community organiza-

sent to the station by digital services DCI or DGS.

Wells said, "We also produce a lot of spec spots, which I help write and conceptualize with the sales people. Our station bills about \$2 million every month, so that's a lot of commercials."

The station personalities do not handle production shifts, but they do contribute

Philadelphia where a majority of the drivers are black. We had a lot of interviews on the air through the strike. We also distribute food to the needy with corporate sponsors. This has always been a traditional role for our station," said Wells.

Wells said WDAS-AM-FM has geared its programming to the black community since the 1950s, and those contacts were established way back. Politicians know the station, he said, and seek it out.

"Our main competition is WUSL(FM), which skews much younger. There's also WJZZ(FM), our sister station, which plays smooth jazz. Another long-time Philly competitor is WHAT(AM), a talk station."

WDAS uses the AudioVault System from Broadcast Electronics.

"Our traffic department uses it and it's our main on-air system. There is a production component, but it's not multitrack. In fact, we don't have a digital multitrack recorder, but we're working on

that," said Wells.

The stations use an Otari MX 50 and two MX 50/50 open-reel decks and a Mackie SR-24, which is a 24-track control board.

Wells laughs and said, "This board was kind of a mistake because it's more of a sound reinforcement board for live music, but it works for us."

### Production gear

The production room also has an Eventide H3500 Harmonizer for effects, a Tascam 112 cassette deck, two Panasonic SV3700 DAT machines and a Symetrix SK 201 for voice processing.

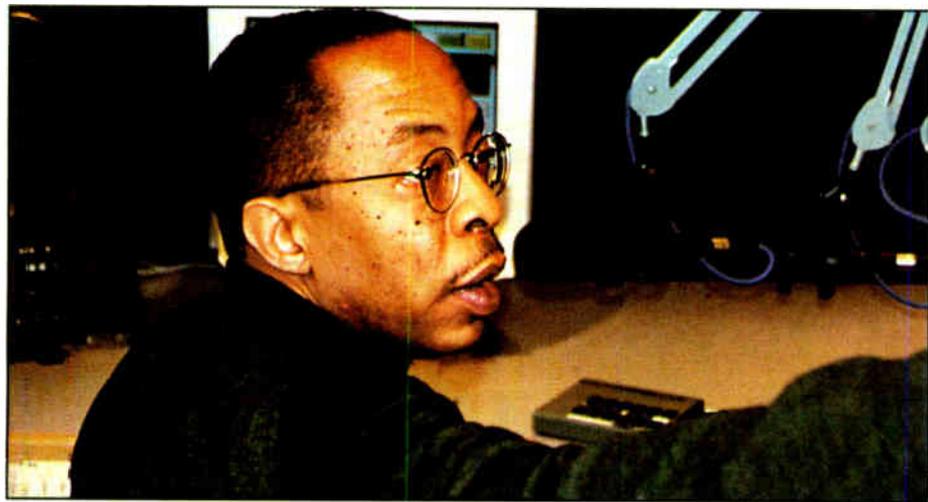
Also in the rack is a Yamaha Q2031-A graphic equalizer. The standardized station mic in all production and air studios is the Sennheiser MD 421-U. Each air studio has four for interviews, and there are two in the news booth.

WDAS-AM-FM also has a mobile broadcast vehicle, which was specially constructed using a conversion van.

Wells knows what works on his station and in this format.

"You've got to always keep the target

See WELLS, page 49 ▶



Photos by Paul J. McLane

Jerry Wells is hard at work.

tions. We editorialize and present information our listeners want," said Wells.

As part of this effort, the station holds interviews with local candidates for public office, provide forums for debate, stages telethons for local charities, airs frequent remote broadcasts and offers call-in shows for public comment on issues.

"Anything that's of interest to blacks in Philadelphia is on our station," said Wells. All his efforts in the production department are geared to this goal.

WDAS(AM) is a gospel format and WDAS-FM plays "adult urban" music, including Earth Wind & Fire, Whitney Houston and soul hits from the 1970s and '80s. The target demographic is 25 to 54.

"We don't play too much hip-hop," said Wells with a laugh.

### A day in the life

The job of a production director entails creating commercials, image liners and contest promos, and in general serving as the voice for both stations. Wells has been at WDAS-AM-FM for 25 years, an eternity in radio terms.

"My boss, Philly legend Joe 'Butterball' Tamburro, has been here 35 years. In fact he's the one who hired me!" said Wells.

"We give away \$1,000 every day at the sound of the cash register," said Wells. "We use MLMI to record our contest voicers, but I put their audio together with the music and the winners' voices. Every winner gets a promo."

On-Mic Productions usually provides voice-only scripts based on copy faxed by Wells. The soundtracks are usually

their voices, which Wells incorporates into the spots.

"My voice can be on both stations, but usually we keep the staffs separate. FM jocks only voice spots heard on their station and AM guys only voice spots for their station. If a spot runs on both stations, we'll either cut it twice or I'll voice it myself," said Wells.

"Often the spots running on both stations are national ones from outside agencies anyway."

Wells also has an assistant who comes in three days a week to handle dubbing chores.

"I initially came in as a newsman, but after 18 months one of our FM jocks left and I started filling in. I started working mornings and did that for 17 years, but soon black radio began to change.

"In the old days, we all picked our own music. Then along came a lot of other stations and that led to restricted playlists and consultants. That's when I decided to go into production. I just didn't feel like it was my show anymore," said Wells.

WDAS-AM-FM is a union shop for all announcers. Wells belongs to the American Federation of Television and Radio Artists. The rest of the station is under the aegis of the Teamsters Union. The unions are involved with talent contracts, proper treatment of the air personalities and bargaining for salary and benefits.

Wells said, "The unions are here to protect the interest of our jocks."

"We are very involved with the community. We have a room at the station used for live broadcasts and call-in shows.

"We recently had a transit strike here in

Perhaps you've heard the buzz around Cool Edit Pro, the complete software multitrack recording studio. Why is it so popular?

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PRODUCT EVALUATION

# MCE 58: Changes for the Better

Carl Lindemann



The MCE 58

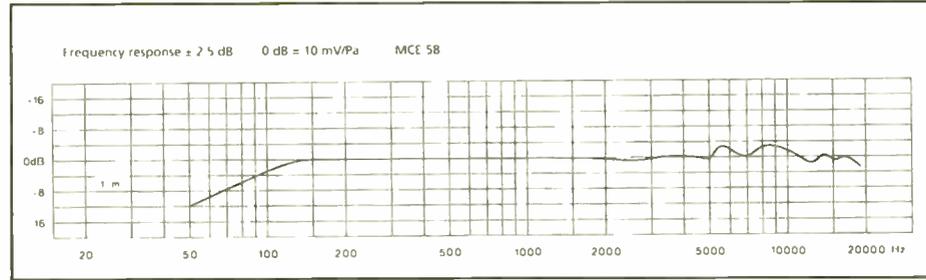
The beyerdynamic MCE 58 reporter's condenser microphone is a near-ideal complement to pocket MiniDisc and DAT recorders.

The back electret condenser element is different from those used in other mainstream mics. Most pro mics use dynamic moving coil transducers. This unit is, in some ways, a re-conceptualization of the beyerdynamic M 58.

There was nothing wrong with the original M 58, but you might encounter a problem using the older model with consumer-type recorders. These recorders have powered mic jacks, a form of phantom power for cheapie consumer mics. Unfortunately, there is no way to turn off this feature.

A dynamic mic run through a powered jack could cause nasty

pops and ticks in recordings as well as a high level of background noise. One solution is to build a special mic cable with an in-line capacitor to block the charge from the microphone.



Because the MCE 58 is an electret, there is no concern about isolating the phantom power.

**Second verse, same as the first**

The MCE 58 and the M 58 share a strong family resemblance. Both use a non-glare Nextel finish. They have the same 40 Hz-to 20 kHz frequency response and omnidirectional pattern.

Apparently, this new version was engineered to match the original specs as closely as possible, despite fundamental engineering differences that are obvious.

The MCE 58 is a two-piece unit that unscrews to reveal a battery compartment inside. An AA cell powers the MCE, with an estimated battery life of up to 80 hours in continuous use.

Usually, a battery-powered mic can be a cause of anxiety. If the battery dies, the

recording is ruined. Thankfully, the mic includes a battery check LED.

The On switch has three positions. The battery test activates when you turn the mic on. The red LED glows to confirm

that it is ready.

I tried to run the mic off the "plug-in power" of my portable MD, but it could not sustain the power needed to run the MCE. The wise user will conserve the power for running the recorder.

Some electret mics get a bum rap because of all the cheap ones sold in the consumer market. Designed properly, electrets are among the finest condensers available. The element is the same one used in the more expensive

MCE 82 stereo mic.

The real challenge for an electret condenser for field use is the power supply. Having a reliable, regulated power supply for the studio is difficult enough. Creating one that fits within handheld dimensions adds to the difficulty.

The MCE 58 overcame that challenge. The audio quality in my studio testing was consistently excellent, and that quality held up in the field.

**Support and suspension**

The capsule of the MCE 58 is larger than that of the M 58. Inside, elastic supports suspend the electret element to eliminate handling noise.

Built-in filters cut rumble from traffic and other low-level noise. Used with a foam windscreen, I found this to be a quiet mic. It was rugged enough to withstand the usual jostling.

Like the M 58, the omnidirectional pattern is not as "omni" as one might think. Though hardly a cardioid, it does display some directional characteristics like an EV RE-50.

The MCE 58 outputs a hot signal, weighed against comparable dynamic-type mics. I had to lower the recorder mic sensitivity to adjust for the nearly line-level signal, a welcome difference.

See MCE 58, page 52 ▶

PRODUCT EVALUATION

# A Beefy New On-Air Dynamic Microphone

Ty Ford

According to the specs, the beyerdynamic M 99 mic is a pressure gradient dynamic with a hypercardioid pattern and a frequency response of 30 Hz to 18 kHz. It generates an open circuit voltage at 1 kHz of 3.0mV/Pa/2.0mv/Pa. Outputs vary due to the different EQ settings.

Although there is no mention of it having a NeoDymium magnet, the output is similar in level to an ElectroVoice RE27/ND, which is about 6 dB hotter than a standard RE20.

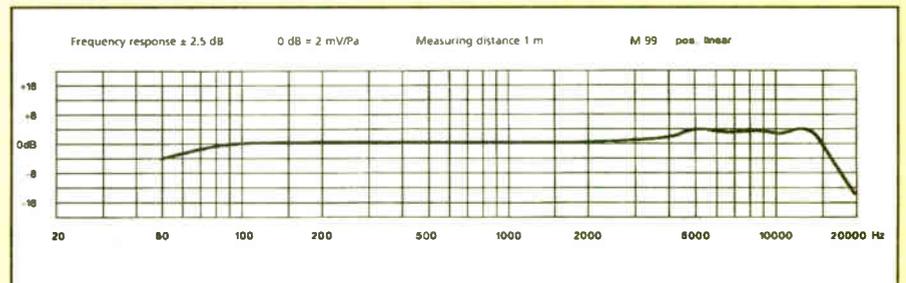
**Looks**

The M 99 has a gray metallic finish reminiscent of a Shure SM7 and weighs just under a pound. The chrome head grille and slotted sides is reminiscent of an Electro-Voice RE20. The body of the M 99 is several inches shorter and slightly larger in diameter than the RE20.

The M 99 also reminds me of the Shure SM7 in that it has EQ switches on the back of the body. Unlike the



The M 99



SM7, on which a cover can conceal the switches, the switches are available on the M 99. One switch engages or disengages the EQ. The other allows selection between two curves.

In the flat or disengaged position, the graph shows the mic flat down to 100 Hz. At 2 kHz there is a slow rise of 4 dB that peaks at 5 kHz and continues on

See M 99, page 52 ▶

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Time	Cart	Title	Artist	Length	Intro	End	Type
12:13:07	L002	Liner # 2		00:55			LC
12:13:12	M1012	Photograph	Def Leppard	04:54	:22	F	MUS
12:18:06	M2174	Friends	Elton John	02:20	:05	C	MUS
12:20:26	M1732	Dance The Night	Van Halen	02:47	:13	F	MUS
12:23:13	V026	Voice Track 26		00:12			VTK
12:23:25	DALIVE	SPOT SET		03:00		I	COM
12:26:25	J011	Jingle 7 Fast		00:06			Jin
12:26:31	M0713	Listen To Her Heart	Tom Petty	02:48	:11	C	MUS
12:29:19	V027	Voice Track 27		00:15			VTK
12:29:34	M2214	Black Friday	Steely Dan	03:40	:12	F	MUS
12:33:14	M0015	All Day Music	War	04:04	:19	F	MUS
12:37:18	L015	Liner # 15		00:15			LC

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- LED Illumination
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- S/N RATIO (+8dBu) 93dB line, 82dB mic
- THD+N (20Hz-20KHz)  
Line +4dBu .003%, +16dBu .006%
- Mic +16dBu .005%
- HEADROOM (+4dBu) 24dB

• **MSRP: \$2944 (6 in) \$4255 (10 in)**



**R-5**

- 30 Audio Inputs
- Electronic Switching
- Simple Phone
- Line Selector
- Tape Remote
- LED Illumination
- 3-Year Warranty

- S/N RATIO (+8dBu) 90dB line, 78dB mic
- THD+N (20Hz-20KHz)  
Line +4dBu .007%, +16dBu .007%
- Mic +16dBu .010%
- HEADROOM (+4dBu) 24dB

