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The Newspaper for Radio Managers and Engineers

April 11, 2001

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Pubcasters Scrutinize Sat Radio

Some Are More Accepting Of Competition While Others Fear Future Impact on Fundraising

by Leslie Peters

As satellite radio edges closer to full-scale operation this summer, public radio station managers and fundraisers appear more calm about the potential competition. That's a change from nearly two years ago when public radio's major program producers signed deals to provide satellite radio programming, generating concerns that pubcasters were teaming up with a dangerous new competitor.

"When I can actually hear a satellite radio broadcast, and see how easy it is to operate the receiver, then I'll have a better idea if we have anything to worry about," said Scott Williams, program director at public stations KJZZ(FM) and KBAQ(FM) in Phoenix.

Public radio has its own competitive issues with satellite radio. Many broadcasters are concerned about just how

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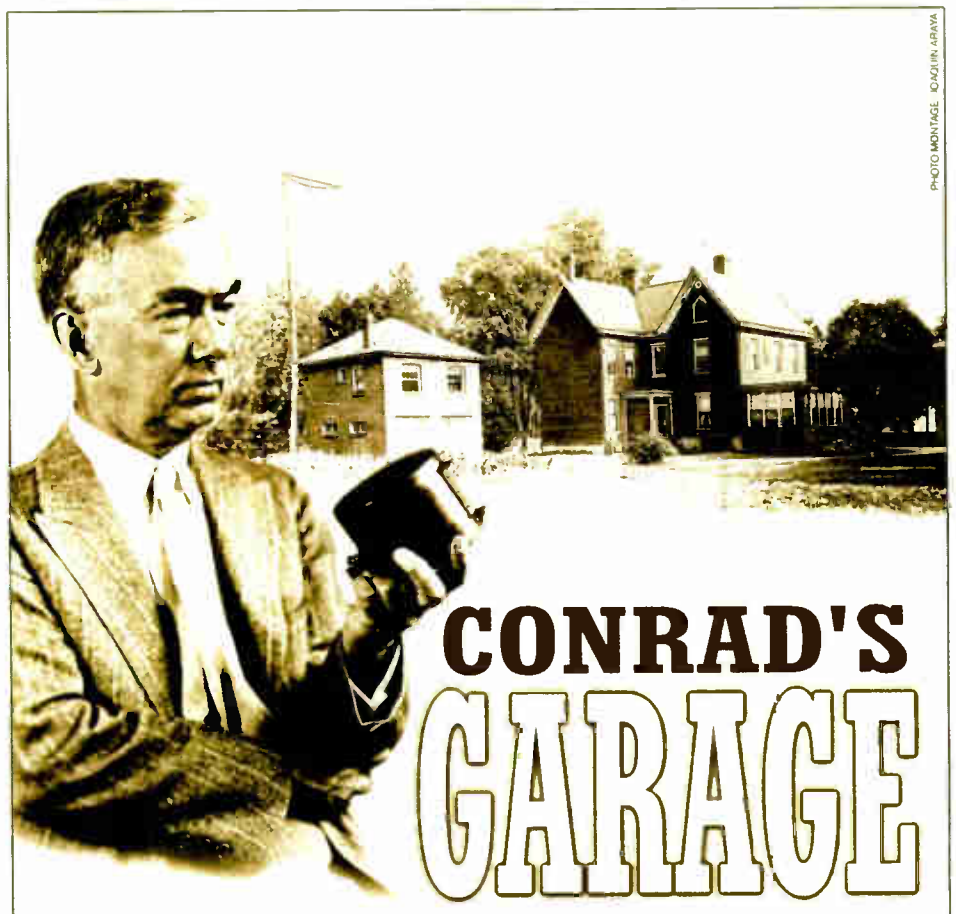

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Shown: Frank Conrad holds a microphone in a 1921 portrait; rear, the Conrad garage and home in 1920.

◆ NEWSWATCH ◆

XM Launches Rock

XM Satellite Radio hopes to launch its second satellite in May. Sea Launch sent up XM's first satellite March 18 after manufacturer Boeing scrubbed an earlier attempt in January.

A 200-foot Zenit-3SL rocket lifted the Boeing 702 geosynchronous satellite, called "Rock."

"We now have a satellite in the sky, XM-ready radios on retail shelves, our chipsets in production, and our state-of-the-art broadcast studio humming," stated XM President and Chief Executive Officer Hugh Panero.

XM is having a total of three satellites built; one of the three is a spare.

The company plans to launch its second satellite, called "Roll," in May from the Sea Launch platform in the waters of the Pacific Ocean on the equator.

XM and competitor Sirius Satellite Radio plan to begin offering consumers their subscription-only satellite-delivered digital audio radio services this summer.

Audio Sales 'Solid' in 2000

ARLINGTON, Va. Total audio revenues of manufacturer-to-dealer sales grew by 6 percent last year, reaching $8.6 billion, according to the Consumer Electronics Association. Portable audio, separate components, systems and aftermarket autosound all showed gains over 1999.

Portable audio rose 11 percent to nearly $2.7 billion for the year.

Portable CD products, comprising almost two-thirds of portable audio, the largest sector, increased 13 percent. During 2000, portable compressed audio file devices — MP3-type players — sold 587,000 units, totaling $107 million.

Aftermarket autosound gained 1 percent to $2.2 billion. In-dash CD players alone gained 12 percent, topping $1 billion in 2000.

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NEWS ANALYSIS

Michael Powell Gets Started

by Leslie Stimson

WASHINGTON FCC Chairman Michael Powell has taken a dramatic step that directly affects broadcasters in his efforts to establish himself as a chairman who believes in deregulation — that less government involvement in business is better than over-regulating it.

The FCC reduced the backlog of pending radio transactions in March. Of a total of 42 pending transactions, 32 were approved in one day, and Powell said the remaining deals would be processed in the coming weeks.

The actions represent one of Powell's first attempts to eliminate barriers to media mergers.

'Flagging' deals

Some of the transactions had been held up for more than two years. Under previous Chairman Bill Kennard, the Mass Media Bureau began flagging certain radio sales because of concern about increased ownership concentration in certain markets.

Clear Channel Communications Inc. and Cumulus Media were the main beneficiaries of the deck-clearing. Clear Channel was free to purchase 16 stations and Cumulus could acquire another 21.

Since beginning this process in 1998, Powell said, the commission has struggled with the disposition of the cases; trying to balance the goals of competition and diversity with the expectation of broadcasters that their applications would be reviewed in a timely way. All the deals that were approved in March complied with the radio ownership limits set by Congress in the 1996 Telecommunications Act.

"Avoidance and inaction is not a legitimate government policy," Powell said.

NAB President and Chief Executive Officer Eddie Fritts applauded the action, announced by Powell at NAB's State Leadership Conference, where the chairman and congressional leaders shared their broadcast regulatory agendas.

"We are pleased that Chairman Powell has moved to clear the backlog of most pending radio transfer applications."

Cumulus Chairman Lew Dickey was pleased and suggested that former commission officials overstepped their authority in holding up the deals, according to published accounts.

Powell's fellow commissioners had varying reactions to clearing the applications.

Photo by Leslie Stimson

FCC Chairman Michael Powell, Left, and NAB President/CEO Eddie Fritts

Party lines

In one of its first public debates on a radio issue since Powell was appointed chairman, the commission divided along party lines, with Republicans moving to unblock regulatory obstacles and Democrats arguing that deregulation had gone too far.

Republican Commissioner Harold Furchtgott-Roth was blunt about the flagging policy.

"There were no rules. ... There were only the arbitrary decisions of a bureau in an agency unanswerable to any law or any authority but its own," he said.

Democrat Commissioner Susan Ness defended the practice, although not the lengthy delays it caused. She said many of the newly cleared applications represent local market concentrations of more than 50 percent.

While the 1996 Telecom Act established a ceiling on the number of stations that can be owned in a market, she said, "It did not expressly require the commission automatically to approve a combination if the resultant ownership level were at or below the ceiling."

Ness said the FCC should move quickly to change how it defines radio markets for the purpose of determining station ownership. The current contour overlap method, she said, is flawed; it creates outcomes that defy normal market assumptions and, she said, the method is arbitrary because it allows some group owners to hold more licenses in a radio market than competitors.

Had the FCC applied an Arbitron market definition to the deals, using Radio Metro Survey Areas, Ness said 17 out of the 32 transactions would have violated the local ownership limits.

Fellow Democratic Commissioner Gloria Tristani concurred, saying the FCC should not just take any action, but do so in the public interest.

Powell said that, to the extent the rules for determining the size and number of stations that count towards the limits has led to higher concentration than Congress intended, the agency can fix that problem in its pending rule making on radio market definitions (see *Newswatch*, page 10).

Powell on DAB

What can the industry expect from Powell on other major issues, such digital audio broadcasting?

Powell, who has not said much about DAB, indicated he has "a healthy amount of optimism" about in-band, on-channel digital audio broadcasting.

"We get excited at the commission when new services are proposed that don't require new spectrum," he said.

How will Powell run the agency? Like at least two of his predecessors, Reed Hundt and Kennard, Powell has pledged to make the agency more efficient and act on paperwork more quickly. He has appointed Deputy Managing Director Mary Beth Richards to lead the agency's reform project. She will work with the chairman's office and the bureaus to ensure a smooth transition.

Where Does LPFM Fit in Now?

by Leslie Stimson

WASHINGTON It is hard to say how LPFM will fare under Michael Powell, a Republican who inherited the low-power radio program from his Democratic predecessor. The new FCC chairman has said he's unclear whether LPFMs would interfere with existing stations.

In the meantime, the Mass Media Bureau is processing applications and working with the Office of Engineering Technology on an interference test agenda.

Bureau Chief Roy Stewart said that of about 1,700 total applications received in the first three filing windows, about 600 to 700 will be returned to their senders because they don't comply with third-adjacent channel protection requirements, or they're incomplete or for other reasons.

One source said 40 to 50 applications would be returned because the senders had once operated unauthorized stations.

Licenses when?

Earlier, the FCC identified about 225 eligible applications for entities applying for just one station from the first two filing windows (RW, Jan. 17). It is processing 30 Petitions to Deny on those, said Stewart. He said the commission hoped to open the last two filing windows, for a total of five, between May to June.

He said the commission is moving forward on LPFM and it's "possible" the first stations could be licensed within the next two months.

An order circulating among commissioners in March would codify into the commission's LPFM rules the changes affecting the new class of low-power stations that Congress passed at the end of last year. The changes restored full channel protections to existing stations and LPFMs, mandated that the FCC go through Congress to change channel protections in the future, and prohibited any pirates from owning LPFMs.

Congress also directed the commission to have an independent entity conduct LPFM interference in nine markets. The tests would determine the impact of LPFMs on existing stations' third-adjacent channels, FM translators and subcarriers as well as the ability of existing stations to go digital.

A source said the commission is putting the test procedures out for open bidding and believes it will take about $3 million to have the tests conducted and the results analyzed — all in what may be a 16-month time-frame. He said the FCC was planning on involving one station in each of the nine markets in the tests.

Sources declined to speculate on Powell's plans for LPFM, and Powell did not say. One source said there's no indication that "just because we have a Republican in office LPFM will die."

New House Telecom and Internet Subcommittee Chairman Fred Upton, R-Mich., said he would oppose any legislation that relaxes interference protection in order to allow more LPFM stations on the air. He was referring to a bill introduced by a fellow Republican, Senate Commerce Committee Chairman John McCain (S. 404), that would negate the LPFM changes Congress passed in the previous year.

McCain's bill is similar to one he introduced in the previous Congress.

"No bill which would slacken safeguards is going to get by me," said Upton, who replaced Rep. Billy Tauzin, R-La., when the latter became chairman of the House Energy and Commerce Committee.

Lone Star Honors for George Marti

Let's hear a big Texas-sized cheer for George Marti.

The radio equipment legend was honored this winter at a meeting of the Cleburne Rotary Club. The Texas Association of Broadcasters presented Marti with a replica of its commemorative plaque about his career, which is on permanent display at TAB headquarters in Austin; and the mayor of Cleburne declared "George Marti Day."

It's fitting. I'm sure there are other notable people who live in Cleburne. But for most of us in the radio business, the town name means just one thing: Marti.

George Marti, shown in his days as mayor.

According to the TABulletin, broadcasters from around the state made the trip to Cleburne to show appreciation for everything Marti has done for the industry. Among them: TAB President Ray Alexander; John Barger; Richard Tuck; Benny Springer; Dudley Waller; Dan Bell; Norman Philips; Gary Moss; John Furr; David Webb; Donna Burt; and Ann Arnold, the TAB executive director.

Jim Godfrey of Marti Electronics and Steve Schott of Harris Corp. were among those representing the technology side.

To this day, eight decades after his birth and five years after selling the company that bears his name, George Marti is synonymous with radio remotes. He revolutionized such broadcasts for radio in the 1940s, designing and building portable microwave transmitters to replace costly, unreliable phone circuits.

As the TABulletin tells the tale, and as we've reported in the pages of RW in the past, Marti attended tech school in Fort Worth and began his career as a part-time apprentice for what is now the Texas State Networks. Marti served as a Marine staff sergeant in World War II; after discharge he applied for a license for KCLE in Cleburne. He designed and built his own 250-watt transmitter and audio console in his mother's living room.

George Marti holds a replica of the plaque that hangs in the lobby of the Texas Association of Broadcasters in Austin. From left: Former TAB President John Barger; TAB Executive Director Ann Arnold; George Marti; and TAB President Ray Alexander.

KCLE went on the air on April 7, 1947. But like every station owner, he was sensitive to costs, and he decided it was too expensive to have an engineer sitting at the transmitter just to record readings every 30 minutes. So he built one of the first transmitter remote control systems, allowing readings to be logged from the studio.

Broadcast colleagues began asking Marti to build equipment. In 1960 he founded Marti Electronics and signed a contract with Collins Radio to market the equipment.

In the late 1970s, Marti began to market his products internationally, including studio-transmitter links. He sold the company in 1996 to Broadcast Electronics but continued his interests in radio stations throughout the state.

In 1991, Marti received the TAB's Pioneer of the Year Award and the NAB Radio Engineering Achievement Award.

Today, with the power of ISDN and POTS codecs at our fingertips, it's easy to forget how important Marti's reliable, affordable RPU technology must have been to radio stations when it first became available. Certainly, the phone industry took decades to catch up.

Oh, by the way: George Marti also served six terms as mayor of Cleburne. And his Marti Foundation awards $200,000 annually in college scholarships to the youth of Johnson County. So it seems Marti stands not just for RPU, but for class, as well.

Well done, Mr. Marti, well done indeed.

From the Editor

Paul J. McLane

Photo and Mic by bigdmc.com

Shane Ruff is the lucky winner of the latest prize in our 25th Anniversary Silver Sweepstakes.

He gets to outfit his studios with a package of eight of OC White's model 51900, a deluxe mic arm with standard OCW riser base (shown, mic not included).

The 51900 is ideal for personalities, permitting floating placement of the microphone of choice. It adjusts to the "just right" sweet spot for maximum comfort and presence. The robust 51900 series is the world's most popular arm/boom for control, news and talk studio use, built for years of service. Rush, Laura, Imus, Frazier and Howard all use it. With a retail value of $149 each, this prize package is worth $1,192.

Ruff, the director of operations for the Catholic Radio Network Chicago, registered to win by visiting *www.rwonline.com*. We'll give away a great broadcast prize in each issue throughout 2001. If you haven't registered yet, get there now!

DIGITAL NEWS

Texas Instruments Unveils DAB Chip

by T. Carter Ross

HOUSTON The type of digital audio broadcasting used in Europe and some other countries has a new receiver chip option, thanks to Texas Instruments Inc.

TI has developed a low-power, single-chip digital baseband for use in Eureka-147 DAB radios.

This chip could have applications with in-band, on-channel digital audio broadcasting in the United States.

TI is an investor in iBiquity Digital Corp. and the chipmaker is working closely with iBiquity on the commercialization of IBOC.

Multimedia content

According to TI, its Eureka 147 digital signal processor-based, open-software chip will help manufacturers construct integrated digital radios, Internet audio players and similar products that take advantage of the multimedia content capabilities of DAB.

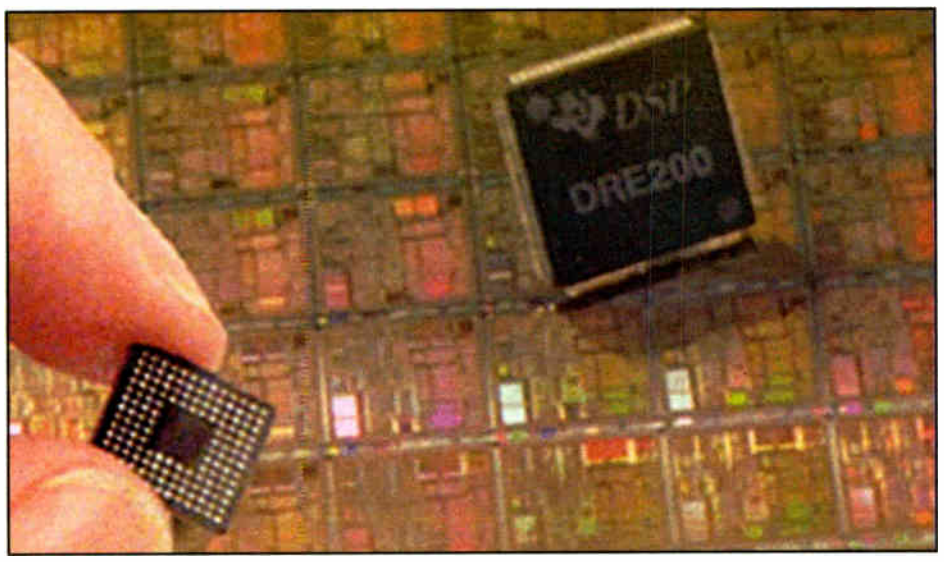
The offering targets all segments of the digital radio market, including automotive, portable and home.

The first digital baseband for digital radio from TI, the TMS320DRE200, includes TI-programmable DSP technology and RadioScape Ltd. software. The reference design contains the components needed to design a receiver, including the DRE200 baseband, analog parts and RF circuitry.

"We utilize TI technology in our WaveFinder product because it allows us to deliver some of the advanced capabilities of digital radio such as real-time MP3 transcoding and broadcast data services," stated Ken McAlpine, managing director at Psion Infomedia Ltd.

WaveFinder is a digital receiver that connects to a PC, allowing for the transmission and reception of text, pictures, hyperlinks and Web sites, as well as DAB audio.

"The solution from TI will facilitate low-power, easy-to-use systems that can be upgraded as digital radio technology evolves. We are also very encouraged by the drive by TI to reduce system costs, which will help to accelerate the adoption of digital radio in the consumer market," McAlpine stated.



The TI TMS320DRE2000

According to the company, TI helps manufacturers save on costs by eliminating the need for hardware such as external memory and microcontrollers.

The chipmaker claims the DRE200 consumes less than 200 mW — 60 percent lower than existing basebands, which drain power in excess of 450 mW.

Using the TI open-software platform, customers can add applications on top of the DRE200 digital baseband. For example, a customer can integrate MP3 decoding with digital radio on a single chip.

Future applications such as data decoding, recording, interactive two-way communication and AM/FM radio could be all implemented via a software download. This will allow manufacturers to move from basic introductory units to radios that contain more features.

Eureka vs. IBOC

"In the past, digital radio has suffered from negative perceptions about its viability as a mass market product," stated Naresh Coppisetti, general manager of the TI digital radio business unit.

"We are confident that our endeavors to drive down the system power and to make development as simple as possible will have a significant impact on the deployment of this technology."

Production quantities of the DRE200 were slated to be available in April.

Turning to DAB in this country, iBiquity is talking to six manufacturers at the moment, including TI and Philips, regarding chip sets. Some of the technology TI has developed for Eureka would be the basis for initial IBOC chip sets.

"With Philips, we are looking more at an ASIC-based solution which has some DSP or programmable elements, but is more 'hardwired' for the specific IBOC use, said Jeffrey Jury, iBiquity senior vice president.

Ibiquity plans to work with two to four chip manufacturers initially.

"Our strategy is to focus down on a core set of key chip players who can serve the huge radio market, particularly in auto platforms," said Jury. "We will then expand out and work with other chip houses as we expand the IBOC market."

Ibiquity's chip team wants to take the IBOC concept and make sure its functionality can be replicated on a small chip set that goes into a radio receiver.

For TI and Philips chips specifically, that means iBiquity is in DSP development to program and reduce the size of its IBOC software.

IBiquity hopes to hand off production silicon to chip manufacturers in early 2002 in order for the manufacturers to roll out receivers at the Consumer Electronics Show in January 2003.

Leslie Stimson contributed to this story.

BUSINESS DIGEST

Harris to Rep Computer Concepts

Some prominent players are changing teams in the highly competitive digital audio systems marketplace.

Harris Corp. and Computer Concepts Corp. have signed an exclusive distribution agreement. Harris' Broadcast Communications Division will represent Computer Concepts' Maestro, as well as a new digital audio line, to radio and TV customers in the United States, excluding Cox Communications.

Also, Harris becomes the exclusive distributor in all countries except for Australia, England and Mexico.

Harris claims to have installed more broadcast hard-disk systems worldwide than any other supplier.

Jim Hauptstueck, digital products manager, praised Computer Concepts systems for their on-air, production and edit capabilities, the interface to the Harris Impulse digital console and streaming and WAN resource-sharing abilities.

Dave Scott, president of Computer Concepts, said its products had been sold direct in the past, but that the dealer arrangement makes sense, thanks to consolidation.

"The average director of engineering responsible for hundreds of stations needs to make only (one) call," he said. "Harris is the only company that really has it all, from a transmitter down to a box of screws. People don't have the time to shop 87 vendors to buy 87 products."

Scott said Harris planned to hire four regional salespeople who have been working for Computer Concepts to continue to sell the line.

Recent months have seen several changes in the automation/live-assist arena. Earlier this year, Enco Systems said it would sell direct, ending that company's exclusive representation deal with Harris, which dated to early 1999.

Last fall, Scott Studios and Computer Concepts merged, although both brands continue to be sold. Scott Studios products are not part of the Harris dealership agreement.

— Paul McLane

Pub Sat

▶ Continued from page 1

many current public radio listeners will cross over to the new service.

Distributors of the new services are touting their channels' low-density or zero commercial load, long a feature unique to public radio. Satellite radio providers also plan to subsidize their advertising revenues with subscription fees, somewhat analogous to public radio stations' voluntary listener contributions.

In addition, public radio's two national networks are creating satellite radio channels using some of their most popular programs — programs that local stations rely on to draw listeners and financial support.

But concerns remain.

"The networks are out for themselves," said Alan Chartock, executive director of Northeast Public Radio, an organization with seven stations and three translators that broadcasts to parts of seven states. "I've been outraged from the start."

Outrage

That outrage began in 1999 when National Public Radio and Public Radio International both announced programming agreements with Sirius Satellite Radio. PRI will provide Sirius with one channel of news, entertainment and talk programming. NPR is set to supply two: a news and talk channel, and another geared toward entertainment and cultural features.

According to PRI spokesman Dan Jensen, its satellite radio lineup is not yet set, but it will certainly include "Whad'Ya Know?," a weekend comedy show, and may include the networks' powerhouse variety program, Garrison Keillor's "A Prairie Home Companion."

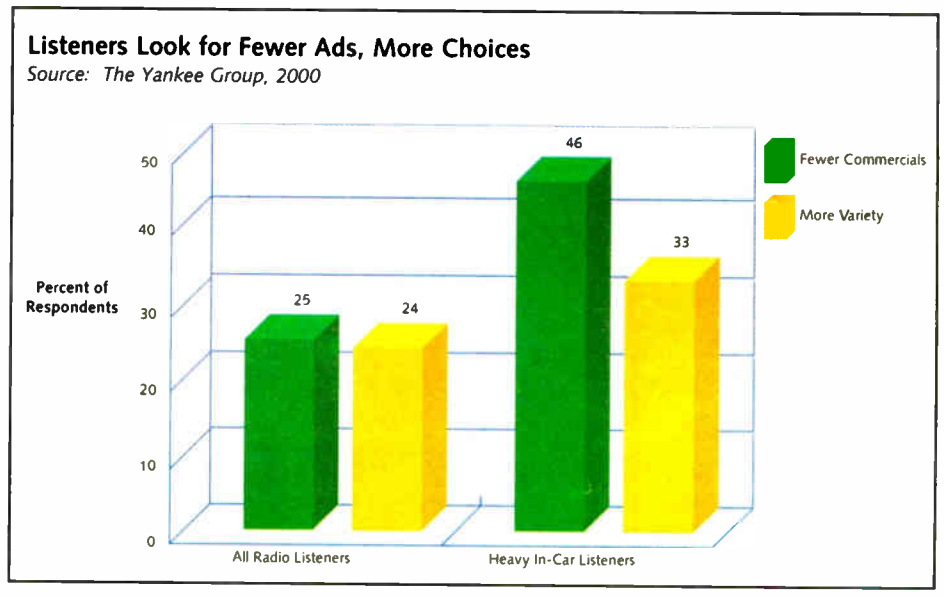
NPR will not broadcast its daily drive-time newsmagazines, "Morning Edition" and "All Things Considered," over satellite radio initially, but the network has not ruled that out for the future, said then NPR spokeswoman Siriol Evans. One of NPR's Sirius channels will air "Car Talk," the Saturday morning comedy car repair show that draws many public stations' largest audience of the week. (Evans was to leave NPR at the end of March.)

NPR has a new division to support satellite radio with about 20 employees so far, said Evans. PRI "is on its way," with its satellite radio efforts, said Elana Sofko, director, Talk/Sales Partners at Sirius Satellite Radio. The so-called "NPR2" division employees will produce material for satellite radio, as well as other media, to build up NPR's worldwide distribution.

"Car Talk" is considered by public radio listeners to be "the most valuable program on public radio" and attracts more money per listener than any other, according to a public radio audience study commissioned by the Corp. for Public Broadcasting. "A Prairie Home Companion" and "Whad'Ya Know?" are also top draws for listener support, according to the study, called Audience 98.

Shrinking federal support

As federal support has dwindled to about 12 percent of operating expenses for public radio, local stations have come to depend on listeners as their largest single source of funding, according to statistics published by CPB. Some public station managers, such as Chartock, say they are "troubled" by satellite broadcasts of popular network shows because they pay a large percentage of their annual budgets for this programming, and the loss of media exclusivity may diminish their stations' audiences and donations.



In a survey by The Yankee Group of 750 households, respondents were asked what radio characteristics they would like improved. Of those, 25 percent said 'fewer commercials.'

Whether public radio listeners will be drawn to satellite radio is the main issue coloring public broadcasters' attitudes.

Other managers are more sanguine about satellite radio. Mike Morgan, general manager of news and classical WBHM(FM) in Birmingham, Ala., said "There's already a lot of competition for our listeners' ears from a variety of sources. This is just one more. For me, that raises challenges rather than fears. It makes us focus on what we can do in our local market to distinguish our service and make it more valuable to our listeners."

Among WBHM's plans are "beefing up local news production" and "keeping in closer contact with the local arts organizations that our listeners patronize," said Morgan.

Whether many current public radio listeners will be drawn to satellite radio is the main issue coloring public broadcasters' attitudes toward this potential rival.

While Alan Chartock said he is "skeptical that it won't pull a lot of public radio listeners," Morgan said his relative lack of concern about satellite radio comes from NPR's assurance to its affiliates that

See PUBSAT, page 7 ▶

Streamers Not Immediate Threat to Pubcasters?

Public radio stations managers must wait to learn if satellite radio will draw their listeners, but they now know that Internet radio has yet to become a serious competitor. A new study reports that Internet radio use by public radio's affluent, educated audience has stalled, with no significant growth between winter 1999 and summer 2000.

The most recent Arbitron/Edison Media study reports that Internet radio use is up by 2 percent for all Americans.

In the same study, Walrus Research also reports:

- While Generation X listeners (defined as age 36 and under) lead older generations in the use of Internet radio, 80 percent of public radio's Gen X audience does not use Internet radio.
- The typical frequency of Internet radio use among public radio listeners who use it is one day per week.
- Only 1 percent of public radio listeners use Internet radio seven days a week.
- About 20 percent of public radio listeners use a public radio station's Web site at least once a month.

A higher percentage of public radio listeners uses Internet channels than the general population. The Public Radio Tracking Study reports that 10 percent of public radio listeners tuned to an Internet channel in the week previous to its survey.

The Arbitron/Edison Media Internet VI report, based on a slightly different survey period and a significantly different sample population, says that 6 percent of all Americans used Internet audio or video in the week previous its contact. That translates to about 2 million public radio listeners using Internet radio in a typical week, compared to 13.4 million Americans in general.

The Public Radio Tracking Study findings are based on nearly 20,000 interviews with public radio listeners conducted between December 1999 and December 2000. Through an arrangement with Arbitron, Walrus Research receives the Arbitron sample of public radio diarykeepers. It then surveys those listeners by phone on a variety of issues.

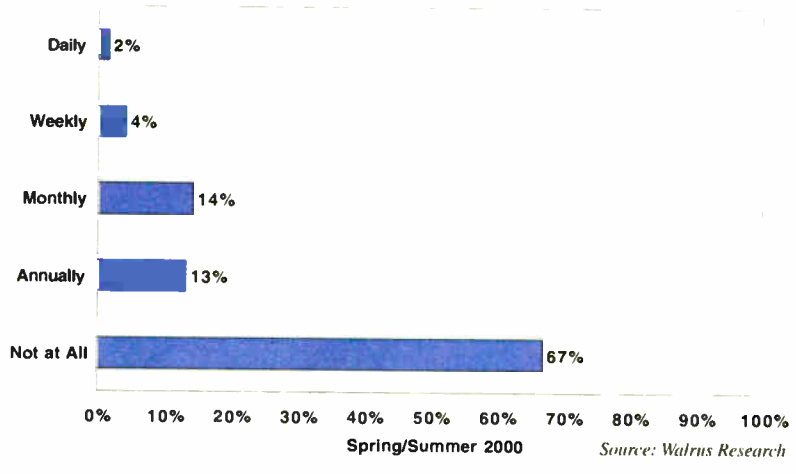
While the PRTS is not the only such study underway tracking public radio listeners and Net use, it is the only study actually measuring such use.

Another effort, funded by the Corporation for Public Broadcasting, is a perceptual study of public radio listeners' attitudes toward the Internet, particularly stations' use of that medium to communicate with listeners to fundraise, sell items, etc.

The interim report for this study can be found at *www.ARAnet.com/*

WKSU is conducting the study with audience research consultant Peter Dominowski and support from the Public Radio Program Directors organization.

— Leslie Peters



Public stations are investing in Web sites as an avenue for listener contributions and merchandise sales. However, according to recent research, two-thirds of public radio listeners have never used their station's sites.

This is the chief finding of the Public Radio Tracking Study, an ongoing project funded by 21 public radio stations and led by Walrus Research, a Wisconsin firm that specializes in analyzing the public radio audience.

"This doesn't mean that Internet radio use will never take off for public radio listeners," said George Bailey, Walrus Research president. "We just see no evidence of it yet."

Pub Sat

▶ Continued from page 6

"public radio listeners would not be early adopters."

Jackie Nixon, NPR's director of audience research and strategic planning, confirmed Morgan's statement. "Satellite radio is a very niche market," she said. "Its primary appeal is going to be to people who are very dissatisfied with their radio choices, and who spend an awful lot of time in their cars. It's going to skew younger than public radio's audience, with its 24-hour music streams."

She said, "Satellite radio is an unproven technology that's going to take a long time to get ramped up." For all those reasons, said Nixon, "It is not a threat to public radio stations."

Doug Wilsterman, vice president of marketing and distribution at Sirius Satellite Radio, said, "We expect this to be a huge business." He cited the broad potential audience of electronics enthusiasts and American drivers, including commuters, truck drivers and other workers whose businesses keep them in their cars for long periods.

"It's unrealistic to think we'll put all terrestrial radio out of business," he said, "but we will be a true alternative."

National reach

In fact, the satellite radio industry expects 1 million satellite radio receivers to be installed one year after the programming services launch, and 21 million to be installed after five years, according to a recently published report of The Yankee Group, a Boston-based technology research and strategic consulting organization.

"With its clarity of sound, its variety, its national accessibility, satellite radio has enormous potential," said Yankee Group analyst Ryan Jones. "It's not peripheral technology."

Both Sirius and XM have hired SRI International, the Palo Alto, Calif.,-based research company, to devise the audience measurement system for satellite radio. SRI beat out several other vendors, including Arbitron, said Sofko.

Still, some public radio programmers are not convinced satellite radio will achieve predicted receiver/service sales.

"It seems like a long shot," said Scott Williams, who is also one of PRI's satellite radio programming consultants. "They keep talking about an audience of people in cars — truck drivers and commuters. What's the potential of this stuff on the weekends, when there's also a lot of radio listening, especially on Saturdays, but so much less in-car listening?"

He said, "People who pay $9.95 a month for satellite radio are probably going to feel compelled to use it." To hedge his own bet, he is "rolling out a local talk show in April" on one of his stations, to replace some of the network talk programming that NPR will also broadcast on one of its Sirius channels.

Williams is also "a little concerned" about the new daily newsmagazine that NPR will produce, primarily for Sirius. The network is not yet putting a launch date on "The Way In," a weekday, one-hour morning drive-time newsmagazine that will compete with the network's own "Morning Edition" program, according to Evans.

Details about the show are few, though she said, "Listeners will hear a mix of familiar NPR news voices along with some new ones." Some of its producers and editors will also be drawn from NPR's current staff roster. Evans could not discuss the specifics between the style and substance of "The Way In" and "Morning Edition." Details of the new show's target audience have not been released.

The main difference between "Morning Edition" and "The Way In" may be the distribution method. While "Morning Edition" is heard on more than 500 local NPR member stations, many of those stations "cover" some national segments with local news. However, "The Way In" will be broadcast directly to listeners, without alterations.

"NPR, as widely distributed as it is, doesn't have a 24/7 pipe anywhere in the U.S.," said Sofko. "It has a limited pipe with its affiliate stations. With three dedicated 24/7 satellite channels, NPR will have national exposure for its programming and its producers that it doesn't have now," she said.

That direct access to listeners is an issue that has driven a wedge between the public radio networks and their affiliates in recent years.

Sylvia Carson, director of station relations for the Development Exchange Inc., a 250-station association of public radio fundraising specialists, is disturbed that NPR will produce original news programming for satellite radio.

"That's direct competition with the local stations," she said. But for the most part, said Carson, DEI's members "right now don't see satellite radio as a threat to listener support. It's just not real yet. But over the next 18 months a lot could happen, in the economy, in the government, in media competition that could create a money crunch for public radio, and we have to be prepared for that."

Like many of her colleagues, Carson sees improved local programming and stronger ties to the local community as the right responses to any potential new media competition.

"The sheer volume is what scares me," said Williams. This summer, Sirius Satellite Radio, and its rival, XM Satellite Radio, are both promising subscribers up to 100 channels of commercial-free music formats, and a wide variety of news and entertainment channels.

Said Williams, "There's probably going to be some good radio, something to attract public radio listeners in all of that — if anyone can find it."

Industry Changes

Suppliers

Brian Heimer is a new sales and marketing executive at **RDA Systems Inc.**


Brian Heimer

Digigram has formed a new business unit called **Digigram Europe** to provide sales and customer support for both Digigram and Aztec Radiomedia products in Europe, Africa and the Middle East. Meantime, Digigram has hired **Cynthia L. Hall** as product support manager. Hall previously worked for Cumulus Media Inc. of Milwaukee, where she served as manager of special engineering projects and technical projects coordinator.


Jim Wilmer

Harris Corp. has announced the appointment of **Sarah Foss** as director of marketing for Harris' Broadcast Communications Division. **Jim Wilmer** has been tapped as regional sales manager, North America for **Calrec Audio**. **Jonathan Burtner-Cawley** has been appointed project manager of **Klotz Digital America.**


Jonathan Burtner-Cawler

RCS has named **Dwight Douglas** vice president of product marketing, **Paul McKnight** vice president of client services and **Criss Onan** sales and marketing manager for the non-radio side of RCS including Internet and corporate radio.

Symetrix welcomes new personnel on board. **Jim Latimer** joins the company as director of sales, pro audio. **Cari Casteel** is the new vice president of sales.

Circuit Research Labs has hired **Steve A. Claterbaugh** as North American sales manager. He has held positions with Crown Broadcast and Continental Electronics Corp. CRL has also appointed **Robert W. McMartin** to the post of controller, has promoted **Kevin Clayborn** to the position of product manager for the company's Amigo Series of broadcast audio processors and has named **Greg Ogonowski** to the new position of vice president of product development for **Orban/CRL**.


Greg Ogonowski

Bradley E. Singer, executive vice president of strategy at **American Tower Corp.**, has joined Verestar's board of directors.

Sonifex welcomes **Andrew Winmill** as the new U.K. sales manager. **Prophet Systems Innovations** has appointed **Frank Edenburn** sales manager. **John Bastianelli** has joined **Tascam** as product development manager.


Ivan Schwartz

Richard A. Sawyer has been hired as director of international sales for **Gentner Communications Corp.** Sawyer previously served as a consultant to Radio Systems Inc. **Harry Spielberg** has accepted a position on Gentner's board of directors, while the company has named **Eugene W. Kuntz Jr.** and **Stephen Hertzenberg** as officers in the company. Kuntz will serve as vice president of technology development and Hertzenberg will serve as vice president and chief marketing officer.

Mackie Designs Inc. has appointed **Ivan Schwartz** as director of corporate communications.

Omnia, a Telos Systems Company, has named **P + P Nachrichtentechnik GmbH & Co. KG** as Germany's exclusive distributor of Omnia audio processors.

Colin Pringle has been appointed managing director of **Solid State Logic Group Ltd.** SSL has also hired **John Pastore** as product specialist, East coast and **Ryan Hewitt**, product specialist, West coast.


Noel McKenna

Audio Processing Technology has hired **Noel Mc-Kenna** as managing director. He previously served as technical director at APT.

Leitch Technology Corp. has appointed **Lawrence Enroth** to the post of national accounts manager, Western region.

Programming

Seattle-based **Jones Broadcast Programming** has made big changes. **Mike Betteli** has been named director of AC programming, **Steve Young** is the new director of rock-pop programming, **Ray Randall** picks up duties as country programming director and **Tom Clendening** joins the company as director of talk programming. In a related move, **LJ Smith** has been named director of consulting.

Emmis Communications Corp. has named **John S.**

See INDUSTRY CHANGES, page 10 ▶

Innovation begins with a fresh look.
How are we doing so far?

Telos

www.telos-systems.com/smartsurface

Industry Changes

▶ Continued from page 8

Nelson to the newly created position of vice president of human resources. Emmis also has named **Deborah Esayian** to the position of vice president of integrated sales.

Deborah Esayian

Meantime **Mike McKinnon**, Emmis Communications' vice president of television engineering, has been named vice president of engineering for all Emmis entities.

AP Radio welcomed **Jack Crawford** to its radio sales team.

The **Radio Advertising Bureau** has promoted **Bud Stiker** to vice president, international development. The RAB also announced **William E. Barr** was elected to the office of vice president, co-op/NTR services. **NBG Radio Network Inc.** has appointed **Casey Keating** executive producer of the new mainstream version of Hollywood Hamilton's Weekend Top 30 program.

Moody Broadcasting Network welcomes **Robin Jones** to the position of national promotions and marketing director.

Arbitron's Dr. Ed Cohen has been promoted to vice president, domestic radio research. Cohen previously served as vice president and research director of Clear Channel Communications. Arbitron has also appointed **Eric Coats** and **Jim Haynes** as software training specialists for radio station services in Atlanta for Arbitron.

Judy Carlough

The company has promoted **Gabby Selva** to account executive for radio station services on the West coast, **Dennis Seely** to the post of vice president of marketing for radio station services, named **Jan Bournstein** senior account executive for radio station services in the Northeast and appointed **Judy Carlough** to the post of vice president, advertiser services for the company's Webcast Ratings division.

Margaret Low Smith has been named vice president for **NPR2**, National Public Radio's recently created satellite radio division. NPR has also named **Dana Davis** Rehm as vice president for member and program services. NPR's senior vice president for programming, **Thomas W. "Bill" Davis,** resigned from his position effective Dec. 31, 2000.

Jason Jennings been incorporated into **BOA Worldwide** as founding chairman.

XM Satellite Radio has hired **Tripp Fennell, Jordan Lerman** and **David Zeimer** as production directors; **Bobby Bennett, Bruce Kelly, Bob Mackowycz, Maxx Myrick, Jessie Scott, Joey Swanson** and **Marlin Taylor** as program directors.

Clear Channel Communications Inc. has named **John Cullen** president, international radio division and **Andrew Rosen**, market executive vice president for the company's New York station group. Clear Channel Radio has promoted **Tom Parker** to Atlanta operations manager.

John S. Orlando has been named senior vice president, external relations, **NAB**.

Interep has promoted **Adiesa Brown** to the post of vice president of specialized agency sales in the Interep Network Division. **Regent Communications Inc.** has bumped up **Robert Allen Jr.** to the post of vice president of accounting and financial reporting.

WorldSpace Corp. has appointed a trio of senior executives to direct the company's global expansion. **Timothy J. Puckorius** is the new senior vice president of worldwide marketing and sales, **Yajaman N. Bhushan** will serve as senior vice president of business integration and product strategy and **John M. Novack** will serve as senior vice president of finance.

John McConnell has joined **ABC Radio Networks** as senior vice president of programming for ABC Radio Networks.

MeasureCast Inc. has announced **Evan Oster** has joined the company as vice president of research. Former RW sales manager **Robert "Skip" Tash** has joined **FMiTV Networks Inc.** as executive vice president of syndication. Tash previously served as executive vice president of sales at Buysellbid.com.

Internet radio network **RadioWave.com** has appointed **Tom McCarthy** to the post of vice president and chief technology officer.

Send us your personnel news via e-mail to radioworld@imaspub.com

We are particularly interested in hearing about engineering staff changes, which most publications do not report and which many broadcast groups do not announce. RW wants to know!

◆ NEWSWATCH ◆

▶ NEWSWATCH, continued from page 2

CEA President/CEO Gary Shapiro called 2000 a "solid year" for audio sales.

"With the continued interest of consumers in new surround sound formats, DVD-Audio and other digital products that complete the audio experience, we can expect 2001 to be another successful year for audio sales."

AM Directionals Get a Break

WASHINGTON Consulting engineers first broached the idea of relaxing AM directional antenna performance verifications in 1991. Now the commission is giving a break to licensees of the approximately 1,900 AM directional stations in the United States. That's about 40 percent of total AMs.

The agency will relax or eliminate several rules, recognizing technological advances and the burdens the rules place on broadcasters. It seeks public comment on aspects of this proceeding not yet resolved.

What has been decided is to cut the number of required radials to six minimum and 12 maximum, and reduce the number of measurement points per radial to 15.

The agency has agreed to standardize a format for submission of field-strength measurements and simplify measurement requirements for partial proof of performance to eight points per radial.

The main unresolved issue, subject to a Further Notice of Proposed Rule Making, is whether or how to incorporate computer modeling techniques into the proof of performance process. Comments on the FNPRM in MM Docket 93-177 would be due 75 days after publication in the Federal Register.

NAB: Why Change Radio Markets?

WASHINGTON Now that public comments are in, the FCC is considering how it might change its radio market definitions.

NAB has asked the FCC to "proceed cautiously" and argued that any changes might run afoul of Congress' intent when it established the tiered station ownership limits in the 1996 Telecommunications Act.

The FCC is fearful that its current signal contour overlap method to count stations in a market and how they "count" for the purpose of applying the ownership limits are creating unintended results. Last year, if proposed changing how a radio market is defined (see story, page 3).

"Due to the scattered location of radio stations and their widely varying signal strength and coverage areas, NAB doubts that a perfect, anomaly-free method of defining radio markets could ever be formulated," the association wrote in public comments submitted to the FCC.

NAB is against using proposed Arbitron radio market definitions, which it said the FCC has considered and rejected twice. Half of the nation's radio stations are not in Arbitron-rated markets, and Arbitron data "lack the neutrality and consistency needed for data to be used as a regulatory tool," NAB stated.

Crown Unit Stolen

NASHVILLE A broadcast engineer in Tennessee is asking colleagues to keep an eye out for some stolen equipment.

Jim Turvaville, director of engineering and expansion at WAY-FM Media Group Inc. in Nashville, said a thief stole a Crown FM30R transmitter from the American Tower Corp. site on Needmore Road in Clarksville, on or around Feb. 10. The serial number of the unit is 094959.

This particular model is an FM transmitter with internal receiver board, for translator operation. Anyone who comes upon the product or has information about it is asked to contact Det. Danny Fewless of the Clarksville police at (931) 648-0656 ext. 308, and refer to Report No. 01002680, or call Turvaville at (800) 226-9296.

Harris Lays Off TV Employees

MASON, Ohio Harris Broadcast Communications released 12 employees in March. Ten were part of the Studio Products and Systems Business Unit, which designs and integrates broadcast mobile production systems.

Harris has focused in the past on a range of mobile TV systems integration from small news vans to large trucks. The company is narrowing its focus to larger projects where it can offer the most value, according to a spokesperson.

Two other laid-off employees were switchboard operators; the company has installed an automated phone system. Harris employs more than 1,000 workers in the Broadcast Communications Division.

GUEST COMMENTARY

It's Radio, Jim, But Not as We Know It

IBOC, DRM, Satellite, Eureka — The CEO Of Digital One Calls for a Combination of Technologies to Satisfy Market Needs

Quentin Howard

The author is CEO of Digital One, the national commercial digital radio multiplex in the United Kingdom.

Who would dare predict the future in print? Nostradamus, for one. And me. I predict that analog FM and AM radio will appear a pretty thin offering in 10 years' time when compared to other media and delivery platforms emerging now and yet to come.

Radio has served us well since 1922. It has survived the onslaught of talking movies, television, LPs, cassettes, CDs, MiniDiscs, cable, satellite, DVD and MP3. People like radio, and listen for more than 20 hours a week. Radio as a device is the most ubiquitous of consumer products — every household has around six sets. Eighty million new radios sell each year in the United States, and a similar number across Europe.

It is a century since Marconi received Morse code across the Atlantic, and 80 years since public broadcasting began. Radio is undoubtedly *the* mass communications medium of the 20th century — influential, cultural, politically powerful, entertaining and informative. In fact, radio is so popular you'd think it would figure centrally in every debate about media. It doesn't.

Ignoring radio

In December 1997, the EU Green Paper on Convergence almost completely

ignored radio, concentrating instead on television and the internet. In the UK, the current White Paper on communications regulation and media ownership devotes only 1 percent of its pages to the subject of radio.

In France last year, a similar thing happened, and elsewhere radio is consistently undervalued, both as a medium in its own right and as a consumer item.

Little wonder, then, that whilst politicians are busy helping industry to shape the future of television, satellite, mobile phones and the Internet, radio broadcasters — who face exactly the same issues in going digital — are left to struggle alone. The results are unclear business models, slow uptake and a consequent wavering of commitment.

Dateline spring 1991, the National Association of Broadcasters convention, Atlanta. Eureka 147 is unveiled to the world and everyone applauds. NAB President Eddie Fritts declares that Europe is five years ahead of America, and NAB recommends the United States accepts the Eureka system.

Three months later and NAB rescinds this, claiming equal transmission areas for all stations on a multiplex would damage individual marketing abilities. Cynics have a different interpretation: U.S. broadcasters don't like the thought of more radio channels or competition, and U.S. consumer equipment manufacturers would stand to gain nothing from European-owned royalties and IP.

Different approaches

Largely as a result of misinformation, the gulf between the U.S. view of digital radio and the Eureka view has grown over time.

Europe and the United States take very different approaches to radio as an industry. Europe is a mix of state-run public broadcasters and private commercial radio in various degrees of maturity. Competition is still on the increase and the concept of more radio channels is seen as an opportunity, not a threat.

Contrast this to the United States, where station owners rejected Eureka's opportunity largely to protect the status quo.

In 1994, the world shared out new spectrum for terrestrial digital radio, which could mean worldwide conformity and compatibility. Most countries signed up to this new spectrum, including all of Europe, Asia and Canada. But U.S. broadcasters favor re-using existing FM spectrum for a system — unproven at the time — called IBOC.

Throughout the '90s, NAB conferences on the respective merits of digital came close to degenerating into playground

See DIGITAL, page 18 ▶

Encore!

The Telos Zephyr is one tough act to follow. It revolutionized point-to-point audio by combining ISDN with MPEG coding, and quickly became the #1 selling codec worldwide — perhaps the most successful digital broadcast product ever. So what will we do for an encore?

Presenting Zephyr Xstream, with innovations like AAC (Advanced Audio Coding) for superior fidelity, a special low-delay mode, and an Ethernet port for IP audio streaming, remote control and easy software updates. There's also a rugged portable version with full-featured digital mixing.

And of course Zephyr Xstream includes everything else you'd expect from a Zephyr, like Layer-II and Layer-III coding, ISDN connectivity, a simple, friendly user interface, and bulletproof reliability.

Zephyr Xstream. Sometimes the sequel is even better than the original.

Telos

www.zephyr.com

FIRST PERSON

Low-Voltage, High-Hassle Licensing

Mark Persons

So you are a radio broadcast engineer, with 10 stations to take care of, and no spare time. You have an FCC General Class Radio-Telephone license and are a member of the Society of Broadcast Engineers. You may also have a ham license and a state tax resale number to keep your one-man business legal.

What else could you want or need?

Well, if you operate in the State of Minnesota, you now also need an Alarm and Communications license from the Minnesota State Board of Electricity. Information can be found at *www.electricity.state.mn.us/*

By the book

This required certification is commonly called a low-voltage wiring license.

Unknown to me, a few years ago, the Minnesota state legislature passed a bill to require anyone running audio wiring, computer networking or, for that matter, any low-voltage wiring in any commercial building, to possess this license. This only excludes homeowners who run wiring in their own homes.

The fact that I did not have this license struck home like lightning when I was about to do the finest project of my career in my own home town. It is a brand-new, 6,000-square-foot studio building capable of handling six radio stations.

This half-million-dollar facility was designed by architects and built by a high-quality commercial construction firm. No one said a thing about a license until the "by-the-book" electrical inspector asked, "Who is doing the low-voltage wiring? And let's see his license."

That's when my smile turned to a blank expression. According to

Mark Persons

Minnesota state law, I was not allowed to lay out wiring or run a single wire in a commercial building without the license. The building was already under construction and on a timeline for completion, including the studio wiring.

No one can get this license by filling out an application and sending a few dollars to the state. It is far more complicated than that. Here is how to proceed in trying to get a license:

1. Call or send a letter to the Minnesota State Board of Electricity asking for the form to request an examination.

2. Fill out and return the request form and wait for return mail. After about a week, an examination date is set and you are issued a "Notice to Appear for Examination." The exam date typically is a month in the future.

3. Purchase a copy of the current National Electrical Code. It's published by the National Fire Protection Association Inc. and can be purchased at *www.nfpa.org* or through dealers, in printed or CD-ROM formats. I paid $36 for my book.

4. Study the book daily until the exam date rolls around. This book is your "bible."

5. Go to the exam site. In my case I had to drive 130 miles to the session in St. Paul. To do this I had to stay overnight in Minneapolis so I could arrive at the test session first thing in the morning. Had I arrived after 8:30 a.m., I would have been refused admission and would have had to reschedule the exam.

6. Pay $35 for the privilege of taking the exam.

7. Take the test. The written exam is in two parts. The first consists of 25 multiple-choice questions that involved researching and documenting pertinent sections of the NEC book. Answering the question without the proper NEC references was not acceptable.

The second part was 25 multiple-choice questions answered from memory. A 70-percent score was required to pass the exam. In my case, the entire exam took five hours to write. It probably would have taken less time if I had attended a vocational school class on the subject.

8. Wait for the results. Exam results are not released at the session. I had to go home and wait for the mail to arrive about three days later to find out if I

See PERSONS, page 20 ▶

Everything
you've ever wanted.

Everything
you've ever needed.

Everything
you'd expect from PR&E's legacy.

And...it even looks better than Jennifer Lopez.

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SERVICE

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TRANSMISSION

HARRIS

NEWS MAKER

NAB Honors Belar's Arno Meyer

Arno Meyer, president and founder of Belar Electronics Laboratory Inc. in Devon, Pa., will be honored with NAB's Radio Engineering Achievement Award during the Technology Luncheon on Wednesday, April 25, at the NAB2001 convention.

The awards, established in 1959, are given to industry leaders for significant contributions that have advanced broadcast engineering.

Meyer spoke via e-mail with Radio World Technical Consultant Tom McGinley of Infinity Broadcasting Seattle about the early days of the company, early DSP-based products, his role in the AM stereo debate and current Belar products.

***RW:** Belar Electronics is a name synonymous with high-quality precision modulation monitors and has been around a long time.*

Meyer: I founded Belar Electronics in 1964 in the early days of FM stereo. I had been working for ITA Electronics in Lansdowne, Pa., on FM exciters and stereo generators.

ITA was owned at the time by Triangle Publications, Walter Annenberg. I had proposed to Triangle that the FM stereo monitoring market was wide open and ITA should pursue it. I found out that ITA was not interested in continuing in the broadcast business and was going to sell the company.

I gave my notice and my intention of going into the business of developing and marketing FM stereo monitoring monitors.

Wideband FM monitors good enough to look at FM stereo composite waveforms were not available at that time. I used a delay line FM discriminator to monitor my signals.

After a while I found this detector too cumbersome, so I developed a tunable FM detector that demodulated an FM signal to baseband and in addition could act as an AM detector to indicate AM noise and synchronous AM noise. This was my first product — the Belar FMD-1.

***RW:** We have heard that the name Belar was born as a combination of your name and your wife's. Who gets the credit for thinking of it?*

Meyer: Yes, Belar is a combination of bel — my wife's name was Isobel — and my name, Arno. I think it was a joint decision — a "ma-and-pa" business.

***RW:** I remember in the 1960s that the name General Radio was prominent on modulation monitors at most stations. It seems that company went away about the time Belar emerged. Might there be a connection?*

Meyer: I think FM stereo was the connection. FM stereo transmissions made monitoring a whole new ball game. I think it required too much development for GR for a small market. The other players at the time were Collins Radio and McMartin Industries.

***RW:** How big is Belar in terms of annual sales and how many employees do you have?*

Meyer: Belar is a privately held company of 25 employees.

***RW:** Belar was a pioneer in using digital and DSP-based technology in your equipment. Tell us how that occurred and evolved. What other technical breakthroughs helped improve your products and what other design engineers besides yourself have been involved in the creation of Belar products?*

Meyer: The advent of the sigma delta A/D converters, with their high resolution combined with high sampling rates, made it possible for us to digitize the FM composite signal accurately.

This, along with the introduction of the Motorola 56000 series of DSP chips, allowed Belar to replace many of our critical analog functions with DSP processing.

These advances gave our products greatly improved performance as well as increased stability and allowed changes to be made with software updates

Mark Grant is the chief architect of the system; his name is also on the patent. Dwight Macomber, Jim Malone, Steve Hemphill, Walt Hartman and Mohammad Olama also contributed to our product designs.

***RW:** In the late 1970s, you collaborated with RCA in the development of an AM stereo transmission standard. Tell us about that experience and why do you think AM stereo never really succeeded?*

Meyer: Byron Fincher of RCA came to us several weeks before an NAB convention in Chicago saying that RCA needed something to spark their exhibit at the NAB. He thought that if they could revive AM stereo, it would create that necessary spark. Could we help them?

Since RCA was a valuable client — we brand-named all our monitors for them, BW-50s, etc. — we could not refuse.

RCA provided us with two Ampliphase exciters, copies of their patents and their good will. We designed the stereo generator and stereo decoder in record time. We built two systems, and both RCA and Belar showed and demonstrated that AM stereo did work and sounded good.

Soon after, the AM stereo committee was formed by the EIA to propose standards — RCA, Motorola and Magnavox were the proponents, with the FCC participating. Belar assisted RCA in the meetings.

After a while RCA decided that they did not want to continue to propose this system and were going to drop out. Belar got a call from Harold Kassens, who represented the FCC in the committee meetings, advising us of this development and would we pick up the RCA system and continue with the committee.

The committee could not continue with only two proponents. We agreed to continue the proposed RCA system and the system became known as the Belar AM-FM Stereo system.

After the standards were proposed and the three systems were tested by the committee, the results were submitted to the FCC with the expectation that a system would be selected. The FCC decided not to make the selection, but let the marketplace decide. The rest is history.

Arno Meyer

Mr. Meyer's technical contributions significantly improved the quality of AM and FM radio transmission systems through continuous improvement of the state of the art in modulation measurement technology.

— NAB

Here is what NAB had to say in its announcement of the Radio Engineering Achievement Award to Arno Meyer:

Belar modulation monitors are used by radio and television engineers to monitor important technical aspects of their broadcast signal and have become the industry standard. The Federal Communications Commission first used Belar monitors to verify their measurement of commercial FM broadcast stereo performance standards in the mid-1960s.

Mr. Meyer's technical contributions significantly improved the quality of AM and FM radio transmission systems through continuous improvement of the state of the art in modulation measurement technology. He developed and marketed the first DSP-based AM, FM and TV broadcast modulation monitors and his company's SCA monitors were the first all-digital units in the industry.

He was the developer of the AM stereo system proposed by RCA and played a role in the development and rollout of TV Multichannel Television Sound systems. His inventions and products have played an important role in keeping radio broadcasting a competitive and viable medium. He holds a patent for a modulation monitor.

Meyer obtained a BA in Physics from the University of California and is a member of the Institute of Electrical and Electronics Engineers and Society of Broadcast Engineers.

***RW:** What role did you play in the development of TV multichannel sound?*

Meyer: Belar was a member and participated in the BTSC committee meetings. We made recommendations on the testing procedures and specifications for monitoring.

***RW:** What item in your product line are you the most proud of? Which one was the most difficult to perfect and bring to market?*

Meyer: Our Wizard System is what we are most proud of.

It includes the digital stereo decoder in the FMSA-1 stereo monitor, the digital subcarrier demodulator in the SCMA-1 SCA monitor, the digital RBDS decoder in the RDS-1, the frequency-agile RFA-4 FM RF amplifier, the frequency-agile DC-4 down-converter for multiple transmitter operation.

All can be interconnected to be accessed remotely by a PC.

***RW:** FM stations still seem to be getting louder and insist on running right up to the legal FCC modulation limit. Peak weighting emerged in the early 1990s as a new way of pushing the limit even higher. What is your opinion of peak weighting and how should it be applied to measuring over-modulation?*

Meyer: When the FCC wrote the rules for measuring peak modulations, they recognized that the monaural monitors at the time were not adequate to include the L-R double sideband stereo components and the SCA subcarriers in the measurement of modulation peaks.

The new rules specified tone bursts to be applied to the left-only and right-only channels respectively so that all components of the stereo composite would be measured.

Applying the tone to just the L+R (left and right simultaneously) is a monaural signal with the 19 kHz pilot and does not include the L-R components. The result is, with 9 cycles of peak weighting, actual unprocessed modulation peaks of greater than 140 percent can indicate as low as 100 percent. Heavy processing will bring the actual peaks closer to the indicated peaks.

See MEYER, page 17 ▶

Meyer

▶ Continued from page 16

Peak weighting only should be used if there is a noise problem. Our peak weighting is adjustable from off to 15 cycles. We will recommend 3 cycles for off-air monitoring with a noise problem due to a bad path.

***RW:** The FCC rules used to require specifically that stations install and maintain a modulation monitor. Then deregulation changed that. Do you think stations nowadays pay as much attention to modulation levels as they used to? And is the FCC still citing over-modulation as a rules violation and enforcing it?*

Meyer: The larger stations and multiple ownerships do comply with correct modulation levels as far as we can tell because they purchase and install our Wizard systems. We have no information that the FCC is citing over-modulation as a rules violation. They may be, for all we know.

***RW:** What about DAB and the rollout of in-band, on-channel digital broadcasting by iBiquity Digital? Are you working with them in developing a mod monitor for this new medium? And how long do you think it will be before we see a standard adopted and stations begin transmitting DAB full-time?*

Meyer: We did sign an agreement with USA Digital Radio Inc. last April. *(Ed. note: USADR is now part of iBiquity.)* Nothing has happened yet. I guess we will contact them soon to see how we can be of help and to advise them of what can be done with our new CSA-1 spectrum analyzer.

We have been looking at how our spectrum analyzer can be used to display and measure compliance of the IBOC signal.

***RW:** Broadcasting on the Internet appears to be evolving into a very important part of radio's future. Does Belar have a modulation monitor under development for Webcasting?*

Meyer: Webcasting is on the books. Belar has a modulation monitor under development for Webcasting.

***RW:** What single, most important factor do you think enabled Belar to become the industry leader in precision modulation monitoring equipment?*

Meyer: Care. Care in design. Care in manufacturing. Care in testing. Care in recalibration and repairs.

***RW:** Tell us a little about some of your new products, including the new CSA-1 FFT spectrum analyzer.*

Meyer: We are developing a new DSP-based AM Wizard specifically for controlled carriers. The rising energy costs around the world are forcing the high-power shortwave transmitting stations to control their carrier power according to their modulation levels.

The CSA-1 is a unique product for Belar. It gives the broadcaster another measurement tool to analyze their signal visually, in the frequency domain. Using the 150 kHz analog input, the complete FM or TV composite baseband spectrum can be viewed at once. The 24 kHz left and right inputs, both analog and AES/EBU, allow dynamic stereo separation measurements.

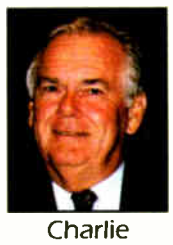
With the appropriate down-conversion to IF, the 2 MHz analog input can be used to display the FM spectrum up to 2 MHz wide.

The AM broadcaster can use this input to check his NRSC-2 compliance directly, using the on-screen mask. All these measurements are made easy with the CSA-1's 120 dB dynamic range and 0.1 dB resolution.

Engineering Award Winners

The NAB established its Engineering Achievement Award in 1959. The following is a list of past winners. Note: NAB separated Radio and TV beginning in 1991; Radio winners are shown.


Mike Dorrough


Charlie Morgan


George Marti


Hilmer Swanson

1959 John T. Wilner, Vice President of Engineering, Hearst Corp., Baltimore
1960 Commissioner T.A.M. Craven, FCC, Washington
1961 Raymond F. Guy, Consultant
1962 Ralph N. Harmon, Vice President of Engineering, Westinghouse Broadcasting, New York
1963 Dr. George R. Town, Dean of Engineering, Iowa State University Ames, Iowa
1964 John H. DeWitt, Jr., President, WSM Inc., Nashville, Tenn.
1965 Edward W. Allen, Jr., Chief Engineer, FCC, Washington
1966 Carl J. Meyers, Senior VP & Dir. of Engineering, WGN, Chicago
1967 Robert M. Morris, Staff Consultant, Engineering Dept., ABC, New York
1968 Howard A. Chinn, Director, General Engineering, CBS Television, New York
1969 Jarrett L. Hathaway, Senior Project Engineer, NBC Television, New York
1970 Philip Whitney, GM, WINC, & Supervisory Engineer, Lewis Radio, Winchester, Va.
1971 Benjamin Wolfe, VP of Engineering, Post-Newsweek Stations, Washington
1972 John M. Sherman, Director of Engineering, WCCO, Minneapolis
1973 A. James Ebel, President & GM, KOLN-TV, Lincoln, Neb.
1974 Joseph B. Epperson, VP of Engineering, Scripps-Howard Broadcasting, Cleveland
1975 John D. Silva, Dir., Research & Dev., Golden West Broadcasters, Los Angeles
1976 Dr. Frank G. Kear, Consulting Engineer, Washington
1977 Daniel H. Smith, Senior VP of Engineering, Capital Cities Inc., Philadelphia
1978 John A. Moseley, President, Moseley Associates, Inc., Goleta, Calif.
1979 Robert W. Flanders, VP & Dir. of Engineering, McGraw-Hill Inc., Indianapolis
1980 James D. Parker, Staff Consultant/Telecommunications, CBS Television, New York
1981 Wallace E. Johnson, Exec. Dir., Association of Broadcast Engineering, Washington
1982 Julius Barnathan, President, Broadcast Operations & Engineering, ABC, New York
1983 Joseph Flaherty, Vice President of Technology, CBS Inc., New York
1984 Otis S. Freeman, VP & Director of Engineering, WPIX Inc., New York
1985 Carl E. Smith, President, Smith Electronics, Cleveland
1986 Dr. George Brown, RCA Laboratories, Princeton, N.J.
1987 Renville H. McMann, CBS Technology Center, Stamford, Conn.
1988 Jules Cohen, Jules Cohen & Associates, Washington
1989 William Connolly, President, Sony Advanced Systems, Montvale, N.J.
1990 Hilmer Swanson, Senior Staff Scientist, Harris Corp., Broadcast Div., Quincy, Ill.
1991 George Marti, President & CEO, Marti Electronics, Cleburne, Texas
1992 Edward Edison & Robert L. Hammett, Hammett & Edison, San Francisco
1993 Robert M. Silliman, Silliman & Silliman, Silver Spring, Md.
1994 Charles T. Morgan, VP & Dir. of Engineering, Susquehanna Radio Corp., York, Pa.
1995 Robert Orban, Chief Engineer, AKG Acoustics Inc., San Leandro, Calif.
1996 Ogden Prestholdt, A.D. Ring & Associates, Nakomis, Fla.
1997 George Jacobs, George Jacobs & Associates, Silver Spring, Md.
1998 John Battison, P.E., Consultant, Loudonville, Ohio
1999 Geoffrey Mendenhall, P.E., Harris Corp., Quincy, Ill.
2000 Michael Dorrough, Dorrough Electronics, Woodland Hills, Calif.
2001 Arno Meyer, Belar Electronics Laboratory Inc., Devon, Pa.

Source: NAB

Digital

▶ Continued from page 12

name-calling: "My system's better than your system." The only practical outcome of these squabbles was to unnerve Japanese receiver manufacturers, who prefer a single world market and a common standard.

Consequently, although more than 20 manufacturers have made and sold digital radios to the Eureka format, the critical mass necessary for volume manufacturing, which in turn leads to rapid falls in silicon cost, has not yet happened.

Fast-forward to the year 2000: Eureka 147 DAB is rolled out in more than 30 countries with more than 400 digital radio services on-air and 300 million people within range of multiplex transmission. Of those countries committed to a digital radio system, only the USA and Japan have not adopted Eureka.

After eight years searching for a viable U.S. alternative, the main contenders developing IBOC — USA Digital Radio and Lucent Digital Radio — merge their efforts to form iBiquity Digital, a company owned by broadcasters as a vehicle to exploit the IBOC technology IP.

Muddy arrangement

There is no doubt that IBOC has clear advantages for a U.S. broadcaster who, by adding a digital exciter to an existing FM transmitter, can simulcast a digital version of his service. Providing the interference caused to and by other FM services works out, IBOC is likely to prove the cheapest way to go digital.

Where the argument gets muddied is in the assumption that what works in the United States will work everywhere else. FM frequencies and transmitter powers are planned to very different criteria on either side of the Atlantic and this, amongst other things, may prevent IBOC getting a look in.

People are amazed that whilst a New York City FM station may boast 50,000 or 100,000 watts, the equivalent FM in London is limited to 4,000 watts. And whereas the USA has 9,000 FM transmitters, across Europe, more densely packed and smaller geographically, there are 23,000 FM transmitters.

IBOC as currently engineered would probably make the existing European FM spectrum plan unworkable.

Whilst Eureka has been building its networks and, as some would have it, waiting for manufacturers to honor their supply promises, and whilst the United States is still waiting for IBOC to happen Big Time, new rival digital radio platforms, which may yet prove how fragile the radio ecosystem really is, have already arrived.

Quentin Howard

Perhaps IBOC and Eureka 147 should take stock for a moment and realize that they both have more in common than either would like to admit.

For a start, both need to persuade manufacturers to invest significantly in research and development, and to manufacture new radio receivers.

To achieve mass-market penetration there is only one issue: the retail price of a digital radio. Consumers have a perception that radio is already almost a zero-cost addition, or that a stand-alone radio is low-ticket, sub-$50 item. So why would anyone purchase an expensive digital radio?

The IBOC content proposition means digital radio offers exactly the same as analog and the only marketable difference is the quality upgrade of AM stations, plus data. It is doubtful that consumers will value this at more than a few dollars, insufficient to meet the delta cost of adding IBOC technology to any audio device.

The challenge for the United States is to make IBOC radios for essentially the same price as existing FM/AM devices.

The role of DRM

This same challenge also faces Digital Radio Mondiale, the digital shortwave and AM replacement system.

Whilst DRM's audio quality doesn't bear too close scrutiny, and finding simulcast spectrum for a dual-mode AM transition strategy will be a task in itself, there is possibly a role for DRM in long-distance and domestic rural broadcasting, provided the receiver cost is not prohibitive. But DRM is unlikely to be successful as the sole digital replacement technology.

Unlike IBOC and DRM, which essentially offer listeners "the same, only different," the Eureka proposition offers perhaps twice as many radio channels as current analog availability, plus multimedia data applications and flexible digital audio quality. This is ultimately more compelling and therefore may be able to command a premium on the final consumer price, but still there is a big gap between current DAB component costs and the relatively small retail premium attainable.

With both IBOC and Eureka, the question of subsidy of receivers to kick-start the market arises.

Any broadcaster contemplating subsidy, other than for a marketing stunt, would be mad. Subsidy is like a drug — once started, it's hard to come off, and it serves little purpose other than to allow the retailer/manufacturer to maintain margins which the broadcaster pays for

See DIGITAL, page 19 ▶

Digital

▶ Continued from page 18

through the nose.

The plain fact is that subsidy is only applicable where there is a subscription income stream from the end user to pay for it. One of radio's great virtues is that it is, for the main part, free to air.

Yet without intervention, the receiver market will be very slow for both Eureka and IBOC. Meanwhile, alternative platforms are emerging, some overhyped and ultimately inconsequential, others which should be taken more seriously.

For $10 a month, U.S. consumers can subscribe to either XM Satellite Radio or Sirius Satellite Radio, which promise to deliver 100 channels apiece. The subscription income immediately allows in-car receivers to be subsidized and, with additional substantial investment from car manufacturers, it is likely that satellite radio receivers will emerge more quickly than other digital radio devices in the United States.

Whether people will quickly get bored with DJ-free music services is debatable, and my money is on a gradual return to real radio with announcers and DJs doing what's been working well since the 1920s.

Limited capacity

WorldSpace receivers are appearing in discount electronic retailers in London and in abundance in duty-free shops. Simultaneously, we wonder if the WorldSpace satellite is having trouble with its on-board guidance controls? Suddenly it appears that its beams are receivable in Europe — not bad for a service aimed at continental Africa!

Proponents of satellite radio in Europe seem to have glossed over the obvious shortcoming that whatever capacity exists has to be shared among 20 nations, each with its own language and culture. Unlike U.S. satellite radio, the offering relevant to one country will be severely limited.

Internet is minimal compared to traditional radio reception. The commercial value of a Los Angeles listener to a radio station in Paris, France, is nil. IT managers hate it when corporate networks clog up with multiple radio feeds, and ADSL backbones congest when too many users access high bandwidth content.