• **MSRP: \$4995**

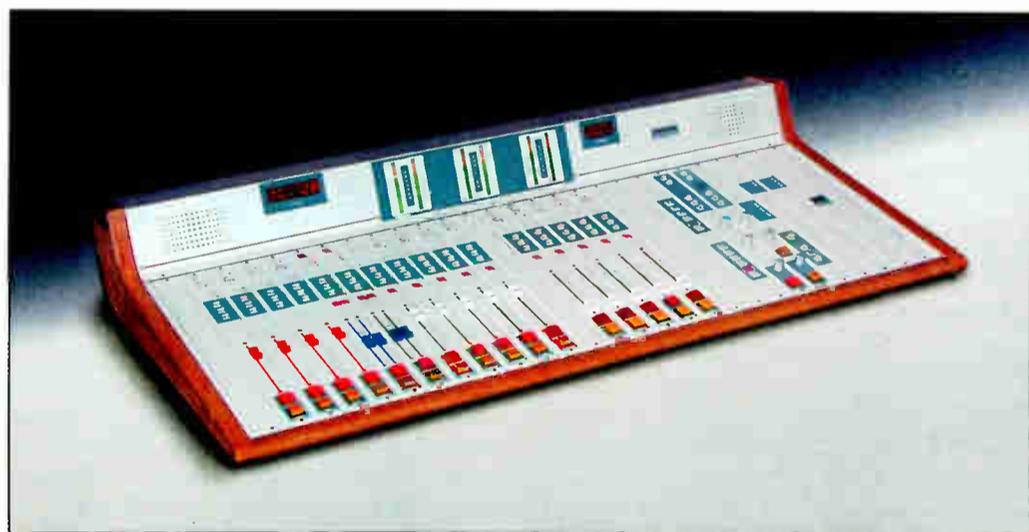


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- Any Combo of Mic/Line Inputs
- LED Illumination
- P&G Faders
- 3-Year Warranty

- S/N RATIO (+8dBu) 94dB line, 78dB mic
- THD+N (20Hz-20KHz)  
Line +4dBu .005%, +16dBu .005%
- Mic +16dBu .005%
- HEADROOM (+4dBu) 24dB

• **MSRP (12 input mainframe): \$5435 (8 in) \$7750 (12 in)**  
• **MSRP (18 input mainframe): \$7866 (12 in) \$10,643 (18 in)**



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### PRODUCT EVALUATION

# Hayes: 21st Century Speaker Design

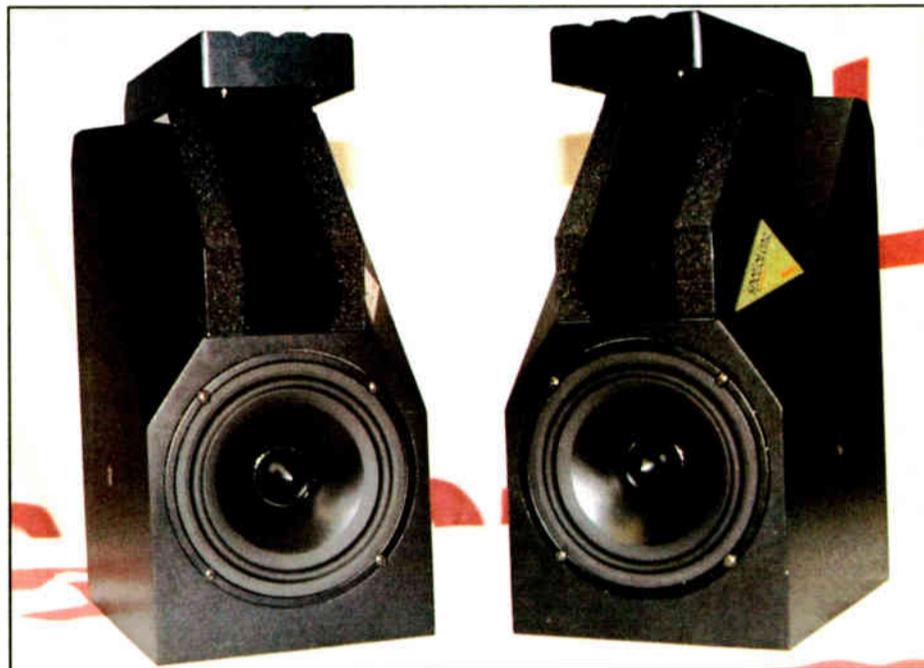
Rick Barnes

Looking for something original to add to the broadcast or recording studio? Something that looks futuristic?

The design of the Hayes Spatial One near-field monitors makes it an excellent

We started by listening to Spyro Gyra's "Dreams Beyond Control" CD. The Hayes speakers had a well-balanced sound. Some selections featured the "Tower of Power" horn section. The speakers had the crisp brass sound that I always enjoy hearing.

Next, we listened salsa music by Victor



Hayes Spatial One Near-Field Monitors

choice for the studio or an addition to spice up any facility. The look is unique.

The speakers are available through LPB Communications, which specializes in turnkey radio packages. Hayes positions this as a speaker for many kinds of applications, including radio.

The Spatial Ones are 16 inches high by 7-1/2 inches wide by 10-1/2 inches deep and weigh 24 pounds each. The fre-

Manuelle titled "Solo Contigo." On one selection, the Hayes made some of the mid- to high-frequency percussive triangle and bells jump out in the mix. I did not hear that part of the mix as prominently as with the other two pair of speakers.

John Devecka, vice president of sales at LPB Communications, responded to the notion that the speakers were bright.

"Things have been changed in the

**The reflected highs give the speakers a more 'rounded' sound, yet the high end still has clarity.**

quency response is 55 Hz to 20 kHz, and it can handle a long-term maximum power of 120 watts and a short-term maximum power of 300 watts each.

It has a Seas 6.5-inch polypropylene woofer with a 1.5-inch voice coil and a Philips one-inch fabric dome tweeter.

The innovation in the design comes from the placement of the tweeter. Instead of the tweeter being aligned with the bass driver, as with most monitors, it is mounted on a plank that sticks out of the top facing downward. The sound bounces off a diffuser at an angle of approximately 45 degrees toward the listener. Hayes calls this "fractal engineering."

The reflected highs give the speakers a more "rounded" sound, yet the high end has clarity. In other words, there is clarity but it is not biting or edgy or crass.

In order to test these speakers, I took them to the home recording studio of my friend Charlie Garrett. We compared the Hayes Spatial Ones to Charlie's JBL 4410s and the Alesis Point 7 near-fields.

design since the prototype that RW tested. The brightness has been tuned out. The 4 kHz notch has been filled out and the overall tweeter level reduced slightly," he said.

"The immediate effect is monster bass without sacrificing any clarity. Also, the 200 Hz slight bump is changed by decoupling the enclosure."

To check the low end, I was looking for something "disco-y" and also something classical. Charlie and I borrowed Aqua's "Barbie Girl" from Charlie's daughter and the Gustav Holst's "Suite #1 in Eb for Military Band."

Needless to say, the JBLs delivered much better bass response because of the larger woofer. The sound of the Hayes was similar to the Alesis. There was plenty of pumping disco bass with Aqua and the tuba section could be heard with great clarity as well on the Gustav Holst piece.

These speakers work fine for any studio, but as we were comparing them to the other speakers, we noticed that the

See HAYES, page 54 ►

# Philly Producer Links Communities

► WELLS, continued from page 45 audience in mind when you create production. Our sponsors like background music that is consistent with the music we play. That means smooth jazz or laid-back urban-sounding music," said Wells.

"We stay away from a lot of explosions and zaps and punctuators because that's not a part of our sound. We use club or house music occasionally too."

Wells seems to be very pleased with his job.

"I have my gripes, but it's the nature of the business. Some sponsors make us re-do spots three or four times. Copy is sometimes very late from the sales people at the end of the day, but overall, we have much better communication now. About 90 percent of what I do in the production room is routine, but on the other 10 percent I get to do something wild," said Wells.

Ben Hill, chief engineer at WDAS-AM-FM, has only known Wells for a few months, but is impressed.

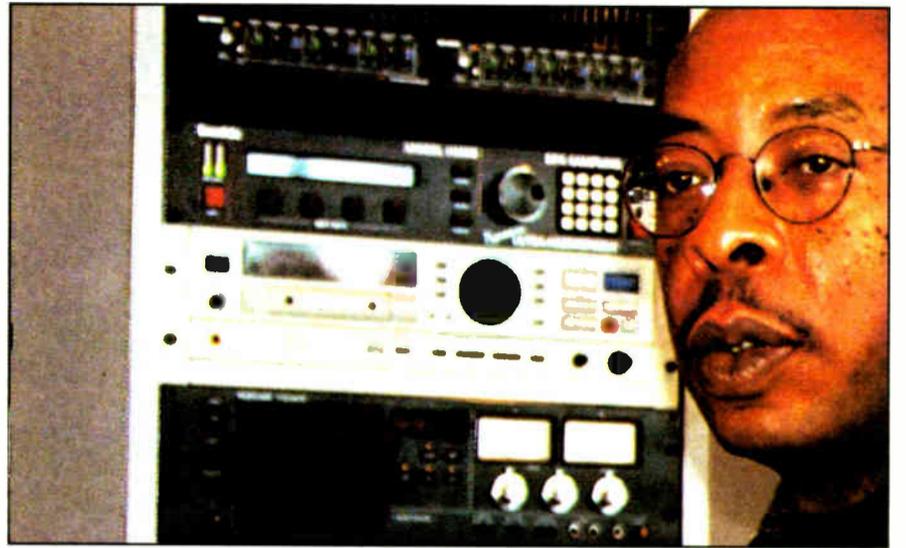
"Jerry is a real yeoman in production, he works at it day and night. He's

a perfectionist with a very good ear for audio. He's also a 'people person' who's able to keep a calm demeanor. He just doesn't get rattled when the heat is on," Hill said.

Jerry Wells comes from a background of record promotion with CTI Records. He is a native of Philadelphia and the happily married father of two teens.



*Ken R. is a former jingle producer and now occupies himself as a full-time freelance writer.*



Jerry Wells creates the Philly sound.

## WDAS-FM On the Web

Go to most stations' Web sites and you will get streaming audio, a couple of pictures of the jocks and some blatant commercial content from the advertisers.

A visit to [www.wdasfm.com](http://www.wdasfm.com) is a different experience.

The site is packed with features in a colorful presentation. The \$1,000-a-day giveaway icon is always blinking and moving.

There are different places to click to get details on the music, community news, concert information, Philadelphia entertainment capsules, contest details, national news, thumbnails and pictures of the personalities and a history of the station.

Visitors can hear the station's streaming audio and other streams. The site is detailed and kept current by a full-time staffer.

## WDAS-FM Studio Equipment

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Broadcast Electronics AudioVault (production and on-air delivery)  
DCI, DGS (digital transmission of audio)

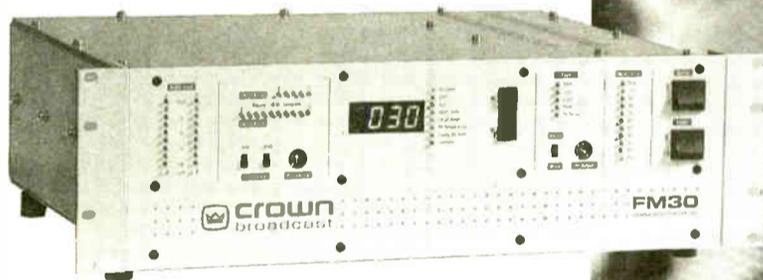
**Playback**  
Otari MX 50 and MX 50/50 reels  
Mackie SR-24 console  
Tascam 112 cassette deck  
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# Building a Web Site With Audio

## Travis

In previous articles, I discussed how an Internet site could be an effective and cost-effective tool for distributing a voice-over demo. I pointed out that your best option is to create the Web site yourself. In the last article, I defined most of the terms you would need to know in order to set up your own site.

One good way to get started is to use Microsoft's Front Page Express. This program comes free with Microsoft Internet Explorer versions 4 and 5. If you didn't choose to install Front Page Express when you installed Explorer, and if you have Windows98, you can use Windows Update to download and install the program. If you are using Windows95, the program can be downloaded from the Microsoft Web site.

Once you have installed Front Page Express, you can start designing a Web page after playing with the program for a couple of hours, to figure out how it works. Documentation for the program is skimpy.

Creating a Web page is similar to creating a page in Microsoft Word, with some important differences. First, you will find there are restrictions to the placement of text and graphics on the page. Reasons for this can be learned through resources on the Web or through some of the books on Web design.

In Front Page Express, you insert graphics onto the page, which modifies the HTML code to make the graphic show up in the browser. Adding short sound to a Web site is done in the same way that you insert an image, except you insert a sound file instead of a picture file.

You can see what the program is doing to the HTML code by selecting "view" from the menu bar at the top of the program window, then selecting "HTML." This is a good way to learn a bit about HTML code and how your Web browser interprets it. Knowing a little bit about HTML will be valuable later, when you add longer sound files to your site.

### Finished page

Usually, graphics are uploaded separately from the text. You will upload the html document that will have either an .htm or .html extension in the file name, containing the text along with information that tells the browser viewing the site where the graphic images will be placed on the page.

You will need to find out how to upload the pages to the site from the Web hosting provider. Most hosting services provide detailed instructions and many hosts also provide page creation tools that automatically take care of that part of the procedure.

Some find this uploading to be the most confusing part of the procedure. However, everyone I know who has tried to put up their own site has managed this after a couple hours of agony. It gets easier after the first time.

In most instances, the file name of the main page should be "index.htm" or "index.html", the name that Internet browser looks for.

For instance, the actual location of my voice-over Internet Web site is

<http://members.aol.com/travis749> When going to that address, the browser automatically finds the page named "index.htm" and loads it. I don't give out this address, however. I give out [www.voice-guy.com](http://www.voice-guy.com) which I pay a company to "forward" to my actual site address.

### Placing audio on the site

I mentioned audio can be placed on your Web page in the same way that graphics are, due to the sound being stored as computer files just like graphics. Sound files may be compressed or uncompressed. The compression is not

to a potential client.

Currently, there are three types of real-time compression sound files that you might want to place on your site. The most popular seems to be the RealAudio .rm files, with the runner-up being Microsoft Streaming Media .asf format. I prefer RealAudio, but the Microsoft format sounds good. Take into consideration Microsoft's competitiveness; it will be important to pay attention to see which format ultimately wins. I am sticking with RealAudio, but as Microsoft gets more accepted, I will include .asf files on my site, too.

The third format you should also con-

## Plenty of information and instruction on HTML is free on the Web.

the dynamic levels or volume compression, but a means of making the files much smaller for digital transmission or storage.

Most Web browser programs are equipped to play uncompressed audio files (like Microsoft .wav), and older compression systems. The newer and now most popular compression systems like MP3, Microsoft .asf or RealAudio .rm files require downloading and installation of programs to play them.