One of the world's largest broadcasters reckons its maximum capacity of 30,000 simultaneous Internet streams costs up to $30,000 per hour (including server, throughput and licensing). Compare that to the $100 per hour of a national digital transmitter network reaching unlimited millions, and it isn't hard to see that the efficiency of the broadcast model is way ahead of Internet streaming.

Perhaps IBOC and Eureka 147 should take stock for a moment and realize that they both have more in common than either would like to admit.

Critics of satellite radio point to the need for terrestrial repeaters to provide adequate city coverage and any hope of in-building penetration, and this requires yet more spectrum. Some would go as far as to label it a back-door means of achieving conventional terrestrial radio with the bonus of a satellite repeater.

The Internet is losing its gloss all round, including as a viable alternative means of delivering radio. Broadcasters who rushed to set up audio streams and stake a claim to cyberspace now realize that it is limited and expensive.

Broadband connection is essential, and even then the share of radio listening by

The same limitations apply to mobile phones which, for all the promise and hype of UMTS, cannot provide even a fraction of a percent of the capacity terrestrial radio broadcasters need. Moreover, listening to radio on a mobile phone connection is never going to be free to air.

In any analysis, terrestrial radio remains the most powerful and compelling consumer proposition. Digital radio adds considerable value to the proposition, yet keeps all the attributes of existing radio.

IBOC will be made to work and may be successful if the consumer appreciates the marginal benefits. Satellite is dependent on geography and subscription. DRM may find favor in limited markets, starting perhaps with international broadcasters. The internet and mobile phones are extension platforms, not replacements.

Meanwhile, Eureka has already gained considerable momentum and commitment which will ensure its continuance.

Combine technologies

So is there a clear way forward without confusion? One realistic option is to encourage a combination of technologies to satisfy market needs.

In countries like Australia, DRM would be ideal for the outback and Eureka for its metropolitan cities. Such a strategy could work with other system hybrids too, and with a big change in attitudes to system rivalry, a successful roadmap can be built which sees receiver manufacturers making worldwide devices with standardized optional modules inside for IBOC, Eureka, DRM.

This could ensure the success of all the digital radio systems rather than the damaging and expensive likelihood of market failure for one or more of them. Ultimately the consumer isn't driven by the best technology, he just wants a radio that works and we should be capable of delivering that to him.

RW welcomes other points of view.

Persons

▶ Continued from page 14

had passed or failed. In my case, the letter said I had passed the exam.

9. Send in the necessary paperwork. In my case:

a. Application for Alarm and Communication Contractor's License along with a check for $75. There is a $100-per-year license renewal fee.

b. A $5,000 Alarm and Communications Contractor's Bond signed by a Notary Public. This bond is an insurance policy, for which I pay about $80 per year.

c. A Certificate of Insurance with at least $300,000 liability coverage.

d. A Certificate of Employment stating that if I quit my employer (myself) that I will notify the State Board of Electricity 15 days in advance of my leaving.

e. A Minnesota State Tax Information Form stating that I will charge state sales tax on any items I sell in the process of working as an Alarm and Communications Contractor.

10. Wait for the license. After about a week, my license arrived. None of the work at the studio could be done until the licensing was complete.

A construction permit was required to do the studio work. It came to 50 cents per device to be installed, after which, the electrical inspector would sign off on the project, assuming it met the NEC specifications.

Minnesota State Law 326.244 requires "every new electrical installation in any construction, remodeling, replacement or repair, except minor repair work as the same is defined by the board by rule, shall be inspected by the board for compliance with accepted standards of construction for safety to life and property."

One problem, as I see it, is that there is no place in the law allowing a broadcast engineer to be employed full-time by one radio station or group unless that group is a licensed Alarm and Communications Contractor with the necessary insurances and paperwork as described above.

Another problem is that I cannot have an assistant help me pull and terminate cables unless that person is my employee, is an employee of a licensed Alarm and Communications contractor, or is a licensed electrician.

Obviously, there will need to be some middle ground so that the work can get done without the radio station paying an arm and a leg.

Minnesota may not be the only state with this requirement. Chances are most states will adopt similar statutes. Broadcast engineers everywhere should be proactive in getting licensing or they should oppose legislation requiring licensing in their state or states of operation.

Personally, I believe the new licensing will help prevent substandard work from being done at broadcast stations. We have all seen shoddy and dangerous wiring at studios and transmitter sites. Electrical safety is a prime consideration here and you can't really put a dollar value on that.

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Mark Persons is an SBE Certified Professional Broadcast Engineer based in Brainerd, Minn. He has built 14 new radio stations and rebuilt many others in the past 22 years. His Web site is www.mwpersons.com

Radio World welcomes other points of view and stories about problems facing radio engineers and engineering contractors.

You Saw It Here ...

Twenty Years Ago

SBE President Bob Jones stated that SBE was filing a strong reply comment against the position taken by NAB favoring the elimination of the 1st Class Radio Telephone license. According to Jones, NAB has no idea of the real problem. The FCC has the legal responsibility to issue meaningful licenses and now wishes to get out from under this responsibility. Jones feels that the FCC has been trying to eliminate the 1st Class license for the past five years because of the "memory factories." In Jones' opinion the FCC should figure a way around memory schools rather than simply giving up. Jones also feels that all the excuses he has heard concerning saving money made no sense at all. ...

Lew Wetzel, the NAB's Senior Vice President for Engineering, stated that 1st Class elimination was an issue that got engineers all riled up but that he didn't think management cares strongly one way or another. Wetzel stated that NAB's board voted for elimination after only a 10-minute discussion and that most board members were not violently for or against elimination. ...

News Item
"SBE Attacks NAB's Position; NAB/NRBA Stand Firm"
January 1981

Standard equipment on every model.

If any digital audio delivery system could have a "trust" button, DAD$_{PRO}$32 is it. Live assist or automation, single radio station or regional cluster, you can trust DAD$_{PRO}$32 to deliver 24/7/365. Put your mind at ease, choose DAD$_{PRO}$32—from ENCO Systems.

Smarter. Faster. Better.

ENCO SYSTEMS, INC.

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WIRED FOR SOUND

Uncle Steve's Weird Wire Stories

Steve Lampen

I promised last time to talk about weird wire stories. So here goes!

Back in 1985, I was working for a small FM here in the San Francisco Bay Area. Management had finally bitten the bullet and approved a new transmitter and antenna.

I really got lucky with the transmitter. Another local station was also putting in a new transmitter. In their case, it was a 5 kW Harris. They were concerned that, as they switched from their old rig to the new rig, something would go wrong, so they ordered a "temporary backup" transmitter, a Harris FM2.5K.

Well, something did happen; their old rig died before they could finish putting in the new rig, so the little "emergency transmitter" kept them on the air one afternoon drive time.

I heard about this, and a 2.5 kW rig was exactly what I was looking for. So I convinced the local Harris rep that it would be silly for him to send back this "used" transmitter (six hours used) to the warehouse, when he had a willing customer standing in front of him.

Of course, all he had to do was to give me the right price. It wasn't hard. I saved my station $7,000. And he probably saved about as much by unloading it. I had a crew pick it up and deliver it to my site. All Harris had to do was send out their install tech to check everything out.

75 vs. 50

In the process of installing the rig, I found a very strange thing. The coax cable running from the exciter to the IPA was wrong. Of course, all of these little cables are supposed to be RG-58 (50 ohm). In this case, someone had installed a piece of RG-59 (75 ohm). Still the rig checked out just fine. So I waited for the expert from Harris.

When I told him about the 75-ohm coax, he said "Wrong, wrong, wrong." So I dutifully opened the rig, took out the 75-ohm cable, and put in a piece of 50-ohm cable. We closed it up and turned it on, into our dummy load.

The rig went haywire. The tuning was all off, and we couldn't get it to stabilize. After screwing around for an hour or so, we decided to put the other cable back in, which we did. When we brought the transmitter back up, it was right on the money. Every spec was perfect.

Of course, we couldn't look at the VSWR on that one cable, but the VSWR on the output of the exciter was very low, and the output of the entire rig was 1.05:1, pretty nice.

So we left it as it stood. As far as I know, the rig is still there, humming along with a piece of 75-ohm coax in its innards. Can anyone explain to me how this darn thing worked? And why the 50-ohm didn't?

Now, even more amazing is the fact that, after I had written the paragraphs above, I opened a back issue of this very newspaper to John Bisset's *Workbench* column. He says, "I found an exciter that was wired with 75-ohm video cable." So maybe my discovery was not as unique as I thought.

The long way home

In that same issue, John asked for some interesting stories regarding RPUs. Well, in terms of wire and cable, this isn't a story so much as an observation.

Can anyone explain to me how this darn thing worked? And why the 50-ohm didn't?

I remember doing a remote one day, and having this sudden realization of all the technology that was involved in what I was doing. The actual thought was formed while looking at the talent. He was on a wireless mic, and listening to himself on-air with a Walkman-style receiver. From his mic to his earphones, here was a list of the wire and cable (and technology) used.

The wireless mic went across the room to the wireless receiver where (1) a short microphone cable attached it to a Shure M267 mixer. Then (2) a multipair snake, only one channel used, went up to the roof of the building where the 455 MHz RPU transmitter was. Of course, I could have run a long piece of RG-8 or half-inch Heliax to the roof, but you get more power and less loss if the transmitter is close to the antenna.

The output of the RPU went through a short piece of (3) Belden 9913 RG-8 to the antenna. The signal was picked up at our transmitter site and fed to an RPU receiver with (4) Andrew 1/2-inch Heliax. The output of that receiver was fed to another RPU transmitter in the 450 MHz band. This was fed to another antenna through (5) another piece of 1/2-inch Heliax and aimed at our studio location. There, a final RPU antenna picked it up and another piece of (6) Belden 9913 fed it to an RPU receiver.

See WIRED, page 30 ▶

Workbench

Radio World, April 11, 2001

Not Just Any Rubber Glove Will Do

John Bisset

I'll never forget the first time I witnessed an engineer "hot-tune" an AM tuning unit. The OIB dials were set for 50+j0, and the engineer grabbed the coil clip with his bare hand and "tapped" it around the coil 'til the null meter on the bridge read zero. "If you squeeze the clip real hard, you won't notice the RF!"

Fig. 1: This transmission line was not supported properly. The crinkle is the result.

I did notice that little blue flame, and that unmistakable zzzzap as the clip came in contact with each coil winding. Where was OSHA in 1970! Ha!

As for me, I chickened out, preferring to use the rubber insulated glove — and with the transmitter at low power. Of course, this was years before anyone considered RFR exposure; it was the burns we were protecting our fingers from, not RF exposure.

How times have changed. One wouldn't dare match a network in this manner today; or if they did, they wouldn't tell anyone about the technique, even if they used a rubber glove! There are rare instances, however, when a qualified engineer must work with hazardous voltages, and not just any rubber glove will do.

Charles Fitch, P.E., brought up the importance of selecting gloves as he answered an inquiry from an engineer from the United Arab Emirates. The engineer was asking about glove specifications for electric and telecommunications use. I'd like to share a portion of his reply, and especially the source for standard compliant electrical maintenance gloves — should you need them.

Electrical industry gloves are manufactured to the ASTM D 120 standard. The ASTM is the American Society of Testing and Materials. One of its stated goals is to assure uniformity between similar products of different manufacturers. The stated standard has at least five levels of performance ratings, with maximum work voltage making up one aspect of the ratings.

The standards also ensure that the glove length is sufficient to prevent arcing up the arm, protecting workers handling electric power equipment. Another more desirable feature is the color-coding of gloves, whereby the colors conform to different voltage ratings. This coding is extended to the base tone of the multiple levels used in each layer of the glove. Color layering permits visual detection of any cut or abrasion that may reduce the glove's effectiveness.

A separate standard outlines glove testing. The testing consists of water poured into the glove to see if any leaks out in a break or cut, and pressure testing with air to spot any imperfections.

Although a number of manufacturers make standard compliant electrical maintenance gloves, Charles has selected gloves from North Safety Products. You can find them on the Web at *www.northsafety.com/gloves.htm*

Note that I mention "qualified" engineer working on this kind of equipment. No radio station is worth dying for — a message of which many of us need a constant reminder. I'm ever amazed at the engineer who will climb towers, just to save his owner a buck. Don't get sucked into that kind of "dedication." You may be rewarded with an injury, or worse. If you are not 100-percent sure of the procedure you are about to begin, leave it for the professionals — learn by watching, not by becoming a statistic!

★ ★ ★

Site inspections can disclose all kinds of irregularities.

Figure 1 shows a crinkle in a piece of 3-inch flex line that was not properly supported. This cable actually touched the ground before looping back up into the transmitter building.

Closer inspection disclosed the outer jacket worn away where the cable lay on the crushed stone and was moved by the wind. Lacking the appropriate hangers is no excuse, as good old American

See WORKBENCH, page 24 ▶

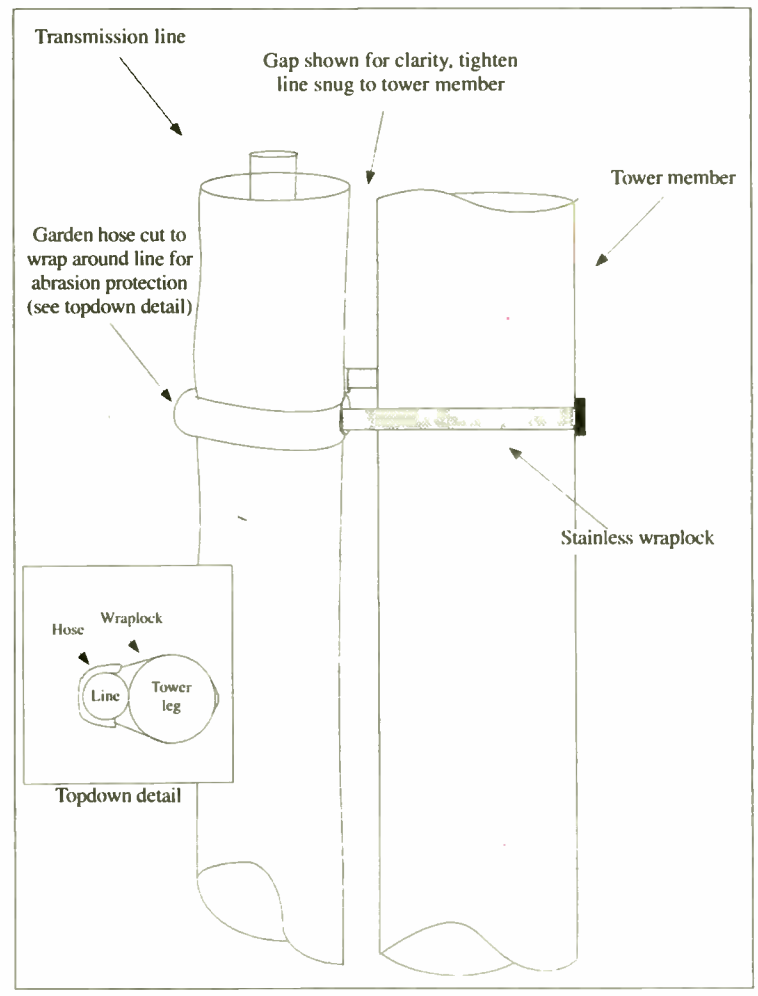

Fig. 2: A temporary fix: Stainless steel wraplock and sections of garden hose support the line.

Workbench

▶ Continued from page 23

ingenuity will prove.

A customer was installing line for a new station, the CP for which expired the next day. The tower crew was short 25 hangers for 3-inch cable. The factory was backordered on hangers for a month. The tower crew tried another manufacturer's 4-inch hangers, but they were too large.

Harris Systems Engineer Paul Barzizza shared a winning idea that provided the temporary support that was needed until the correct hangers could be installed. Shown in Figure 2, stainless steel wraplock and short sections of garden hose were combined to support the line. The 25 missing hangers were spaced throughout the coax run, so the line was supported mostly by the proper hangers. The wraplock hangers filled in the gaps.

Although not a permanent fix, the solution got the station on the air.

★ ★ ★

Glen Kippel of KHCS(FM) in Palm Desert, Calif., replied to our reminder to check security lighting at a transmitter site.

Glen went a step further — he has sampled the voltage of the motion-sensing lighting and connected it to a status input on the remote control. The engineer should inform the studio operator of any late-night visit to the transmitter, so the operator doesn't get "alarmed" (pun intended).

Otherwise, the status light will serve to alert personnel to a potential intruder. A magnetic reed switch installed on the door, and tied to another status channel completes the installation — your own "in house" security system!

★ ★ ★

Speaking of in-house systems, how's your first-aid kit? Do you have stocked kits at both your studio and transmitter sites?

It's not unusual to find depleted first-aid kits. Open your box and take stock of the supplies.

At the transmitter site, don't forget to include several bottles of clean water. Figure 3 shows a stocked first-aid kit.

★ ★ ★

If you are looking for a good spring-cleaning project, consider replacing the grass and weeds that surround your transmitter building with a carpet of crushed stone.

Ken Sleeman, CE for WWZZ(FM) in Waldorf, Md., placed landscape fabric (which blocks weeds) and a bed of crushed stone in a 4-foot perimeter around the transmitter building. His efforts have been rewarded with a dramatic decrease in bugs, pollen and dust inside the building.

Not only does the site look better, the side benefit of a cleaner transmitter building can't be ignored.

No budget available? Keep in mind that many garden and landscape centers will gladly trade this kind of service, given the popularity of gardening in the spring and their desire to get "free" advertising on your station.

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

Fig. 3: Have you checked inside this lately?

Keep Up With Broadcast Rules at NAB

Harold Hallikainen

TV dominates the list of items at a session about broadcast regulation on the morning of Wednesday, April 25, at the NAB2001 convention in Las Vegas.

But the entire broadcast industry is undergoing tremendous changes. Competition for spectrum from satellites, digital modulation techniques on the auxiliary service bands and the long path to DTV are likely to be discussed.

Dane Ericksen of Hammett & Edison leads the Broadcast Engineering Conference session "Regulations: Keeping Pace with Broadcast Technology." Keith Larson, associate chief for engineering of the FCC's Mass Media Bureau, is to be among the panelists.

Issues to be discussed include the 2 GHz BAS band transition, digital modulation on the 950 MHz aural STL band as well as the 2, 2.5, 7, and 13 GHz TV BAS bands, and DTV/NTSC and Class A TV issues.

The 2 GHz band transition raises conflicts between those who want to use a particular portion of the spectrum and those who occupy that the spectrum now.

As for digital modulation in the broadcast auxiliary service bands, a petition by the Telecommunications Industry Association proposes modifying the rules to permit digital modulation specifically in most of these bands. The Society of Broadcast Engineers and others have filed comments.

DTV is a big part of this discussion. In January, as part of its ongoing review of the transition to digital TV, the FCC adopted rules regarding the selection of the single DTV channel to be used by a station after the transition to DTV.

Other technical issues will be discussed, including the decision to stay with 8VSB instead of COFDM as a digital TV transmission standard.

Class A television issues will be addressed.

Last year, following direction from Congress, the FCC established the Class A TV service to "provide a measure of primary status to certain low-power television stations." When LPTV was originally adopted, it was largely a provision to allow local program origination on television translator stations.

These stations operated on a "secondary basis" and could be displaced if they would have prevented changes at full-power stations. Indeed, many of these stations were to be shut down or moved in the DTV transition. How this new primary status affects the DTV transition will be discussed.

On The Air

A Monthly Newsletter from Broadcast Software International Issue 3

News

BSI Joins the Cast of CBS' Y&R

In an industry crowded with broadcast automation options, CBS' eye met BSI. It was love at first sight. CBS Television City had their choice of digital audio systems, but they selected Broadcast Software International's Series 200.

"When I saw a demo of the BSI software, I just thought 'Wow'," said Ray Lignowski, Audio Supervisor at CBS Television City. "With BSI, we can work the way we want to. The BSI system is very versatile and easy to use. No other digital workstation does what BSI does."

CBS engineers cite several reasons for choosing Broadcast Software International. BSI's ability to provide quality systems at prices that fit CBS's budget was important. CBS was also looking for a system that was easy to operate and could satisfy the demands of live entertainment production.

BSI will furnish digital audio systems for CBS' live entertainment programming, which includes the daytime drama The Young and the Restless. CBS will be using BSI Series 200 automation systems. The $15,999 Series 200 system includes 2 rack-mount Pentium class PCs and flat screen monitors. BSI is providing their broadcast and production software, as well as Cool Edit Pro from Syntrillium. The system also includes dual ASI 4113 audio cards from AudioScience. In coming months, BSI will provide systems for additional CBS productions.

"We are proud to be chosen by yet another company recognized worldwide for quality broadcasting," said BSI President Ron Burley, "Working with CBS is a great opportunity. Live broadcast support is a unique challenge. We love finding new ways to improve our products."

Quote of the Month

"I went to WaveStation Weekend and thoroughly enjoyed it. Ron's demos are a must-see."

Dan Kolenda
WVIJ- Port Charlotte, FL

Calendar

Apr 24, Demonstration of a new product at the NAB by BSI President Ron Burley. Call for an invitation.

Aug 16-18, WaveStation Weekend

Birthdays:
Apr 15 1452, Leonardo da Vinci
Apr 16 1867, Wilbur Wright

Tip

Email Remote Control

BSI's WebConnect accessory allows you to send files to your automation system using regular email Unlike FTP or pcAnywhere, WebConnect requires only email capability on the sending machine. You can create and email a file to your automation system for air play. Radio groups can update every station with one email. WebConnect can also notify you via email or pager if there is an out-of-date or missing item. You can do it with WebConnect!

User File

KLEY - Matt Clark

Matt Clark started at KLEY about the time when they decided to get a new automation system. "I researched up and down all the different systems. By far, for the price and features, the best solution was WaveStation."

KLEY really depends on their $1499 WaveStation system. "Because we're such a small operation, with only two full-time employees, having a reliable automation system is very important to us," said Matt. "And WaveStation's ease-of-use really simplifies our work all the way around. It's very flexible, allowing us to instantly be running live-assist or fully automated."

Matt finds that BSI's tech support after the sale is great too. "I remember one time late on a Sunday night. We had a problem with our system, but couldn't figure it out ourselves. The tech guy at BSI was great. He walked me through step-by-step to fix our problem. He was patient and asked the right questions. It was just such a smooth and fluid process. If you've ever spent any time on the phone with your typical tech support guy, you know that that's very hard to come by."

Matt's advice to people looking at BSI's WaveStation, "It's a 'can't-go-wrong' type of purchase."

Send us your story.

The Uses and Limits of Cable Tray

Charles S. Fitch

This is one in a series of articles about the National Electrical Code and how it applies in radio station environments. The articles and supporting materials are available online at www.rwonline.com *in the reference section.*

In the last few episodes of our NEC saga, we have followed our multitude of wires through a myriad of pathways. This included various sorts of conduit and boxes to get to their ultimate destination: the appliance and system loads of our station.

One of the more interesting and flexible ways to carry wires — and not just electric — around the station is in cable tray.

The NEC is organized logically. Wiring methods, such as the use of conduit, are clustered in Chapter 3. Cable tray, a wiring method, is covered in this chapter within Article 318, which defines a cable tray system as "a unit or assembly of units or sections and associated fittings forming a rigid structural system used to securely fasten or support cables or raceways."

Over the years, code changes have allowed cable tray to be used all over the station. Two critical exceptions have the most direct effect on broadcasters.

You may *not* use exposed single-conductor wire in cable tray in most personnel environments; see 318-3(b). Open-wire cable tray is forbidden except in dedicated "Industrial Establishment" areas.

For example, one station used extensive cable tray in the transmitter room to carry big single conductors between major devices, including the humungous surge suppresser/voltage regulator and various items of switch gear, as well as its big, old 50 kW main transmitter.

This was a beautiful installation, wonderful all around. The Powers That Be, however, wanted to move some desks in that room for the interns so they could have their own "office."

The building inspector came along shortly thereafter to look at another permit item and noticed this violation.

He took out that dreaded multicolored form with that "stop violation" tag and started writing. He issued the ultimatum, "Put all these big conductors into conduit or move out these desks before I come back tomorrow. Those desks make this an office."

Only because the PTB didn't want to work all night helping with the conduit did they move out the desks.

The second exception is that cable tray must not run in an environmental airspace.

For instance, many stations use the space above the drop ceiling as the High Volume Air Conditioning (HVAC) system air return. Cable tray must not run through this space.

Ease of routing

But cable tray provides tremendous flexibility just about everywhere else. You can use the tray to run circuits such as audio, phone and data as long as the insulation is rated at or higher than the highest electrical voltage in that same tray.

If you run "covered cables" such as romex (not your best choice in tray) or AC, BX and other armored cables, just about any wire or cable can run along in the tray with your electric circuits, with few restrictions. This is helpful especially where tray provides a path to the open tops of your racks. Telco, audio, control and video along with your rack power circuits can drop into the rack cleanly and elegantly. Changes are performed quickly and easily.

An interesting difference between cable tray and other wiring methods, such as conduit, is that the wire sees the light of day. If the tray passes a window or the outside, make sure the wire and cables have a covering that is resistant to sunlight and ultraviolet. The concern is not so much about color fade but for the breakdown in the integrity of the cable covering from the sunlight.

NEC aside, I love to specify really garish colors for the wires that run in cable tray. Not only does it give the installation that Sci-Fi Channel look, but circuits are easier to find and matters are more easily organized.

Article 318 does have some additional caveats. I strongly suggest that you read this article and any other appropriate NEC section before specifying or beginning construction of a cable tray system.

The actual cable tray has many descriptive elements such as width between the outside

See NEC, page 27 ▶

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Radio World encourages our readers to obtain a full copy of the code as a complement to this series and as a future reference.

MARKET PLACE

New FM Transmitter

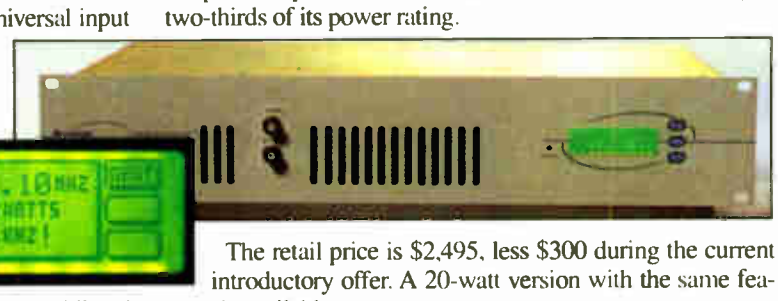
Available exclusively from Progressive Concepts, the new Broadcast Warehouse TX150 is a stereo FM broadcast transmitter suitable for low-power FM radio stations or as an exciter and back-up transmitter for higher-powered stations. The product is manufactured in England and sold in the United States by Progressive Concepts.

The RF output power is continuously variable from 35 to 200 watts. A front-panel backlit LCD graphics display indicates frequency, forward and reverse power, PA temperature, PA voltage, PLL board voltages and modulation levels as well as the amount of gain reduction of the internal audio limiter module.

The rear panel contains two XLR balanced audio inputs with individual level controls, a BNC socket for multiplex output from the internal digital stereo generator, a BNC connector for audio loop-through or external multiplexer/processor input direct to the exciter, a 15-pin D-type connector for remote control and monitoring with pins available for fault monitoring, RF muting, and for transmitter parameter monitoring via RS232. A program for Win95/98 will be available in spring.

The rear-panel IEC mains connector has a universal input voltage range from 85-260 volts AC for global power compatibility.

The transmitter is configurable; the built-in audio limiter and/or digital stereo encoder can be switched in or out of circuit to provide a full broadcast solution in one box, or it can be used with external equipment such as a multiband processor or external stereo generator.



The oscillator design incorporates a "virtual VFO" dual-loop PLL system, which the company says allows perfect audio flatness to below 10 Hz. Stations can pass super-low bass frequencies without distortion and without modulator overshoots while maintaining low-frequency stereo separation.

The power amplifier is based on a fan-cooled, SWR- and temperature-protected, 300-watt MOSFET device running at two-thirds of its power rating.

The retail price is $2,495, less $300 during the current introductory offer. A 20-watt version with the same features is available.

For information contact Progressive Concepts at (630) 736-9822, send e-mail to pconcepts@compuserve.com *or visit* www.progressive-concepts.com

NEC

▶ Continued from page 26

rails and the usable height of the rails. Cable tray is defined further by whether it is open or solid bottom. This is an important factor because of the heat dissipation difference due to the reduced air circulation of a solid bottom.

Conversely, most open-tray systems have rungs, like a ladder, and you need to specify the type of rung, i.e. square, round or elliptical, and the spacing between those rungs. These details affect how well the cable is supported.

Finally, you need to specify whether the cable tray will be aluminum, steel or some sort of non-conducting plastic.

All sorts of attachment and connection accessories are made for these systems, and on occasion they begin to look like those computer-designed roller coasters in modern theme parks with their coils, curls, hills and twists. Make a measured and surveyed road map of the system before ordering so that you have everything you need to complete it.

Restrictions

There are restrictions and instructions on tray capacity and fill, proper support and continuity of safety grounding. Foremost of these is that if the tray is mounted vertically, you must support and restrain the cables properly. Make sure you have the correct material to do a thorough job, and keep it that way by staying ahead of the maintenance curve.

Cable tray systems are not new to stations, and we see them all the time. Back in the analog era, most of us never imagined that these cable trays ever could become full. Few of us envisioned how much computer and information systems cable would run in stations today!

Once again, when planning, keep in mind that material is the smallest part of construction. Overbuild, with prudence, to avoid having to rebuild in the near future. Think it through and plan ahead.

If you have a mountain of cable above the rails on your existing system, it's time to replace or augment.

These systems are neither inexpensive nor simple, but they do pay out in convenience, flexibility and ease of troubleshooting every day you're on the air.

Charles S. Fitch, W2IPI, is a registered professional consultant engineer, a member of the AFCCE, a senior member of the SBE, lifetime CPBE, licensed electrical contractor, station owner and former director of engineering of WTIC-TV in Hartford, Conn., and WHSH-TV in Marlborough, Mass.

Seattle Radio Weathers Quake

Craig Johnston

"We are having an earthquake. The lamps are swinging, we are rocking and rolling ladies and gentlemen!"

Morning show host Dave Ross of Entercom's powerhouse Seattle station KIRO(AM) let his 10:54 a.m. listeners know the earthquake had hit.

"I tried to get under the desk as I kept talking and describing the motion of the fixtures," Ross remembers. "But the microphone boom wouldn't extend that far, so I just sort of crouched, and then decided I'd better get up, look out the window and see if the skyline was still there. It was."

Upwards of $2 billion in damage resulted from the 6.8 quake, centered nearly 30 miles southwest of Seattle. Older buildings, built before seismic considerations were incorporated into building codes, suffered the worst damage.

The KJR(AM) Tower, Missing Its Top Sections

Generator power

The area's radio stations rode out the shaker with a mix of results.

New Century Media's sports talk station KJR(AM) suffered the worst damage from the quake by far.

"It went off right around the time of the earthquake," said John Miller, New Century's director of engineering. "We were able to switch to the other transmitter, and that stayed up for a short time, and then that went off."

What the station staff didn't know was that the top 40 feet of the 530-foot tower had folded, and the beacon flew off. They had problems down below as well.

Land surrounding the transmitter building had been built up by the Port of Seattle, which uses it to store containers.

"So this means that any sort of water accumulates down there," said Miller. "Because of the earthquake, several water and sewer mains broke."

The earthquake also rendered the building's sump pumps inoperable.

"We probably could have gotten the old (transmitter site) going," Miller said, "although with the top 40 feet of the tower missing, it would have been a problem, and the mud and water in the transmitter room would have made it a terrible mess."

As they say, "timing is everything." For several months, New Century had been testing a new transmitter site near Tacoma, 30 miles to the south. It is co-located and diplexed with the company's KHHO(AM).

However, following the earthquake, KHHO was having its own problems.

"We had something go wrong with KHHO, but that turned out to be something had fallen down and shorted out the phaser," Miller said. The station reduced power and continued broadcasting until an engineer could get to the site and rectify the situation.

"We could have immediately turned on the Tacoma site for 950 KJR, but given that we were getting strange results on KHHO, we were hesitant to turn anything else on down there because of the possibility of making things worse."

"But when we got somebody down there and saw that both towers were still standing, he brought KJR on with low power, then gradually brought it up to 12-1/2 kW, quarter power, and that's where it stays."

Shown are two sections of the top 40 feet of KJR(AM)'s tower after being lowered by riggers.

He said the station was expected to begin operating at its authorized 50 kW within a few weeks after the event. New Century's two FM stations were unaffected by the earthquake.

The state capital, Olympia, is 10 miles from the quake's epicenter.

"Our building is built on pilings over the water, so we got shook good," said Tom Trotzer, chief engineer of Olympia's KGY-AM-FM. The stations lost power

See QUAKE, page 30 ▶

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Wired

▶ Continued from page 22

This receiver could switch between the 450 MHz and 455 MHz assigned frequencies. So we could either go direct to the studio for close or line-of-sight remotes, or we could power up the second hop transmitter and the studio receiver could switch to that frequency. This one was, of course, a two-hop project.

Our studios, not being line of sight to the transmitter, required that we use a Modulation Sciences composite line driver. This required (13) an RG-58 coax from the stereo generator to the composite driver, and some twinax (14) to run 1,000 feet to a building that did have line of sight.

23, 12 and 5

There the twinax was converted back to (15) RG-58 coax, which fed a pair of TFT 950 MHz transmitters. (These days, I'd just use a T-1!). From the microwave transmitter, it was (16) a run of 1-inch Heliax because of the high frequencies and cable loss at 950 MHz, up to the roof of the building and to a Scala full-size dish.

As far as I know, the rig is still there, humming along with a piece of 75-ohm coax in its innards.

The audio from the RPU studio receiver was fed to a distribution amp through (7) single-pair audio cable. And the output of the amp was fed though (8) a multipair snake cable to the on-air studio console. The output of the console was fed through two pairs of another (9) snake cable to another distribution amp, and from there (10), a pair of audio cables fed our on-air processing (11, 12) and stereo generator.

This signal went to our FM transmitter site, to an identical dish, and (17) through 1/2-inch Heliax to a TFT receiver. The composite output fed some (18) RG-58 that attached to the exciter in the Harris transmitter.

Then we have the strange case of the (19) RG-59 mentioned above. The transmitter output was (20) a 1-5/8-inch Heliax, through a switcher, and (21) another piece of 1-5/8-inch Heliax to a two-bay ERI antenna. The output of that antenna was picked up by the antenna wire (22) in the talent's Walkman, and the audio fed up through (23) the wires to his headphone.

Twenty-three cables, of 12 different types, working in five different parts of the spectrum.

And all this happened instantaneously! Truly a miracle of technology!

Steve Lampen is technology specialist, multimedia products for Belden Electronics Division in San Francisco.

His book "Wire, Cable, and Fiber Optics for Video and Audio Engineers" is published by McGraw-Hill. Reach him at shlampen@aol.com

Quake

▶ Continued from page 28

immediately, but emergency generator power assured uninterrupted broadcasts. There was no damage to the operating plant.

National news coverage has shown pictures of structural damage to Washington's legislative building, less than a mile from KGY's studios. The studios suffered cracks in their building walls as well as a hot water heater tipped over.

"And our commercial coffee maker flew about seven feet," Trotzer said.

Many other stations in the Seattle were largely unaffected.

Worldwide evacuated their building; some sought shelter under desks or doorways. No one was hurt.

"We are still on pins and needles and any loud noise could cause anyone of us to jump under our desks," said President Tim Schwieger. "Other than that, life is great."

No EAS

The Seattle region's Emergency Alert System was not triggered during or after the earthquake. Washington State EAS Chairman Clay Freinwald said the system is designed to warn of "short-fuse" events.

"The purpose of the EAS is to be the first warning, to precede something that the media would then run on the air as a news event." He cites a hazardous material event, gas main rupture or freeway bridge failure that had just happened as emergencies that would trigger an EAS alert.