The advantages of using the newest compressed-audio files outweigh the disadvantages of requiring the users to download software to play them. It is possible to play compressed sound through a 33.6 connection, which is good enough to present your voice-over demo

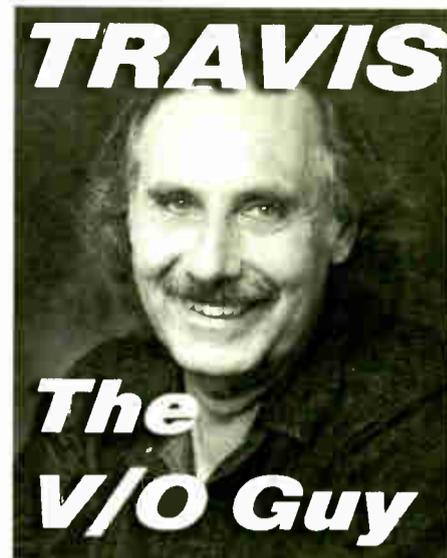
sider is the MPEG-3, or MP3 format. While MP3 does not sound as good over a 33.6 modem, when the file is downloaded first or streamed through a high-speed connection, the sound quality is excellent. I currently include an MP3 demo file on my site.

There are a number of other streaming media file formats available, but they are not as popular, so I do not discuss those.

### File formats

Once you record the sound file on your computer, it needs to be compressed or converted to one of these file formats. All the tools for creating all these file formats are available for free on the Net. Check out [www.real.com](http://www.real.com) [www.microsoft.com](http://www.microsoft.com) and [www.mp3.com](http://www.mp3.com)

You will need to do some snooping



through these sites to find the free versions. These sites offer tools with advanced features that cost money, so the free ones are more difficult to find.

The RealAudio and Microsoft streaming formats require extra code on the Web page to get the files to start playing before it has completely downloaded. Both companies offer tools that create Web pages with the proper coding already inserted.

With these tools, along with Microsoft's Front Page Express, it is possible to create a site with your voice-over demo without any HTML code. However, a little HTML code lends to more flexibility in the design.

The HTML language is forgiving of mistakes. While the language will not work properly if you do something improper, a mistake does not cause the program to crash or freeze up your computer. There is a lot of information and instruction on HTML available for free on the Web, and plenty of books available on the subject.

Please check out my Web site voice-over demo for examples at [www.voice-guy.com](http://www.voice-guy.com).



Travis the V/O guy is a veteran voice-over artist writing from California. Send e-mail to [travis@voice-guy.com](mailto:travis@voice-guy.com)

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# Microphone Costs More, But Worth It

► MCE 58, continued from page 46

The only downside is price. The mic retails at \$419. The regulated power supply nearly doubles the price compared to the dynamic M 58. Even so, I could not resist buying the demo unit for sound gathering. I am sure that I will be seeing more of these.

■ ■ ■

Carl Lindemann is a frequent contributor to RW.

**Product Capsule:**  
**beyerdynamic MCE 58**  
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For more information, contact the company in New York at (800) 293-4463 or visit the Web site at [www.beyerdynamic.com](http://www.beyerdynamic.com)

## Stereo Version Forthcoming

If \$419 seems like too much to pay for a mono ENG mic, hold on. Watch for the release of a stereo version of the beyerdynamic MCE 58 for less money.

The prototype displayed at AES in New York in 1999 was basically a pair of MCE 58 elements inside a tough plastic case. Instead of using an XLR plug, this prototype had an integrated cable terminating in a TRS 1/8-inch plug.

The plastic case certainly was not as rugged or appealing as the MCE 58 metal case, but it certainly looked serviceable for the intended use. Also, the LED battery check was eliminated to cut costs.

At a target price of \$300, MD users partial to stereo recording might find the mic irresistible. In fact, one company official noted that the biggest fear for this mic was that it might seem too inexpensive. If sound quality matches that of the MCE 58, the new stereo model may become as hot as the MiniDisc field recorders designed for use with it.

# beyerdynamic Scores With Microphone

► M 99, continued from page 46

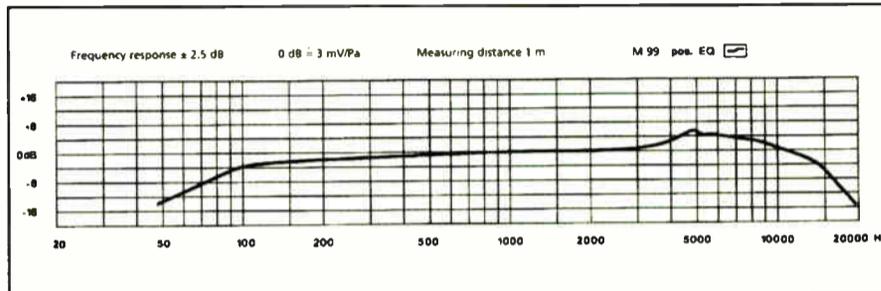
as a shelf until about 12.5 kHz. Above 12.5 kHz, the response drops off fairly rapidly, crossing zero at 15 kHz.

The first curve starts a slow roll-off at the low end at about 500 Hz to 600 Hz. At 100 Hz the response is down 4 dB, at 50 Hz the response is down 12 dB, vs. down only 4 dB in the flat position. The top shelf is a bit peakier just below 5 kHz and then rolls off more quickly, starting its decline about 6

headed out to Baltimore radio stations WBAL(AM) and WIYY(FM), where the RE20 is the predominant mic. Kerry Dietrich and Jamie Schmidheiser of the FM production operation, and Jackson Whitt from the AM production side joined me. Assistant CE Mike LaBoone and engineer Bob Sneeringer also dropped in to observe the comparison.

## Test drive

The station has many production



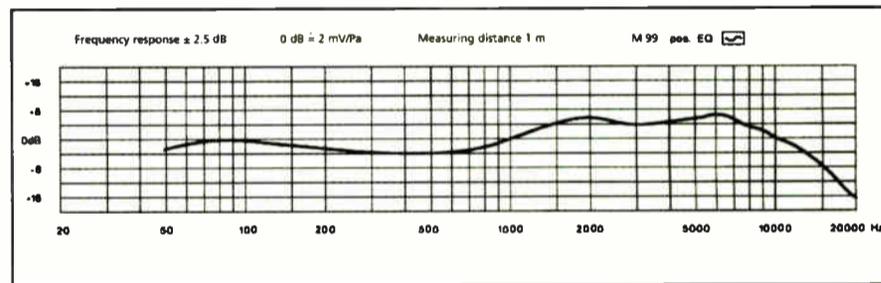
kHz, crossing zero at 10 kHz and down 5 dB at 15 kHz.

In the flat position, the M 99 sounds full and thick. I found a working distance of about two inches was best. Any closer than an inch and the mic mashes up.

The pattern is fairly tight — any

rooms. We carried out the exercise in one studio through a Ward Beck console.

The first task was to compare the RE20 and RE27/ND. We found the RE27/ND about 6 dB hotter than the RE20. The RE27 was more aggressive sounding with a HF peak slightly below



more than an inch off center is out of the pick-up pattern.

The first EQ curve pulls some "boominess" out of the mic and the notch at just below 5 kHz adds a nice edge that results in a more aggressive sound, but may be problematic for sibilant voices.

The second curve creates a shallow dip of 4 dB between 100 Hz and 1 kHz, rises to a plateau of 6 dB at 2 kHz and maintains that within 1 or 2 dB until 6 kHz, crossing zero at 10 kHz and dropping 8 dB at 15 kHz.

It made my voice start to sound nasal and seemed to make the pattern tighter. Moving around is difficult using this second curve setting. Based on the curve, this pattern might work best on a soft, dark voice.

Switching back to the flat position opened up the top end and warmed the bottom a bit.

## Up against the big boys

In a flat-to-flat comparison between the M 99 and my RE27/ND, the two mics had about the same output, but the RE27/ND was thinner and brighter.

With the top-end roll-off engaged, which is supposed to make the RE27/ND resemble the RE20, the RE27/ND was still brighter and clearer. The M 99 had a low "woofy" bottom, while the RE27/ND did not.

Not everybody has an RE27/ND, so I

that of the RE20. With the RE27 top rolled off using its HF tilt switch, the RE27 exhibited less HF than the RE20, but started to sound sort of nasal. The RE20 sounded more natural.

We swapped out the RE20 for the beyer M 99. The RE27 and M 99 are similar in output level but the M 99 is much thicker and bassier. The M 99 is also warmer and fatter than the RE20.

That girth comes with a caution, as you cannot eat this mic.

## Nasty

When you get closer than an inch, the diaphragm starts to convulse and it gets nasty sounding. Backing off to an inch or more makes a big difference.

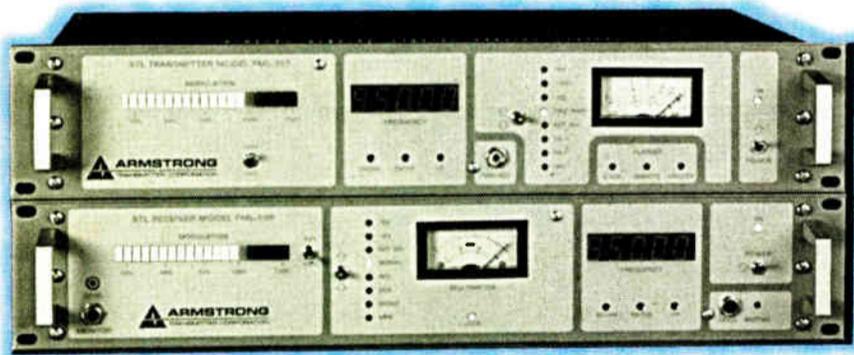
Because radio announcers are famous for eating the mic, I called the beyer company and asked applications engineer Herber Herrera if any pop protectors might be available that would keep the talent at least an inch from the head grille. It was mentioned that the WS 740 windscreen could be used with the M 99.

Back at my studio I continued the evaluation, comparing the M 99 with my RE27/ND. While both mics had equally good off-axis rejection, I could hear more off-axis low end on the M 99, probably due to the rear lobe of the hyper-cardioid pattern.

The M 99 comes with a suspension mount. This is good, as the M 99 is less

See M 99, page 53 ►

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**beyerdynamic: 75 Years of Making Transducers**

RW reviews two beyerdynamic microphones in this issue. The name beyer is familiar to many in broadcasting.

Eugene Beyer founded the company in Germany in 1924. The mission was to improve the quality of sound reproduction through the development of enhanced transducer technology.

A handshake between Beyer and Georg Neumann created an agreement that beyer was not going to make condensers and Neumann was not going to make dynamics.

In 1938, the company's first moving coil headphones, the DT 48, went into production. A stereo version created in the 1950s is still in production. Beyer's first moving coil microphone, the M 19, went into production in 1939.

The 1950s also produced the first small ribbon mikes for beyer — the M 130, M 160 and M 260. These mics were unique in their lightweight design due to rare earth magnets and a new method of producing small, durable aluminum ribbons.

The next 20 years brought about the M 88 and M 69 dynamics. Neodymium magnets began to be used to create the DT 880 headphones, which led to the high-output TG-X series of mics.

After both engineers passed away in the 1970s, beyer began making its first condenser microphones. The MC 740 was the company's first large-diaphragm, multi-patterned mic.

A new product of note from beyer is the M 100 digital mic. It puts the A/D conversion right after the diaphragm, producing an AES/EBU digital output from the mic.

The company also makes wireless mics and conference systems.



Eugene Beyer

► M 99, continued from page 52 isolated than the RE27/ND. On the positive side, the M 99 hears less HVAC air duct turbulence and hard drive noise.

The RE 27/ND was picking up some stray AC fields that caused some buzzing when the mic was positioned in certain ways, whereas the M 99 was clean by comparison. Both buzzed a bit when I got them within a foot of a monitor. The M 99 seemed to hear less of the din from hard drive fans and cart machine bearings.

For on-air situations in which the talent stays an inch back from the grille, the beyer M 99 is a good option. At a \$799 list price for mic, case and suspension mount, the mic delivers a thick, beefy sound.

Mic eaters can be kept at bay by finding some way to mount a three-inch embroidery ring, available at most sewing stores, with some nylon mesh stretched over it.

If trying an M 99, remember that it has a 6 dB hotter output than an RE20, which means adjusting the mic pre input to get a proper comparison.

Reach Ford at [www.jagunet.com/~tford](http://www.jagunet.com/~tford)  
Ty Ford's equipment reviews and V/O files can be found at [www.jagunet.com/~tford](http://www.jagunet.com/~tford)

**Product Capsule:  
beyerdynamic M 99  
Microphone**

- Thumbs Up**
- ✓ Fat sound
  - ✓ Somewhat resilient to AC fields
  - ✓ Hotter response than RE20

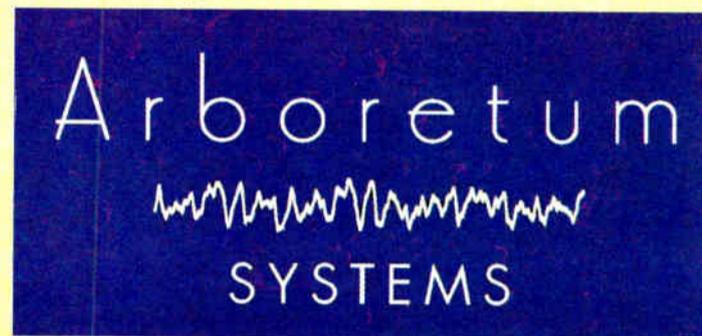
- Thumbs Down**
- ✓ Mic cannot be 'eaten'

For more information, contact the company in New York at (800) 293-4463 or visit the Web site at [www.beyerdynamic.com](http://www.beyerdynamic.com)

**New Effects Tools for Macs**

Arboretum Systems offers Hyperprism 2.5 real-time sound processing for Power Macs. The standalone software retails for \$299.

It includes the following tools: the Granulator, which chops up the audio into tiny pieces and rearranges it in interesting ways; Formant Pitch Shift, which alters pitch in semitones; HyperPhaser, with eight resonant filters, reminiscent of a flanger; Harmonic Exciter; Bass Maximizer; Tube/Tape Saturation effects plus the original Hyperprism effects library for a total of 42 effects.



Hyperprism 2.5 for DirectX, Premiere (Mac) and VST (Mac) are also available as upgrades to current Hyperprism Plug-in Pack owners for \$99.

Hyperprism 1.0 is available at \$299 for Soundscape SSHDR1, Mixtreme and R.Ed PC workstations. The release consists of the following modules: Bass Maximizer, Tube/Tape Saturation, Quasi Stereo (mono-to-stereo), Flanger and Phaser and others. Purchasers of the 1.0 edition will receive the next upgrade, including new effects, free.

The Arboretum Realizer Pro for \$74.95 improves AIFF, WAV, SDII, MP3 files, streams, CD audio and other audio formats.

Version 1.0 includes the following effects: Bass Maximizer, Two Parametric EQs, Harmonic Exciter, Reverb, Ultra Stereo and Loudness. It is useful for pre-and post-mastering and supports DirectX and VST plug-in formats.

Registered owners of Winamp and SoundJam MP Realizer qualify for a discounted upgrade to Realizer Pro.

For more information contact the company in California at (650) 738-4750, check out the Web site at [www.arboretum.com](http://www.arboretum.com) or for the Soundscape edition of Hyperprism go to [www.soundscape-digital.com](http://www.soundscape-digital.com)

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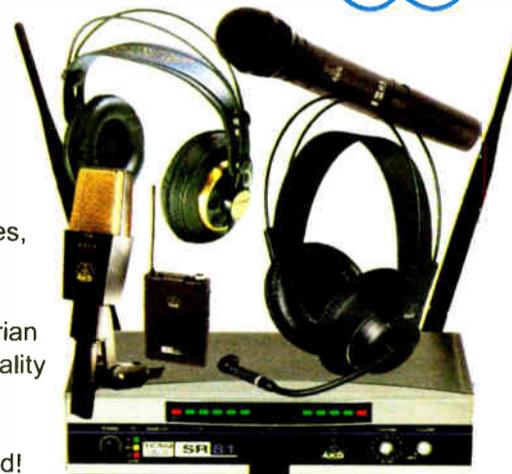
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# A Look at Hayes' Near-Fields

► HAYES, continued from page 48

Hayes speakers were softer in volume than the other two pairs of speakers. Charlie has a Hafler amp that was used for all three pairs of speakers. All settings and controls remained exactly the same for all three as well.

The relative volume levels of his JBLs and his Alesis were comparable, even though one was self-powered. At first, we thought that the Hayes speakers were just less efficient, but that was not the case.

Because no technical material came with the speakers, I had to read the fine print on the back of them — using a magnifying glass — to discover that they are rated at 6 ohms. Most amps used in studios are 8 ohms, so there is an impedance mismatch. I am assuming this mismatch accounted for the loss in volume.

I wanted to find out more about the speakers. Again, on the back label of each speaker, and again in fine print, was the e-mail address for Hayes in Australia.

I contacted the designer, Joseph Hayes, who was accommodating in answering questions.

"The crossover has a series notch that causes a 1 dB reduction in output. The monitors sound best when cranked," he said.

Charlie and I heard considerably more than a 1 dB reduction in volume when compared to his Alesis and JBL speakers. However, Hayes is correct in that these speakers do sound fine when cranked.

Also on the back of each speaker is a small toggle switch that Charlie and I could not figure out. The switch did not affect the phasing or the impedance.

When I asked Hayes what this switch

is supposed to do, he said, "Nothing. It was left over from an earlier prototype." I do not know why it is there, but I was correct in my assessment.

Hayes has also changed the crossover from the model that I reviewed, and claims the newer monitors sound better.

If you have a 6-ohm amplifier or an impedance matcher, or don't mind turning up the amp a bit, the speakers are fun to listen to. With a list price of \$695 for the pair, consider the Hayes Spatial One near-field monitors for your next set of studio speakers.

■ ■ ■

Rick Barnes, CBRE, is a studio engineer with the Voice of America and a Ph.D. candidate in communications technology. He can be reached via e-mail at KE3QJ@email.msn.com

## Product Capsule: Hayes Spatial One Near-Field Monitors

### Thumbs Up

- ✓ Full-range sound
- ✓ Good bass for the size of driver
- ✓ Clear mids and highs
- ✓ Cool look
- ✓ Not too expensive

### Thumbs Down

- ✓ Bright sound (which could be thumbs up)
- ✓ Six ohms — requires extra power on an 8-ohm amp
- ✓ Few dealers in the U.S.

The speakers are available in the United States through LPB Communications in Pennsylvania at (610) 644-1123 or visit the LPB Web site at [www.lpbinc.com](http://www.lpbinc.com)

## Products & Services Showcase

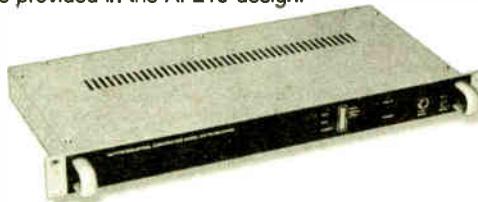
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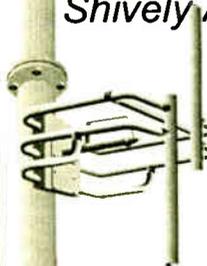
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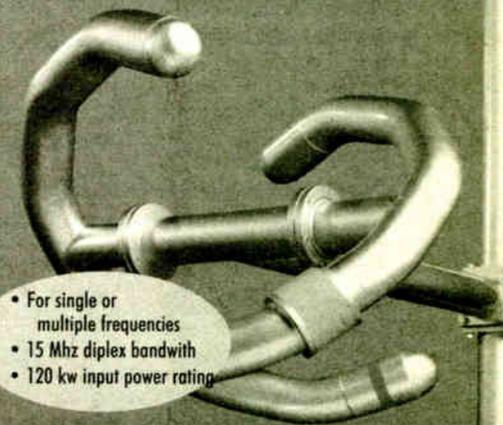
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PRODUCT GUIDE

# New Products from TC Electronic

TC Electronic offers many new products of interest to the radio station production director. The M-One Dual Effects Processor, and the D-Two Multi-Tap Rhythm Delay. Each retails for \$699. Both units have analog 1/4-inch I/O and S/PDIF I/O for a digital signal path that supports 44.1 and 48 kHz.

The M-One is a 24-bit dual-engine processor with 25 algorithms including enhanced reverbs, delay, dynamics, pitch, chorus and tremolo.

The D-Two Multi-Tap Rhythm Delay offers up to 10 seconds of delay. It features spatial, ping-pong, reverse, dynamic delay, chorus and filter.

Also, Tube-Tech, distributed by TCE,

working on two transitions at the same time, and it has the ability to use the master view section as a plug-in.

TC Works also has Voice Tools, a plug-in bundle for \$699 for Digidesign's ProTools 24Mix featuring the TC Intonator for pitch correction and TC Voice Strip that includes com-

pressor, de-esser, voice EQ, lo-cut fil-

ter and gate. It also has an emulation of tube gear.

The new MSD600M Master Stereo Display from DK-Audio has as an interesting feature. It can function as an audio matrix control center, meaning



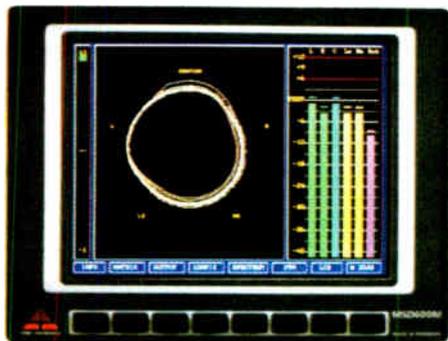
TCE's M-Two



TCE's M-One

any input can be routed to any output. It has individual gain control and an optional fader panel.

For more information call the company in California at (805) 373-1828 or check out the Web site at [www.tcelectronic.com](http://www.tcelectronic.com)



DK-Audio's MSD600M Master Stereo Display

offers the new SMC 2A, a three RU, stereo, all-tube multi-band compressor for \$4,395. It has three-band gain, threshold, attack and release controls on a single master gain control. The frequencies of each individual band are variable. The I/Os are balanced and fully floating.

TCE also took over distribution and marketing of the Dynaudio Acoustics near- and mid-field monitor product line in North America.

### 5.1 reverb

TC Electronic introduced the System 6000 that retails starting at \$8,595.

Algorithms include VSS-5.1 reverb, a multi-source input to multi-channel output space simulator. Four-band dynamics processing includes expander, compressor and brickwall limiter. It has multi-channel pitch change, as well as classic TC algorithms, including several reverbs, chorus, delay, phaser and EQ.

System 6000 consists of the core system which includes the Mainframe 6000, Remote CPU 6000 and a remote user interface called the TC ICON. Options include various software licenses for specific DSP functions, up to three ADA 24/96 and two-channel analog I/O cards.

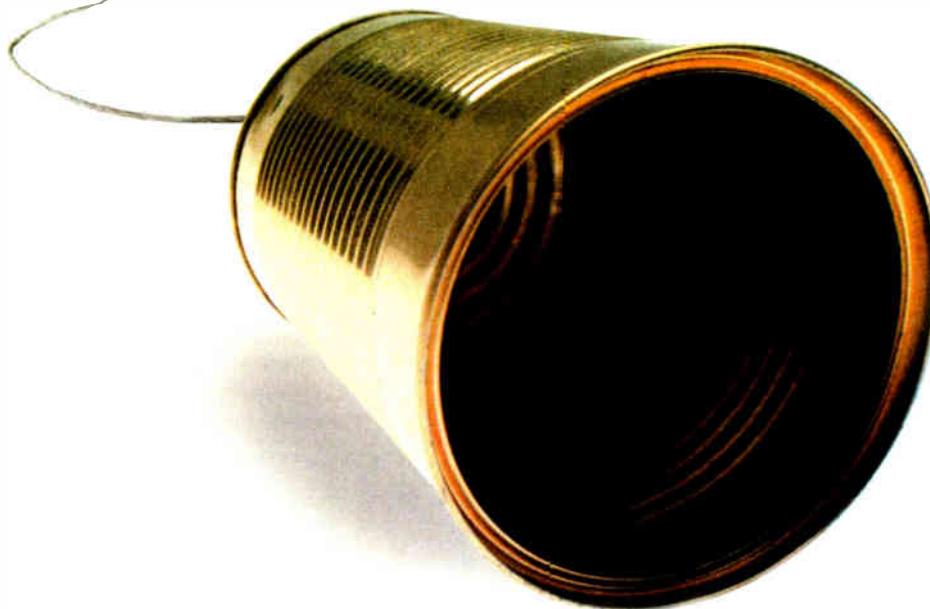
The TC ICON has a large touch screen and six touch-sensitive motorized faders built into a metal chassis. The DSP-6000 processing card is capable of running several effects simultaneously. This card has four pairs of AES/EBU digital I/O and word-clock.

The CPU 6000 is a one-RU device that acts like a communications module. A multi-pin socket connects the CPU to the ICON, and additional USB connectors are provided for connecting optional keypads, joysticks and other control devices.

TC Works has upgraded Spark 1.0 to 1.5 for \$499 retail. Enhancements include the Cut Editor, which now allows

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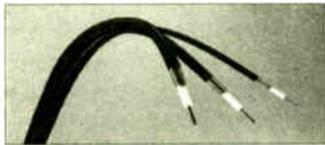
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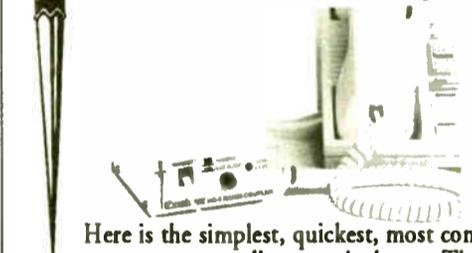
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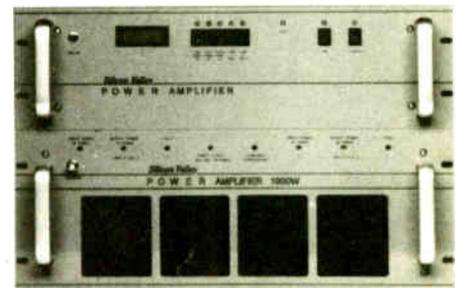


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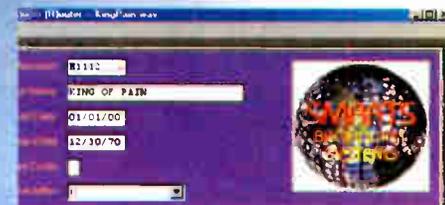
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# Buyer's Guide



Inside

Radio World

Digital Production Tools

March 15, 2000

## Revolution Shifting to Software

Alan R. Peterson

The real revolution in radio production may be played out not with CD decks and DAT machines, but with clever software and its creative uses.

As today's radio production studio depends more on digital workstations and less on tape decks and rack processors, the big changes coming are more likely to arrive on a CD-ROM than in a cardboard carton. The digital movement has even made it possible to do without a console or a CD player in the room.

Companies with little or no previous broadcast exposure are fast becoming common names around the studio. Syntrillium Software proved it is possible to produce and mix a 64-track digital project — with effects — for only about \$300.

Steinberg and Sonic Foundry — two companies more familiar to musicians and sound designers than production directors — can sell you plug-ins that slice and dice your tracks in ways you would not have

thought possible. And these plug-ins are even compatible with several of radio's most visible editing systems.

MPEG compression continues to make the world spin to a new beat, so the latest and greatest encoder available is a necessity. Even the free software you can download from the Internet can do more

Goldwave made the rounds on the World Wide Web as novelty programs. Today, Cool Edit Pro is commercially available software that has matured to a point where it stands among radio's favorite production tools — not just because of its price and ability to do multitrack mixing, but because it has a built-in complement



Audioactive Real-Time Internet Audio Encoder

for production than that Ursa Major rack processor you lusted after back in 1987.

If the future holds anything specific for radio production tools, it will be that your favorite effects and processes — present and future — will likely consist more of "bytes" than "black box."

Only a handful of years ago, shareware audio editors such as Cool Edit and

of 40 quality digital effects and space for plenty more.

Systems like Cool Edit Pro are remaining open-ended in order to accommodate various file formats that can be shared between platforms, workstations and additional plug-ins.