"We do not use it for a storm that the weather department has been forecasting for the past 14 hours, because we knew it was coming. (Alternatively,) we don't use it is when we don't know it's coming, and we have no way of predicting earthquakes. So consequently we can't issue a warning for an earthquake."

Though West Coast attention to earthquakes has traditionally focused on California's San Andreas Fault, in recent years a fault zone off the Pacific Northwest Coast has been discovered as a substantial earthquake risk. Some scientists have termed it the second most dangerous fault in the United States, next to Alaska.

Was this the "big one"? Seismologists were quick to point out that the region remained largely unscathed from the 6.8 quake because it originated so deep within the earth, some 30 miles beneath the surface. By comparison, 1994's earthquake in the Northridge section of Los Angeles took place a few miles beneath the surface of the earth, causing some $50 billion of damage.

Three hundred years ago, Seattle experienced a subduction zone earthquake off the coast of Washington that was many times more violent than February's shaker. According to seismologists, that prospect looms again for the region, someday.

I just sort of crouched, and then decided I'd better get up, look out the window and see if the skyline was still there. It was.

— Dave Ross

As soon as the staff confirmed that the company's bevy of Seattle stations were still on the air, Entercom Seattle's Director of Engineering Tom Pierson took a walk through their facility.

"We're earthquake-aware, so we've taken a lot of measures," he said. "Racks are all bolted to the concrete slab, and they're tied to a support which goes across the top and is bolted to the wall." His report: everything stayed where it was supposed to. The stations never lost power at the transmitters.

Asked if there was any improvement he would make in their plan, Pierson said, "My number-one concern is sales people putting their phone books on top of their cubicles." Though the interview took place on the phone, it is supposed that he was winking.

Tom McGinley, director of engineering at the Infinity stations in Seattle and technical advisor to Radio World, said everything in his plant "worked just like it was supposed to." The station infrastructure and signal path were OK, though Infinity lost external power to one transmitter on nearby Cougar Mountain. Emergency power automatically came online and broadcasting continued.

"The building shook for about 40 seconds; we've got some small cracks in the plaster around the suite and a few things fell off shelves, but no damage," he said. "There was no loss of power and the telephone and Internet services were uninterrupted."

In Tacoma, near the epicenter, the employees of BSW-Broadcast Supply

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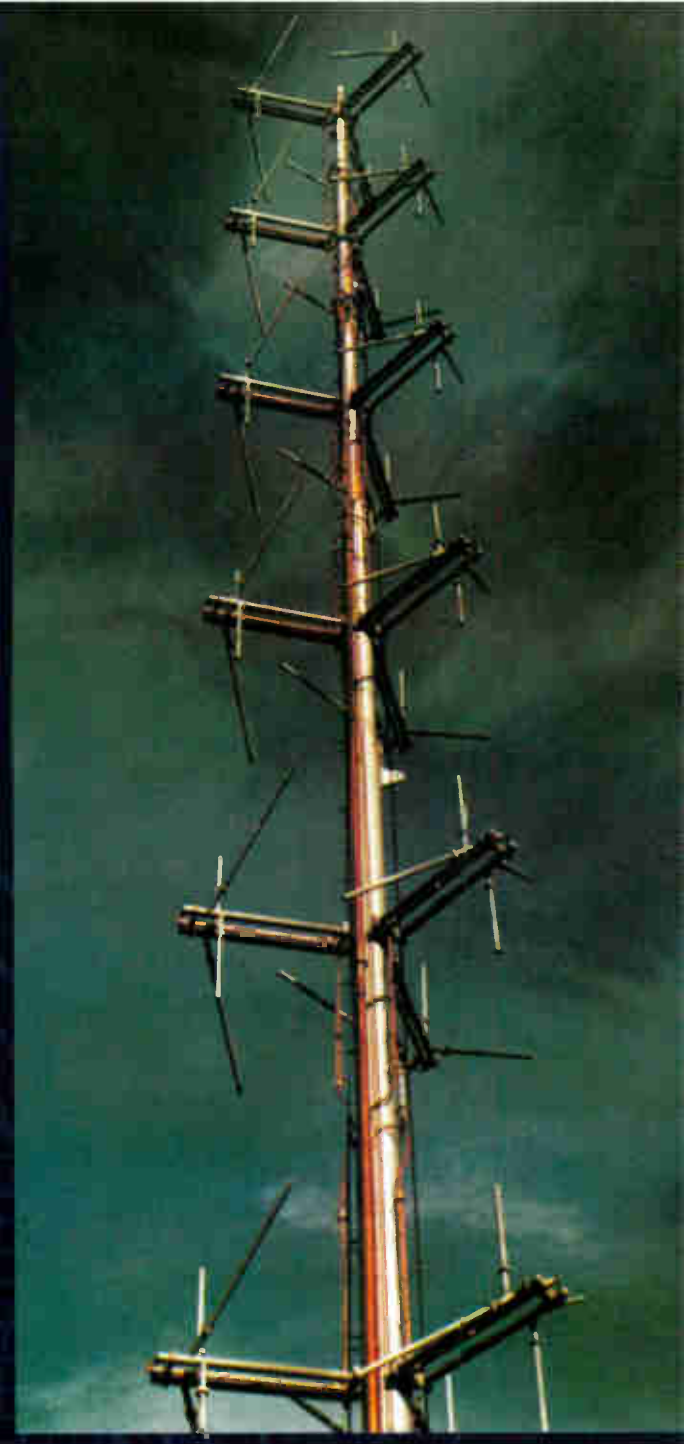

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50 Years On the Air
Page 44

Historic Site to Be Resurrected?

Storage Looms for the Site of Radio's First Commercial Broadcasts From 'Amateur' Station 8XK

Ken R.

The year was 1916. In a little brick garage in suburban Pittsburgh, an engineer toiled away on secret electrical experiments. The neighbors might not have understood what Dr. Frank Conrad was up to, but his tinkering led to the first commercial radio broadcast in this country.

Conrad's success with experimental station 8XK encouraged him to push his employer, Westinghouse Electric and Manufacturing Company, to build its own commercial station, KDKA.

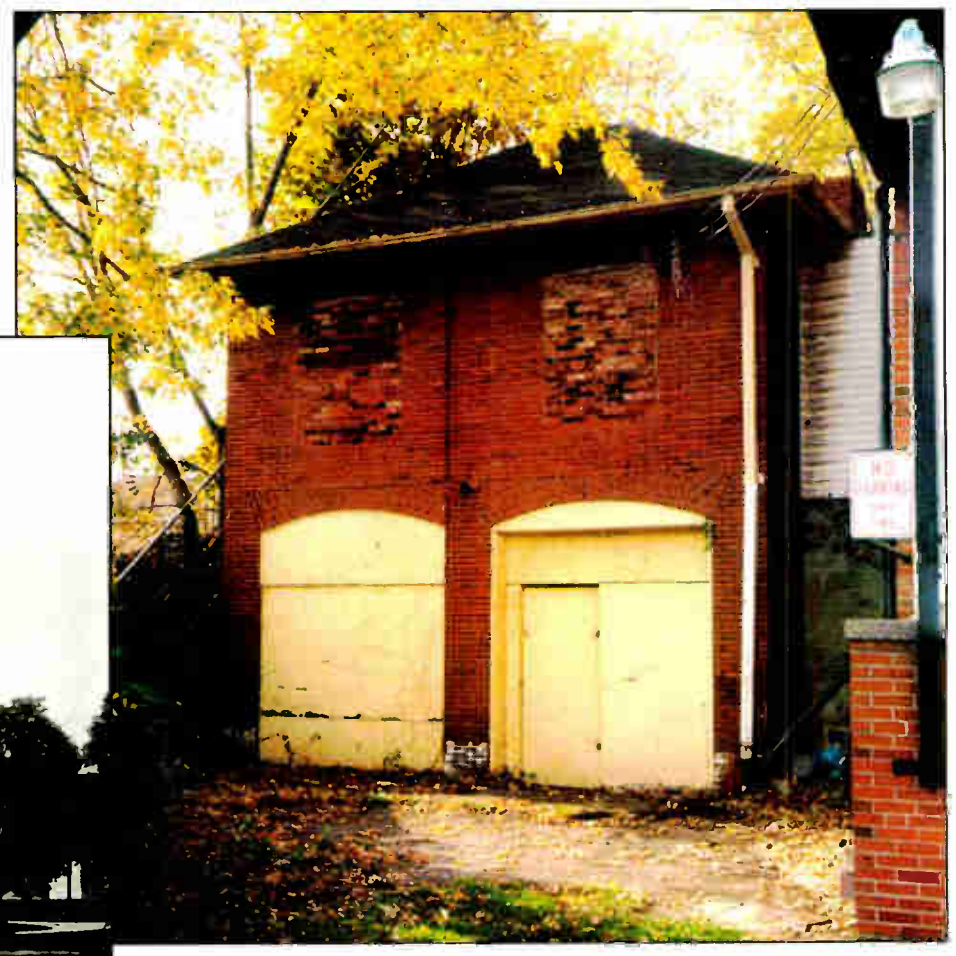
But unlike other sites where great American inventors launched industries of enormous wealth and cultural impact, such as the Edison Museum in West Orange, N.J., and the Henry Ford Museum in Dearborn, Mich., this 80-year-old historic site is in danger of being lost forever.

Radio's birthplace

The property on which the Conrad house and garage sit has been sold and the site slated for redevelopment. Disassembly of the garage began in late March, with plans to reconstruct it later brick by brick, when its champions raise the funds.

Rick Harris is chairman of the Frank Conrad Garage Project, an eleventh-hour effort to save the birthplace of radio and make it the centerpiece of a proposed National Museum of Broadcasting in Pittsburgh.

The Conrad Garage, Left, in 1920



The Conrad Garage Today

With a little help from Interep Chairman Ralph Guild and Save America's Treasures, a public-private partnership between the White House Millennium Council and the National Trust for Historic Preservation, this effort might prove successful.

"It was slated to be destroyed as early as May 1, 2001," said Harris, "to make way for a fast-food restaurant."

While the story of radio is dotted with colorful characters like Reginald Fessenden, Major Edwin H. Armstrong and Vladimir Zworykin, Frank Conrad was a visionary who took a simple "wireless" invention and built it into a practical product which some would say kicked off the commercial radio industry.

The book "Early Radio in the USA: The Story of Westinghouse Electric" by

See KDKA, page 34 ▶

KDKA

▶ Continued from page 33

George H. Douglas provides some context for Conrad's achievement.

For the most part, Douglas writes, even as late as 1920, almost 20 years after Marconi first demonstrated the "wireless telegraph," only a few amateur hobbyists had radio sets that they had built themselves.

Frank Conrad in 1921

Few could see the commercial value in wireless communications. Radio reception was still erratic and the public couldn't buy ready-made sets until 1920. Westinghouse was one of the first companies to make these new receivers available and so had a vested interest in providing the content.

Frank Conrad was a Westinghouse engineer in charge of the company's radio division that worked on government contracts, developing radio technology for the military during World War I.

During the war, Conrad developed radio technology that enabled pilots to send voice messages from airplanes to the ground.

And after the war, Conrad spent time experimenting in his garage just outside of Pittsburgh with his own experimental radio station, 8XK, which was licensed by the U.S. Commerce Dept. as an "amateur" station.

He and his two sons aired songs played live by local musicians and singers and broadcast phonograph records. The few people with radios, or homemade "crystal radio" sets, started to tell their neighbors. Then Conrad began to receive a deluge of calls and letters from people requesting that he play a special song dedicated to someone at a specific time, according to Rick Harris.

"He got hundreds of requests each week," Harris said. "Average people just couldn't believe that you could play music over the radio."

When he started to borrow records from the local Hamilton Music Store, Conrad began to credit the music store on the air and thus what many believe was the first commercial broadcast was made from that garage outside Pittsburgh in 1920.

Also that year, the public's interest in Conrad's "programs" spurred a local department store to advertise an amateur radio set for about $10. That same year, at Conrad's urging, Westinghouse built a 100-watt transmitter that Conrad designed and tested. Just in time for the 1920 presidential election results, the U.S. Department of Commerce, the agency first charged with regulating radio, licensed commercial station KDKA.

"The license wasn't official until you had it in your hands and so the Cox-Harding elections returns were broadcast on '8ZZ,' which became KDKA two days later when the U.S. Post Office delivered the commercial license that Westinghouse had applied for," Harris said.

In 1937, when pioneer Marconi died, all the radio stations in the world broadcast a two-minute silence; when Conrad died at age 67 in 1941, there was no such fanfare.

Money talks

At press time, Harris was disassembling the garage and moving it into storage. Now he and the garage project will need to find additional funding to rebuild the garage or build the proposed museum.

The largest grant the project has

See KDKA, page 36 ▶

Early Radio History Timeline: Beyond the Telegraph

1887 — German scientist Heinrich Rudolf Hertz demonstrates that electromagnetic waves can be transmitted through space. Hertz's name was adopted as the measure of all radio frequencies.

1901 — Italian engineer Guglielmo Marconi receives first trans-Atlantic wireless signal sent from England to Newfoundland. The first practical applications of the new wireless are for ship-to-ship and ship-to-shore communication.

1904 — British engineer Sir John A. Fleming develops the diode tube, which becomes the basis for transmitting wireless voice signals, but it fails to amplify electronic signals.

1906 — Inventor Lee de Forest devises three-element or triode vacuum tube (known as the *audion*), which becomes the basis for radio signal amplification of voice transmissions.
— Canadian inventor Reginald Fessenden transmits the first distant voice and music broadcast from Brant Rock, Mass., to ships at sea in the Atlantic.

1910 — DeForest conducts experimental live radio broadcast from the Metropolitan Opera House in New York of *Cavalleria Rusticana* and *Pagliacci* with casts that featured opera tenor Enrico Caruso, marking the first significant wireless voice and music transmission in a U.S. city.

1913 — The American Society of Composers, Authors and Publishers (ASCAP) forms to protect the creative works of musicians and music publishers that air over the new experimental radio stations. It is the first music licensing organization in the United States.

1916 — Inventor and business entrepreneur David Sarnoff, then commercial manager for the American Marconi Telegraphy Co., proposes developing a "radio music box" to receive radio transmissions. (Sarnoff eventually became the major force behind RCA's moves into radio broadcasting and television.)

1919 — Radio Corp. of America (RCA) is established primarily to market wireless radio receivers manufactured by General Electric and Westinghouse.

1920 — Wireless receiving sets are advertised for sale to the public.
— Westinghouse's KDKA, Pittsburgh, signs on with the election returns of the Harding-Cox presidential race. KDKA is generally considered the first major U.S. radio station to offer regularly scheduled programming.

1921 — Westinghouse's WBZ (Springfield, Mass.) receives the first U.S. broadcast license, granted by the Department of Commerce.

1922 — First paid commercial "message" airs over WEAF New York. This station eventually became WNBC and then WFAN.

1923 — First simulcast (a five-minute saxophone broadcast) by wire connects radio stations WEAF New York and WNAC Boston. The event marks the beginning of multiple "chain" station or network broadcasting.
— The National Association of Broadcasters forms in Chicago to negotiate ASCAP's demands for music license fees from radio stations.
— First government classification of radio stations by signal power is undertaken to alleviate channel interference when broadcasting.

1925 — Commentator Lowell Thomas makes first radio appearance over KDKA. Thomas is recognized as the pioneer of news broadcasting.

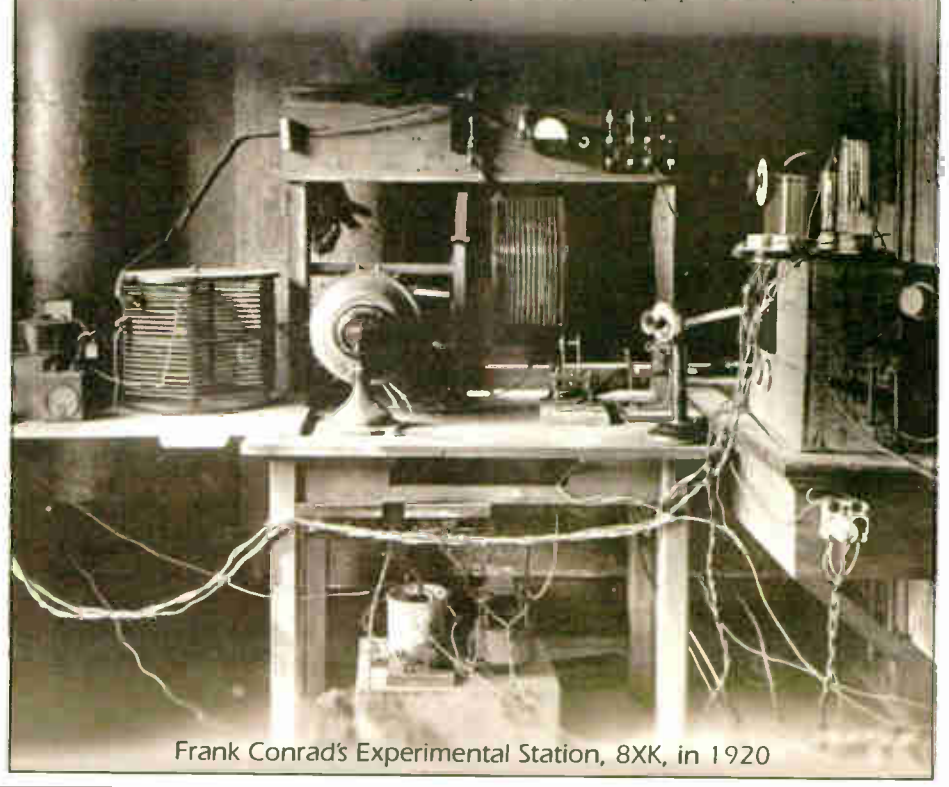
1926 — NBC (National Broadcasting Company) Radio Network broadcasts on 20 scattered stations through leased AT&T telephone lines and so becomes the first major radio network in the United States.

1927 — Congress establishes the Federal Radio Commission (FRC) through the Radio Act of 1927 to regulate radio. One of its mandates was that stations operate in the "public interest, convenience or necessity."

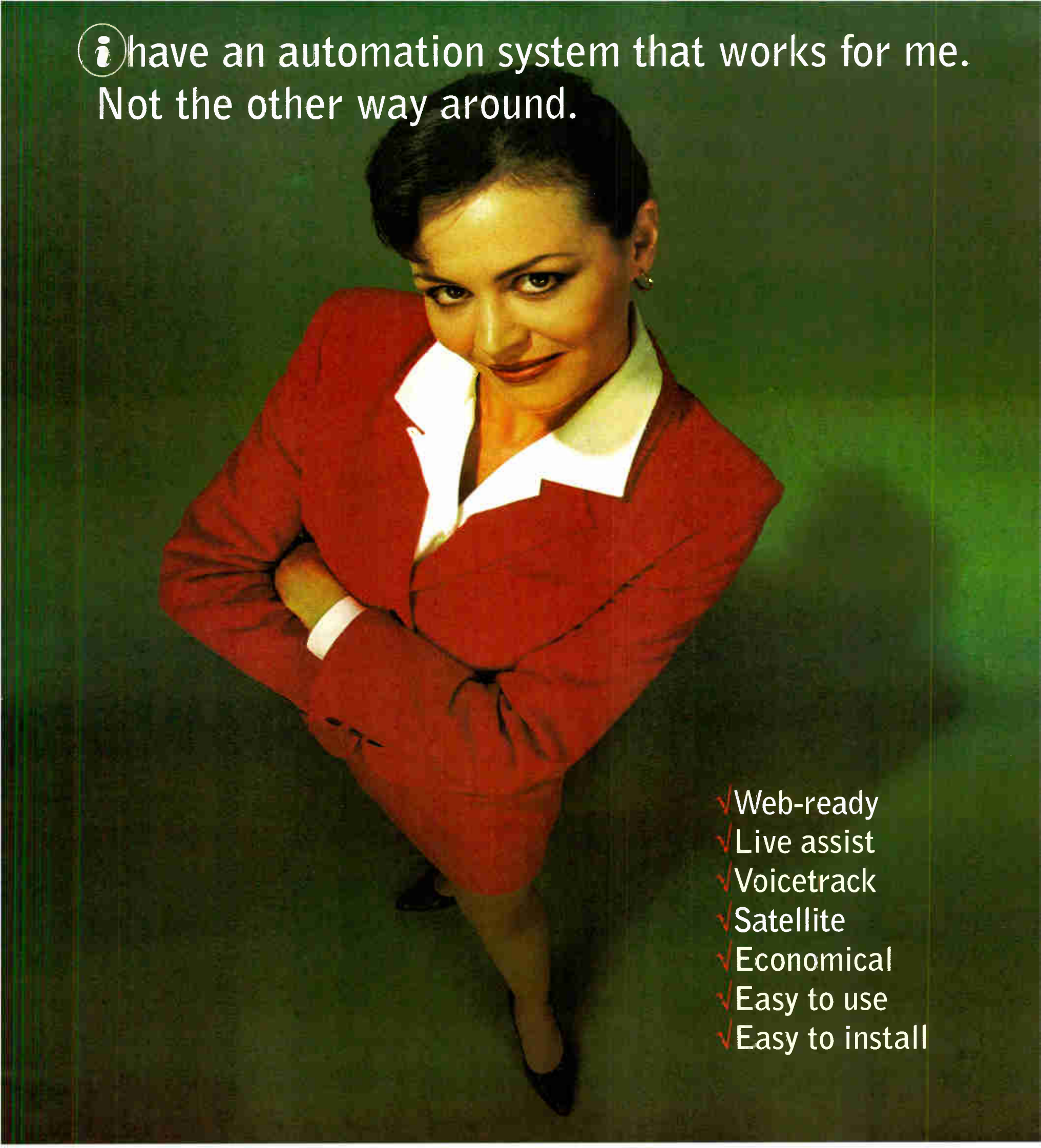
1927 - 1928 — CBS (Columbia Broadcasting System) Radio Network forms, first calling itself the Columbia Phonograph Broadcasting System, to compete head-on with NBC. Former cigar company executive William S. Paley becomes its president and eventually assumes the chairmanship.

1928 — Advertising agencies expand beyond print placements to radio.

Source: "The Remaking of Radio," by Vincent M. Ditingo, published by Focal Press



Frank Conrad's Experimental Station, 8XK, in 1920



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KDKA

▶ Continued from page 34

received thus far is $50,000 from New York-based Interep Chairman Ralph Guild.

"I have a very strong interest in this project because it's a link to the very beginning of the medium," said Guild. "Rick (Harris) and his associates are very dedicated."

While Guild's firm, Interep, has a commercial relationship with KDKA(AM) and its current owner, Infinity Broadcasting, the money donated to save the garage was from Guild's personal funds.

Michael Young, general manager of KDKA, said his station has no local dollars available to contribute.

"Our parent company has a foundation that gets involved in any contributions the company makes, but we can't do it at the station level."

The little brick garage where commercial radio began is headed for storage — and an uncertain future.

Young said KDKA has been generous with its free airtime and other in-kind services for the cause.

"We have a lot of respect for what Mr. Harris is trying to do and we've done everything we can to help raise awareness," said Young.

Harris said, "That is all true, but the bottom line is that neither KDKA, the CBS Foundation, Infinity nor Viacom has given us any money. When we solicit other organizations for funds, we're always asked how much KDKA has contributed, but when we tell them we received no money from them, that usually ends the conversation."

While there was some early talk that the CBS Foundation would make a cash donation, in a letter last November Harris received the official word.

"CBS said they would not be able to contribute to the Conrad Garage Project," said Harris. "I assume this means that the $5,000 they pledged earlier will not be forthcoming."

Dana McClintock, vice president communications for CBS/Infinity, declined to comment, other than to say that the CBS Foundation was closed as part of the recent mergers and reorganization. The NAB declined to comment on the project.

Alice Sapienza Donnelly, author of "When Radio Was Young" and passionate advocate of the garage project, said the group has asked many broadcasters and potential donors for help with the garage project and the proposed museum that would house it. She said the situation is exasperating.

"The Conrad Garage is the Bethlehem of broadcasting — there is no room at the inn in this situation," Sapienza Donnelly said, in reference to the group's frustration in trying to find a site to rebuild their treasure.

Harris said one potential tract of land, a former KDKA transmitter site, is ideal for the proposed museum where the deconstructed garage could be resurrected. It is four miles from the original Conrad property.

While it appears that Harris may have been quick enough to spare the garage from demolition, he said he will need at least another $250,000 to rebuild and restore the facility.

The spark

Harris has no background in radio, but got excited about the world of broadcasting at age six.

"The building where Conrad did his experiments later became an Elks lodge that my dad and grandfather belonged to," said Harris. "I remember when I was very young I attended a Christmas party there and my grandfather showed me around the building and said, 'This is where radio started.' That stuck with me all these years."

Harris is an unpaid volunteer in his capacity with the Conrad Project and has spent $75,000 of his own funds to help keep the organization alive.

"I am also president of a small graphics firm, R.J. Harris Company, which I've put on hold while we were in this crisis," said Harris. "I'll need to get back to that soon, though."

Those interested in the "Save the Conrad Garage" effort can visit *http://trfn.clpgh.org/nmb* or contact Rick Harris in Pittsburgh at (412) 241-4508. The National Museum of Broadcasting and The Frank Conrad Garage Project are nonprofit organizations.

Ken R. is a former broadcaster who now devotes full time to writing. Contact him via e-mail to kenr5367@aol.com

Correction

In "Radio Commercials for ... Radio!" in the March 14 issue, the telephone number provided for RAB members to call for copies of RAB-produced spots was a fax.

The correct number to call is the RAB's Member Services office in Dallas at (800) 232-3131.

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RAB at NAB: Stars and New Tools

Laura Dely

The Radio Advertising Bureau's "Sales and Marketing Conference" at this month's NAB2001 convention will offer strategy, psychology, motivation, inspiration, non-traditional methodology and power tools in a series of 10 sessions.

The SMC will begin with a session that will present some of the industry's top major-market managers, who will share their insights into how to find and keep valuable employees.

SRO

"We tried this first at the RAB and it was a huge hit — it was standing room only. The 'Most Influential Women' on this panel talk about their mentoring program for women in the broadcast business," said Lindsay Wood Davis, RAB executive vice president of meetings.

The "MIW Forum: Radio's Most Influential Women Speak Out" will focus on what the group believes is vital to developing and retaining more of the under-tapped talent pool that women represent.

"What we're hoping is to encourage mentoring of women, whether through formal, corporate programs or through informal programs that stations or senior management are willing to implement," said Edie Hilliard, president and general manager, Jones Broadcast Programming.

"One of the things we'll cover is the fact that out of the top 15 radio stations, seven of them have either women general managers or GSMs," said Hilliard. "And that is far disproportionate to the number of women that are in the business."

Ruth Presslaff

The "MIW Forum" will take place on Monday morning, April 23, in the Las Vegas Convention Center.

Database marketing is not only a tool for program directors. Ruth Presslaff, president of Presslaff Interactive Revenue, will demonstrate that it's also for sales managers on Tuesday afternoon in the Las Vegas Convention Center.

Presslaff's session, "Database Marketing for Sales Managers," will be about a "wonderful off-air sales tool," according to Presslaff. "We'll talk about how you can be a matchmaker between advertisers and listeners — matching advertisers' need to listeners' needs."

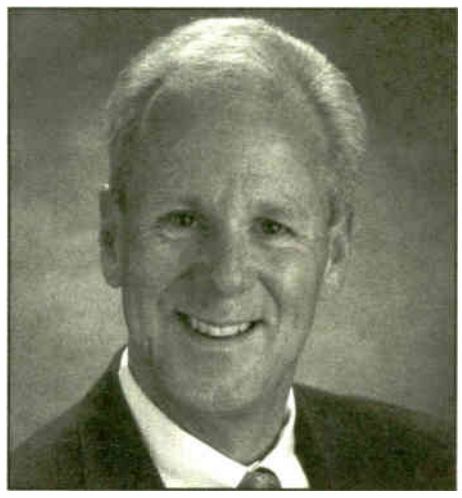
Dave Casper

Lindsay Wood Davis, RAB's meetings vice president and organizer of the RAB conference at the NAB, said this session is important.

Database

"More and more companies are pushing to harvest listeners' e-mail addresses on the programming side," Davis said. "At the RAB, we asked 'OK, what are you going to do with all those things that is going to make you some money?'"

Presslaff built PIR, an interactive voice response systems and Web-sites service, after a career in radio sales and network management. She said it has always bothered her that so much attention is paid to the listeners' needs only. This session will also talk about how to correct that missed opportunity.



Mike Mahone

"All of these listener-focused faxes and e-mails make a ton of sense, but why didn't we have something going out to the guys who were paying the bills? Why shouldn't there be a database with all of your advertisers?"

Presslaff said that if you knew what restaurants they like and their birthdays, for example — typical information in simple databases — an AE could develop a better relationship with a client.

"Then you could send them information about the station, about the market as a whole, about avails, about ratings. It's about keeping in touch with them other than to say 'there is a buy-up' or 'are you going to buy something from me' or 'I'm up for a renewal,'" Presslaff said. "Why shouldn't there be an automatic birthday to them, too?"

Presslaff said major companies see that some stations have databases that make radio even more attractive to them.

"So here's an opportunity to start really creating the asset and then getting your money's worth out of it."

On Wednesday, the RAB will show you how to work with independent music promotion companies with a respected independent music promotion company.

Tom Barsanti is senior vice president at Jeff McClusky & Associates in Chicago. Organizers said JMA is credited with helping to bring legitimacy to a business that has come in for its share of criticism.

Barsanti will lead the "Independent Record Promoters: Why Those People Want to Give You All That Money (and Why It's OK to Take It!)" session Wednesday.

Davis said this side of the radio business has become much more accepted.

"It has always, however, been looked at as if it's a programming issue and there's so much money involved, our attitude (at the RAB) was, 'Why isn't this a sales issue? And real sort of NTR?' We think it really is."

JMA consults superstar clients such as Madonna and U2 as it helps its radio affiliates win some of the millions of NTR promotion dollars that flow from the music industry.

If you missed Dave Casper and Mike Mahone's "Radio and the Internet: What Do We Do Now?" seminar at the RAB conference, you'll have a chance to sit in at NAB2001.

More companies are pushing to harvest listeners' e-mail addresses on the programming side, but how are you going to make money from that?

Casper, RAB's senior vice president of Internet services, and Mahone, RAB's executive vice president, services, write the new column *Web Wins* in Radio World. The pair will discuss where radio and the Internet are going, a question that appears to be on every station manager's mind these days.

"Radio and the Internet: What Do We Do Now?" will be held in the Las Vegas Convention Center on Monday afternoon.

Another Internet-focused session in the RAB's SMC track will take place on Sunday afternoon: "Programming Your Station's Web Site."

Moderator Dan O'Day is president of a company that conducts seminars for radio stations, groups, associations and advertising agencies.

A list of conference sessions is available at *www.nab.org/conventions/nab2001*

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SATELLITE RADIO

Facility Focus

Special Supplement to Radio World

April 11, 2001

XM Satellite Radio Completes D.C. Studio Complex Build-Out

By Judith Gross

Washington, D.C.

XM Satellite Radio has put the finishing touches on its 82 studios and has successfully launched the first of two satellites to begin the testing phase in anticipation of a mid-summer service start date.

The build-out marks not only the completion of the largest radio facility in North America, but a completely new concept in broadcast facility building, operations and control.

Part IT center, part military control center and part traditional radio, the completion of this massively complex and vast construction and installation project in just about 11 months marks a fresh chapter in facility design and building that promises to usher in a new era in how radio broadcasters will think, work and operate.

Along the way, equipment suppliers, designers and

continued on page 3 →

XM SATELLITES ARE READY TO "ROCK" AND "ROLL"

The studios are completed, the receivers are ready for sale and now the first of two satellites to transmit the 100 program channels planned by XM Satellite Radio has lifted off. Two satellites, appropriately named "Rock" and "Roll," are slated to blast off within a few months of each other and on March 18 at 5:33 (EST) Rock went into orbit off the Sea Launch Odyssey Launch Platform in open waters of the Pacific Ocean. "Today's flawless launch puts one of the final pieces in place to kick off XM's revolutionary new radio service on-schedule this summer," said XM President and CEO Hugh Panero.

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Satellite Radio is:

26,000,000,000 bytes of storage

2,000,000 audio cuts

1,650,000 ft. of CAT-5 cable

630,000 ft. of fiber optic cable

133,870 square ft. facility

320 audio work stations

288 digital control surfaces

279 relay racks

185 ethernet switches

37 local area networks

82 studios

24 news prep areas

14 Pro Tools production systems

9 gigabyte routers

3.6 megawatts of emergency power

2 high powered satellites

1 wiring solution

Ann Braverman, official Radio Systems spokesmom, shows Hugh Panero, President and CEO, XM Satellite Radio, one of the more than 500 StudioHub+ blocks that interconnect the XM Satellite Radio broadcast facility.

StudioHub+

The XM Satellite Radio Broadcast complex in Washington, DC may be the largest in the world. Its vast array of digital studios and computer networks starts to blur the separation between IT and broadcast systems. That's why XM chose the wiring system that doesn't discriminate.

At XM, **StudioHub+** carries every analog audio, digital audio, 100 Mb LAN, Cybex KVM extender, broadcast and business telephone, and even every office enterprise workstation signal.

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→ *continued from page 1*

technology planners either invented new ways to accomplish their objectives or borrowed technology from outside the radio industry, according to VP of Operations Tony Masiello, who was intimately involved in every aspect of the planning and installation.

"This is the largest digital radio facility in North America, "Masiello noted. "It took over a year to plan it out and less than a year to build it, so the time we spent planning was key. We brought together a lot of disciplines, including IT systems and network control that are well-known in military operations but not widely used in radio."

Accomplishing so much in such a short time period was only possible, Masiello said, by employing concepts such as modularity and computer-aided design, which involved planning the whole thing out on-screen before the first hammer hit a nail.

XM SATELLITE RADIO LIVE PERFORMANCE STUDIOS

Air studio as viewed from talent

MODULARITY REVISITED

"Many people think of modular construction as inferior to other methods of building, but we turned that concept on its head with the choice of high-quality suppliers, a high degree of engineering and a large measure of quality control every step of the way," Masiello said.

Austin, Texas-based Acoustic Systems provided the modular studios — more than 1.2 million pounds of them — but not one modular piece was put into place until the entire room plan had been plotted on computer and three-dimensionally modeled.

"Northeastern Communications Concepts provided the acoustical consulting; they measured it out using auto-CAD and devised a way to put 82 studios into 60,000 square feet of space, "Masiello said. "NCC then modeled the rooms to make sure they would be adequate."

"Not only did the CAD planning allow XM to virtually build off-site while the HVAC systems and utilities were being installed in the building, but it guaranteed that once the installation was begun, everything would fit into the space," said Al D'Alessio, president of NCC.

The studio shells, which were put together in pieces that averaged 4 by 10 feet, contained elegant extras such as trim details, texture and even curved surfaces to avoid a stereotypical modular appearance and resulted in a near-miraculous completion timetable of about 11 months, D'Alessio said.

"They came together fast with little compromise in ergonomics. These studios are about 5 to 20 percent larger than the minimum size you'd expect for the 60,000 square feet of space,"

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The result is extremely quiet studios built upon floating floors with neoprene isolators to keep noise out. In addition, silencers were installed for air conditioning, along with baffles on the air ducts, which were lined with soundproof material.

"These extras not only eliminate noise, but also reduce the turbulence from the air systems. With so many studios so close together, we wanted to make sure there would be no noise bleeds from one room to the other. Now, a studio playing a booming urban format can coexist side by side with one playing classical music," said Masiello.

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Yet to be finished is a special high-end performance studio that is planned for live concerts and on-site music recording. That studio is a 2,600-square-foot, two-story high, fully isolated room that Masiello called "one of the largest modular studios ever built."