"We are DirectX compatible," said Bob Ellison, president of Syntrillium Software. "It's a Windows standard and is the one standard everyone is writing for."

In addition to the base effects that come with Cool Edit, a user can plug in third-party effects from TC Works, Waves or Sonic Foundry.

A competing plug-in standard from Steinberg — VST — works only in programs that have agreed to adopt that standard. While not compatible with DirectX, there are always end-runs to get what you want.

"Amulet Software has created a VST-to-DirectX linker," said Ellison. "It lets you run a VST plug-in where a DirectX plug-in should go. And it actually works pretty well with Cool Edit Pro."

Plug-in compatibility assures a product's life will be extended, at least until the next big version comes along. Longtime radio favorite SAW (Software Audio Workshop) also has hooks to link DirectX and VST plug-ins into a SAW project. The product line from Innovative Quality Software (IQS) now claims SAWPro as its top-of-the-line editor, with 32 stereo tracks and independent DSP on each track.

DirectX has also made an impression at Digigram. Xtrack, the company's flagship audio editor, not only records and



edits entirely in MPEG, but will also allow DirectX plug-ins on each channel.

Neil Glassman, president of Digigram Inc. in North America, commented on the extra step needed for Xtrack to do its job.

"DirectX plug-ins won't work directly on an MPEG file," Glassman said. "The program must decode the file, process it, then re-encode it. For us, a DirectX effect

See PLUG-INS, page 60 ▶

### USER REPORT

## Orban Links Up Clear Channel Facilities

by Jim Cook  
Director of Creative Services  
Clear Channel Communications

**ATLANTA** When I came to work at Clear Channel Communications' Atlanta production facility in 1995, studios and equipment were limited.

were interfering with productivity.

We installed an Orban DSE 7000 digital audio workstation, predecessor to the Audicy, in one of the rooms to remedy the problem. We soon had a "deli line" running out the studio door of people wanting to get on that workstation.



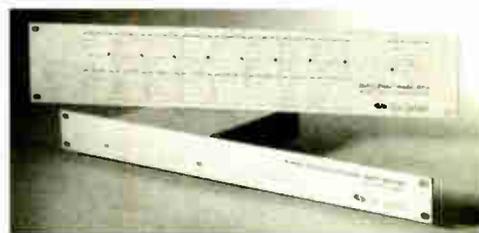
Jim Cook works with the Orban Audicy at Clear Channel studios.

What was immediately noticeable was that only a few production-savvy staff members were using the available digital editor. The learning curve for using the editor and computer-phobia

The effect was not lost on either the engineering staff or management. Everyone was asking, "Why don't we have more of these?"

See ORBAN, page 59 ▶

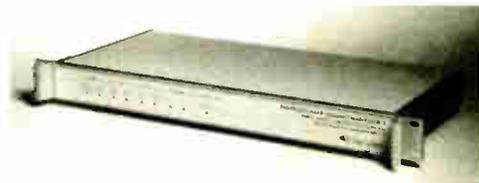
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## USER REPORT

# Antex Boosts System Into Orbit

by Kurt Brecheisen  
 Technical Support Representative  
 CBSI, Digital Universe Division

REEDSPORT, Ore. CBSI's step-ahead automation system, Digital Universe, was designed to work with a

cards we routinely recommend or configure into our systems.

Our wish list was a long one. A stable Windows NT driver and full compatibility with Windows Multimedia were essential to our success.

Size mattered in terms of giving our

customers as much flexibility as possible in putting together a system tailored to their needs.

We tested many cards, with mixed results. We found a good match to our wish list, as well as a strong and cooperative partnership, with Antex Electronics and its range of audio cards, specifically the LX-44.

We started out specifying the Antex SC2000 and have since begun to phase in the LX-44, where appropriate, for the installation.

One factor that has been helpful, especially working with these multiple cards, has been that all the Antex cards

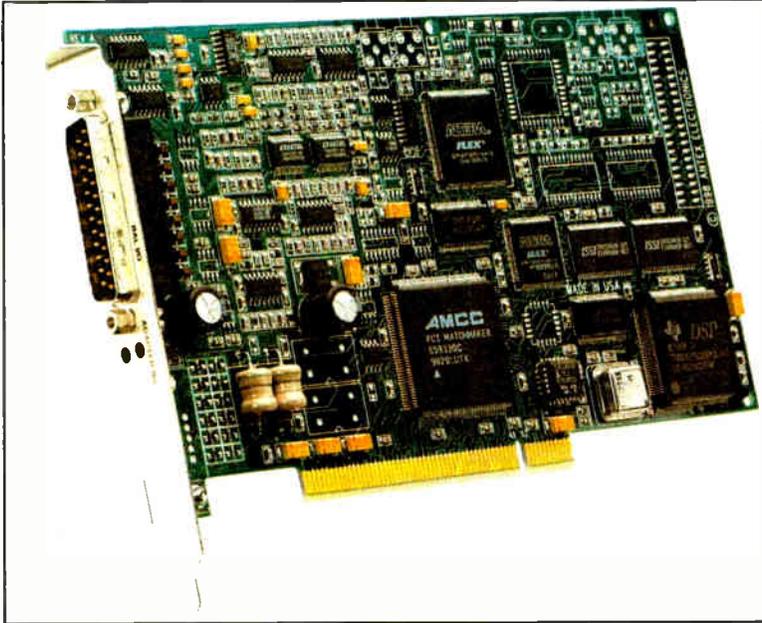
use a universal driver setup disk — simply identify which card you have installed, and you're there.

The small footprint of the LX-44 also is a big plus for us.

Space is at a premium just about everywhere within a station, especially in on-air and production areas. Because this compact card requires only a PCI slot, we don't have to restrict our customers to industrial-strength, rackmount PCs capable of accommodating ISA cards, as some manufacturers do. We can opt for the more standard, and probably more operator-friendly, PC.

We have found the external hookups of the LX-44 are just as flexible. There is a straightforward connection for an octopus cable on the rear panel or, for more complex installations, Antex can provide

See ANTEX, page 60 ▶



Antex LX-44

range of audio cards and did not require specialized hardware.

However, that does not mean we are not picky when it comes to the audio

customers more choices about PC hardware. Simple connectivity and setup were important. And we were looking for a family of cards, so that we could offer

## USER REPORT

## Going Digital With The Arrakis DL-4

by Robert Mills  
 President  
 Ohio & Illinois Centers for  
 Broadcasting

CLEVELAND If you've agonized over the prospect of digitizing your studio, I can sympathize.

The decision to invest in a digital stu-

dio system was easy, but after discovering the myriad products available, choosing one was difficult.

As the operator of three broadcasting training centers, I had to have a product that best represented what our future broadcasters would face in the real world. The Arrakis DL-4 computerized automation system has met that demand without breaking the budget.

When asked to offer my opinions on the DL-4, I enlisted the aid of some staff members who have worked closely with the system.

Elmir Husetic, our engineer at our Chicago facility, enthusiastically welcomed the system to our studio.

"I'm not one who typically relies on first impressions, but the DL-4 proved to be something very different. The first thing that really amazed me was the

ease of installation and simplicity in design. In the matter of an hour, I was able to hear the first tunes emanating from the system," said Husetic.

"The second thing that I got hooked on was the versatility. It offers applications ranging from cart replacement to studio and satellite automation, and provides for very easy upgrade procedures

and interconnectivity options," he said.

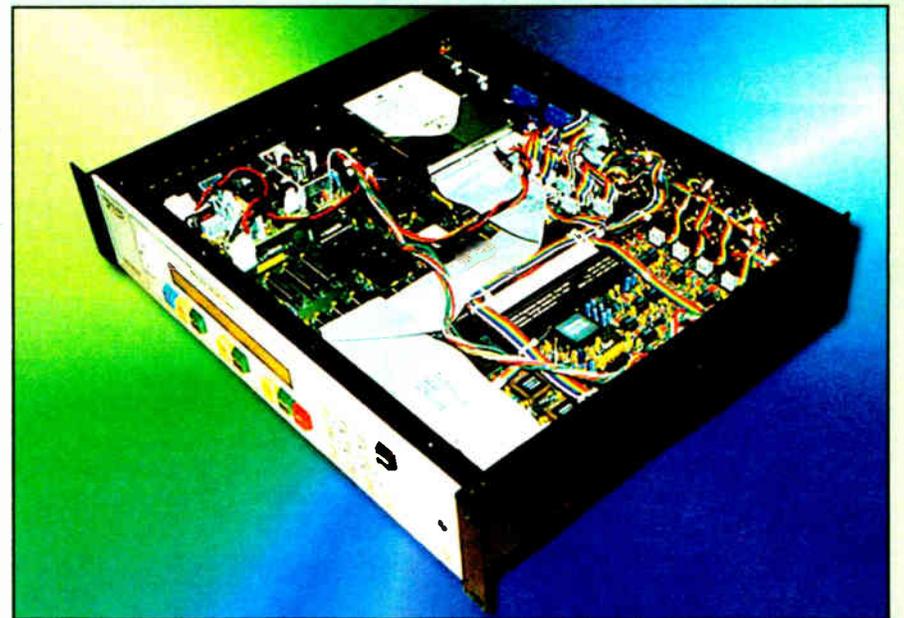
"You can easily operate the device from the control panel installed on the main unit, by using a remote panel that can be installed up to 200 feet away, or by utilizing a PC software system that incorporates a touch screen. What more can I say?"

When choosing a digital system, we had to keep in mind that hundreds of students would be trained on the equipment. We needed a product that adapted easily to an educational environment.

Broadcaster Terry Spialek, an instructor at our Cincinnati center, proclaimed the DL-4 as money well spent.

"The Arrakis DL-4 is perfect for an educational setting. Its ease of use is unmatched by any other system I've encountered.

See ARRAKIS, page 59 ▶



Arrakis DL-4

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# Urban Audicy Networks Stations

► **ORBAN**, continued from page 57

When we moved into new buildings the following year, we outfitted three of our rooms with Audicys. The learning curve on the Audicy is so shallow that we soon had everyone from the young board operator to the morning show producer doing full, multitrack production.

Since, we've continued to add Audicys as we have added studios. We now have nine.

## Fit, form, function

In Atlanta, we're responsible for doing every sort of production, including promos, donuts, imaging and programming for Clear Channel radio stations in our region and also for national distribution.

Unsurprisingly for the No. 1 radio owner in the United States (830 stations and counting), our duties cover every sort of format, from news to oldies.

► **ARRAKIS**, continued from page 58

"I especially love the on-screen prompt bar. Using that, and maybe a third of the instruction guide, I was quickly manipulating the system as if I was operating my home PC. The auto-start/stop recording mode is a particular blessing. And having the DL-4 do my head/tail editing on dubs into the system frees me to grab that extra cup of coffee," said Spialek.

"This is the perfect system for the first-time computerized automation user."

He said even the most tech-intimidated person at a station will appreciate its ease of use.

## Endurance of time

The Arrakis DL-4s have been in place in our schools for more than a year. They have proved to be reliable, hardworking partners in our educational and broadcasting endeavors. Our director of education in Cleveland, Bruce Ryan, said it's almost impossible to imagine life without the DL-4.

"It's my obligation to make sure our students are prepared for the real world of broadcasting. We have recently incorporated the DL-4 into the operation of our student-run Internet radio station," said Ryan.

"As a cart-replacement and program-automation tool, this unit is in use 24 hours a day. Once our students have been trained on the DL-4, they have no problems adapting to the operation of other systems used in the broadcast industry."

The diversity, flexibility, and ease of operation of the Arrakis DL-4 makes it a studio favorite among our staff and students. Digital MPEG compression and hard-drive applications have become today's market standards. The DL-4 is destined to become a standard tool in the radio broadcasting industry.

The Ohio & Illinois Centers for Broadcasting has locations in Cleveland, Cincinnati and Chicago. Information on the centers can be found at [www.beonair.com](http://www.beonair.com)

For more information contact Arrakis Systems Inc. in Colorado at (970) 224-2248, fax (970) 493-1076 or visit the Web site [www.arrakis-systems.com](http://www.arrakis-systems.com)

Besides ease of use, there are two features that we have come to value highly — networking and reliability.

Audicy networking allows us to start a production in one room, stop if necessary (for instance, when someone else needs to use the room) and call up the production in another room to continue working. Or a producer working in one room can leave a production for a second producer to finish in separate room.

In a production environment as demanding and deadline-driven as Clear Channel's Atlanta facility, the flexibility Audicy allows us in mixing and matching rooms is valuable. Audicy networking also gives users instant access to sound libraries

on the central server from any workstation.

In our case, the Audicys are networked to a Novell system central file server. But Audicy also supports Windows, NT or TCP/IP (Internet Protocol) networking.

We're working on networking Audicys between facilities (there are nine Audicys in Clear Channel's Denver facility), so that we can export full productions across a wide-area network.

Regarding reliability, I can honestly say that Audicy is the most stable editing technology I've ever used. I have been working with it, in one fashion or another, since 1992 and I have never had a crash.

People shake their heads and ask if I'm kidding when I tell them that, but it's

true. I've never had a DSE or Audicy lose a session. I've worked with a lot of other systems, where lockups and crashes take all kinds of material with them.

Our engineers love the Audicy. They set it up, they walk away and they're done. You never see an Audicy on an engineer's workbench.

Networked digital audio workstations clearly offer radio producers tremendous power and flexibility. However, those qualities mean little if radio production people who don't happen to be "cyber-geeks" are discouraged from using the system, or if the system doesn't perform reliably and consistently.

Audicy has fit the bill at Clear Channel in Atlanta.

For more information contact Orban at (510) 351-3500, fax (510) 351-0500 or visit the Web site at [www.orban.com](http://www.orban.com)

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# Plug In to the Future of Software

► PLUG-INS, continued from page 57 application is not real time, but must be an off-line rendering procedure."

In spite of this extra step, Xtrack



Orban Audicy Digital Audio Workstation

remains a popular companion program to automation and storage products marketed by Scott Studios, Broadcast Electronics, Enco and RCS.

A new version of Xtrack will soon be available for about \$500. And because it remains DirectX-compatible, there is almost no limit to what new

effects can be plugged in.

Free audio utilities abound on the Internet. Among the most popular are MP3 encoders and players, and CD rippers.