Acoustician Francis Daniel designed the control room as a "zero environment" sound room, meaning one with no sound reflections of any kind, making it ideally suited to state-of-the-art digital sound recording.

"Our vision is that the performance studio will be part recording studio, part performance hall that will have its own characteristic sound and attract world-class artists like Pavarotti or Yo Yo Ma," said Masiello. "Like our radio studios, it's all-digital and is furnished with equipment from all over the globe."

The list of equipment providers to

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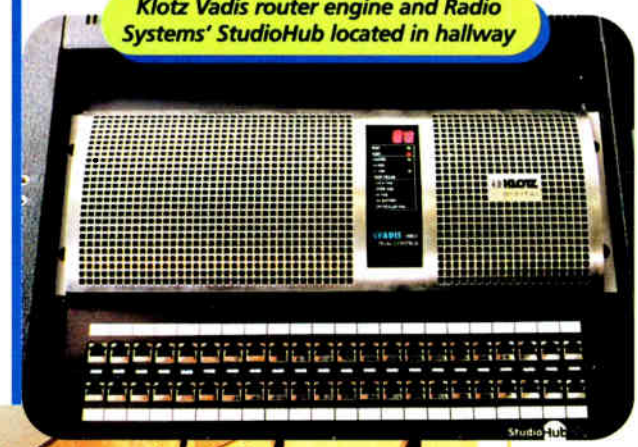

Klotz Vadis router engine and Radio Systems' StudioHub located in hallway

XM's Talk Studio Suites/Studios Architecture

STUDIOHUB BORROWS FROM IT WORLD TO SIMPLIFY WIRING OF XM'S STUDIO COMPLEX

Radio Systems' StudioHub was designed at the same time the distinction between analog audio, digital audio and Ethernets was beginning to blur. "Instead of having to run different cable for each and trying to predict what the future would bring, everything could be wired the same way, much faster and more simply," explained Dan Braverman, president of Radio Systems. Because digital audio really is a form of data, borrowing from the world of information technology was a logical step for connectivity. When the product was first introduced in 1999, Radio Systems added shielding to CAT-5 cables, making StudioHub suitable for radio studios.

"This kind of wiring is widely used in European facilities, but not in the U.S.," Braverman noted. But that may change, now that XM has shown how easily and quickly a huge studio complex can be wired with CAT-5 cabling.

Radio Systems used adapters to convert all equipment connections to RJ45. "Ethernet connectors are what simplifies the job. With XM's choices of equipment, only two types of wiring were required — fiber optics and CAT-5 — to wire the entire facility," said Braverman.

"Using the CAT-5 cable and RJ45 connections is an innovative way to wire our studios," said XM's Tony Masiello. "Taking into account the scale of the project, it would have been too time consuming to use punch-downs and also would have been difficult to manage. When Radio Systems demonstrated StudioHub, we knew it was right for us."

SATELLITE RADIO

Facility Focus

Special Supplement to Radio World

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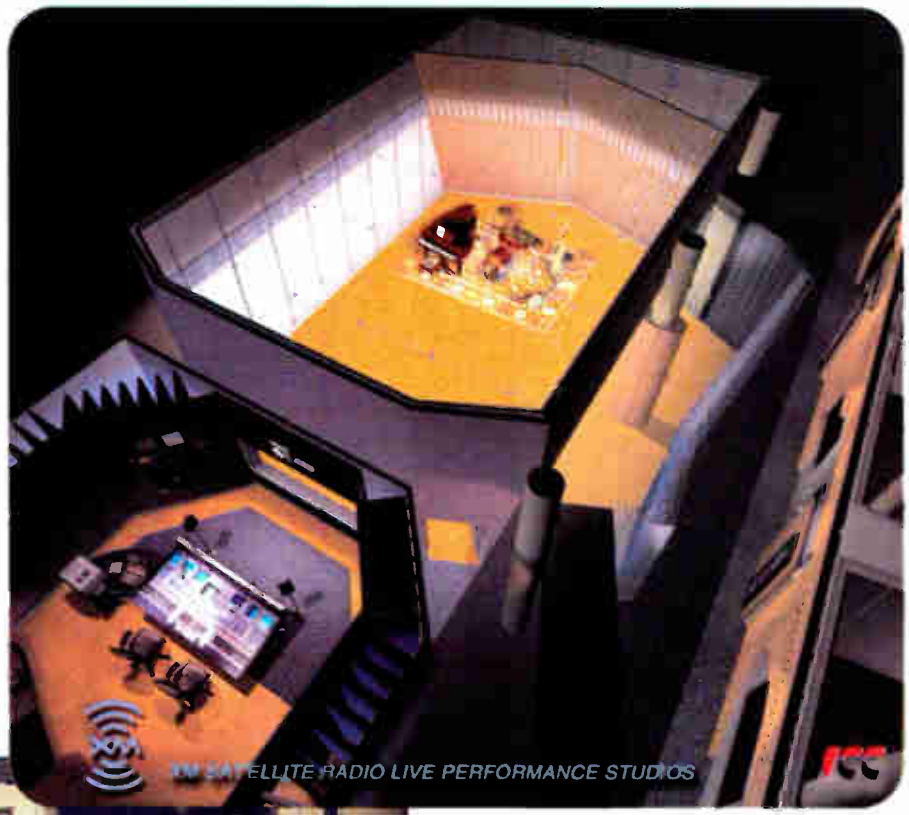

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The list of equipment providers to

continued on page 6 →

Klotz Vadis router engine and Radio Systems' StudioHub located in hallway

XM's Talk Studio Suites/Studios Architecture

STUDIOHUB BORROWS FROM IT WORLD TO SIMPLIFY WIRING OF XM'S STUDIO COMPLEX

Radio Systems' StudioHub was designed at the same time the distinction between analog audio, digital audio and Ethernets was beginning to blur. "Instead of having to run different cable for each and trying to predict what the future would bring, everything could be wired the same way, much faster and more simply," explained Dan Braverman, president of Radio Systems. Because digital audio really is a form of data, borrowing from the world of information technology was a logical step for connectivity. When the product was first introduced in 1999, Radio Systems added shielding to CAT-5 cables, making StudioHub suitable for radio studios.

"This kind of wiring is widely used in European facilities, but not in the U.S.," Braverman noted. But that may change, now that XM has shown how easily and quickly a huge studio complex can be wired with CAT-5 cabling.

Radio Systems used adapters to convert all equipment connections to RJ45. "Ethernet connectors are what simplifies the job. With XM's choices of equipment, only two types of wiring were required — fiber optics and CAT-5 — to wire the entire facility," said Braverman.

"Using the CAT-5 cable and RJ45 connections is an innovative way to wire our studios," said XM's Tony Masiello. "Taking into account the scale of the project, it would have been too time consuming to use punch-downs and also would have been difficult to manage. When Radio Systems demonstrated StudioHub, we knew it was right for us." ■

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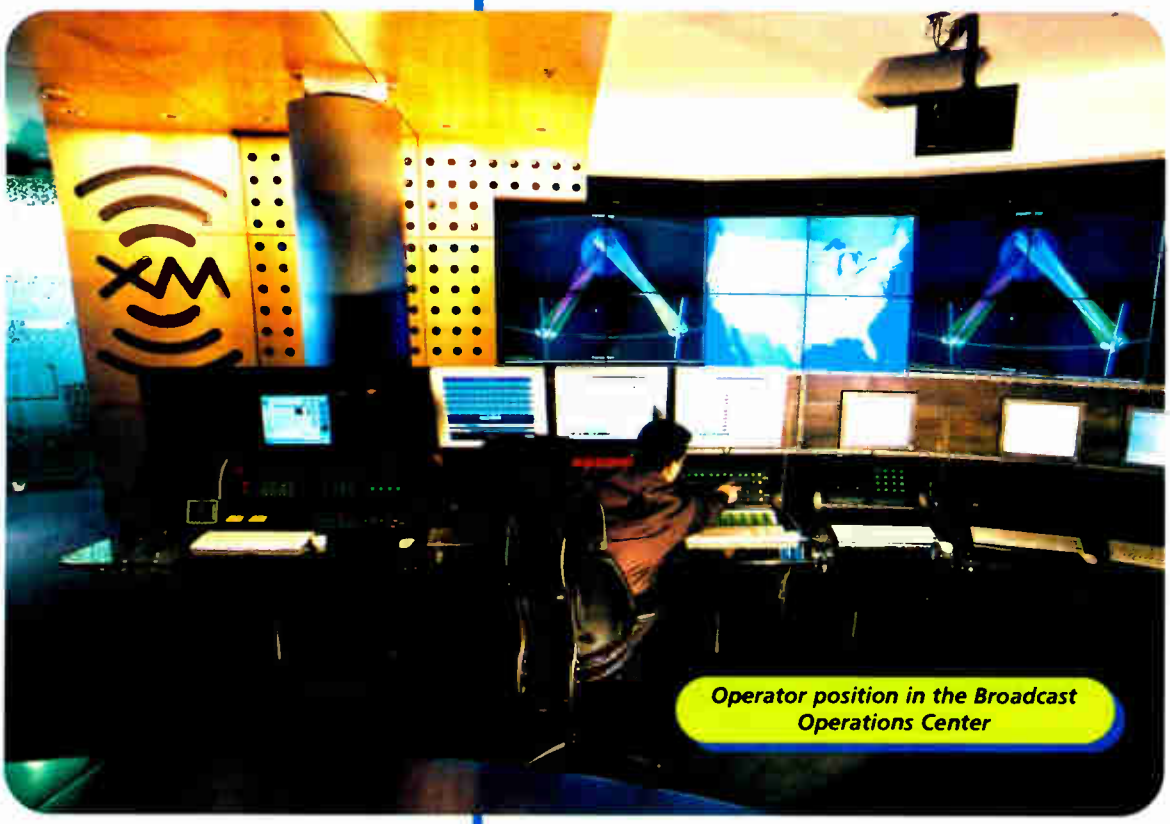

Operator position in the Broadcast Operations Center

→ *continued from page 4*

furnish XM Satellite Radio's studios and control center reads like a multinational *Who's Who*. There are studio monitors from Finland-based Genelec, consoles and control from German company Klotz, workstations from France-based Dalet Digital, satellite uplink equipment from SED of Canada, Rode mics from Australia and custom mic arms from the Broadcast Store in Germany.

There are also numerous equipment, integrators and planners based in the U.S.A., including the Radio Systems StudioHub, modular studios from Acoustic Systems, furniture from Studio Technology, processing and telephone systems from Omnia and Telos, and network management from Harris.

Even more amazing is the way XM has borrowed from other industries and set up a model of operations that is almost military in its precision and hierarchy — which is not surprising considering that Jack Wormington, the Senior VP for Engineering and Operations, whose department oversees the technical part of the facility, is a retired Air Force brigadier general, whose responsibilities once included launch and range operations at Cape Canaveral.

As Masiello explained, XM's technical facility is really three operating centers in one: a TOC, or Technical Operating Center; a BOC, Broadcast Operating Center; and an NOC; or Network Operating Center. How the three interact to sustain the mix of radio programming, technology and satellite control necessary to provide 100 channels of high-quality satellite digital radio 24/7 has rewritten the book on radio operations.

PERFECT BLEND

The heart and soul of the Broadcast

continued on page 8 →

GOING MODULAR: ACOUSTIC SYSTEMS CUSTOM-CREATES XM'S STUDIOS

XM Satellite Radio put a lot of preplanning into the design of its studios, simplifying the construction and installation process by borrowing innovative technologies from other industries. In doing so, XM managed to fit 82 studios into an efficient use of space and finished the studio build-out in less than a year.

An important element was the choice of "modular" studios, but not in the sense or the associations the term usually brings to mind.

"The perception of modularity, and the way it plays into the latest studio projects, has changed," explained Charles Roe, broadcast sales manager for Austin-based Acoustic Systems, which supplied the 1.2 million pounds of studios XM used. "Pre-engineered is actually a better way to say it. The studios are built by component and shipped to the site for assembly. But although they can later be reconfigured or moved, they aren't portable; we're dealing with heavy construction," Roe said.

For XM's studios, Acoustic Systems also used "silencers" on the air system to eliminate noise even more. The studio "shells" were also put on top of floating floors, so the studios are completely isolated.

"Sound isolation was critical to this project," said XM's Tony Masiello. "We're going to have all types of radio formats next to each other, and there would be no tolerance for sound bleeding through from a loud rock room to a quiet classical studio. Acoustic Systems produces very high quality components. They also delivered on-schedule, which was especially important to our project management."

An added benefit of using the pre-engineered studio panels is that XM can reconfigure them should they need more room to grow. They could even take the studios with them to an entirely new location, although each studio does weigh in excess of 20,000 pounds. ■

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Klotz DC II Console with control screens of Klotz & Dalet

continued on page 10 →

each studio the ability to have 64 channels of stereo audio going out and 64 coming in at the same time. Masiello noted that fiber has not been a mainstay of radio plants to date, but added that the experience XM has pioneered may start a trend of more studios using fiber to carry audio in a digital environment.

"In addition to enabling us to wire the facility quickly, fiber has an incredible capacity for audio, so that 128 channels of stereo audio can be wired to each studio simply," Masiello explained. "Plus it eliminates the problems associated with traditional studio wiring such as interference, noise and hum."

Klotz consoles were already using fiber connections, so the company became a logical choice for handling XM's audio. "Klotz is the audio backbone of the facility," Masiello explained. "They were already building the type of digital system we needed, from the fiber carrying audio to the ability to

continued on page 10 →

→ continued from page 6

Operating Center and the Technical Operating Center is the union of three equipment components that can't be understood in terms of the traditional radio studio, Masiello said. These are the Klotz system console and control system, Dalet Digital workstations and Encoda automation gear.

All live audio is transported as AES 3 digital audio via fiber optics, giving

Unique furniture design by NCC and custom-built by Studio Technology

STUDIO TECHNOLOGY HELPS CRAFT A UNIQUE LOOK FOR XM'S STUDIOS

XM Satellite Radio's studios and surrounding rooms have a supersonic space-age appearance, right down to the Enterprise Control Center. The look is deliberate and fitting for a company about to sky-rocket radio into the 21st century.

Part of the sleek appearance is due to curvilinear designs transforming the modular look of computerized designs. The theme is carried through in furniture custom-built for XM by Philadelphia-based Studio Technology.

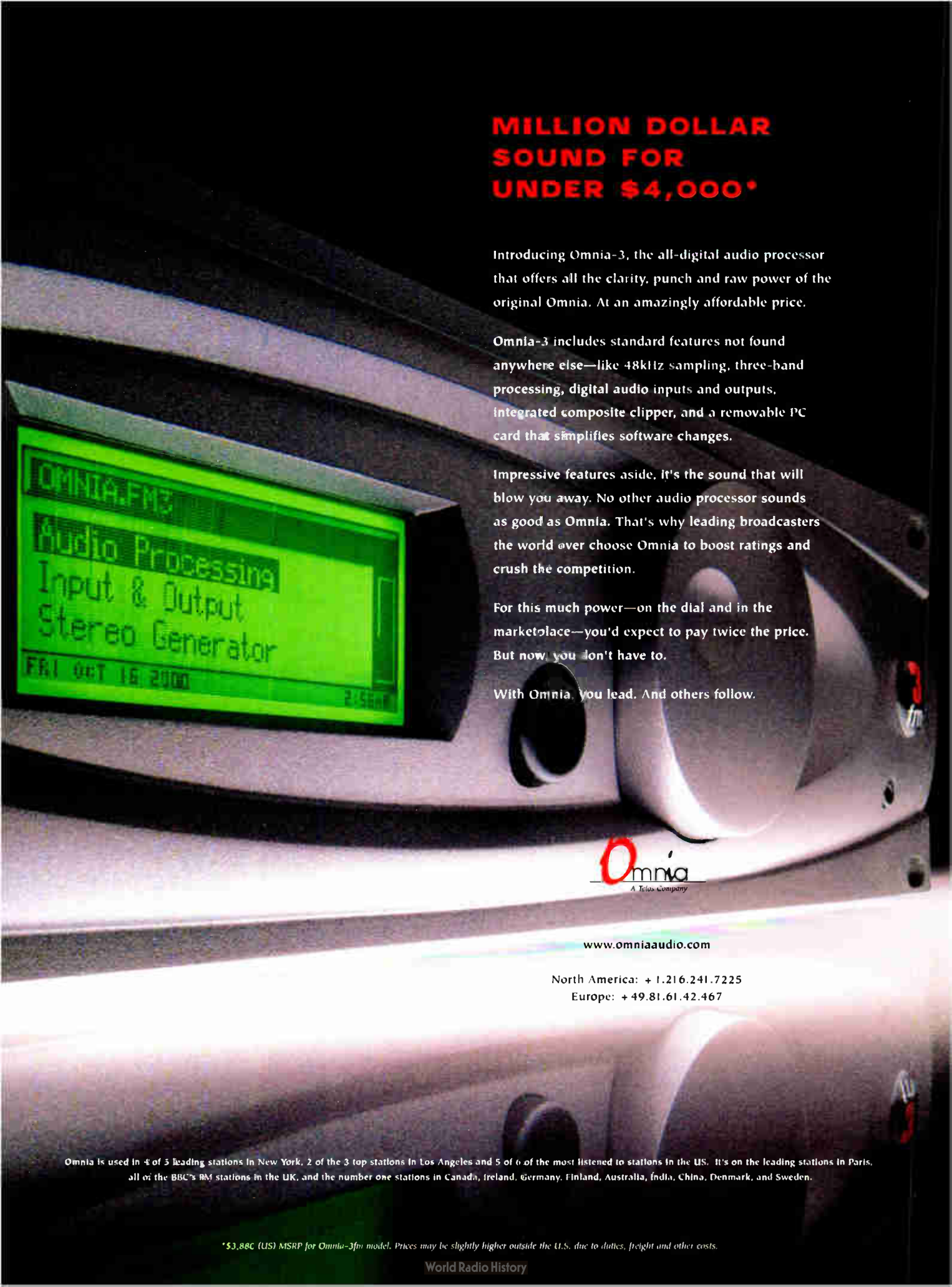
Creating studio furniture for 82 studios and completing the job on-schedule was a challenge for Studio Technology — as it was for all the equipment suppliers on the project. But according to company President Vince Fiola, the key — once again — was in the planning, especially that done by Northeastern Communications Concepts and XM's Tony Masiello.

"We had a good design to work with," Fiola said. "We took NCC and Tony's CAD designs and manufactured the furniture according to XM's specifications." The furniture was manufactured on-site by Studio Technology and then was ready to wire.

Unique to XM's studios are what Fiola termed "hanging cabinetry" — the furniture's cabinets are hung from the bottom of the countertops.

The furniture's countertops are made of Corian, a durable, solid-surface, man-made composite with the look and feel of stone. The base cabinetry is plywood with a laminate imported from Italy. The colors, reflecting the rest of the studio complex, are blacks, grays and silvers, with what Fiola called a "cutting-edge look."

"It looks great," Masiello said. "Studio Technology faithfully executed the design we wanted. So far, everybody who has seen it has said 'wow!'"



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*$3,88C (US) MSRP for Omnia-3fm model. Prices may be slightly higher outside the U.S. due to duties, freight and other costs.

→ *continued from page 8*

handle an operation this large. Klotz thought it all out in advance."

The Klotz equipment serves the function of a digital audio console, consisting of the Vadis platform along with the sleek-looking DC II control surfaces, which Masiello helped design. The Vadis platform uses frames that form a central matrix, providing the equivalent of 2000x2000 (or greater) switching instantaneously.

In XM's TOC, 82 Klotz consoles work with 200 Vadis platform frames to make up the central matrix. Redundancy is built into the system, which performs more than mere console functions, also providing audio routing, intercom, mix-minus, IFB and a variety of different digital audio formats, depending on the modules selected.

Console setups can be programmed for each room and each user, so the multiple talents using each studio can customize their EQ, compression and function settings. That, plus the fact that the DC II console surfaces resemble traditional consoles, should cut the learning curve to zero when XM is ready to begin its program service.

THE LARGEST SERVER

Digital audio that is not carried live over fiber is treated as data and stored in a massive Dalet store-and-play system including some 400 workstations. CAT-5 wiring borrowed from the IT world is the main wiring for audio, which is stored and manipulated as CD-quality 384 kbps MPEG-2 audio.

Masiello explained that the Dalet system is a 22 Terabyte storage system, holding two times the amount of information contained in the Library of Congress, the largest storage area network ever built by IBM and more than ample storage for the 1.5 million songs comprising XM's programming library. All audio content stored, including a huge amount of information about the music such as song title and artist information, album graphics, royalty-tracking information, when it is played, and the like, will be available from the huge Dalet server to

continued on page 12 →

Hard drive storage (over 22 Terabytes) for Dalet digital audio system

Turret-mounted Denon DN-961FA CD Players

DENON CD PLAYERS TAPPED TO BE XM'S RADIO STUDIO STAPLE

The sale of more than 100 Denon DN-961s to XM Satellite Radio was one of Denon's largest single sales of one model to a radio station. With an all-digital audio chain supporting a multitude of radio music formats, reliable CD players were a necessity. But because their primary use will be for production and as source material to create XM's 1.5 million-song library, accessibility was also a concern.

"Since most of our music is on file servers, we'll be using CDs to add to the libraries and for use in production and for backups. The Denon players allow us to play CDs from the slide draw instead of having to worry about the jewel cases," explained XM's Tony Masiello.

"XM purchased these as a "bullet-proof" CD player to load all the station's music to their hard-disk system, as well as a backup in case the hard disk crashes," agreed Wayne Dolnick, Denon's sales and marketing manager for pro-audio products. "The DN-961 is a narrow-frame, industrial-grade CD player designed to play 24/7, 365 days a year. Plus, it has our proprietary drive mechanism — a cast-aluminum chassis within the body of the machine that can withstand almost any kind of abuse."

The DN-961 has a drive mechanism that allows the unit to go into "sleep mode" when it is not in use, which prevents wear and tear on the motors and the laser, Dolnick explained.

"The result is thousands of additional hours of playtime — perfect for radio stations that cannot afford any down-time," Dolnick said. ■

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dalet
DIGITAL MEDIA SYSTEMS

NCC designed the talk show studio, which features Studio Technology furniture and Acoustic Systems modular components.

→ continued from page 10

any of its numerous workstations everywhere in the facility.

The secret of instant availability of stored content, according to Masiello, lies in 14 virtual LANs set up according to priority levels of need. So, for example, a DJ playing a song live would have slightly faster access to a single selection than a programming guru reviewing cuts for a future show.

Ceiling-mounted Genelec reference monitors

"But even then, we're talking microseconds, without even a human ability to perceive the difference," noted Dalet Project Manager Bill Wheeler. The Dalet system also makes use of the company's operations software such as NewsTeam, which can handle all the prep, editing and packaging of a full-fledged radio newsroom.

Managing all of XM's multiple channels of audio is a huge automation system provided by Encoda, which takes the concept of radio automation to a totally new level. Its process control computer talks to the Klotz and Dalet systems and interfaces with each studio, deciding what audio goes where, when — acting as a massive content manager.

Management of each channel of audio, down to its bit-rates, is handled by the Encoda Paradigm system. The Encoda Paradigm uses a relational database management system with software modules for traffic management, program scheduling, content creation and tracking, as well as on-air automation, among other functions.

For example, if each of XM's 100 program channels needs two promos a day, the Paradigm system will track this function, prompting its creation by assigning a "cart" number, assigning production personnel, showing when it is scheduled and sending out alarms if it is not available when it is scheduled to air. It can also generate program logs, handle billing and is responsible for much of the information data that will be sent to XM-ready radios, to identify a song or an artist.

WIRING MADE EASY

Wiring all of this control and operations would have been a time and ergonomic nightmare if XM hadn't made two critical decisions: first, to send AES audio over fiber and then to send data over CAT-5 wiring borrowed from the world of information technology. Integral to the decision to use CAT-5

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GENELEC STUDIO MONITORS KEEP AUDIO IN THE DIGITAL DOMAIN A LITTLE LONGER

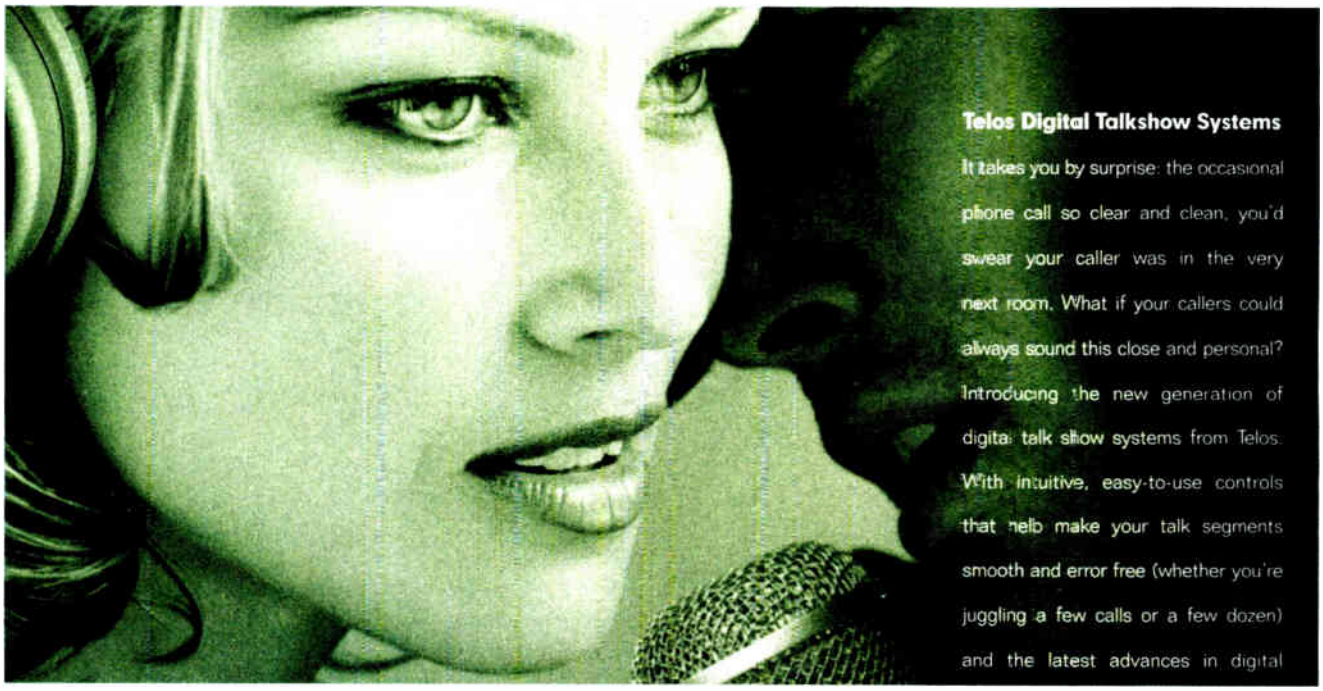
An all-digital radio facility designed and built to the specifications XM Satellite Radio used is likely to become the ultimate example of how far digital technology has come. From console input through workstation through smart satellite radio receivers, the ideal is to have as few D/A conversions as possible. Up to now, the exception has been studio gear such as monitors.

But the right equipment choices can change even that. In the case of XM, the Genelec S30D nearfield monitors installed in the 82 studios were designed specifically for all-digital environments. With a 96 kHz/24-bit digital interface, the monitors accept AES/EBU audio (as well as analog).

"The AES digital signal goes directly into the monitors, which have very high-quality D/A converters that are 100 percent electronically matched to the input of the filters. This means the sound is truer, eliminating guesswork within the digital-to-analog interface," said Will Eggleston, U.S. director of the Finland-based company.

Eggleston also noted that the output of the S30D's D/A converter is adjustable, so that the output of the attenuated speaker can be "wide open," using as many of the digital bits to create the sound as possible without needing to adjust the analog gain. "You can set the maximum output relative to dBFS (digital full-scale). So loudness is not a function of the digital bitstream."

The frequency response of the S30D is 36 Hz-50 kHz. The quality, XM's Tony Masiello, is extraordinary. "Personally I was blown away by the quality of these speakers. Since they accept an AES input I can truly keep the signal digital up to the last component. The D/A converters and matched amplifiers are built into each speaker. But their strength is really in their sound." ■



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Monitor area of Encoda automation system

→ continued from page 12

cabling was the selection of Radio System's StudioHub.

"We originally designed StudioHub [when] the distinction between analog audio, digital audio and Ethernets began to blur," explained Radio Systems President Dan Braverman. "Ethernets had already been using CAT-5 wiring and RJ45 connection, and it turned out to be one of the best cables for both analog and digital audio as well."

"Because of the vastness of the project, we made a fairly fast decision to use StudioHub for the wiring. Radio Systems uses shielded CAT-5, making it well-suited for our audio environment. Wiring up all the studios and control centers this way saved time. It also allowed us to fit all the wiring into the spaces beneath the floating studios," Masiello noted.

In addition, the other equipment choices — including the Klotz, Dalet and automation systems — were completely compatible with this type of connectivity. And other equipment could be easily adapted to it.

Once again, when it came to the wiring, the complexity of the task was simplified using computer design. XM used VIDCAD to plan out every inch of cabling and all the connectors that would be needed, so the actual job of laying wire and connecting it went smoothly and swiftly.

"Captain Kirk's" chair in Enterprise Control Center

BEAM ME UP

Within the BOC exists the Enterprise Control Center, the command center for XM's operations. The ECC has a special supervisor's chair above the operations not unlike Captain

continued on page 16 →

HARRIS SUPPLIES AN INTERNATIONAL POTPOURRI OF RADIO EQUIPMENT TO XM

Even with an all-digital plant and two geostationary satellites beaming back 100 channels of subscription programming underneath it all, XM Satellite Radio is still simply all about radio. Revolutionary though it may be, the basic rock-and-roll and other music and talk formats will still rely on the basics of radio gear to grow an avid audience.

A massive list of the basic workhorses of radio studios include multinational corporations half-way around the globe as well as some closer to home. A large majority of typical studio equipment was supplied through Harris Corp.'s Broadcast Division.

"Systems Product Sales Manager Dick Schumeyer worked with XM's Tony Masiello to draw up a list of the equipment XM wanted to install in its 82 studios.

"Through our partnerships with a large variety of manufacturers, we were able to supply XM with approximately $1 million dollars' worth of equipment," said Scott Beeler, director of North American Sales for Harris Corp. Beeler added that the equipment list was "truly representative of manufacturers worldwide." He also said there was a quick turnaround on the orders, which arrived at XM in two shipments late last fall.

Among the equipment Harris supplied were clocks and timers from ESE; DATs, MiniDiscs, DVD players and VCRs from Sony; CD players from Denon; the 360 Systems Instant Replay; Genelec powered speakers; Tascam cassette decks; Fidelipac cart machines and eraser/splice finders; Audio-Technica mics, Leitch routers and even Technics turntables for those oldies.

And although XM's studios aren't the biggest project for Harris, which supplies radio gear throughout the world, Beeler said Harris was excited to be a part of the project. ■

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→ continued from page 14

Kirk's chair on the bridge of the starship Enterprise so familiar from old *Star Trek* shows.

The BOC monitors every studio configuration as well as its operation. Because of the way it functions, it is also a "help" center that can come to the aid of an individual studio or on-air talent should something malfunction due to operator- (or any other kind of) error. A technician in the BOC can thus reset a computer or call up an audio feed and act as co-pilot to a DJ in trouble.

Talk show call screener area features Telos 2101 phone consoles

The TOC is the equipment rack area, with more than 200 racks containing 200 Dalet workstations, 120 Omnia-3 processors, Telos 2102 multi-line phone systems, the Klotz mainframe, Cisco routers and hubs.

Equally as critical to XM's operations as those two is the NOC, or Network Operating Center, which monitors and troubleshoots the satellite, uplink systems and repeater.

The NOC controls the uplink, multiplexing management, information processes, subscriber information, repeaters and everything connected with the satellites. Telesat Canada has been contracted to actually "fly" the satellites and keep them within their prescribed tolerances using telemetry control. This command area can also take over complete control of the satellites if necessary.

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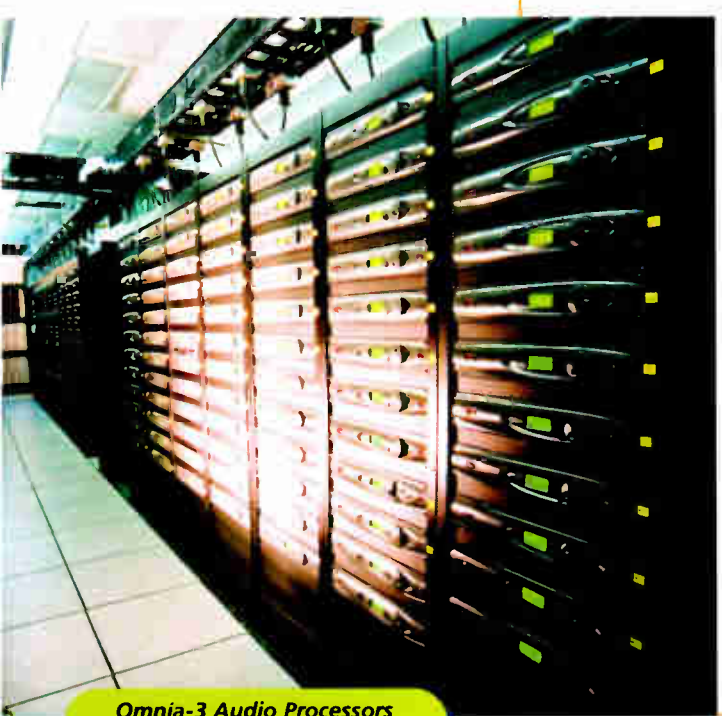


Omnia-3 Audio Processors located in rack room

XM SATELLITE RADIO TAPS TELOS, OMNIA FOR MAJOR STUDIO PROJECT

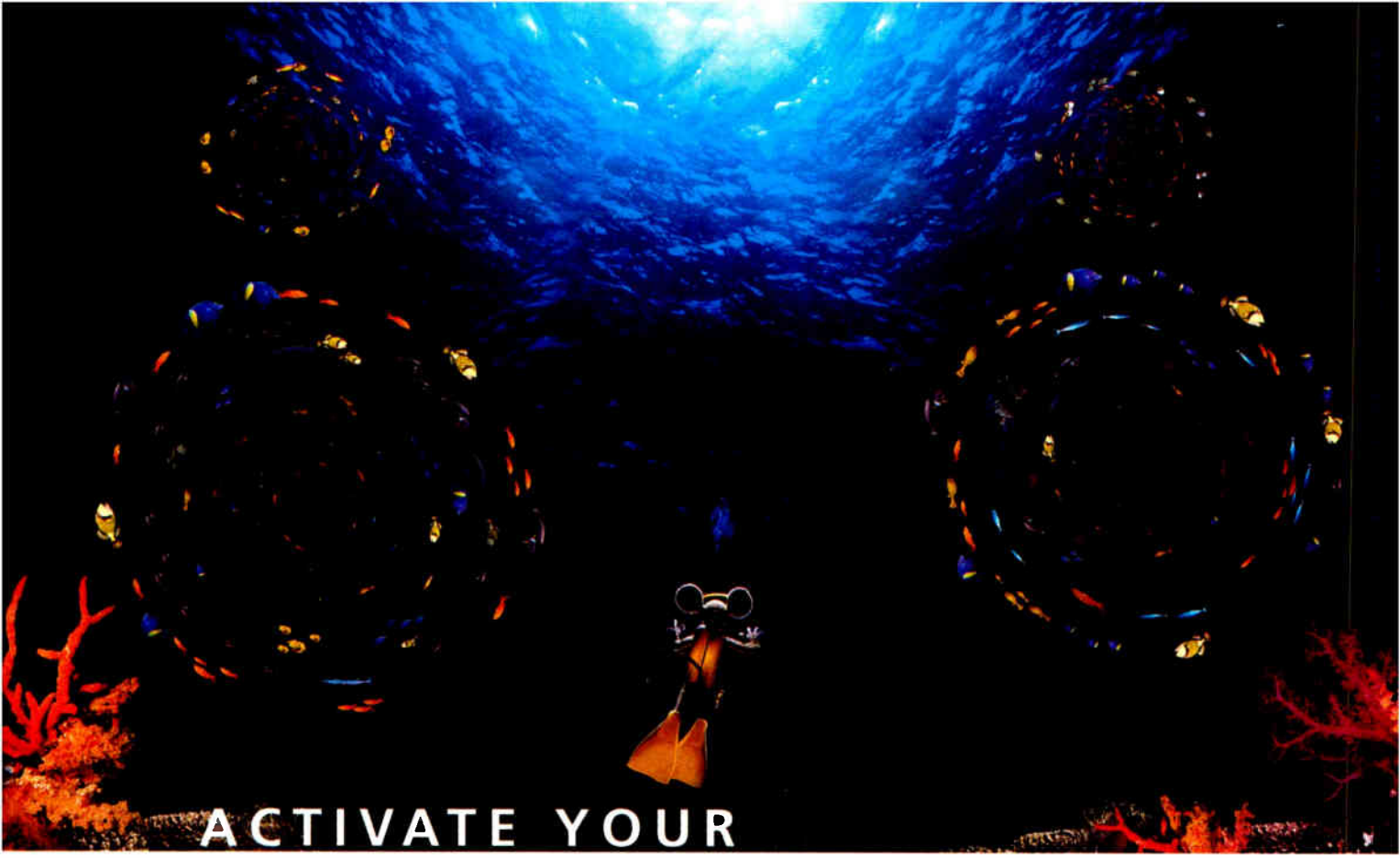
When XM Satellite Radio begins its 100 channels of satellite radio programming, each channel will have a signature sound and be recognized as radio — all-digital radio. Each format will benefit from tried and true digital processing, using the capabilities of the Omnia-3 digital audio processor.

"Obviously loudness is not an issue for us," noted XM'S Tony Masiello. "We are more concerned with the ability to precisely sculpt a station's signature sound to suit its format. We want to enhance the characteristics of each channel to give it a signature sound, so that the urban channel will sound like an urban station, jazz will sound like jazz and so on," Masiello said. "The Omnia-3 has the ability to do this and still sound pristine."

"The Omnia-3 was designed for a wide range of formats, and the choice here appears to be program-driven," said Mike Dosch, managing director of Telos Systems. "What's especially interesting is that XM is taking a very aggressive approach to satellite radio. They think like the programmers in major stations and have hired some of the best names in the business. These guys came from the top markets and they only want the best."Masiello added that working with Omnia also provides extra benefits for XM. "The Omnia-3s are already capable of handling processing for digital audio, especially DAB audio. And we also get the huge benefit of Omnia's major market processing expertise — something you can't put a price tag on."

In addition to top-rated radio processing, XM intends to manage an extremely complex stream of live callers, which will comprise an important part of XM's programming, by using the Telos System Series 2101 Multi-Studio Talkshow System. "The approach is really unique for satellite radio; we will provide a high level of interaction with listeners, but this also raises the level of complexity for our phone equipment," Masiello explained. "That's why we chose the Telos 2101; it's the only one we've found capable of handling the wide variety of simultaneous calls we are anticipating. Plus, Telos has a lot of experience with radio in general, and particularly this kind of live radio."

Dosch also pointed out that the Series 2101 gives XM the ability to forgo the normal discrete phone lines in favor of T1 lines. "XM also wanted to be able to manage and control multiple T1 lines, and Series 2101 gives XM Ethernet control. The phone lines come to a central location and are distributed to studios as required and controlled with our Desktop Directors. They also have the flexibility to use analog line capability if they want to. XM must have thought we'd designed our system just for them." ■



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Telos Series 2101, digital hybrids pictured in rack room

Fig. 1

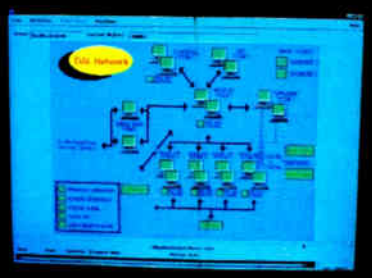
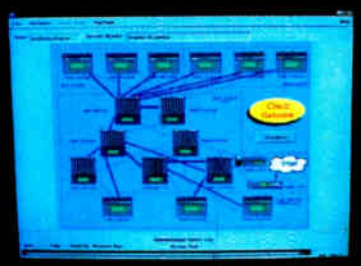


Fig. 2



Figs. 1 & 2: monitor screens of Harris Netboss Network Management System

Screenshot of Dalet digital audio system

→ continued from page 16

The key element of network control is the network management system provided by the Harris Netboss system. Similar to supervisory systems found in large telecommunications facilities, the NMS watches the component of every system, including the 400 workstations, Klotz mainframe and consoles, power components and all the system components — including the satellite and repeater network, the broadcast equipment and even the air-conditioning and power systems. It also monitors and controls the repeater network.

Using SNMP (Simple Network Machine Protocol), this system watches over operations and will identify a problem component, flashing it in red on a graphical screen representation of the entire plant. This continuous monitoring will troubleshoot problems in the early stages, sometimes even before they can affect the normal programming delivery, and make diagnostics and maintenance a breeze.

IT'S ABOUT RADIO

Despite the nearly incomprehensible use of machine redundancy, control and information systems and monitoring, in the end, XM Satellite Radio is really about radio. The first satellite launched the third week of March and the second satellite is set to be put in orbit in May.

XM Satellite Radio, with radio broadcast owner Clear Channel as one of its backers, has been busy recruiting heavy-hitters from the world of radio programming in anticipation of its launch. So at its core, all the technology and IT control is really about having a pristine-quality, all-digital on-air sound that truly belongs to the world of radio, according to Masiello. "Thus the decision to use AES digital audio and deliver it on fiber and use high-quality audio storage," he said.

"And the desire for quality sound is also reflected in our choice of equipment, such as Omnia processing, where we can sculpt the sound of each particular format and forget about things

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DALET SYSTEM GOES WELL BEYOND TRADITIONAL STORE AND PLAY

To handle stored audio for XM Satellite Radio, France-headquartered Dalet Digital supplied one of the largest storage systems ever created. Huge systems were no problem for Dalet, who had already installed systems for the VOA, NPR and CBC.

The Dalet system at XM is a 22-Terabyte storage system that IBM has said is the largest it has ever built. All of XM's stored audio, including its 1.5 million-song library is in CD-quality MPEG-2 at 384 kbps in a 4:1 compression ratio.

News producers, programming and promotional staff as well as on-air talent all have access to the central server and can call up anything as needed, with different levels of accessibility defined by critical needs.

In the Dalet system, as in the rest of XM's equipment, fiber optics is the key connection from the server to the hard drives. Wheeler noted the extra-redundancy built into the system, with no single point of failure anyplace in the system and two independent fiber loops from the workstation to the drives.

For extra reliability, Dalet also uses a system of drive replacement before average predicted failure. The system will take a drive out of operation before it hits that point, and switch to any of the other hot-swappable drives included as "spares."

With all that content stored on such a massive system available to everybody, management and access could become a nightmare of confusion. Not so with Dalet, Wheeler explained.

"Content management is simplified because the users never need to be concerned about where anything is going. They see a screen, with easy-to-identify categories. The system keeps track of all the metadata and where it is stored. All the user needs to know is what he or she needs next."■

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KLOTZ CONNECTIVITY VIA FIBER CRUCIAL TO XM

Key decisions as to how XM would build its 82 studios in record time led to logical equipment choices. For the consoles selected, according to XM's Tony Masiello, there were several necessities: digital capability, control and flexibility and the ability to integrate seamlessly into a large and complex operation.

Klotz Digital was the solution. The German manufacturer had already thought out all the difficult questions, such as digital audio sync and the flexibility to interconnect different types of audio standards together. But what sold XM on Klotz was its use of fiber.

"What we needed was available practically off-the-shelf from Klotz," Masiello said. "We chose them because of their fiber-optic interconnections, their high degree of control, their configuration and their audio quality."

"Our Vadis platform is the architecture that allows for versatility. In our configuration, digital audio sync is a given and allows XM to get the best performance out of all their equipment," explained Ray Esparolini, managing director of Klotz Digital America.

Input and output modules in the Vadis frame support multiple digital audio formats such as AES, EBU, S/PDIF and MADI, among other types. Output modules can go anywhere in the frame and users can link together as many frames as needed. In XM's operation, 200 frames provide 2500x3500 routing.

XM had decided to send its digital audio over fiber optics and fiber is integral to the Klotz system. AES 3 digital audio travels via fiber into 64 stereo channels going into and 64 stereo channels going out of each studio simultaneously. "Klotz is the audio backbone of the facility," said Masiello. ■

Tony Masiello (center, in black shirt) flanked by members of the XM Radio technical staff and installation team.

Klotz Vadis Routers located in rack room

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like processing artifacts," said Masiello. Another benefit the Omnias will provide is the ability to maintain more uniform sound levels from one programming channel to another.

"We want the rock stations to sound like rock, and the classical and jazz stations to sound like their formats, but we also want to avoid what you sometimes find in TV cable systems, where one channel is obnoxiously loud and another is too low," Masiello said.

The concern for audio quality is also why Masiello decided to use high-end Genelec studio monitors and Rode mics. "Ultimately it's all about the quality of the sound that reaches your ears," he explained.

Now that the D.C. studio complex is nearly completed, XM is building studios in Nashville in the Country Music Hall of Fame, as well as studios and offices in mid-town Manhattan. Both Nashville and New York will use the same designers and equipment suppliers that have served the project so well in D.C. and benefit from all the planning and

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building completed to date.

"Getting everything ready so quickly would not have been possible using traditional broadcast studio installation and building methods," Masiello noted. "And it wouldn't be possible to run and maintain control over all of it without using the types of technical decisions and equipment choices we made. In doing this, we've modeled new methods that I think broadcasters will be turning to in the future. Given our time, space, cost and staffing parameters, doing it this way was the only way that really made any sense." ■

NCC ACCELERATES XM CONSTRUCTION IN THE FAST LANE

It's no coincidence that in XM's accelerated quest to beam to millions of vehicles, Broadcast Consultants at Northeastern Communications Concepts Inc. designed and built the facility's 82 studios using the same technologies that Detroit uses to roll out quality cars on-time and within budget.

"Let's face it," NCC President Al D'Alessio said, "The dream at the big three is to exploit computer technology to the point where they can take the designer's CD, shove it in a slot, and have a Chevy roll out the factory exit ramp with no human error." So instead of relying on a contractor's interpretation of a paper set of computer drawings to build the studios from gypsum drywall, XM's studios were precision factory-built from virtual models developed by NCC — using the same steel, glass, neoprene, and fiber components found in cars.

NCC engineers Philip Altenburg and Arty Ware modeled everything, from the internal cabinetry supports and studio acoustical fields, to the final locations of the maze of ducts, conduits, raceways, and plumbing needed to support a huge broadcast operation. According to D'Alessio, XM couldn't have chosen a better site to develop.

"By 1999, XM's Lee Abrams knew exactly the number and function of the studios he needed to support 100 program channels. From his list, we described the building features XM would need for an aggressive construction schedule, and they never wavered from our shopping list in locating the site."

The payoff was a construction rate exceeding 2.5 studios per week, or as XM's Tony Masiello sees it, "You can save a lot of cash coordinating on a 3D screen instead of on the floor. I worked in real-time with the NCC staff at the computer, and for every day at the keyboard, they saved us a week in construction. And in broadcasting, time is money." ■

Manufacturer & Services Contact Information

Acoustic Systems:
Modular Studios
415 East Saint Elmo Road
Austin, TX 78745
PH: 512-444-1961 FAX: 512-444-2282
www.acousticsystems.com

Dalet Digital Media Systems:
Digital Audio Workstations,
Store & Play System
50 Broadway
Suite 1500
New York, NY 10004
PH: 212-825-3322 FAX: 212-825-0182
www.dalet.com

Denon Electronics:
CD Players
19 Chapin Road
Pine Brook, NJ 07058
PH: 973-396-0810 FAX: 973-396-7459
www.del-denon.com

Genelec:
Active Monitor Speakers
7 Tech Circle
Natick, MA 01760
PH 508-652-0900 FAX 508-652-0909
www.genelec.com

Harris Corp.:
Broadcast Equipment, Systems Integration
& Netboss Network Management System
4393 Digital Way
Mason, OH 45040
PH: 513-459-3400 FAX: 513-701-5301
www.harris.com

Klotz Digital:
Console mainframe and controllers
5875 Peachtree Industrial Blvd., Suite 340
Norcross, GA 30092
PH: 678-966-9900 FAX: 678-966-9903
www.klotzdigital.com

Northeastern Communications Concepts (NCC):
Studio Planning & Furniture Design;
Acoustic Consulting
16 East 42nd Street
New York, NY 10017
PH:212-972-1320
www.nccnewyork.com

Omnia:
Audio Processors
2101 Superior Avenue
Cleveland, OH 44114
PH: 216-241-3343 FAX:216-241-4103
www.omniaaudio.com

Radio Systems:
CAT-5 Wiring & Installation
601 Heron Drive
Bridgeport, NJ 08014
PH: 856-467-8000 FAX: 856-467-3044
www.studiohub.com

Studio Technology:
Studio Furniture
2 Pennsylvania Ave.
Malvern, PA 19355
PH:610- 640-1229 FAX: 610-296-3402
www.studiotechnology.com

Telos Systems:
Digital Multi-line Phone Systems
2101 Superior Avenue
Cleveland, OH 44114
PH: 216-241-7225 FAX:216-241-4103
www.telos-systems.com

XM Satellite Radio Equipment List

Equipment providers from all over the globe worked on the 82-studio complex at XM's headquarters in Washington, DC. The XM project involved: 1.2 million pounds of studio, over 700 tons of air conditioning, 120 miles of fiber-optic cable, 180 miles of CAT-5 cable and back up electrical generators with the capability to generate over 3.6 Megawatts of electricity.

Company	Equipment	Qty.
360 Systems	DR 554 Instant Replay 2.0	36
Acoustic Systems	Modular Studios	
Audio-Technica	AT808G Gooseneck Mic	40
Audio-Technica	AT857QMAL Long Gooseneck Mic	30
Broadcast Store (Germany)	Mic Arms	200
Encoda/DAL	Automation System	
Dalet Digital	V5.1 Workstations w/Team Newsroom	400
Denon Electronics	DN-961FA CD Players	138
ESE	ES-3242 16" Clock	10
ESE	ES-324312" Clock	73
ESE	ES-32445" Clock	55
ESE	ES-3244P2 Dual 5" Clock	11
Eventide	BD500-100 Digital Delay	36
Fidelipac	CTR14 Record/Play Cart Machine	9
Fidelipac	ESD10 Eraser/Splice Finder	9
Genelec	S30D Powered Speaker	52
Genelec	2029B Powered Speaker	48
Genelec	1091A Subwoofer	26
Genelec	1031A Powered Speaker	16
Harris Telecom	Netboss Network Management System	
Klotz Digital	Vadis Platform Console mainframe	200
Klotz Digital	DC-2 Console controllers	82
Leitch	Master Clocks	
Lucent Technologies	Definity PBX system	2
Northeastern Communications Concepts (NCC)	Studio Planning & Design Acoustics, Furniture Design	

Company	Equipment	Qty.
Omnia	Omnia-3 Processor	120
Omni-Mount	Ceiling Speaker Mounts	68
Omni-Mount	Ceiling TV Mounts	70
Prolite	On-Air Light	82
Radio Systems	StudioHub CAT-5 Wiring & Installation	
Rode	Microphones	200
SED	Uplink System Hardware	
Sony	DVP-S5340D DVD Player	21
Sony	KV-13FM12 13" TV	44
Sony	KV-20FS12 20" TV	42
Sony	KV-27FS16 27" TV	26
Sony	KV-9PT60 9" TV	46
Sony	PFM-510A1W 42" Plasma Displays	15
Sony	MDR 7502 Headphones	174
Sony	MDR 7506 Headphones	96
Sony	MDS-E11 MiniDisc Recorder	21
Sony	PCM-R500 DAT Recorder	58
Sony	SMS-1P/B Powered Speaker	118
Sony	VS01630 VHS VCR	31
Studio Technology	Studio Furniture	
Tascam	122 MKIII Audio Cassette Recorder	57
Technics	SL120 MKII Turntable	3
Technics	SLM3D Turntable	8
Telos Systems	2101 Multi-line Phone Systems	192 phone lines
Toshiba	Rear-Projection Cubes	2

Beyond AM.
Beyond FM.

XM Satellite Radio will soon broadcast up to 100 new digital channels of music, sports, news and entertainment directly to cars and homes from coast to coast. Our state-of-the-art broadcast center in Washington, DC is one of the largest digital broadcast facilities in the world, with 82 interconnected studios. Our satellites are the most powerful commercial satellites ever built. So, keep your eyes on the sky and get ready for the next generation of radio.

XM SATELLITE RADIO

MANAGEMENT CORNER

The Key to Keep AEs: Training

Vincent M. Ditingo

For most radio group owners, consolidation has resulted in a relatively smooth ride up the profit chain for nearly four years.

Now, faced with continuing, heavy debt and a weakening economy, many of these same owners must avoid the temptation to trade long-term economic stability for near-term financial gains.

Instead, consolidators should view the first half of 2001 as critical to advance the performance of front-line sellers by creating or bolstering already-established training programs.

"The pressure of Wall Street money in our business is having a negative effect on training as more and more stations hire inexperienced salespeople and immediately put them in the field," said Paul Anovick, president of New York-based Media Training Systems.

"And many younger managers have no (formal) sales training to support them," Anovick said.

Public pressure

Unquestionably, short-term improvements in profit margins bode well for shareholders and stock values in today's financial environment.

The good news for sales managers is that training may be one of the most effective tools they have to combat turnover.

— Scott Musgrave

But investing in new, comprehensive sales training for all account executives, flanked by electronic communications systems to streamline the buying process, will certainly go a long way to establish sustained growth

Indeed, if e-technology is the backbone for a station's long-range strategic plan, then extensive sales training will facilitate the achievement of that plan. And many salespeople would like to see this training extend into new and non-traditional revenues.

According to a number of radio sales executives, this could include classified advertising and other integrated media, such as traditional radio's convergence with Internet banner and streaming audio advertising.

The call for more extensive sales training is a recurrent theme in our industry. But given today's incredibly high financial stakes, it has never been more important. And a recent study conducted jointly by Arbitron and CoLearn.com, an online sales training company, gives us some interesting numbers to consider in this matter.

Titled "What Are Your Salespeople Thinking," the study canvassed 350 radio sellers across all sized markets. It provides valuable insight into the warning signs of account executive turnover.

Deeper training

Although the report notes that a number of account executives are generally satisfied with their jobs, those radio sellers who said they are planning to leave the industry within the next two years perceive the state of radio sales and sales training very differently from those who plan to stay.

For instance, of those planning to leave radio, only 35 percent thought that their company was committed to

See DITINGO page 45 ▶

The Additional Training AEs Want

Reasons for Turnover	% Plan to Leave	% Plan to Stay
Very satisfied with job	10	37
Company committed to training	35	61
Fairly compensated	63	89
Non-compete agreement	52	41
Respected as a professional	52	61
Product training very helpful	29	58
Client training very helpful	33	61
Future opportunities/career growth	57	87
Top third of station billers	56	60
Very satisfied with manager	22	46
Consolidation not beneficial	29	15
Rarely turn down business	19	27
Very realistic budgets and goals	7	24
Shares computers	54	43

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KLOTZ DIGITAL

Bill Miller Honored in Kansas

Laura Dely

The governor of Kansas declared Feb. 19 "Bill Miller Day," in honor of the radio host who marked his first 50 years in radio that day.

"The Bill Miller Show" is heard on approximately 100 stations nationally and is Webcast on *www.waby.com*

National Radio Syndicators distributes it from the show's office and studios in Olathe, Kan.

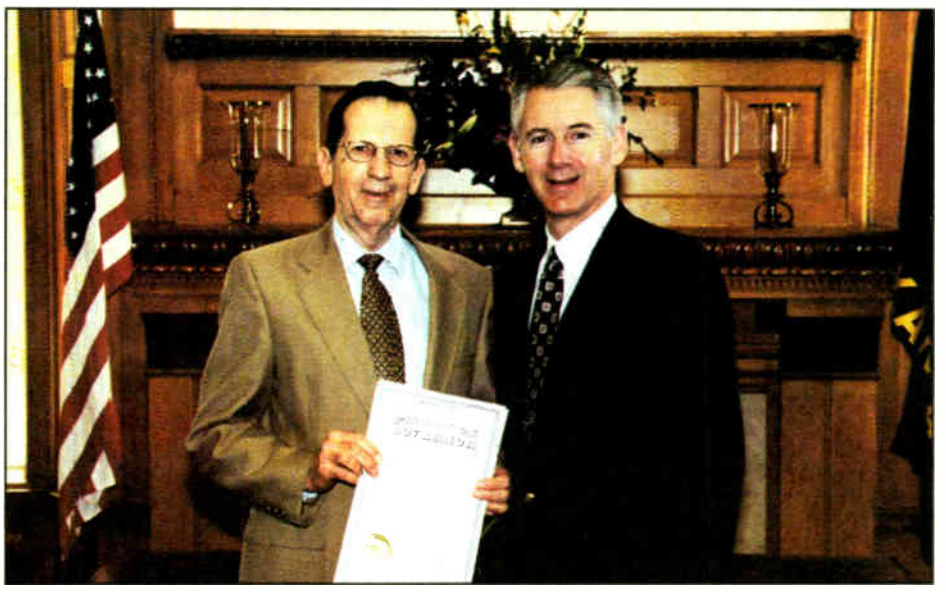
The five-hour weekly show features adult standards, non-rock music of the last 60 years and celebrity interviews.

Some of Miller's favorite guests include Bob Hope, Doris Day, Andy Griffith, Eddy Arnold, Kathie Lee Gifford, Pat Boone, Barry Manilow, Stan Freberg, Patti Page, Donald O'Connor, Steve Allen and John Raitt.

Miller said he looks forward to his second half-century of broadcasting to "the best listeners in the world."

A member of the Kansas Association of Broadcasters' Hall of Fame and the recipient of the association's "Distinguished Service Award," Miller said he has no intention of slowing down.

One of Bill Miller's favorite interviews was with actor John Wayne when the actor visited Oklahoma City, Okla., in 1960.



Bill Miller accepts Kansas Gov. Bill Graves' 'Bill Miller Day' proclamation, Feb. 19.

KIIS(FM) Is Top Biller for 2000

Clear Channel top-40 station KIIS(FM) was the top-billing station for 2000, nipping Infinity's perennial leader, WFAN(AM), by $300,000.

Sports/talk WFAN moved to the No. 2 spot after a five-year run at the top of BIA Financial Network's annual estimate of radio market and station revenue estimates.

But Infinity's five stations in the BIAfn Top 10 pulled down more revenue than Clear Channel's four stations that made the cut: $280 million to $223.2 million.

The only other owner represented in the top-10 list is ABC Radio Inc., with KGO(AM), San Francisco, which ranks No. 8. BIAfn estimates the news/talker earned $48.1 million last year.

News/talk are the dominant formats on the revenue winner's list: five of the top 10 had those formats. But what made the greatest impression on BIAfn's Vice President Mark Fratrik was KIIS(FM)'s big jump in revenues. The station earned almost 40 percent more last year than the previous year.

"It shows the dynamic and entrepreneurial nature of the radio business, that a station can so vastly improve its revenues in just one year alone," Fratrik said.

New York had the most slots, according to the BIAfn estimate: seven of the 10 stations are New York-based, with $389 million compared to the next most-represented market, Los Angeles, which had $114.2 million.

BIAfn surveys all commercial radio stations to determine estimated 2000 revenues.

BIA Financial fn network

— Laura Dely

Top 10 Stations By 2000 Estimated Gross Revenues

Revenue Rank 1999	Revenue Rank 2000	Market Rank	Market	Station	Format	Owner	Station Revenue 2000 (Estimate — 000's)
5	1	2	Los Angeles	KIIS(FM)	Top 40	Clear Channel	65,500
1	2	1	New York	WFAN(AM)	Sprts/Talk	Infinity	65,200
2	3	1	New York	WXRK(FM)	Alternative	Infinity	61,000
3	4	1	New York	WLTW(FM)	Lite AC	Clear Channel	60,700
4	5	1	New York	WINS(AM)	News	Infinity	57,400
11	6	1	New York	WHTZ(FM)	CHR	Clear Channel	49,000
13	7	2	Los Angeles	KROQ(FM)	Alternative	Infinity	48,700
6	8	4	San Francisco	KGO(AM)	News/Talk	ABC Radio	48,100
9	9	1	New York	WKTU(FM)	CHR/Rhymc	Clear Channel	48,000
8	10	1	New York	WCBS(AM)	News	Infinity	47,600

Ditingo

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training. That stands in contrast to the 61 percent who plan to stay in radio and believe that their company supported training for sales people.

Actually the largest disparities between the two groups in the "Reasons for Turnover" category centers on training issues.

The study finds that only 33 percent of those leaving within two years find client or market-oriented training very helpful and only 29 percent of this group said product or station-oriented training is very helpful. Of those AEs who will stay with their radio sales jobs, about 61 percent find that existing training is very helpful.

With the high rates of turnover that radio experiences every year in their sales departments, if even half of those who are walking out the door could be retained with different and better training, this is valuable insight that managers should incorporate into their plans immediately.

And even if better than 60 percent of the AE's who said they will stay are satisfied with existing training, that means about 40 percent believe that there is ample room for improvement.

"Account executives (in the study) were very clear about their desire for more training," said Scott Musgrave, senior vice president and general manager for Arbitron Radio. "The good news for sales managers is that training may be one of the most effective tools they have to combat turnover."

NTR help

According to the study, sellers now seek more "non-agency" sales training in new business and non-traditional radio revenue. Sellers also emphasize the need for qualitative research, which is rated as important for many stations by the sellers surveyed, as is quantitative research. (See accompanying chart for other areas of training interest.)

Additionally, direct interaction between manager and salesperson, either through one-on-one training or as feedback/coaching during ride-along sales calls, is rated the most helpful sales training method.

Meanwhile, another key result shows that radio stations are not proactive enough in finding news sales talent.

Only 8 percent of survey respondents said they were recruited (from a college, job fair, etc.) for their first radio job. Most study respondents applied directly, saw an ad or transferred from another department within the station/company.

That leads to one of the top recommendations from the study: *Create an ongoing system to recruit new sales talent.*

Anovick suggests an in-house, business-training model similar to the one established by Interep in the early 1990s that, in essence, creates a farm team of new, trained sales professionals that supplies the company with a stellar sales team.

Called the "Radio Apprentice Program," Interep recruits some 12 college graduates several times a year to undertake an extensive 13-week training program in the company's New York headquarters that includes station trips, sales meetings and agency calls as well as classroom time with research and computer executives. The group is usually assigned several mentors to facilitate the learning process. Among the several radio group owners that do invest significantly in sales training as well as in marketing and promotional programs is Emmis Communications.

Create an ongoing system
to recruit new sales talent.

In fact, in late February, Prudential Securities, one of the few major investment firms in the U.S. that closely follows radio broadcasting, gave Emmis a "strong buy" recommendation, which may in part illustrate the importance of investing in personnel and in events that support sales efforts.

The Prudential report notes that while Emmis did not consolidate "as rapidly as some of its peers," the company has proved, based upon double-digit same-station radio revenue and broadcast cash flow growth, or BCF, over six consecutive quarters that "it can outpace the industry based solely on its operating prowess."

Vincent M. Ditingo is an assistant professor of communication arts and coordinator of the radio program at the New York Institute of Technology. Contact him via e-mail to vditingo@aol.com

PROMO POWER

How to Get Free Outside Promotion

Free Publicity Requests Can Turn Into Great Promotions for Your Radio Station

Mark Lapidus

Not a day goes by that a radio station doesn't get a letter or e-mail from someone looking for publicity to promote something. Generally this comes as a request from a nonprofit group trying to get the word out about their next fundraiser.

Or sometimes the request is to promote a book, appearance or product. Here's one: "My car is perfect for your radio station! I've been racing for 10 years. For just $1,500, I'd be happy to put your call sign or logo on my doors. Please call me to discuss details ..."

Nonprofits and you

Before you toss these letters overboard, see if you can use their interest in you to your ultimate benefit. Maybe their self-serving concept could actually trigger your ideas on how others can help you generate publicity for your radio station.

Let's consider first the nonprofit approach to publicity. A nonprofit group or association will typically attack the media with a form letter to every radio and television station in the market about their upcoming event.

They want the station to be either the media partner or perhaps even the title sponsor. How can you turn this around?

Find your own media sponsors for your events or contests. Could your next big concert be co-sponsored by a TV station or newspaper?

Sure, I know your sales department has tried to bring them in as "partners" in the past, but this comes with a price tag that they may not have budgeted. A reasonable sales manager can be convinced that it's beneficial for your radio station (and the rest of your clients) to have a media partner who brings just media to the table.

Partner up

Perhaps your latest newspaper partner would be willing to include the logos of a few of your clients in a co-branded "promotional ad" in their paper. You get the extra publicity you need, the clients get the additional exposure and the newspaper gets the media value of being on your air.

Another method of turning the nonprofit request into a station promotion is to find out which nonprofit in your area has the largest direct-mail list. Call them and ask if they're interested in exploring a relationship.

Here's what you've got in mind: If they'll include a small advertising piece about your station in their next direct mailing — perhaps something with content value, like a magnetic concert calendar — you'll reserve a quantifiable number of announcements in a "nonprofit spot bank."

Invite high school newspaper editors the next time you've got a star coming to your radio station.

Next, let's take that sponsorship plea from the racecar driver. Sure, I know you don't have the budget to pay him the $1,500 he wants you, as sponsor, to pay to paste your logo on his speeding doors.

But he hasn't thought this all the way through. Mr. Driver doesn't know it yet, but he'd love it if your morning show would just talk about him once in awhile; have him call in as a "fan of the show" and invite someone on the show to his next race.

This gives you an excuse to bring him on the air a second time to talk about how great the race was, so much so that's he's going to put your logo up just for the on-air exposure.

Here are a few more ways to obtain promotional support for free — successful pizza chains do a rather large volume of business. Wouldn't be cool if you had either a logo on their box or a custom flyer on the top of each box?

The flyer can promote an on-air contest, a Web site registration, a special morning show or anything else you can dream up. Again, this one requires a preliminary conversation with your sales manager.

The last thing you want is to bestow what might look like freebies on the folks to whom your sales department is trying to sell spots! But your joining in could very well complement your sales buddies' quest for the big bucks.

How about hanging your banner in the hottest bars and restaurants around town? You're right; nobody's doing that for free — that is, not unless you have an angle. Fortunately, if you're already making appearances at these places, you're

See PROMO, page 47 ▶

Promo

▶ Continued from page 46

halfway there.

For example, after a particularly good appearance, have the manager's or owner's favorite DJ present her with a framed radio station logo, made out to her and autographed by the entire airstaff.

Few people in that business can resist showing others how popular they are with celebrities or on-air personalities.

Well-planned efforts to gain free outside promotion could be among your station's most valuable assets.

Perhaps your station could benefit from exposure in your high school area newspapers. Don't laugh — a lot of kids read those rags and they can make quite an impact. The next time you know you've got a star coming to your station, invite up a bunch of high school newspaper editors.

That ink could go a long way toward gaining new young "cumers."

Finally, the obvious route to explore is trade, either in terms of spots, sponsorships or simple mentions for various outlets that can provide your radio station with exposure. Unfortunately, our industry rarely maximizes the trade opportunities because it's difficult for us to determine just how much available inventory we'll have annually.

Perhaps you could be the one in your market who gets the team of traffic manager, sales manager and marketing director together to take a good guess at what you can offer next year. It's very likely that well-planned efforts to gain free outside promotion could be one of your station's most valuable assets.

Mark Lapidus is president, Lapidus Media. Contact him via e-mail to marklapidus@yahoo.com

STATION SERVICES

Winners Feel Like A Million Bucks

Would you like to offer your listeners a chance to win a million dollars?

American Media & Special Promotions offers games to stations that can have big pay-offs for listeners and stations alike. For example, last year it awarded $1 million to Ted Lovelace, a WKLR(FM) listener in Richmond, Va., and another $1 million to KNEX(FM) listener Roger Fernandez of Laredo, Texas.

Just before he pulled out his winning prize, Fernandez declared that if he won, he'd ask his girlfriend to marry him. He was noncommittal after winning his prize.

AMSP's "Million Dollar Race Ticket" promotion game is available this year. Bill Weston, WKLR "The Planet" program director said the station would run the game again.

At WKLR, the game works when listeners call the station to predict the top five finishers of an upcoming NASCAR event.

For being the lucky caller, listeners automatically win a "Planet Prize Pack" — and have the chance to win the big money, payable as a 40-year annuity.

The Cox Communications radio station in Richmond, Va. partnered with Heritage Chevrolet, a local auto dealership that sponsored the game and split the cost of the game's insurance premium with the station.

Listener Ted Lovelace accepts a $1 million prize from Cox Communications radio station WKLR(FM) In Richmond, Va., for correctly predicting the top five finishers of the NASCAR 'Pepsi Southern 500.'

KNEX(FM) in Laredo, a Rodriguez Communications station, staged its "Million Dollar Song" game with a "money bag" promotion from AMSP.

"Radio K-NEXT – 106.1" played the winning song during morning drive and twice again throughout the day. The sixth caller at the time the song was played won $106 and the opportunity to attend a station VIP listener party, where contestants would have the chance to win the jackpot.

Winner Fernandez dove into a pile of 106 moneybags and chose the one with a jackpot certificate inside.

"We had listeners calling in all day, not just when we played the correct song," said Luis Villareal, KNEX(FM) operations director. "We had TV personalities and newspaper reporters there covering the story. It was the talk of the town and still is today. We'll be doing this again in April and procuring a title sponsorship for the contest will be easy."

AMSP provides insurance coverage for thousands of promotions annually. AMSP is a division of American Hole 'n One Inc., a golf, sports and specialty insurance provider. Former National Football League kicker Mick Luckhurst is owner.

For additional information about AMSP's Million Dollar Song or Money Bag Millionaire promotions, call the company in Georgia at (888) 323-2257.

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Studio Sessions

Flash Goes Stereo
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Radio World — Resource for Radio On-Air, Production and Recording — April 11, 2001

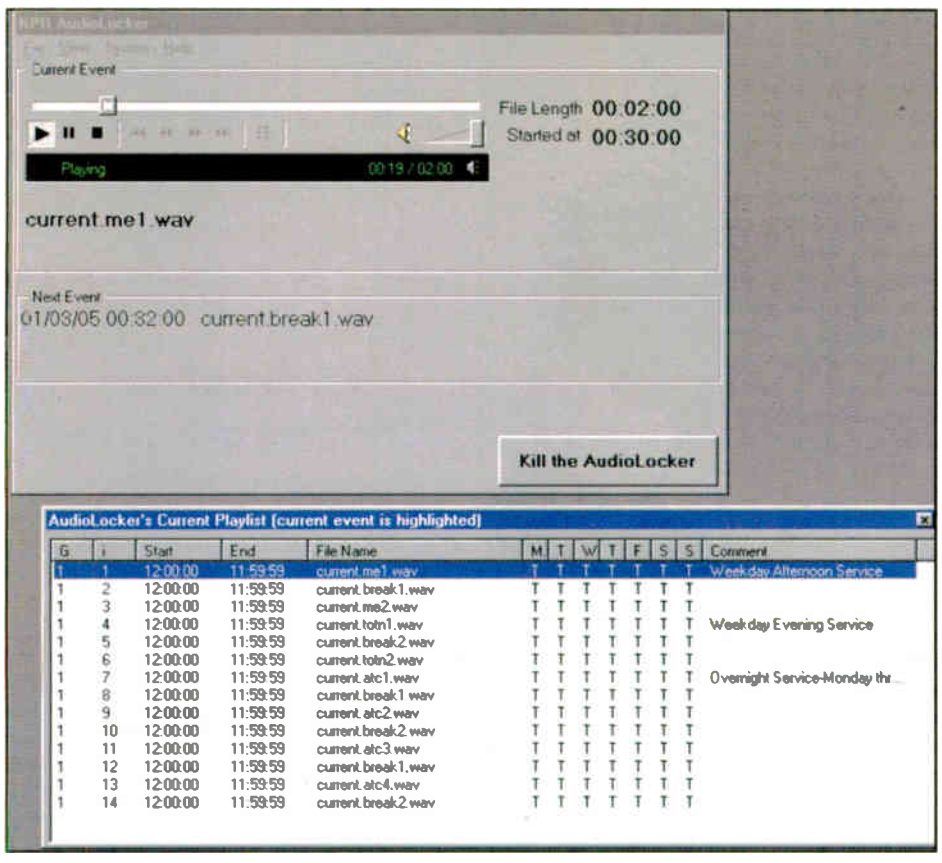
PUBLIC DOMAIN

Code Creation for Web Automation

Rich Rarey

This is the second article of a three-part series examining the NPR AudioLocker online automation system.