The encoders are popular in group-station operations and with free-lance radio "liner guys" who use MP3 files to deliver tomorrow morning's promo via the Internet. Among the encoders praised most highly in MP3-related newsgroups is the Fraunhofer algorithm, also licensed in Cutting Edge's AudioActive product line and available as a plug-in for Cool Edit Pro.

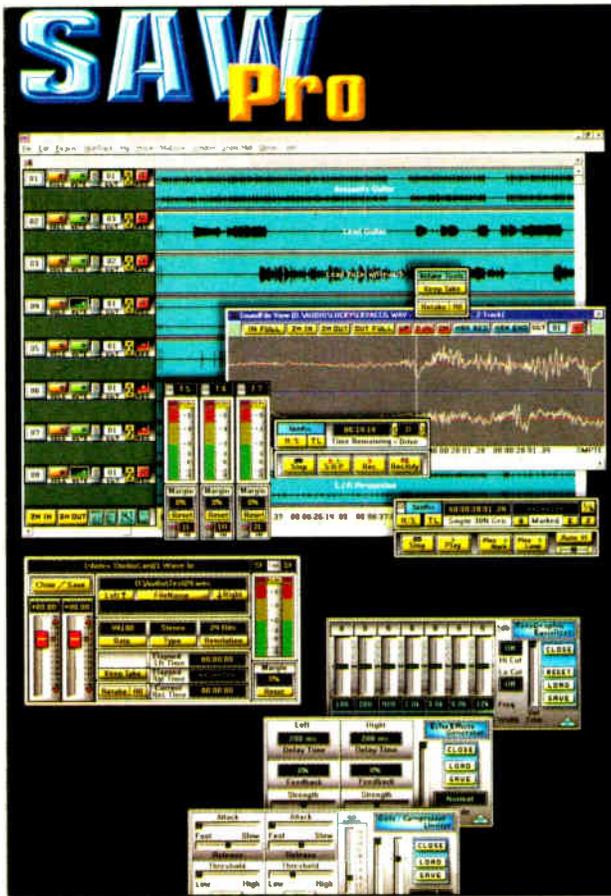
## You get what you pay for

Encoders based on other algorithms can be found on the Internet for free. Unfortunately, many are worth little more than that.

Among the more visible MP3 players available for free download is the WinAmp player. It plays back WAV, MP3, MIDI, MOD and a few files many production folks have never heard of. Its popularity is bolstered by the amount of "skins" created for it by fans.

A skin is a layer of artwork that changes the player's appearance from its utilitarian Windows look to whatever is desired, such as wood grains, supermodels or cartoon heroes. Skins affect only the player's appearance and not its operation.

Beyond free MP3 players, it is actually possible to outfit a versatile production computer right off the Net for next to



IQS SAWPro

nothing. At the time of this writing, it was possible to download "Pack 3" for free from Maxim Digital Audio of the United Kingdom ([www.abel.co.uk/~maxim](http://www.abel.co.uk/~maxim)).

This is a collection of Mac and PC plug-ins that emulate an amp and speaker combination, a drum box, a compressor/limiter and a lo-fi sample converter for novelty degraded digital effects. Three other effect packs were available at press time that also cost nothing.

There are free or inexpensive programs that turn a conventional PC into a sampler or a retro-'70s synthesizer. Some recreate analog warmth and can assist in the mastering of an audio mix before burning a CD.

Syntrillium Software and IQS are getting on the low-bucks express as well. The two-track Cool Edit 2000 can be bundled with a plug-in that converts it into a four-stereo-track production machine with DirectX compatibility, all for \$98. IQS recently introduced SAWLite for users requiring no more than eight tracks.

## Free ripping

Lest you forget about CDs, think about rippers. With free CD-ripping software, it no longer matters if there is a CD player in the production room. Place the disc in the CD-ROM drive of the computer and start ripping. The soundcard is bypassed and the disc data is written directly to the hard drive as a WAV or MP3 file.

In fact, a combination of software and hardware has the potential of emptying a studio out very quickly.

Miles Smith, a maintenance engineer for WGBH-FM radio in Boston, said, "I have a friend using ProTools and he just jacks right into the interface. He bypasses the console entirely."

Such a situation is possible with a legacy product such as the Orban Audicy,

where all mix decisions can be done inside without the benefit of an external console. But in the case of the Audicy, it is best to leave the plug-ins and modifications to the pros.

Jeff Stedman, Audicy product manager, reminded us that the Audicy is indeed a computer, but does not behave like one.

"It's a DAW, not a garden-variety computer," he said. "We had a guy send us his unit, which he tried to modify. 'Sure, it's just a computer,' he thought, 'so how hard could this be?'"

Orban technicians ended up having to return the DAW to original condition, then make his changes.

"It is not the 'home computer model,'" he said. "If you want to go in and make changes, go ahead. Just don't call us when it goes bad."

Orban has resisted the urge to add DirectX compatibility to the Audicy, at least for the time being. Stedman said there is enough brainpower behind the scenes at Orban to keep high-quality effects for radio coming along.

"Our team leader designed the Lexicon PCM-90 processor," he said. "It's easier for us to roll our own. DirectX is

not so straightforward and is not an issue at the current moment."

## Antex: A Sound Card For the Universe

► ANTEX, continued from page 58 a separate, rackmount breakout box for all the XLR connections. Either way, the results are tidy and efficient.

Another motivating factor was the elusive balance between cost and quality we were looking for in an audio card.

The SC2000 had performed admirably for us. However, many of our clients did not necessarily need an elaborately equipped audio card with SMPTE time code and so forth. The Digital Universe's uncompressed audio foundation was all they needed.

For those clients, the LX-44 was a wonderful find. It gives us lots of bang for the buck. A further bonus, one that benefits us directly and our customers indirectly, is that we don't have to concern ourselves with compression algorithms that are immaterial to our system. Digital Universe doesn't need them, and with this card, we don't have to pass the extra costs onward to our clients.

With some manufacturers, what you save in cost you lose in poor customer service. That is far from the case with Antex. John Lechuga in our purchasing department reported that the Antex staff has been courteous and attentive to our needs, regardless of whether the concern was a price negotiation, a return, a shipping question or an international issue.

"They're always willing to assist us when troubleshooting a sound card and, should one fail, cordial and expedient in sending out an overnight replacement," said Lechuga.

"Antex is one of the few companies in

existence today that is seamless to our customers. They complement CBSI by offering quality sound card products, supporting us in all aspects of our needs and being downright friendly. You can detect a smile when holding a conversation with them."

## Final answer

It comes down to one issue — how does the result sound to the end users, our clients' listeners?

The feedback has been unilaterally positive on this front. Many individuals to whom we have demonstrated the unit commented that Digital Universe is the best-sounding system they've heard.

An engineer at one of our Rocky Mountain stations reported back to us that their listeners were actually calling in to say, "You sound so much better! Did you get some new equipment or something?"

Of course, we like to think that Digital Universe's uncompressed audio makes the difference but, like a good idea that hits a roadblock, the best-sounding audio can fall apart at the output stage unless the audio card carrying it is rock-solid.

So here is credit where credit is due. Our own product may be in orbit, but it probably wouldn't be nearly as smooth a ride were it not powered, underneath it all, by Antex audio cards.

For more information contact Antex Electronics in California at (310) 532-3092, fax (310) 532-8509 or visit the Web site at [www.antex.com](http://www.antex.com)

## TECHNOLOGY UPDATE

### mediatron

The ProTracks multitrack digital audio system from mediatron is a digital recording and editing system designed for use in jingle, report, trailer, commercial creation and music production.

The system offers two to eight physical tracks and as many virtual tracks as needed. Audio tracks can be displayed in the shape of blocks or as waves, and virtual fader settings can be saved and recalled.

ProTracks features a fast catalog function, which permits users the management of sound effects and productions. The catalog tool also supports MOD or CD-ROM access. The system's ability to network allows users to share information between workstations.

Other features of ProTracks include time-stretch and expand functions, pitch and noise reduction. The current version of ProTracks features a DirectX plug-in interface. With DirectX the user can load audio effects such as hall, delay, chorus, equalization, as well as plug-in modules from different manufacturers.

The MCR8 control panel is available as an operational interface for ProTracks. The system runs on the Windows NT 4.0 platform.

For more information contact mediatron in Illinois at (800) 779-7575, fax (847) 487-2440 or visit the Web site at [www.mediatron.com](http://www.mediatron.com)

**TECHNOLOGY UPDATES**

**Syntrillium**

Cool Edit 2000 is the update to Cool Edit 96, Syntrillium Software's audio recorder, editor and effects processor for Windows.

Although priced at \$69, Cool Edit 2000 offers much of the same power as Syntrillium's flagship product, Cool Edit Pro.

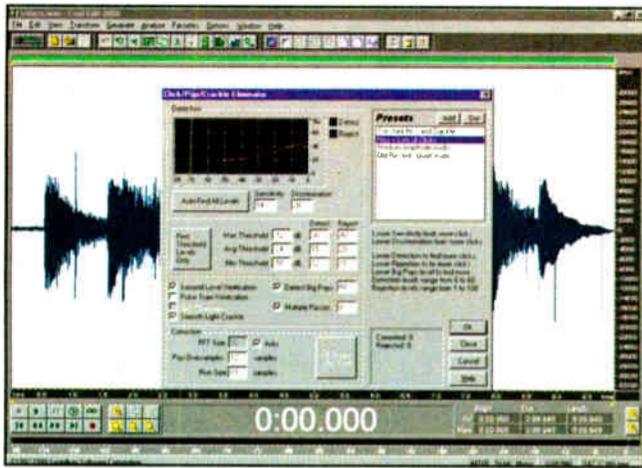
The program's features include more than 20 DSP effects and tools like reverb, noise reduction, flange, frequency filter, time and pitch stretch, and compression. The system supports more than 20 file formats including MP3 and RealMedia G2, batch processing, timed recording, automatic silence detection and deletion.

Cool Edit 2000 acts as the hub for a family of products.

The optional Studio Plug-In adds a four-track mixing studio for mixing

voice-overs, music or sound effects together.

Additionally, it offers features like punch-in recording with support for multiple takes, wave grouping and more. The optional Audio Cleanup Plug-In offers audio restoration tools



Cool Edit 2000 Click/Crackle/Pop Eliminator

like Click/Pop Elimination (for cleaning up old vinyl LPs), Hiss Reduction, and Clip Restoration.

Each plug-in is priced at \$49.

For more information contact Syntrillium Software in Arizona at (888) 941-7100, fax (602) 941-8170 or visit the Web site at www.syntrillium.com

**Smarts Broadcast Systems**

Smarts Broadcast Systems offers an MPEG production system that provides editing terminals that can be added to the Smartcaster Digital Audio System.



The editing stations run on standard PCs and use Soundblaster-type audio cards. Multiple WAV files can be edited via an on-screen editor. The final product is then converted to MPEG for permanent storage.

The unit can be used for commercial production as well as for digitally transferring music into the Smartcaster system.

Smarts will market this product in two forms — as a complete unit includ-

ing the hardware, and as a software-only product that can be installed in any compatible PC. The production system will be shown at NAB2000.

For more information contact Smarts Broadcast Systems at (800) 747-6278, fax (712) 852-5030 or visit the Web site at www.smartsbroadcast.com

**AudioScience**

The ASI4336 PCI broadcast audio adapter by AudioScience features multi-stream MPEG audio record/playback, GPIO and an RS422 serial input.

The GPIO consists of eight relay outputs and 16 opto-isolated inputs. These enable the control of station equipment and sensing of news feeds and other events. Through the use of the WaveX extensions to its Windows multimedia drivers, the GPIO may be accessed using standard Windows mixer calls.

The ASI4336 features an RS422 serial input, which supports the direct input of a satellite receiver MPEG bit-stream and can be recorded as a standard WAV or BWF file for later play-



back. The ASI4336 will be available in March with a list price of \$2,395. Drivers for Windows 98, Windows NT and Linux are available on the company Web site.

For more information contact AudioScience Inc. in Delaware at (302) 324-5333, fax (302) 738-9434 or visit the Web site at www.audioscience.com

**Digigram**

Xtrack digital audio multitrack editing software is designed for use in broadcast editing, video post-production, dubbing, CD authoring and other applications. It can be used with one or more Digigram or third-party sound cards.

When used in conjunction with a Digigram Pocket PC Card (PCM-CIA), Xtrack transforms a PC laptop into a mobile audio workstation. When Digigram's RCX portable digital audio recorder is connected to a PC via its USB port, Xtrack can be used for editing field recordings.

Xtrack features an unlimited number of virtual audio tracks that are dynamically assigned to inputs and outputs, with unassigned tracks serving as work tracks. Nondestructive editing and processing functions include cut, copy, insert, replace, drag and drop, fill with pattern, adjust to marker, time-stretching, pitch-shifting and track merging.

Video and audio auto-location functions allow rapid marking and recall of edit points. A key feature is the ability to create a single sound file in PCM or MPEG format from a multitrack mix, including edits, level automation and track levels. Xtrack supports DirectX effects plug-ins and Digigram provides equalization and noise reduction plug-ins with the basic Xtrack package.

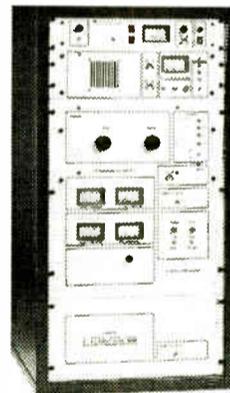
For more information contact Digigram in Virginia at (703) 875-9100, fax (703) 875-9161 or visit the Web site at www.digigram.com



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Email: sbp@pulse.net web site: www.sbpjj.com

## TECHNOLOGY UPDATES

## Waves

Waves' L2 Ultramaximizer is a 19-inch, two RU, hardware audio limiter/converter.

Waves developed the composite limiting technology that is licensed by Harris Corp. in its Digit exciter. The L2 is the third-generation design of this limiting technology.

At the heart of the L2 is the proprietary brick wall, look-ahead, peak limiter algorithm and the IDR (Increased Digital Resolution) dithering technology, which features 48-bit internal reso-

lution and support for 96 kHz sampling rates.

The L2 Ultramaximizer performs dithering to 24-, 22-, 20-, 18- and 16-bit outputs. Additionally, the Waves ARC (Auto Release Control) technology determines optimal release time for maximum levels and minimum distortion every sample.