In the most recent *Public Domain* column, in the Feb. 14 issue, we created the rules AudioLocker would follow when playing audio files in a group. If we followed a formal software lifetime model, creating those rules would give us our "concept" and "requirements" phases. This column will describe the design and some of the key parts of the programming. The programming tool of choice for developing AudioLocker was Microsoft Visual Basic (VB) version 5.0, which was the latest version in 1999. The source code has been recompiled using VB version 6.0



AudioLocker Running With Schedule Displayed

The 'Visual' aspect

Fawcette Technical Publications President James E. Fawcette recently wrote an opinion column in a programming journal.

"A major part of what made VB so successful — reaching more developers than all other languages before it combined — is that it made levels of programming accessible to developers who don't live and breathe development day in and day out," he wrote.

"These are the people in finance departments, or in science and engineering — people who solve business problems first and write code second." I believe Fawcette's analysis is correct. I chose VB for development of the AudioLocker project precisely because it is a problem-solving environment and deadlines were too tight to begin worrying about MemAlloc, heap management and the other "trivial" aspects of C++ programming.

Access logs

The robustness of VB for this use is demonstrated by an examination of the log files.

The AudioLocker log file that covered Oct. 17, 2000 to March 1, 2001 showed that the program ran without interruption except when it was shut down by a human to insert "live" event audio into the Internet stream, or to test an add-on application that generates HTML files from AudioLocker-supplied information. AudioLocker is the *only* application running on that WinNT computer.

Because an original requirement is to play a *group* of audio files repeatedly within a Start and End time, I

See DOMAIN, page 58 ▶

PRODUCT EVALUATION

Orville: A Programming Powerhouse

Alan R. Peterson

This is the second part of a two-part review for Radio World. The first part appeared in the March 14 issue.

In our continuing look at the Eventide Orville digital processor, we concentrate this time on its programmability.

What makes the Orville such a magnificent processor — and worth the $5,695 price tag — is its versatility in taking the basic building blocks of its internal audio processing and patching them together in the way you wish.

Methodology

This modular programming methodology was first instituted on the Eventide DSP4000. For producers who have had experience with the 4000, the process is quite similar.

There are lots of high-end processors that let you do this, and even more units of lesser expense that allow some rudimentary control over preset blocks. But the Orville is one of only a few processors that let you mold the process the way you want and to talk to its innards through a computer.

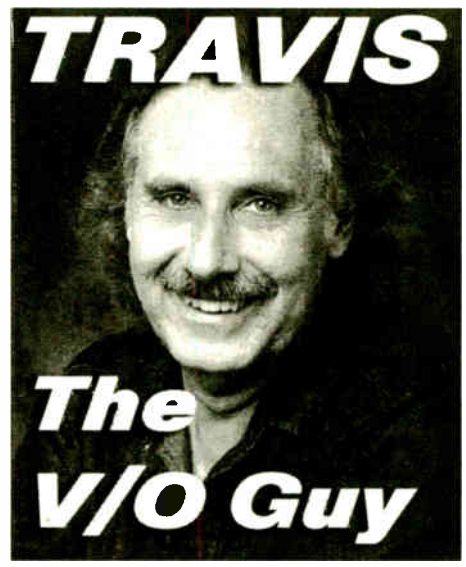
The PC connection is infinitely more desirable than wrestling with parameters on a tiny LCD screen, although Orville works that way too if that is what you are used to.

A new effects program begins with hearing a desired effect in your head.

See ORVILLE, page 54 ▶

Small 'Big' Break Into TV World

Revelations on Ignoring Your Career to Help Others And Taking Time to Smell the Roses Along the Way



Travis

The last year has not gone particularly well for me career-wise — my fault, of course. Due to a number of events, most of which I can only put in the "good" category, I've been ignoring my career recently.

These events are, in part, a result of a relationship I developed a couple years ago. And this relationship has actually worked out, beautifully.

One of the reasons the relationship has worked so well is that the two of us have a great deal in common. I met her on the old CompuServe Broadcast Forum — she was doing a show at the local college radio station and was just getting started in voice-over.

Teach others

I helped her put together a new voice-over demo and demonstrated how important self-promotion was in our industry. She took to my words and soon started doing very well.

Last month, she booked more voice-over work than I did — that's the good news. The bad news is that she booked more voice-over work last month than I did.

I've been helping quite a few people with their voice-over careers. While I've been explaining to everybody how important it is to promote your business, guess who hasn't been doing that.

In fact, I've been coasting. The regular customers I already had gave me enough work to allow me to "take it easy" for a couple of years.

Nothing lasts forever, naturally, and last year, several of my regular customers suddenly passed away. Then my Orange County, Calif., agent, on whom I depended for a great deal of work, suffered a major health crisis and had to close her agency.

Every so often, life reminds you how temporary everything is. Whenever I take customers, friends and, for that matter, anything else in life for granted, I've learned I'm making a big mistake.

Okay, so I learned my lesson. From now on (or at least a couple of months) I'm going to appreciate what I have, while I have it.

I've been helping quite a few people with their voice-over careers.

Another lesson gained from such experience is that whenever you put your career on autopilot — whenever you expect things to continue as they are — you are actually backsliding. It has often been said that in "showbiz" there's no making it — whenever you're resting on your laurels, you're in trouble.

It hasn't been all bad news. Along the way, there have been some real bright spots, too. I recently got my first on-camera acting job. Now, I don't take on-camera work all that seriously — I am a voice-over guy — but it was still a great experience.

Lights

The whole incident came about by accident.

A casting director happened to see me do a scene at my acting class, which I take to improve my voice-over work. A couple of months later I got a call. The caller said they wanted me to do something for "Arrest and Trial" — a new syndicated series produced by Dick Wolf, producer of "Law and

See TRAVIS, page 52 ▶

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HARRIS

Travis

▶ Continued from page 50

Order." Of course, I was excited.

Although the part was small — just one line — I was nervous about it. Fear has an amazing effect on you.

Each week, in my acting class, I learn four pages, about six minutes, of dialog. It takes me about an hour to learn all four pages.

For my big acting premiere, I kept going over my one stupid linefor almost two days. No matter what I did, the line wouldn't "stick." Though it was a rather long line, I was absolutely astounded that I couldn't remember it.

I headed off to the address I was given for my "call." I was driving, with my script in hand, going over and over my one line, hoping I would finally remember it by the time they started shooting my scene.

From articles that had appeared in the trades, I already knew quite a bit about the series. The people who produce "Arrest and Trial" have a tough job.

They need to create one 30-minute show every day, on a very limited budget. Because the show is syndicated, the crew needs to do everything possible to keep production costs to an absolute minimum. I understood this, so I wasn't expecting a great deal, in terms of "production sophistication."

The location was a residential neighborhood adjacent to the Sony Studios lot. A great deal of film and television is shot in that neighborhood, every week.

Camera

When I arrived on the street, I was amazed. I saw two huge wardrobe/dressing room trailers, a big generator truck and shooting scaffolding that must have taken days to construct.

Then I looked at the address. It was not the address for my location. Wrong production.

I looked down the street, toward the correct address. I saw a camper vehicle, a small panel truck and a generator mounted on what looked like a Radio Flyer. This was more like it.

I found the assistant director and introduced myself. The crew was young, friendly and professional. Although I had supplied correct costume sizes, the costume I was given was much smaller than anything that would fit. Fortunately, they had recommended that I bring shoes, pants and shirt, just in case something went wrong.

From now on (or at least a couple of months) I'm going to appreciate what I have, while I have it.

Of course, I was already thinking "Emmy" for my little part. I was really excited that a casting director would hire me, out of all the people in Hollywood, to play this role. The part I played in the show was that of a host for a local "Murder Mystery Theater."

When I got the script, I quickly understood why I had been cast. They want me to play the part of an *amateur* actor. I was slightly disappointed.

But soon, I realized the more positive aspects of this role and how absolutely perfect this part was for a first-time actor like myself.

There was no way I could mess this up. If I really stunk on camera, I could just pretend that I was playing a bad, local actor. If I didn't stink, then I portrayed a good actor.

I've known several voice talent and DJ types who have been cast in movies and television but have had all their lines cut from the show. I realized this was not likely to happen to me here, no matter how poorly I might perform. All I have to do is remember my one stupid line!

All the experience I had doing voice-over gave me one further advantage — I fully understood that it's perfectly all right to be scared to death. You learn, after a while, that some of your best performances occur during moments of extreme terror.

So long as you're comfortable with your anxiety, you can actually use that terror to give you that extra little boost to create a good performance. I also knew that all the other actors were terrified.

When we started my scene, I, of course, completely forgot my one line. We're talking total blank, nothing, nada!

I stood for what had to be at least three or four hours — it could not have been the two seconds that I was told it actually took, but it sure seemed to be hours — staring out blankly, when suddenly the line came.

We shot the scene about 7 or 8 times, to give different camera angles. I realized that I had a tremendous amount of fun — and was getting paid for it!

As the crew was wrapping up, I thanked the director. "Excellent job," he told me.

"You know, this was my first on-camera experience," I blurted out.

I could see an expression of absolute horror take over the director's face for a moment, and then he relaxed after a few seconds. Then thanked me again for my "excellent" work. I'm still not sure what that was all about.

It took a few months before I could see my scene on television. I had no way of knowing for sure whether I was still in the program, or cut-out because I couldn't even play a bad actor, or how my scene would look, until the actual air date.

I had the VCR set to tape every show until my show aired.

As it turned out, the "Arrest and Trial" crew did an excellent job of putting my scene together. They made me look great! Nobody gets tape that good on the first time out.

Demo reel

My acting coach, Steve Eastin, a well-respected actor in Hollywood, said, "You know, Travis, I get the idea that that's going the be the first thing on your demo reel for a long time."

When you consider it's the *only* thing on my reel, he's certainly right. I simply lucked out this time, in a big way.

I need to remind myself, that it's always important to keep things in perspective. Sometimes life gives you really awful stuff to deal with and sometimes it gives you things that are really fantastic.

I had the VCR set to tape every show until my show aired.

When things go badly I need to remember the good stuff. And I need to remember that when things are going well, I'd better take the time to appreciate them.

Travis the V/O guy is a veteran voice-over artist writing from California.

Send e-mail to vo-guy@voice-guy.com or check out his Web site at www.voice-guy.com

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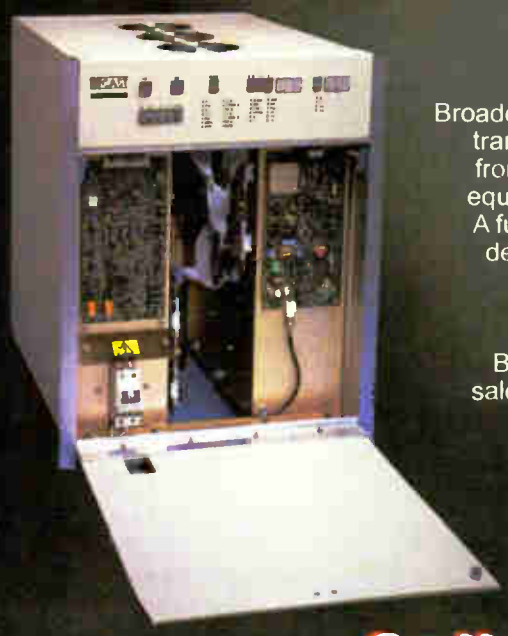

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Orville

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Say you need the effect of an office intercom trying to page someone in the building, only everybody has vacated the premises — a widely copied script gimmick during the dot-com gold rush. First, the voice would need to be bandpass-filtered to sound as if it were coming through a small, cheap speaker.

Next, add a hint of clipping or distortion to imply that the speaker is being slightly overdriven. Finally, wash the entire effect with reverb to suggest a vast, empty space akin to an airplane hangar or underground parking garage.

When all the elements are combined in the proper order, the effect is complete. But when the elements are thrown together in an incorrect order, the effect is lost.

You are now well on your way to creating a custom effect in Orville.

For example, placing the filter at the end of the line will severely cut the bandwidth of the reverb, while placing the distortion at the end will cause the entire track to go gritty and sound unpleasant. Therefore, the order in which the individual effects are stacked makes a big difference in the creation of the overall feel.

Once the structure of an effect is understood, the next step is to assemble it.

These effects blocks inside the Orville are called *modules* and are used in combinations to create a desired result. The Orville certainly comes with a well-stocked toy box full of modules.

For example, there are Bridge modules, which convert audio signals to control signals, or vice versa. One such use would be in a pitch-follower that would track the frequency of your voice, which would work a dynamic filter or play pitches on an oscillator, essentially creating a tone that would move up and down to match your voice.

There are Delay modules that create echo and filter effects, Pitch Shift modules that offer classic Eventide Harmonization or the newer formant-corrected pitch-shifting, Reverb modules and a truckload more.

Hook 'em up

Then comes the process of wiring the modules together in the manner you require to accomplish your effect.

You may do so by using the internal Patch Editor and the display panel on the face of the Orville, or by computer using a program called VSigfile. Both will be discussed here.

Using the Patch Editor, it first is necessary to scroll through the programs and load the one named "Thru." Once there, hit and hold the parameter key — the display changes to show a virtual router, with an In and Out module connected together.

At the base of the display, the labels above the soft keys change to reflect new functions. The one you would be most interested in at this point is Insert. Pressing this soft key opens a list of modules to be patched in.

Grab the module you want with the Select key, press the soft key marked "Connect," and the module appears in the display, ready to be strung to the proper inputs and outputs. You are now well on your way to creating a custom effect in Orville.

At this point, however, the display shows only the flow of audio through the modules. In some instances, you will want to have some variable control over several parameters of each effect, say, the threshold and ratio of a compressor. Give a click to the Aud Only soft key, and the display now shows the flow of both audio and control lines.

The control lines are what tie the buttons and the big knob on the front panel to the program, which in turn lets you obtain control over each module in operation. A few more steps into the Patch Editor and you may decide whether to have a graphic rotary knob or a fader lever show up in the display.

Let the computer do it

On the other hand, you may wish to perform your edits and patch building by way of a computer, the Eventide VSigfile software and the built-in RS232 serial port.

Because the computer is there strictly to write programs and not actually to process audio, you can get by with a low-performance PC. VSigfile runs under Windows 3.1, 3.11, 95 or NT, with a minimum 8 MB RAM (16 MB for NT), which provides yet another reason not to trash that old 486-66.

The PC and the Orville are patched together via the RS232 ports on both or by the MIDI jacks on each device. Once the two are communicating, typical Windows pull-down menus are used to

See ORVILLE, page 55 ▶

Orville

▶ Continued from page 54

create a program.

Connection of one module to another is much the same as on many software synthesizers. Click on the input or output you want to start with and then drag the mouse to the destination — a virtual patch cord is drawn onto the screen between the desired modules.

When you have strung together all of the modules you care to incorporate, you must then pass the program along to the Orville unit down the MIDI or serial line. Find the Send command under the MIDI menu item. Your new effect will be uploaded to the Orville for your evaluation.

By the way, the communication line runs both ways. Should you wish to modify an existing Orville program in the computer rather than with the built-in display, use the MIDI/Get command.

This will take whatever effect program is loaded into the Orville at that moment and fire it across to the computer. You may then modify it as you wish, then upload it back to the Orville as a new program or overwrite an existing one.

It's a bird, it's a plane ...

Eventide engineers have come up with a great timesaver — the Supermodule. Say you have created a terrific effect out of numerous modules, but wished for a way to "shorthand" the effect so you may grab it and plug it into other programs yet to be written.

You got it — create a Supermodule. Highlight all of the modules that make up your masterpiece and then go to the SuperMod menu. Click on "combine modules" and VSigfile will generate a new module constructed out of those smaller modules. Give it a name, drop it into the Module Library and you are ready to use it later in new programs.

Besides saving time during programming, Supermodules eliminate a great deal of tedious editing such as naming knobs, defining menu items and the like.

By the way, if you want to share your creation with other Orville users, you may do so in several ways. First, you may always print your creation to hard copy, via the computer, and hand it off.

It is likewise possible to e-mail your creation to another user. Orville program files are saved with the extension .SIG or .SIF, which are recognized by VSigfile and can be opened and examined by another user running the same program.

Simpler yet, connect two Orvilles together via the MIDI ports or the RS232 serial ports. Run a data dump on one unit, which will transmit the programs to the second device.

Conclusion

Eventide put its whole being into creating the Orville processor and the result is one of the finest processors out there for broadcast, professional audio and music creation.

As I stated in part one of this review, having a Harmonizer in your production rack is a badge of honor that says you are large and in charge. Having an Eventide Orville in the rack proclaims very much the same, only now it puts vast amounts of programming power at your fingertips.

For creative radio production directors that can dig deep and use this power, life will not be the same.

Alan Peterson authors the column The World According to ARP *and writes from Annandale, Va. Reach him at* alanpeterson@earthlink.net

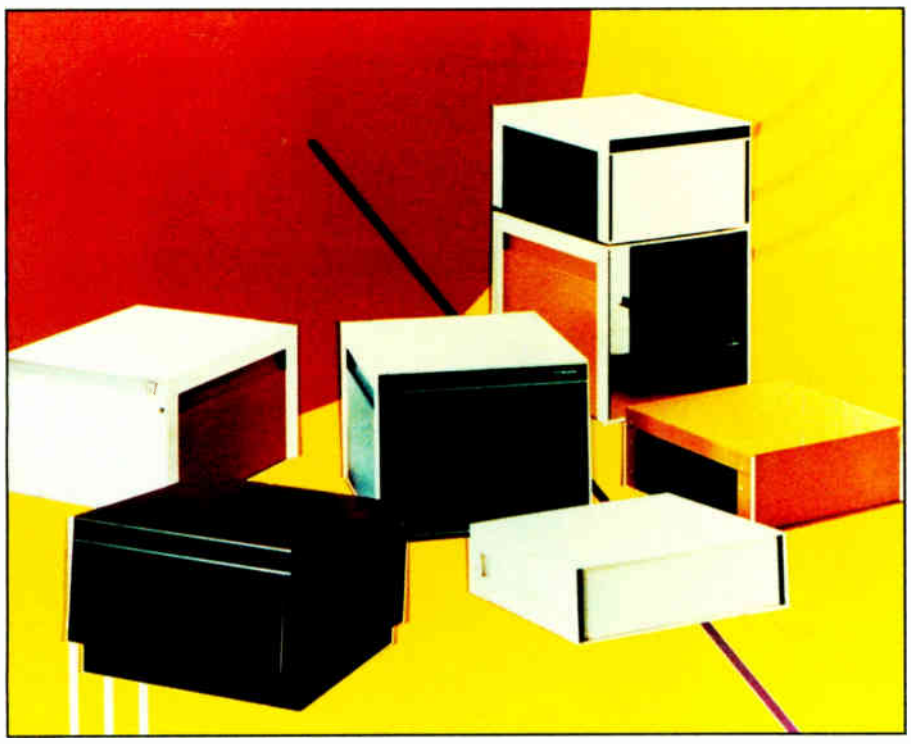
For information contact Eventide in New Jersey at (201) 641-1200, fax (201) 641-1640 or visit the company Web site at www.eventide.com

PRODUCT GUIDE

Equipto Offers Bigger Cabinets

Equipto Electronics instrument cabinets are available in 19-inch and 24-inch panel widths, in either steel or aluminum.

Cabinets meet EIA standards and feature a removable top, zinc-plated panel mounting angles, extra mounting hardware and recessed handgrips. Options include plain, louvered or perforated panels; tilt bails; angular risers and decorative trim. The cabinets can be color-matched or finished in any 12 standard colors.



The company offers the 19-inch units with a choice of plain or louvered panels through the five-day "Express Line" shipping program for quick delivery.

For more information contact Equipto Electronics Corp. in Illinois at (630) 897-4691, fax (630) 897-5314 or visit the company Web site at www.equiptoelec.com

◆PRODUCT GUIDE◆

Products for Radio Air & Production Studios

Mail info and photos to: RW Product Guide, P.O. Box 1214, Falls Church, VA 22041

Sonifex Sees Future in Red

Sonifex has made several additions to its Redbox range of analog and digital audio interface boxes.

The new units include three stereo matching amplifiers for interfacing domestic or semiprofessional unbalanced equipment, such as a CD player, to professional balanced line levels: RB-UL1 single converter; RB-UL2 dual converter and RB-UL4 quad converter, all provided in 1 RU mounts.

RB-UL2 Dual Converter

The RB-UL2 and the RB-UL4 will be available in April.

RB-UL4 Quad Converter

Other additions include the RB-MA1 single microphone amplifier, which consists of a low-noise microphone preamplifier for converting mic-level signals to line level or for driving long lines from microphones to mixing equipment. The RB-SM1 single stereo-to-mono converter converts a fully buffered and balanced mono line output from a stereo input.

RB-SM1 Single Stereo Mono Converter

The RB-SD1 silence detection unit is used to monitor an unattended stereo studio feed and will switch through an alternative signal if it detects that the studio feed has gone below a defined audio level for a defined period of time.

RB-SD1 Silence Detection Unit

RB-SD1 Front Panel

Remote inputs and outputs can be used to signal alarm conditions and to control the RB-SD1. The secondary input signal can be in the form of a recorded message or a previously recorded program.

For more information contact Independent Audio in Maine at (207) 773-2424, fax (207) 773-2422 or visit the Web site at www.independentaudio.com

Symetrix Cuts the Bleep Out

The 6100 Broadcast Audio Delay is the first product in the new Symetrix AirTools family. It is a 24-bit digital delay unit for live broadcast that prevents profanity or unwanted comments from reaching the airwaves.

The 6100 can store a maximum of 20 seconds of full-bandwidth stereo audio in memory. Users can prevent offensive material from broadcasting by dumping the 6100's buffer.

If a radio caller says something the host or producer deems inappropriate for broadcast, he or she presses the "Dump Profanity" button. The 6100 clears its memory and the unwanted material never reaches the airwaves. After a dump, the 6100 begins to stretch the program audio again until full delay is attained.

The 6100 also features automation interface for network broadcasts.

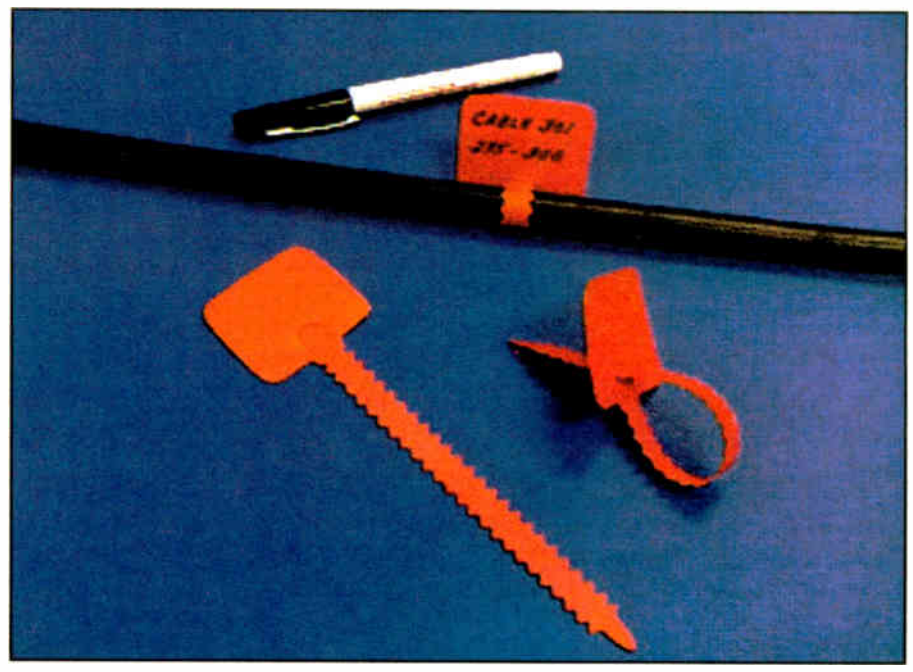
For more information contact Symetrix Audio in Washington at (425) 787-3222, fax (425) 787-3211 or visit the Web site at www.symetrixaudio.com

VIP Unties Orange Tags for Cables

Untie Write-On tags from Visual Identification Products Division are available in telecommunications orange for high visibility. Each tag features an area to write on that is 2 x 1.75 inches. The tags are designed to be used with any cable up to 1.5 inches in diameter.

The ties come in packs of 25 and each package contains a UV-resistant Sharpie black marker. Other tags are available in various sizes and colors.

For more information contact VIP Division in Texas at (800) 950-4921, fax (800) 967-3986 or visit the Web site at www.vipdivision.com



Process This!

Introducing

The NEW Aphex 2020MkII

The original Aphex Model 2020 audio processor set the standard for audio quality, loudness and extended coverage. Not content to sit on its laurels Aphex continued to research ways to improve performance even further. The result is the 2020MkII.

New processing algorithms and circuit designs, in addition to the fifteen proprietary circuits* from the original, allow even greater loudness without sacrificing a clean, natural sound. The MkII's increased flexibility also gives a station the ability to create its own unique sonic signature. New features include a split band optical high frequency limiter, a low distortion overshoot compensated low pass filter* (with no spurs), improved remote control interface, RDS, and dual composite outputs.

Audition the new 2020 MkII on your station and you'll find that Aphex has really done its homework— creating a processor with performance and features unmatched at any price. The 2020MkII —in a class by itself.

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Domain

▶ Continued from page 49

decided to implement the playlist storage in a Microsoft Access Database — easy for VB to access, read and write.

This decision eliminated the drudgery of managing and sorting huge memory arrays. In my previous DOS applications, that was the only practical way to hold data at the time. Yuck!

A world of possibilities opened up using a standard Access database. Users could directly create and edit the database using Access 97 and the Structured Query Language (SQL) could be used in place of sorting routines to return *exactly* the right filename to play.

Because I had never used these database tools, it required some digging into Help files, reading sample programs and referring to some VB programming books to begin to understand what all the database excitement was about.

One of the most frustrating aspects of building an SQL query is knowing what you want to do is possible, but finding out how difficult it is to intuitively write the correct English-like commands.

I needed to keep AudioLocker from becoming too complicated. Rather than write procedures for creating or compacting the MDB database, I used Access 97 to design it and saved copies of the empty database as a backup.

The programming in the first sidebar implies that the end-user would create a playlist of groups logically — that is, creating a group whose members have the same Start and End times and Day settings. Because it is nice to let the user *see* the current playlist, a separate screen form holds a scrollable copy of the database for just that purpose.

The user must have a way of conveniently changing the playlist as needed and saving a text copy of the current playlist if desired. I reused source code from an automation application I wrote in MS QuickBasic 4.5 and updated it for VB.

The user can edit or create a schedule using any plain text editor and load it into AudioLocker using a command line:

```
c:\audiolocker.exe load
```

or by a menu option. I chose to use the single quote (') to mark a comment line in the schedule, allowing the user to extensively document a schedule.

AudioLocker ignores any line beginning with the single quote. As each line is loaded, the comma-delimited fields are inspected for the correct range and invalid lines are discarded. A message window reports the number of valid and invalid lines to the user.

The "Save" function inserts helpful header comments into the file, so the

See DOMAIN, page 59 ▶

Repeat Records

Listed below are the contents of the database, saved by AudioLocker to a plain text file. This schedule may be good for debugging, but would be pretty boring to listen to; it has only one group that plays the same files every day, one by one. At noon or when the current file finishes playing immediately after 12 noon, the playlist resets and plays the file marked by index 1, *current.atc1.wav.*

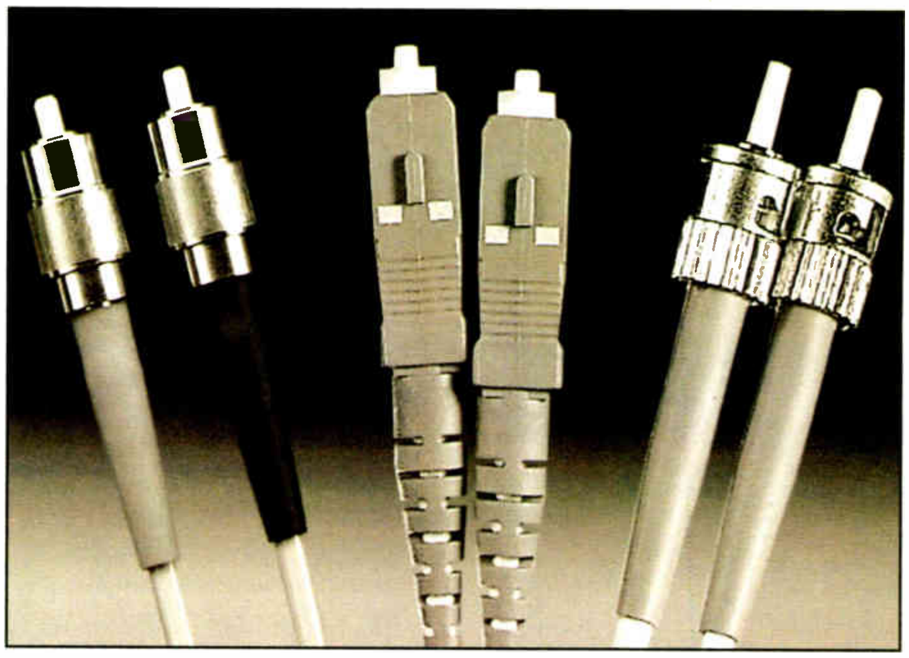
```
'  ————| C:\Projects\AudioLocker\temp\20010301-143708.sch |————
'  Snapshot of the AudioLocker Schedule as of 01/03/01 14:37:15
'Group,Index,Mon,Tue,Wed,Thur,Fri,Sat,Sun,Start,End,FileName,[optional]Comment
'————————————————————————————————————
'
'g            START   END
',i,M,T,W,T,F,S,S,HH:MM:SS,HH:MM:SS,----File Name----,[optional]Comment
1,1,1,1,1,1,1,1,1,12:00:00,11:59:59,current.atc1.wav,Weekday Afternoon Service
1,2,1,1,1,1,1,1,1,12:00:00,11:59:59,current.break1.wav
1,3,1,1,1,1,1,1,1,12:00:00,11:59:59,current.atc2.wav
1,4,1,1,1,1,1,1,1,12:00:00,11:59:59,current.totn1.wav,Weekday Evening Service
1,5,1,1,1,1,1,1,1,12:00:00,11:59:59,current.atc3.wav
1,6,1,1,1,1,1,1,1,12:00:00,11:59:59,current.atc4.wav
1,7,1,1,1,1,1,1,1,12:00:00,11:59:59,current.me1.wav,Overnight Service-Monday thru Thursday
1,8,1,1,1,1,1,1,1,12:00:00,11:59:59,current.break1.wav
1,9,1,1,1,1,1,1,1,12:00:00,11:59:59,current.me2.wav
1,10,1,1,1,1,1,1,1,12:00:00,11:59:59,current.break2.wav
1,11,1,1,1,1,1,1,1,12:00:00,11:59:59,current.totn1.wav
1,12,1,1,1,1,1,1,1,12:00:00,11:59:59,current.break1.wav
1,13,1,1,1,1,1,1,1,12:00:00,11:59:59,current.totn2.wav
1,14,1,1,1,1,1,1,1,12:00:00,11:59:59,current.break2.wav
```


PRODUCT GUIDE

Three Panduit Connections to Fiber

Three fiber-optic connectors are now available from Panduit. The company offers SC- and ST-style connectors and multimode and single-mode versions of FC connectors.

FC fiber-optic connectors have a standard design for terminations in a variety of environments from the backbone to electronics. The connectors can be used in both the service provider and enterprise markets.



The SC fiber-optic connector is designed for use in equipment cross-connects and interconnects in the backbone, as well as horizontal and work-area applications. The non-optical disconnect feature is designed to maintain data transmission under tensile load.

The ST fiber-optic connector is designed for equipment cross-connects and interconnects.

For more information contact Panduit in Illinois at (866) 405-6654, fax (866) 449-1697 or visit the Web site at www.panduit.com/ncg

Domain

▶ Continued from page 58

user, or the poor developer trying to debug the program, can recognize the comma-delimited fields more readily.

This header turned out to be a sanity-saver. A file *Saved* by AudioLocker can be *Loaded* back into the database without editing.

Why am I here?

Once the database details were worked out, it was time to design the initialization procedures.

In most automation systems, the system must answer these questions:

•"What day and time is it?"

•"What am I supposed to be doing now?" and

•"What is the next event and when does it happen?"

For AudioLocker, we get the time and day through intrinsic VB functions and then plug the values into the following SQL query:

*"SELECT * FROM Schedule WHERE (Start <= #" & sPresentTime & "#) AND (End >= #" & sPresentTime & "#) AND " & TodayIs & " = True " & "Order by IndexNum,Group"*

In most cases, this query will return a collection of records from the database, which we can then count and store in a dynamic array.

If, however, no records are returned, we must assume that AudioLocker was started later in the day, and we must look for groups that are scheduled to play past midnight by finding a group start time that is between now and 23:59:59:

*"SELECT * From Schedule WHERE " & "(End < Start) AND " & "(#" & sPresentTime & "# BETWEEN Start AND #23:59:59#) AND " & "(" & TodayIs & " = True) Order by Indexnum, Group"*

If this search returns no records, we make one last search for a group that was scheduled to start *yesterday* and might not have finished.

For example, this situation would occur if a user wrote a playlist that contained a group with a Start time of 22:33:00 that is to play only on Monday night and an End time of 02:00:00. It is now Tuesday morning and we want the group to keep playing until it reaches its End time at 02:00:00:

*"SELECT * From Schedule WHERE " & "(End < Start) AND " & "(#" & sPresentTime & "# BETWEEN #00:00:00# AND End) AND " & "(" & sYesterday & " = True) Order by Indexnum, Group"*

Finally, if no records are returned after the third search, we have to assume there is a big problem with the schedule.

Because we do not know what file to play, we will just load our *emergency.wav* file and keep playing it until either a valid group is found, which is checked each time after *emergency.wav* finishes; or until a human intervenes.

Next time we will explore the valid group dynamic and the rest of the automation functions.

AudioLocker is available to NPR member stations (source code and executable) by browsing to www.euonline.org *Rich Rarey, CEA, CBNT, is the master control supervisor at National Public Radio. He can be reached at* rrarey@npr.org

A world of possibilities opened up using a standard Access database.