The L2 Ultramaximizer has a list price of \$1,995.

For more information contact Waves in Tennessee at (865) 689-5395, fax (865) 688-4260 or visit the Web site at [www.waves.com](http://www.waves.com)

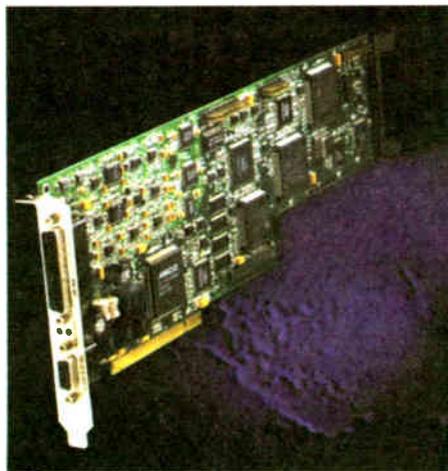


## Antex Electronics

The Broadcaster BX-12e Adapter by Antex Electronics is a new digital audio solution with features designed for broadcast automation.

The BX-12e builds on Antex's Broadcaster series of digital audio adapters, which include the Broadcaster BX-12 and the BX-8, a companion model to the BX-12 featuring multitrack analog and digital outputs with MPEG Layer I/II decoding.

The BX-12e's key feature is its ability to play back MPEG files with up to four



independent and adjustable sample rates. By adjusting each sample rate, the user can achieve dynamic time-scale modification under software control.

Users can fine-tune an audio track for replay under a preprogrammed time frame. DSP software-based sample rate conversion allows files to be converted to a common AES word clock for interface to digital consoles.

Features include 20-bit A/D and D/A converters, four stereo analog channels for playback and MPEG Layer I/II compression. Available as an option, analog outputs can be upgraded in the field to AES/EBU digital.

The BX-12e is designed for digital broadcasting systems engaged in radio automation applications, providing support for on-air playback and assist, satellite distribution and storecasting.

The BX-12e list price is \$2,395. It ships complete with software drivers for Windows 95/98/NT. An advanced software developer's kit is available at no charge from the Antex Web site. Professional-grade XLR connectors are available optionally as a 12-inch cable set.

For more information contact Antex Electronics Corp. in California at (800) 338-4231, fax (310) 532-8509 or visit the Web site [www.antex.com](http://www.antex.com)

## MediaTouch

MediaDisk32 Pro, a new audio program from MediaTouch, provides users with the ability to record, play and edit multiple tracks within their Windows 95/98 or NT environment utilizing any Windows-compatible soundcard.

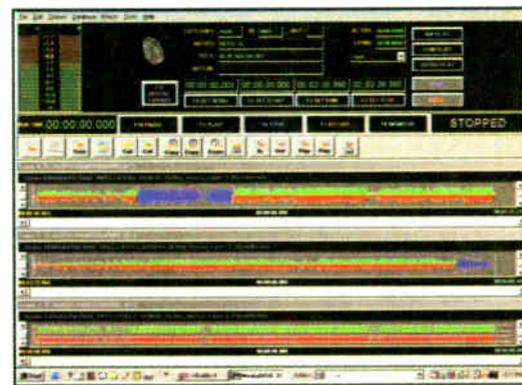
The system supports multiple file formats such as PCM, WAV, MPEG-1 and MPEG-2, for recording audio.

MediaTouch's CD-ripping technology is included, allowing the user to rip music from CDs up to 12 times faster than real time or transfer existing PCM, MPEG or WAV files from their hard drive.

The MediaDisk32 waveform editing features include cut and paste, trimming, normalizing, pitch, word flip, sample rate conversion and sessions with multiple windows. MediaDisk32 Pro allows conversion between formats and supports playback of MP3 and WMA formatted files.

Another feature of MediaDisk32 Pro is its ability to organize the digital library. The full maintenance feature helps the user create, edit, transfer, audition and delete cuts and categories within the libraries and offers a drag-and-drop option. Furthermore, playlists can be created for playback, making MediaDisk32 Pro a virtual jukebox within the user's PC.

For more information contact MediaTouch in Florida at (888) 665-0501, fax (204) 783-5805 or visit the Web site at [www.omt.com](http://www.omt.com)



MediaDisk32 Editing Window

## Yamaha AW4416

The AW4416 Professional Audio Workstation from Yamaha Corp. records up to 16 tracks of 24-bit digital audio and includes motorized faders with automation/snapshot capability, phrase sampling and DSP features.

capabilities, retains true 24-bit, 48 kHz resolution without compression of any type. Two 32-bit on-board effects may be routed to any bus or input channel directly or rerouted during recording to create layered effects.

Two rear-mounted card slots allow any or all of the 16 tracks, inputs and



The AW4416 offers storage options including an internal hard drive and CD recorder, as well as an SCSI interface for data backup to an external drive.

As a digital mixer, the AW4416 contains 32-bit DSP capabilities, 44 automated audio inputs (16 of which are from the internal hard drive), 17 motorized faders, four fader and mute groups, eight bus and eight aux sends plus stereo and stereo cue busses.

The rear panel contains eight 24-bit mic/line inputs, two of which are XLR with +48V phantom power and inserts, plus a high-impedance input that will accept a guitar or other instrument, directly.

The 16-track recording system, with sampling, editing and mastering

assigned busses to be output in digital form for further processing or for transfer to external digital devices. These slots will support future products from Yamaha and third-party developers. A FLASH ROM operating system enables software upgrades to be loaded from CD or the Internet.

The AW4416 offers an optional CD-RW drive, which enables mastering as well as loading and/or backing up data.

The AW4416 has a suggested list price of \$3,399 without the CD-RW drive, \$3,799 with the CD-RW.

For more information contact Yamaha Corp. of America in California at (714) 522-9011, fax (714) 522-9522 or visit the Web site at [www.yamaha.com](http://www.yamaha.com)

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TECHNOLOGY UPDATES

SADiE

Studio Audio & Video Ltd. (SADiE) will debut its new digital audio workstation, Artemis, at NAB2000. The system is capable of 192 kHz editing and mixing and surround-sound panning, and can be configured to provide up to 24 inputs and outputs.

The Artemis is designed for applications requiring large amounts of digital signal processing. The systems are supplied as configured, rack-mounting turnkey systems in a range of I/O configurations, from eight to 24 I/Os.



The entry-level system is equipped with eight I/Os and can replay 24 tracks of edited 16-bit audio. A 20-bit analog conversion is built into the system and external converters are provided through AES/EBU digital I/O on every channel.

Each system includes time-code support and four channels of RS422 interface. The supplied Breakout Box 800 includes eight channels of XLR digital I/O, XLR digital reference input, RS422 nine-pin I/O, XLR time code I/O and eight channels of unbalanced analog I/O. The optional Breakout Box 800B adds balanced XLR analog inputs and outputs at standard operating levels.

All Artemis systems include on-board SCSI interfaces for direct communication with audio disk storage, CDR, DLT, DDS or Exabyte drives.

For more information contact SADiE in Tennessee at (615) 327-1140, fax (615) 327-1699 or visit the Web site at www.sadieus.com

Dalet

The Dalet Digital Automation System, Dalet5.1, includes several enhancements to its built-in multitrack editor Surfer.

Surfer's multiformat mixing and editing support multiple sampling rates of both linear and MPEG audio. Each track in Surfer can be recorded in a different format, but all can be played and mixed into a single file.

With the preset zooms, frequently used time scales can be stored in advance to provide users with consistent and easily recallable views when editing. Volume curves appear right in the Surfer window, allowing editors to adjust the volume of any segment in any track.

While Surfer is recording live audio, editing can begin immediately. This capability is designed for environments such as newsrooms, where multiple sources of audio must be captured, edited and quickly broadcast.

For more information contact Dalet Digital Media in New York at (800) 257-1223, fax (212) 825-3322 or visit the Web site at www.dalet.com

SAWPro Update

SAWPro from Innovative Quality Software now has 24-bit/96 kHz record and playback capabilities, multiple dither options, tempo mapping, new high-resolution 3D graphics, multitrack soft clipping, pop-up shortcut menus, up to 99 levels of undo and support of DirectX and VST plug-ins.

SAWPro, hosted by a high-end Pentium II computer with a multi-channel optical sound card, can deliver up to 24 channels of I/O with 24-bit resolution.

SAWPro features nonlinear, non-destructive editing and direct hard disk multitrack recording, along with 32 real-time mono/stereo tracks and support of 12 stereo devices equaling 24 physical I/Os. All DSP FX processing for the system is maintained at the 24-bit depth level with automated virtual mixing and SMPTE sync and generate capabilities with sub-frame accuracy.

SAWPro's minimum system requirements are Windows NT/98/95, Pentium II-266 or higher, 128 MB RAM, X VGA video 1024x768, 16-bit or higher Windows compatible sound card(s) and EIDE or ultra-wide SCSI hard drives.

For more information contact Innovative Quality Software in Nevada at (800) 844-1554, fax (702) 435-9106 or visit the Web site at www.iqsoft.com



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## USER REPORT

# Antenna Concepts Tames Terrain

*KOIT-AM-FM Eliminates Coverage Shadows From Antenna at Sutro Tower With Ultra Tracker*

by **Randy Pugsley**  
**Technical Director**  
**KOIT-AM-FM, CBS/Infinity**

*This story originally appeared in the Dec. 22 issue but a portion of the article was omitted. It is printed here in full.*

**PORTLAND, Ore.** One of the biggest technical challenges faced by FM broadcasters is that of delivering a high-quality signal in the hills and canyons of the San Francisco Bay Area. During my 20 years as a broadcast engineer in San Francisco, this was also a serious personal challenge for me.

As chief engineer of KOIT-AM-FM, part of my problem was that the transmitting antenna is located on the famous Sutro Tower. This impressive landmark stands 978 feet tall and 150 feet wide at the base, and spans 100 feet between the spires of its candelabra. Its location atop Mount Sutro makes it visible from much of the Bay Area.

Because of its size, antenna patterns

of FM stations have suffered from "holes" where the coverage is shadowed by the tower and from multipath in other areas due to reflections from this massive steel structure.

KOIT-AM-FM was one of the original occupants when the Sutro Tower was built more than 25 years ago. Over that period, KOIT-AM-FM has installed four different FM antennas in the attempt to eliminate shadows and multipath so as to provide quality service to the San Francisco Bay Area.

The first antenna installed for KOIT-AM-FM was a panel-type (wrapped around one of the tower's huge legs), directionalized and distorted, but not by design.

The second was a three-bay, full-wave spaced "rototiller" at the fifth level of the six-level tower.

The station still received many complaints of RF interference (RFI) to television reception from homes located on Mount Sutro. I decided it was time to reexamine our antenna scheme.

In the early '90s we replaced that antenna with a six-bay half-wave spaced rototiller on a lambda tower section (the best technology available at that time). While this improved RFI and interference, we still had serious multipath and inconsistent coverage in many areas.

Antenna manufacturers and consultants told me that little or nothing could be done to improve the KOIT signal short of a new antenna site. This was unacceptable, as we would lose our grandfathered power and height at the Sutro Tower site.

## Band aid

Our "big break" came in early 1997, when I discussed the problem with Lee Granlund, director of engineering for Z Spanish Media Corp. and a design engineer I have known for almost 25 years.

Lee told me that he had been working with Antenna Concepts to resolve similar problems for some of the Z Spanish Media stations and he showed me some impressive results.

Lee's work with Antenna Concepts had contributed greatly to the new design that does away with unwanted side lobes, wasted downward energy and deep nulls.

About the same time I learned that KOIT-AM-FM would have to give up its location on the fifth level of Sutro. However, I also learned that Sutro Tower Inc. would cover the cost of moving the KOIT-AM-FM antenna or of installing a new antenna on the northeast spire just below the channel 32 antenna.

I immediately arranged a meeting with Lee Granlund, Talmage Ball, vice president of engineering for Bonneville Broadcast, and the station manager. Lee was given the opportunity to design what he terms his "biggest accomplishment."

The new Antenna Concepts Ultra Tracker was installed on Christmas Eve 1997.

The results were beyond our expectations. Almost all of the multipath problems we had endured for years simply disappeared. KOIT-FM has the cleanest signal in San Francisco and we got calls from listeners in Santa Rosa, Sacramento and Monterey, Calif.

The 24 kW signal is outperforming some San Francisco stations with 100 kW and more. The antenna also exhibits superior bandwidth, which we measured with a network analyzer.

"The proof is in the pudding," as the saying goes.

Equally impressive, and perhaps more important to the KOIT-AM-FM staff and management, Arbitron ratings for the San Francisco market area show that KOIT (AM and FM) climbed to No. 1 (target audience, persons 25-54) the first book in 1998, and remained there for every book that year.

Granlund offered some additional insights into the reasons the Ultra Tracker made such a dramatic improvement.

"With the exception of antennas specifically designed to produce a directional pattern, most TV and FM transmitting antennas produce a smooth, omnidirectional pattern in free space, or when mounted on a wooden pole," said Granlund.

"On a metal pole or tower, the pattern becomes distorted, typically in direct pro-



Sutro Tower

portion to the size of the structure upon which it is mounted. Traditional antenna technology has not provided an effective solution to these problems.

"Because of the hilly and complex terrain in the San Francisco Bay Area, field intensity data taken at ground level could be difficult to interpret, and perhaps misleading. For that reason, KOIT-FM arranged to have (the late) Stephen McNamara of Stephens Communications make the measurements, using sophisticated airborne equipment and techniques.

"With what results?" said Granlund. "Based on his measurements, Stephen McNamara commented, 'The new antenna for KOIT sure looks great. I'm very impressed how closely the (measured) patterns match the predictions.'

"The Ultra Tracker compares well to the ultimate off-road vehicle — the Hummer. It will take you and your (FM signal) to almost any destination on earth, even in adverse weather conditions. You already know that most FM signals don't travel well over rough terrain," said Granlund.

"However, with the Ultra Tracker, a clear FM signal can be carried in areas that were impossible to serve with older antenna technology. In older technology, up to half of the radiated power may head off in unwanted directions, not toward the listening audience.

"The Ultra Tracker puts more than 99 percent of the power in the main lobe, directly toward the listeners — and at the same time eliminating harmful downward radiation and reflections (multipath). I have used the Ultra Tracker to overcome challenges I've faced in antenna systems I have designed, and the CEO of our network calls it his 'secret weapon.'"

For more information, contact Antenna Concepts in California at (530) 621-2015, fax (530) 622-3274 or visit the Web site at [www.antennaconcepts.com](http://www.antennaconcepts.com)

## TECHNOLOGY UPDATE

### Yamaha A4000, A5000

Yamaha has expanded its digital sampling line with the launching of two professional samplers: the A4000 and A5000.

The A4000 features 64-note polyphony with 64 multimode resonant filters, 20-bit A/D converters, 24-bit D/A converters with 8x oversampling and a sampling rate of 44.1/48 kHz.

The unit contains three effects blocks per program with 96 effect types, four-band total EQ, and loop-based Break-Beats functions that include the popular Loop Remix, Loop Divide and Time Stretch. With the addition of an optional SIMM memory, the A4000 can have up to 128 MB of sampling RAM.



The A5000 contains the features of the A4000, but is further equipped with 126-note polyphony and six blocks of effects per program.

Another feature of both units is front-end CD-R software. When connected to a



CD recorder, these units are capable of writing their own native-format CD-ROMs for data backup. With A-Series internal DSP processing, the A4000 and A5000 are capable of writing audio CDs in real time.

Expandability options for both units include an AIEB-1 output expansion board, E-IDE or SCSI hard drives, removable Zip drives and 72-pin SIMMs for RAM memory expansion. Both share import/export compatibility with many other samplers on the market such as Akai, Emu Systems and Roland, and with standard computer formats such as WAV and AIFF.

The A4000 and A5000 are bundled with sound and wave-editing software (for both Mac and Windows), and a nine-CD-ROM native-format sound library set gathered from Yamaha's sound library. Both will be available as turbo versions with expanded outputs, RAM and internal hard drives in addition to the standard specifications.

The A4000 and A5000 come in a two-RU professional package with a distinctive faceplate, graphic 320x80 LCD display and five data entry/control knobs, which allow the user to adjust parameters and navigate around the interface.

The A4000 lists for \$1,595 and the A5000 lists for \$2,295.

For more information, contact Yamaha Corp. of America in California at (714) 522-9011, fax (714) 522-9522 or visit the Web site at [www.yamaha.com](http://www.yamaha.com)

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Crown DC 150 stereo, \$225; Crown stereo pwr line, one amp, \$275. J Price, 214-321-6576.

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Maze R-1 spring reverb recapped in 1999, XLR I/O at +4 level, gd cond, \$50; Carver CT27V preamp/tuner w/Pro Logic decoder, as new, in original box w/manual & remote, \$100. D Bailey, 214-343-0879.

Orban stereo synthesizer, #245F; Ramsa audio mixer WR130, Technics TT SL1299MK 2. J Gelo, 336-218-8052.

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AVS Micro FM A/V system FM stereo modulator, used 6 mos, \$700 +shpg; Orban 245F stereo synthesizer, gd cond, \$100 +shpg. A Berger, 781-239-5245.

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ITC Delta (3), new used, BO. Dave Torbert 248-435-3932.

ITC SP stereo, (5) PB's, three work, 2 for parts or repair, one has fast forward, \$300; ITC R/P stereo, works, \$200. S Eberhart, 972-392-0274.

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AmpeX AM10, 6x2, excel cond, \$295; Altec 1599A 6x2, \$295. J Price, 214-321-6576.

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Autogram 20 mixer stereo console. Continental Communications. 800-664-4497.

10ASoundcraft 600, 24x8, \$3900; JL Cooper 16 trk automation, \$1200. W Gunn, 760-320-0728.

### WANT TO BUY

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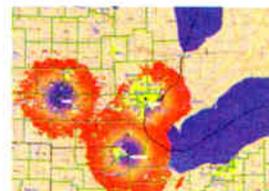
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CBS Volumax, \$400/ea; mint Urei 1176LNs, black, \$2300; 1176LN silver, \$1800; 1176 original blue/silver transformer I/O, \$2300. W Gunn, 760-320-0728.

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EV 666, \$175; EV 654, \$85; EV 636, \$65; Telex xmtr & mic WT-50, \$125; Telex xmtr & mic WT-200, \$125. J Price, 214-321-6576.

EV RE-50 mic w/windscreen & stand clip, \$75. E Ribner, 314-771-2155.

Lomo 19A19 tube mic, \$1200; Neumann U-87, \$1500; Neumann SM-2 stereo tube mic, \$2500; Neumann UM-57 tube mic, \$1800; Neumann KM-64 tube mic, \$1500. F Danner, 781-294-1218.

Shure M68 4 mic mixer, gd cond, \$95 +shpg. A Berger, 781-239-5245.

EV 635L mics, \$95; Altec salt shaker mics, \$295/ea. W Gunn, 760-320-0728.

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RCA 4AA-1 the box shaped mic, 6"x6" from the 1920's, will pay top dollar. L Drago, 203-272-6030 or 203-230-5255.

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RCA 77-DX, 44-BX, KU-3A's, WE-639's, On-Air & recording lights wanted. 615-352-3456, FAX: 615-352-1922.

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Collins ART 13 B29 WWII 100W aircraft autotune xmtr w/operations manual, \$450. E Reilly, 206-282-6914.

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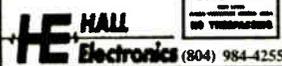
Gentner 5PH-3A telephone system, \$200. C Harper, 606-484-9393.

Henry Engineering Net Commander (2), BO. J Sidote, 304-436-2131.

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Antex audio cards, just removed from service, various models avail. R Tighe, 719-594-9000.

## WANT TO BUY

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Ampex 354-2, \$695; Ampex 351, BO; Ampex 440, \$750; Ampex 440C, \$995; Ampex 8 trk 1" heads, \$750; Ampex 16 trk 2" heads, \$350/ea; MCI JH 110, \$495; MCI JH 110, \$750; MCI stereo electr B-C, \$150; MCI pwr supplies, \$150; Rusland rodr console, \$200; Ampex servo motor & amp, \$300. J Price, 214-321-6576.

MCI JH 110 4 trk 1/2" tape in roll around stand, excel cond w/manual, \$500. JH Rees, 970-641-4000.

Otari MX 5050 r-r R/P, \$400. S Eberhart, 972-392-0274.

Revox B-77, 3.73 & 7.5 ips, needs switch or relay, \$200; 20 reels of Ampex 406 & Scotch 206, 10.5", in boxes; 22 empty 10.5" reels, some metal, \$75; carton of assorted r-r tapes, brown & blk, 1 & 1.5 mil, 5" & 7" reels in boxes, BO. E Ribner, 314-771-2155.

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ITC 99B; BE 3200 RPS stereo. J Phillips, 419-782-8591.

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Radio World's Broadcast Equipment Exchange provides a FREE listing service for radio stations and recording studios only. All other end users will be charged. This FREE service does not apply to Employment Help Wanted ads or Stations For Sale ads. These are published on a paid basis only. Send your listings to us by filling out the form below. Please be aware that it takes one month for listings to appear. The listings run for two consecutive issues and must be resubmitted in order to run again. Thank you.

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 Are you currently a subscriber to Radio World?  
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\*Closing for listings is every other Friday for the next month's issue. All listings are run for 2 issues unless pressed for space or otherwise notified by listee.

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30	Audioactive	www.audioactive.com
2	Auditronics	sales@wheatstone.com
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## ◆ READER'S FORUM ◆

## Processing suggestion

Dear RW,

Here's a revolutionary idea (at least I haven't heard it from anyone else): How about putting the audio processing in the receiver instead of the transmitter? I fear I'm a little late in suggesting that this be considered for IBOC and satellite-delivered radio, but better now than never. Surely good DSP chips could be made cost- and size-effective.

I have often wished that my home library tapes and CDs could get radio station-style processing to make them easier to hear in my noisy Suburban on the highway. Having the processing in the car stereo would permit that.

The digital bit stream in IBOC and satellite feeds could easily contain instructions to select the best processing for the format, even a custom sound. The listener, though, could opt to step outside the default processing and fall in love all over again with his or her station every time a new "sound" is selected.

Just think. Every once in a while you could even choose to listen to the program with *no* processing! Isn't this the age where the consumer should be granted the maximum number of choices possible?

David Sprout  
Chief Engineer  
WRQX(FM)/WJZW(FM)  
Washington, D.C.

## Correction

Dear RW,

In the Jan. 19 issue, the article "Arbitron Study Rates Web Radio" featured a chart on page 34. "Arbitron InfoStream Report — October 1999 Top 10 Cumulative Audience."

The station KNSX(FM) (No. 9) refers to an incorrect Web site address. The correct address for KNSX(FM) (93X) in St. Louis is [www.93x.fm](http://www.93x.fm) not [www.93x.com](http://www.93x.com)

George T. Bundy  
Chairman/CEO  
BRS Media Inc.  
San Francisco

Ed. note:

The same error also occurred in the March 1 issue. RW regrets the error.

## Commentary comments

Dear RW,

I would propose that Ron Burley's Jan. 5 Guest Commentary ("Overbuilding Into Oblivion") on his experience with Windows

NT Server and RAID 5 arose from a poor configuration of the equipment, rather than a poor choice of equipment.

While I agree that Windows NT Server was probably not the best choice, it is not because it can't be configured for the fastest local application performance. It can, from the system properties control panel, just like Windows NT workstation. I would not use NT Server because of the cost.

A Server version (which will become unavailable in the channels because of 2000's release) can add hundreds of dollars to the cost of the server for — and Ron correctly pointed out — little benefit. NT Server's advantage is in what it can do on a network as far as security and other services such as DHCP and routing.

As far as the RAID 5 configuration, I believe Ron was misinformed. The RAID 5 configuration does not compare for accuracy on the reads. If the particular card has that as an option, I'm sure it can be turned off.

Also, reading from multiple disks is actually faster because the disks are usually the bottlenecks in these systems, so with multiple disks, you read less off of each. While RAID 5 is slower in writing to the disks because it does need to calculate the parity bit, most of the higher-end controllers have cache memory to hold the information while the work is being done.

If Ron had slower reads from a RAID 5 system, it was improperly configured. Either that, or he had a "software RAID," where there are multiple disks, but one controller with the calculation done by the OS (a very poor choice).

To achieve real RAID 5 performance and redundancy, you need multiple controllers specifically made for a RAID configuration that can do most of the work without bothering the operating system.

You do have to do your homework — some of it before buying equipment, but some of it afterward to find out why it doesn't work.

Jim Burtoft  
Chief Engineer  
WBXQ(FM)/WBRX(FM)  
Altoona, Pa.

## Shafer inquiry

Dear RW,

With the start of the new century, I was wondering just how many Schafer 903 automation controllers are still in service out there.

The Schafer 903 was designed in the early 1970s as a solid-state radio broadcast automation controller. It was capable of controlling up to 19 audio sources,

NPR  
and  
LPFM

We find National Public Radio's reaction to the low-power FM vote to be more responsible than many others. Its response was measured, not knee-jerk or determined in advance of the facts.

NPR applauded the intent of the FCC, but expressed serious reservations about what the commission actually passed.

In testimony before a House subcommittee in February, NPR President and CEO Kevin Klose said the FCC did not adequately explain how interference from LPFMs to stations or translators will be handled. By dropping third-adjacent protections, NPR said, the FCC made interference more likely.

Klose also testified for the president of the International Association of Audio Information Services, David Noble. Klose said radio reading services, which rely on FM subcarriers, are susceptible to interference from LPFMs.

This is not news to readers of RW, who read a *Guest Commentary* by Noble on this very matter in our Sept. 15, 1999, issue. More than 100 services offer print access to an estimated 1.2 million blind and other disabled Americans on public radio, Noble stated.

(We're a bit cynical about the sudden interest in such services, given how hard they usually struggle for funding and attention. But that's another editorial.)

Public radio also worries about LPFM's effect on translator/booster facilities, which it typically uses to bring radio to underserved audiences in sparsely populated areas.

Although the FCC required LPFMs to protect existing translator/booster facilities, it did not require the protection of input signals.

Klose called the translator/booster protections inadequate. "While the FCC grandfathered existing translator/booster facilities, it required future translator and booster stations to protect previously authorized LPFMs. With a freeze on translator applications since 1997, this is likely to undermine the extension of public radio."

Finally, NPR called it "imprudent" for the FCC to act on LPFM without understanding its effects on the transition to digital audio broadcasting.

The FCC left itself open to criticism about rushing through the process before it had answered all pertinent questions. While RW has given qualified support for the low-power concept, we have also emphasized that any LPFM solution should not cause unacceptable technical problems for existing stations.

We encourage the FCC to provide quick, clear answers to these industry questions, to put these concerns to rest and ensure a smooth rollout of a productive LPFM service.

— RW

which then consisted of reel-to-reel tape decks for music, single-play and multi-play cart machines for spots and studio and satellite feeds.

I'd like to hear from folks who are still using the Schafer 903 full time, as a backup or have retired the system. I can be reached via phone at (972) 387-8688 or via e-mail at [ebullock@iamerica.net](mailto:ebullock@iamerica.net)

Earl R. Bullock  
President  
Broadcast Automation Inc.  
Dallas

## Days gone by

Dear RW,

My dad, Nibs Jochem, recently sent me a copy of Paul McLane's page 4 column from the Jan. 5 RW. In the column, Paul mentions having received a letter from Larry Cervon regarding suggestions for naming new buildings at the Ohio Harris complex. Larry said that he feels the new buildings might best be dedicated to Hans Bott and my father, Nibs Jochem.

I grew up during what I gather was a golden age of burgeoning technology in broadcasting, when the names of Parker Gates, Hans Bott, Larry Cervon and many others were mentioned over dinner.

My dad is now 81, doing well, still living in Quincy, Ill. It was great to see him honored, with the accompanying photo, which I think gave him quite a thrill.

John Jochem  
Clinical Psychologist  
Director, Behavioral Medicine,  
Provena Saint Therese Medical Center,  
Waukegan, Ill.

## Write to Us

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## Radio World

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## NEXT ISSUE OF RADIO WORLD MARCH 29, 2000

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