AudioLocker Fields Forever

What fields should each defined for each database record? How big should each field be? Again, referring to the AudioLocker rules, these following fields seemed sufficient:

```
GroupNum    As Integer    ' The Group Number that this file belongs to.
IndexNum    As Integer    ' Enumerated position of within the group (1, 2, 3, etc.)
Start As String * 8 ' Leaving these as fixed length strings,
End  As String * 8 ' as they are only valid in HH:MM:SS format
Monday As Boolean    ' TRUE if the file plays on a MONDAY, FALSE otherwise)
Tuesday    As Boolean    ' (the remaining days are similar)
Wednesday  As Boolean
Thursday   As Boolean
Friday     As Boolean
Saturday   As Boolean
Sunday     As Boolean
FileName   As String * 64 ' The audio filename with optional path. The path can be absolute, as in "C:\ATC.WAV" or relative, as in "..\ATC.WAV"
Comment  As String * 64 ' I love comments. Everyone should.
```

PRODUCT GUIDE

Marantz Flash Recorders Go Stereo

The Marantz PMD690 records stereo or mono digital audio using PC Cards of flash or hard-disk configuration. The PMD680 model is the mono-only version and includes a telephone input/output.

Audio files recorded on the units can be transferred to a computer for editing, archiving or uploading to the Internet.

Both the PMD690 and PMD680 can record audio in the MP2 format, the voice-optimized version of MP3 audio compression. A variety of compression settings are available to extend recording times on smaller-capacity PC cards.

These recorders can also record uncompressed 16-bit PCM digital audio as a WAV or BWF (Broadcast Wave). A built-in non-destructive EDL system enables the user to place reference marks and create custom playback sequences.

The PMD690 can record via the built-in microphone or can use the stereo XLR mic/line inputs — the PMD680 offers a 1/4-inch or XLR mic input. Playback can be monitored through headphones, the built-in speaker or the line out. Record levels can be set manually, with a limiter or can be automatically adjusted.

A band or high-pass filter helps eliminate unwanted background noise. A programmable "silent skip" feature pauses recordings during lapses in a conversation.

The PMD690 has a suggested retail price of $1,499. The PMD680 has a suggested retail price of $1,249.

For more information contact Superscope Technologies/Marantz Professional in Illinois at (630) 820-4800, fax (630) 820-8103 or visit www.superscope-marantzpro.com

PRODUCT GUIDE

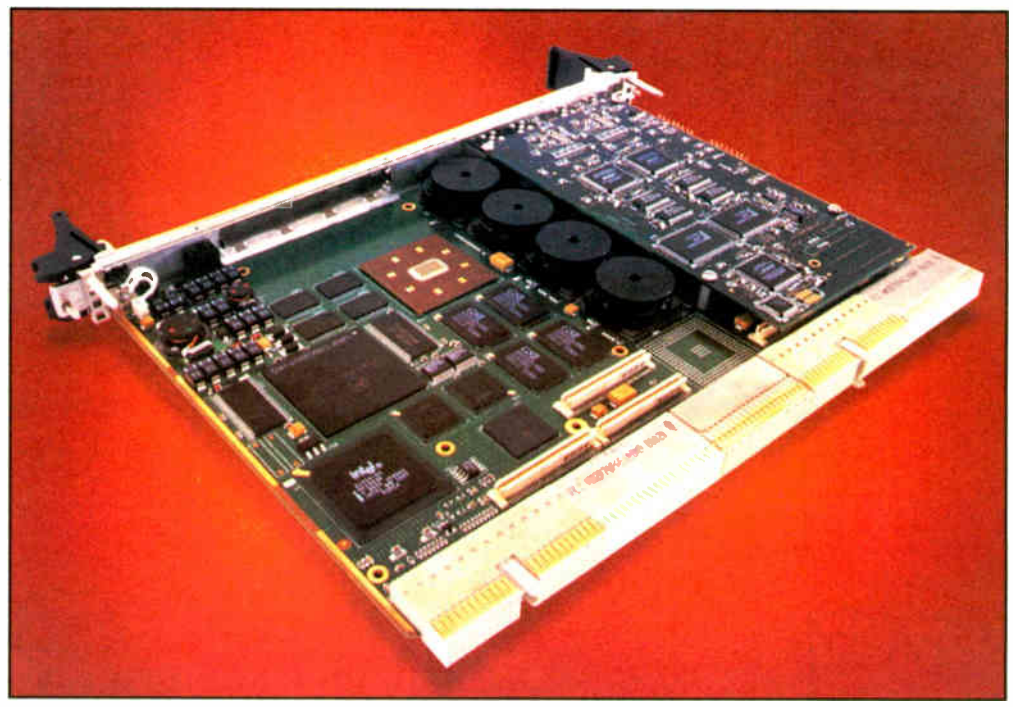
Ixthos Swims Toward Broadband, 3G

Ixthos Inc., developer of digital signal processing (DSP) boards for digital radio, and telecommunications, has released a CompactPCI DSP board designed specifically for 3G wireless and broadband telecommunications applications.

The board comprises four AltiVec PowerPC 7400/7410 processors at 400-600 MHz, providing 16 GFLOPs, Ixthos' CHAMP (Common Heterogeneous Architecture for Multi-Processing) architecture and seven on-board, intelligent DMA controllers.

The seven intelligent DMAs with segmented IXPacket technology provide maximum data throughout and transcoding capability for conversion from network IP or ATM protocols. A programmable IXTRIX interrupt multiplexer provides reallocation of critical systems resources.

The DSP board provides support for two coupled PMC (PCI Mezzanine Card) expansion modules, which allow I/O modifications with industry standard modules.



The CHAMP architecture enables the development of systems based on two scalable, redundant signal processing elements where each SPE "cluster" contains two MPC7400/7410 PowerPC processors running at 400-600 MHz. Each SPE has a dedicated 10/100 BaseT Ethernet interface and can send, receive and process voice/data channels with additional I/O data fed through the dedicated PMC sites.

The four signal processing PowerPCs are supported by a core processing element (CPE) which is made up of an additional PowerPC controller (a 250 MHz MPC8240), global memory, semaphores, interrupt multiplexers, a dedicated Ethernet interface and an H.110 Telephony bus interface.

Independent PCI-PCI data bridges separate the board's core and signal processors, providing over 1/2 GBps of simultaneous I/O data movement, enabling concurrent I/O, Ethernet and CompactPCI bus transfers.

Global CPE memory for the CompactPCI CHAMP-AV is 32 or 64 MB of SDRAM, 64-bits wide. Local memory is 64 to 128 MB of 64 bit wide SDRAM per SPE PowerPC pair. L2 cache is up to 2 MB of SBSRAM (Synchronous Burst SRAM) per processor and FLASH memory is up to 16 MB.

CompactPCI CHAMP-AV software support includes Ixthos' IXATools, used to configure and control the DSPs and all the board level resources and provide a common suite of DSP math libraries.

The IXLibs-AV software provides additional DSP libraries. Supported operating systems include VxWorks and Linux.

For information contact the Ixthos at (703) 779-7800, e-mail sales@ixthos.com *or visit* www.ixthos.com

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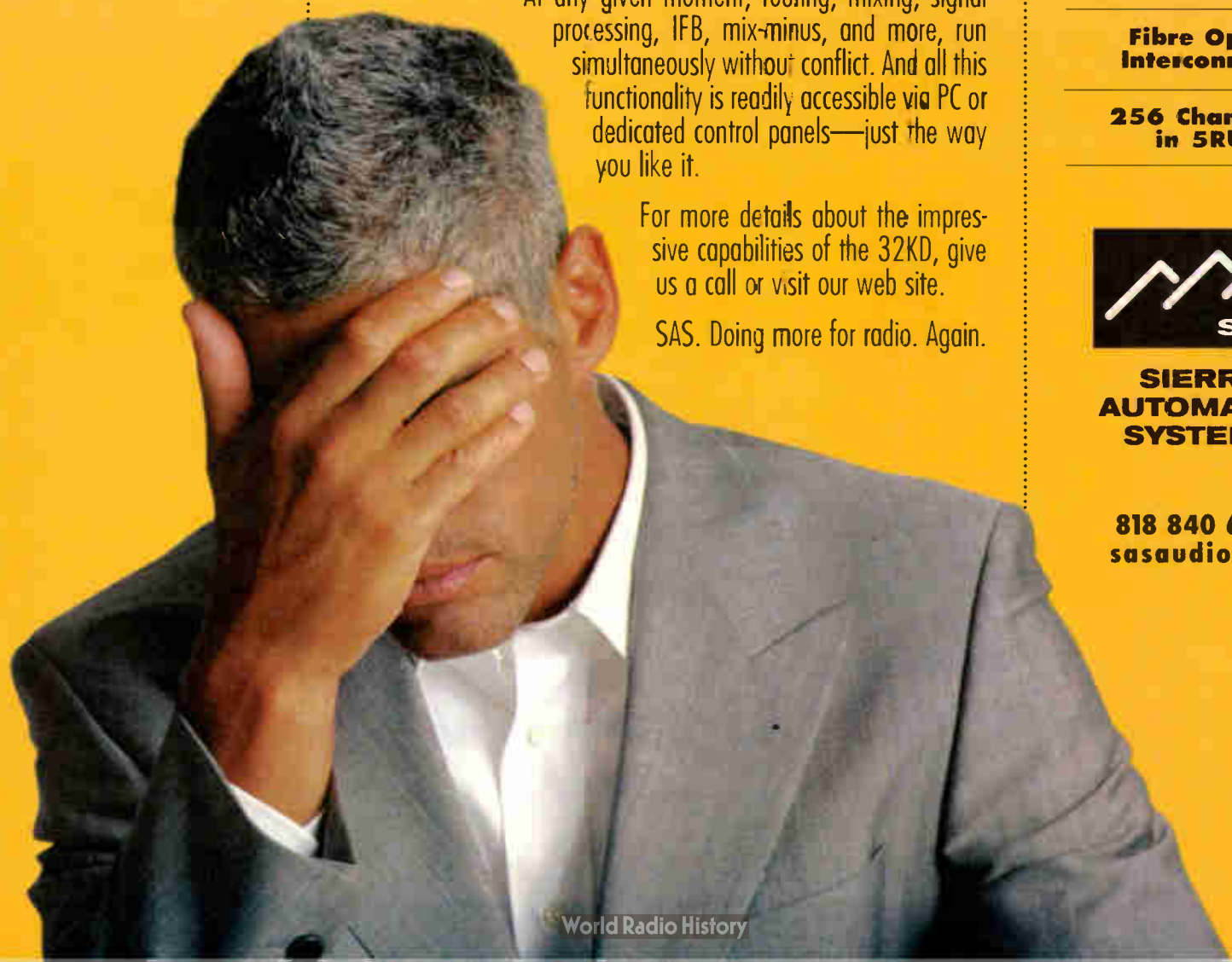

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TECH UPDATES

Genelec Monitors Highs and Lows

The **Genelec** 1029A/1091A is a two-way bi-amplified active monitoring system with subwoofer.

The 1029A nearfield monitor features cast-aluminum construction and magnetic stray-field shielding. The vented speaker enclosure contains an amplification unit, including an active electronic crossover, overload protection circuitry and two power amplifiers, one for each driver.

The Genelec 1029A Nearfield Monitor

The Genelec 1091A Active Subwoofer

The units include Genelec Directivity Control Waveguide (DCW) for stereo imaging and frequency balance. The system features an SPL of 110 dB at 1 meter for the pair and a low-frequency extension of -3 dB at 68 Hz.

The 1091A active subwoofer incorporates the amplifier and all crossover electronics needed to combine it with the 1029A loudspeakers. It reproduces frequencies 38 - 85 Hz (±2.5 dB) and a steep crossover filter of 24 dB per octave maintains the sonic quality. The subwoofer has two input connectors and adjustable sensitivity.

The eight-inch (210 mm) cone driver is capable of producing high SPLs and is housed in a 15-liter vented cabinet. It is front-loaded to improve both the passband efficiency and stopband rejection.

The amplifier unit, integrated into the cabinet, consists of the active crossover filter, driver overload protection circuits and a power amplifier. The amplifier produces 70 watts of output power.

Driver overload protection, power-on signal muting, thermal overload and short-circuit protection are included in the amplifier circuitry.

For more information contact Genelec in Massachusetts at (508) 652-0900, fax (508) 652-0909 or visit the Web site at www.genelec.com

Sennheiser Develops Microphone With NBC

The **Sennheiser** MD 46 handheld cardioid microphone, used at the 2000 Summer Olympic Games in Sydney, Australia, was created out of needs expressed by NBC's project manager for sound at the Olympics, Bob Dixon.

The microphone design — from idea to finished model — took less than a year. Prototypes of the MD 46 were extensively field tested by NBC personnel. The third prototype was the most successful iteration and is now available as a production model.

The MD 46 retails for $199.

For more information contact Sennheiser in Connecticut at (860) 434-9190, fax (860) 434-1759 or visit the Web site at www.sennheiserusa.com

TECH UPDATES

Tannoy Compact Speakers Pack Punch

The **Tannoy** Proto-J is a nearfield monitor featuring a 6.5-inch mid/bass driver and a 3/4-inch high-frequency unit placed in a front-ported reflex enclosure.

The speaker has a frequency response of 60 Hz to 20 kHz ±3 dB; sensitivity of 90 dB and a peak SPL of 1 watt at 1 meter; a nominal impedance of 8 ohms and a crossover frequency of 3,000 Hz.

The Proto-J is priced at $229 per pair and the systems are finished in black ash laminates.

For more information contact Tannoy/T.G.I North America Inc. in Ontario at (519) 745-1158, fax (519) 745-2364 or visit the Web site at www.tannoy.com

Neumann Goes On-Air With Cardioid

The **Neumann** KMS 105 is a super-cardioid, broadcast and live-performance vocal microphone.

The mic features 150 dB maximum SPL and reduced handling noise due to a triple process involving capsule tensioning, mounting and microphone electronics. As a result of the inner basket structure, the unit has a reduced sensitivity to plosives.

The model features a 132 dB dynamic range and an extended frequency response.

The KMS 105 is available in nickel or matte black casing.

For more information contact Neumann in Connecticut at (860) 434-5220, fax (860) 434-3148 or visit the Web site at www.neumannusa.com

Audio-Technica Takes to the Field

Field recording is the application for the **Audio-Technica** AT815ST and AT835ST stereo shotgun microphones.

Both feature independent line cardioid and figure-eight condenser elements. A three-position switch allows selection of a non-matrixed M-S mode and two internally matrixed left/right stereo modes.

In M-S mode, each microphone provides independent mid and side signals; this allows the desired stereo image to be created at the recording desk or through a mixer.

The two internally matrixed modes provide traditional "left-right" stereo. The user may select between a wide pattern (LR-W), with increased ambient pickup, and a narrow pattern (LR-N), which offers more rejection and less ambience.

The AT815ST has a frequency response of 30-20,000 Hz and a length of 14.96-inches. The shorter AT835ST — 9.29-inches — has a frequency response of 40-20,000 Hz.

Both models feature switchable low-frequency roll-off at 80 Hz, 12 dB/octave and require 11 to 52 V phantom power.

The units also include a foam windscreen, stand clamp and 24-inch stereo cable, which terminates into standard XLR connectors.

For more information contact Audio-Technica U.S. Inc. in Ohio at (330) 686-2600, fax (330) 688-3752 or visit the Web site at www.audio-technica.com

Lectrosonics Receives Wireless

The UDR200C studio receiver from **Lectrosonics** is an update to the 200 series system with upgraded internal architecture and software GUI.

Transmitters are available in belt-pack, hand-held and plug-on configurations.

The UT200VM handheld transmitter features the VariMic capsule with adjustable bass, midrange and treble, an adjustable attenuator for high SPL levels and wide-range input limiting.

The 200 Series system is a synthesized UHF design that provides 256 frequencies in 100 kHz steps. Auto-tracking front-end filters in the receiver automatically re-tune to stay centered over the operating frequency as the frequency is changed through the 25.6 MHz bandwidth.

Computer control of the receiver is provided through a built-in RS-232 compatible interface and supplied LecNet software.

Four sections of the pop-up screen for each receiver provide a display showing internal levels and setup information — a work area for building and naming frequency groups, a spectrum analyzer for RF site scanning and a walk-test recorder area for system setup and diagnosis.

A dual-band compandor decreases distortion and noise to levels lower than previously attainable with the single-band compandor.

For more information contact Lectrosonics Inc. in New Mexico at (800) 821-1121, fax (505) 892-6243 or visit the Web site at www.lectrosonics.com

Electro-Voice Turns Blue With Mic

The **Electro-Voice** series of Cobalt microphone features EV's neodymium-based magnet structure.

The Co9 Premium vocal microphone features a cardioid polar pattern with a frequency response of 50 Hz to 18 kHz. The sensitivity is -50 dBV.

The Co7 Crossroad vocal microphone features a cardioid polar pattern for a frequency response of 50 Hz to 18 kHz. The sensitivity is -50 dBV.

The Co5 Classic vocal microphone is designed to deliver a balance of highs, midrange and bass, with controlled proximity effect.

The unit is a dynamic cardioid microphone with a frequency response of 50 Hz to 15 kHz, sensitivity of -51.0 dBV and low-Z balance of 600 ohms.

For more information contact Electro-Voice in Minnesota at (800) 392-3497, fax (952) 887-5588 or visit the Web site at www.electrovoice.com

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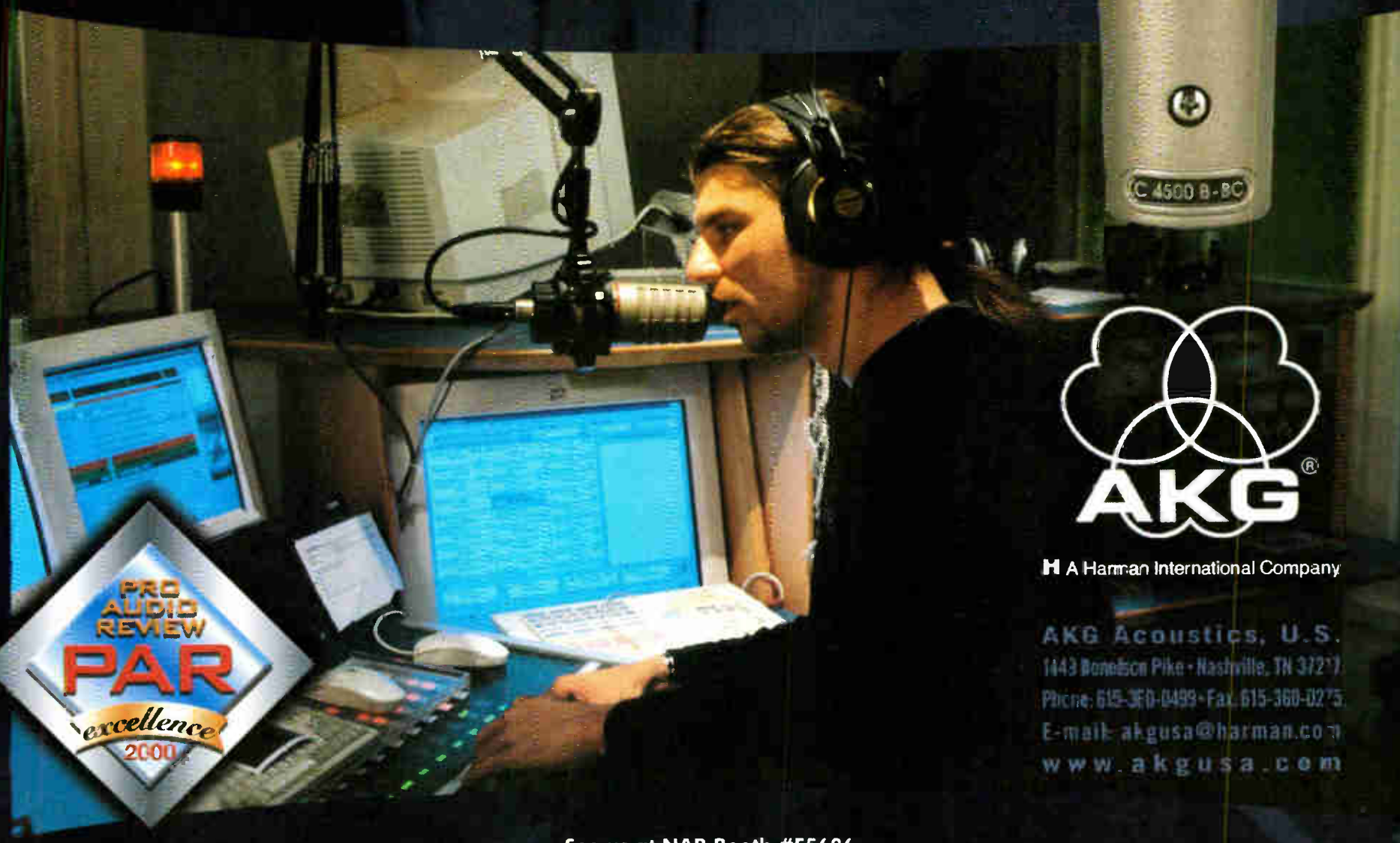

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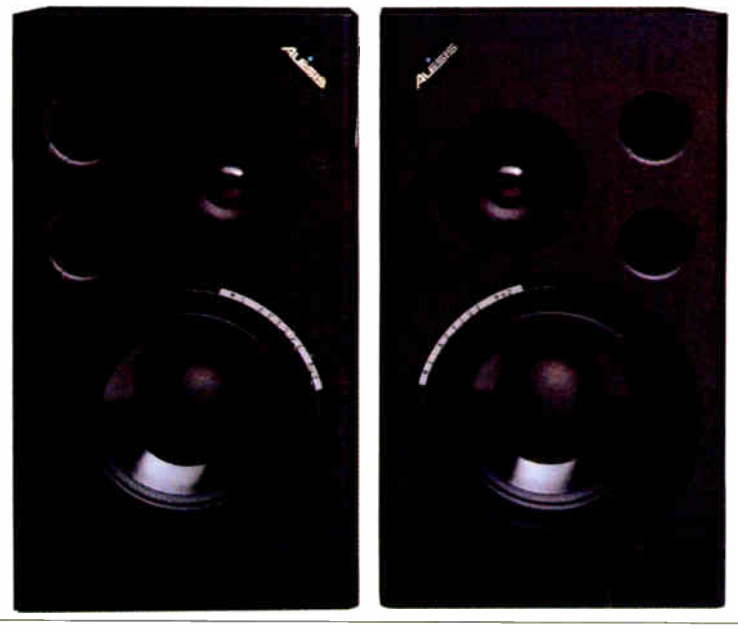
Alesis Makes Reference Active



The **Alesis** M1 Active Mk2 is the next generation of M1 active bi-amplified reference monitor.

The monitor features an internal active crossover and dual amplifiers. The system uses custom drivers for the linear, low-distortion response and its 6.5-inch woofer cone is formulated from a high-tensile-strength, low-weight, non-woven carbon fiber.

The company redesigned the unit's one-inch silk tweeter dome. M1 Active Mk2 also features an internal mounted phasing plug and is ferrofluid cooled.

Two amplifiers — a 75-watt woofer amp and a 25-watt tweeter amp — were developed for the M1 Active, along with eighth-order high- and low-pass electronic crossover filters. The crossover point was reduced from 1.5 kHz to 2 kHz to improve mid-frequency response and midrange coloration.

Time alignment circuitry in the tweeter section of this crossover maintains synchronization of the high and low drivers to avoid time smear.

The M1 Active Mk2 lists at $649 per pair.

For more information contact Alesis in California at (800) 525-3747 or visit the Web site at www.alesis.com

AKG Creates Mic For Radio Talent

The **AKG Acoustics** C 4500B-BC large-diaphragm condenser microphone is designed for on-air radio work.

The microphone offers a front-end firing capsule position, electro-magnetic screening, internal pop-filter and no need for additional outboard processing.

The condenser mic features a transformerless output and is shielded by its metal housing and double-screening of acoustically open sections.

The C 4500B-BC features an integrated 120 Hz roll-off filter, a -20 dB pre-attenuation pad and a dynamic range of more than 135 dB.

AKG has developed a new patent-applied-for multilayer pop filter for the C 4500B-BC, which provides internal screening pops between the front grille and microphone capsule.

For more information contact AKG in Tennessee at (615) 360-0499, fax (615) 360-0275 or visit the Web site at www.akg-acoustics.com

TECH UPDATES

The KSM44 Jumps Into the Studio

The **Shure** KSM44 is a multi-pattern — omni, cardioid and bi-directional — condenser microphone that features externally biased large dual diaphragms in a side-address design.

The mic contains Class A, transformerless preamplifier circuitry and features a frequency response of 20 Hz-20 kHz. Its dual one-inch, gold-layered, Mylar diaphragms provide added low-frequency response and produce a low self-noise of 7 dB.

The unit features a three-position low-frequency filter function and an internal shock mount stems stand-related noise.

Accessories provided with each mic include a locking aluminum carrying case, a color-matched ShureLock elastic-suspension shock mount, a swivel mount and a protective velveteen pouch.

For more information contact Shure in Illinois at (847) 866-2200, fax (847) 866-2279 or visit the Web site at www.shure.com

Behringer Claims It Has Found Truth

The Truth B2031 monitor from **Behringer** features electromagnetic shielding and a frequency response of 50 Hz to 20 kHz.

The B2031 sports amplifiers for low and high frequencies — 150 and 75 watts. The 8.75-inch woofer features a polycarbonate diaphragm and a cast aluminum chassis. The bass reflex system is designed to reduce low-frequency distortion and the shape of the bass tunnel prevents air circulation noise even at high sound pressure levels.

A ferrofluid-cooled tweeter with a 25-mm dome reproduces the high-end frequencies. In addition, the computer-designed waveguide is designed to deliver a homogenous dispersion pattern and linear phase response.

The monitor has a frequency response of 50 Hz to 20 kHz and features overload protection by way of an integrated limiter, which is separately controlled for low and high frequencies

The system has servo-balanced inputs with XLR and 1/4-inch TRS connectors.

The unit features electromagnetic shielding to eliminate the risk of interference between computer monitor and speaker.

For more information contact Behringer in California at (310) 441-4430, fax (310) 441-4460 or visit the Web site at www.behringer.com

Røde Condenses The Valves

Røde Microphones released two new large-capsule mics — the NT1000 and the NTK valve microphone.

The NT1000 features low-noise, transformerless circuitry, internal capsule and a large capsule with gold-plated membrane.

The microphone uses a cardioid polar pattern and is encased in a cast-metal satin nickel body. The head is made of a welded and heat-treated mesh.

The capsule is an externally polarized one-inch pressure-gradient condenser. The frequency response is 20 Hz to 20 kHz (±6 dB); the output impedance is 100 ohms (50 ohms per leg) and the sensitivity is -36 dB re 1 V/Pa (16 mV at 94 dB SPL) ±1 dB.

The dynamic range is greater than 134 dB. The maximum SPL is greater than 140 dB SPL (at 1 kHz, 1-percent THD into 1 k load) and the signal-to-noise ratio is greater than 88 dB.

The unit includes a zip pouch, an M2 stand mount and a 3/8- to 5/8-inch thread adaptor. The list price of the NT-1000 is $395.

The NTK is a valve microphone, which features a one-inch capsule gold-plated membrane with twin triode valves.

The microphone uses a cardioid pattern. The frequency response is 20 Hz - 20 kHz (±6 dB); the output impedance is 200 ohms (100 ohms per leg) and the sensitivity is -38 dB re 1 V/Pa (12 mV at 94 dB SPL) ±1 dB.

The dynamic range is greater than 147 dB. The maximum SPL is greater than 158 dB SPL (at 1 kHz, 5-percent THD into 1 k load) and signal-to-noise ratio is greater than 82 dB.

The NTK includes a power supply, a 30-foot multicore cable, a M2 stand mount and a 3/8- to 5/8-inch thread adaptor. An SM2 shockmount is optional. The list price of the NTK is $595.

For more information contact RØDE Microphones in California at (310) 328-7456, fax (310) 328-7180 or visit the Web site at www.rodemicrophones.com

Joemeek TB-47 Is Not for the Meek

The Meekrophones go tube with the TB-47, the latest mic in the **Joemeek** line.

The unit offers a high-gain tube pre-amplifier section, with a Meekrophone series dual capsule. A multi-pattern power supply gives stepped variation from omni, to cardioid, to figure-eight polar patterns.

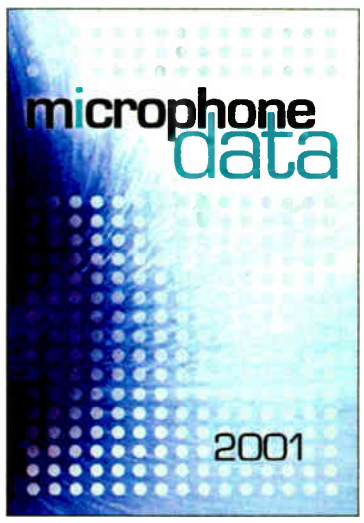
The mic features a one-inch gold, six-micron, hand-assembled condenser capsule. An output transformer balances the output of the TB-47.

Extra features include the shockmount, mic cables and a flight case.

For more information contact PMI Audio in California at (310) 373-9129, fax (310) 373-4714 or visit the company Web site at www.pmiaudio.com

Rycote Collaborates on Guidebook

Windshield and suspension system specialist **Rycote** and publisher Human-Computer Interface Ltd. have assembled a guide to professional microphones.



The publishers said they compiled information on every microphone in professional use for "The Microphone Data Book" (ISBN 095393540X).

Each page carries a photo and essential technical details of one specific microphone. A common format, the conversion of reference levels and a fixed scaling for thumbnail frequency graphs and polar diagrams allow readers to make direct comparisons between different makes.

The 1,016-page guide contains multiple indexes under such headings as preferred use, price range, polar pattern and transducer type.

In addition to the more than 850 microphone profiles, the book also includes articles microphone design, use, history and selection by Hugh Robjohns, Dave Malham, Ron Streicher and Chris Woolf.

For information about the Microphone Data Book, contact the publisher via e-mail at booksales@microphone-data.com *or visit the Web site at* www.microphone-data.com

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On the other hand, maybe you are the sort who can run a fast machine. Who loves the thrill of smooth power. Who revels in the admiration of others.

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TECH UPDATES

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The unit appears identical to the SR69 save a distinctive red logo ring. The model even sounds similar on-axis with the same open frontal pickup but features more bottom end.

The SR68 has a frequency response at six inches of 50 Hz to beyond 20 kHz. Its sensitivity is 10mV/Pa (-40dBV/Pa). It has a SPL of 145 db with 5,000-ohm load.

The unit requires 48V, 10mA phantom power.

The suggested retail price for the SR68 is $450.

For information contact Earthworks at (603) 654-6427, fax (603) 654-6107 or visit the Web site at www.earthwks.com

Soundelux Delivers Vintage Sound

The ELUX 251, by **Soundelux**, is a multi-pattern tube mic. The unit features hand-built and -tuned European capsules; electronic components are wired point to point.

The mic uses cardioid, omni and figure-eight patterns. The frequency range is 20 Hz to 20 kHz and sensitivity is 15 mV/Pa (-36 dBV/Pa).

The model has a maximum SPL of 132 dB for 0.5-percent THD at 1 kHz; the impedance is 150 ohms and a dynamic range of 115 dB. The mic uses a type 6072A tube.

The ELUX 251 can be used for mixing, processing, mastering, broadcasting and Webcasting.

For more information contact Soundelux in California at (323) 464-9601, fax (323) 463-2881 or visit the company Web site at www.soundelux.com/mics

MBHO Brings Microphones to America

The **MBHO** Series 400 small-diaphragm condenser microphones are available in either a cardioid pattern, the MBNM 440, or in an omni pattern, the MBNM 410.

The microphone series features the company's SMD technology designed to deliver short signal routings and low current consumption.

The 440 has a frequency range of 40-20,000 Hz and is available in an S model which features a switch between a high-pass filter and -10 dB. The 410 has a frequency range of down to 15 Hz. All other features are identical.

The MBNM 410 and MBNM 440 both list for $341.

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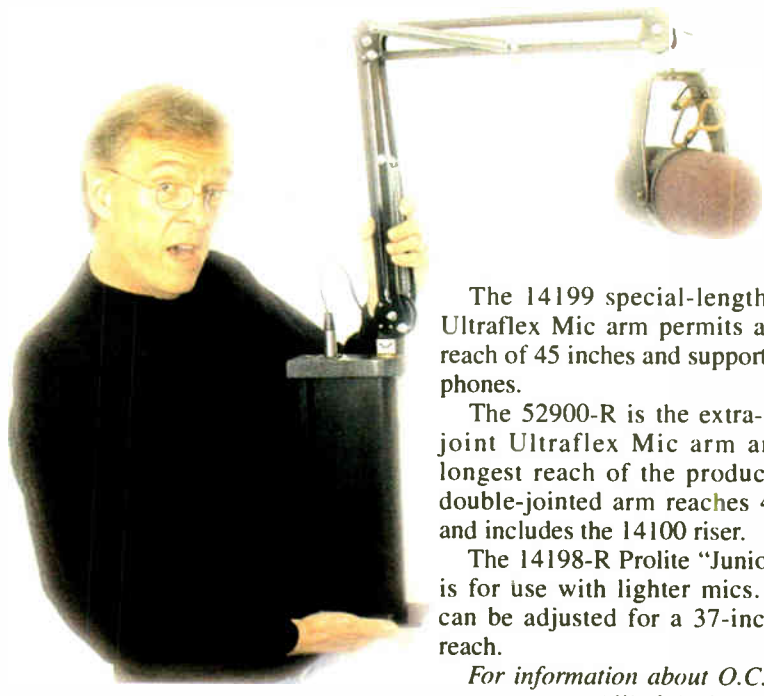
O.C. White Reaches Out With Mic

O.C. White offers several Deluxe Series boom arms at varying lengths.

The Deluxe series 14194 Ultraflex Mic arm has an overall extended reach of 29 inches and supports most microphones without changing springs. Optional heavy-duty springs are available.

The 51900 is the Ultraflex Mic arm with a riser, which adds one foot of vertical height.

The 51900-3 comes with three 14194 arms and a TMA triple-arm mount. The system is designed for use in multiple guest or roundtable situations.



The 14199 special-length, one-joint Ultraflex Mic arm permits an extended reach of 45 inches and supports all microphones.

The 52900-R is the extra-reach, two-joint Ultraflex Mic arm and has the longest reach of the product line. The double-jointed arm reaches 46.5-inches and includes the 14100 riser.

The 14198-R Prolite "Junior" Mic arm is for use with lighter mics. The knobs can be adjusted for a 37-inch extended reach.

For information about O.C. White Mic arms contact Allied AirNet Services at (765) 935-3893 or e-mail dbocw@aol.com

Apex Delivers Multiple Patterns

The Apex450 vacuum tube condenser microphone from **Apex Electronics** features nine selectable polar patterns available from the selector switch on the front panel of the external power supply.

The mic has three gradient stages between each pattern — omnidirectional, cardioid and figure eight.

The model is a condenser pressure gradient microphone with one-inch dual diaphragm. Its frequency response is 20-20000 Hz; sensitivity is 14 mV/pA, which is equivalent to -37 dB (0 dB = 1 V/pA) and its impedance is less than 300 Ohms.

The unit's signal-to-noise ratio is greater than 76 dB and its low-frequency cutoff point is -6 dB at 120 Hz

The Apex450 features an aircraft-grade machined brass body with a scratch-resistant anodized finish. It is shipped with an aluminum flight case, windsock, seven-pin XLR cable, external power supply and a "cat's cradle" style studio shockmount assembly.

The list price for the Apex450 is $899.

For more information contact Apex Electronics USA in New York at (716) 297-2920, fax (716) 297-3689 or visit the Web site at www.apexelectronics.com

Avoid Wires With Azden 1000

The **Azden** 1000 wireless microphone receiver and transmitter series offers 121 digitally selectable UHF frequencies between 723 and 735MHz.

The 9.9-ounce 1000URX receiver features a diversity front-end with two sets of receiver electronics, high-gain antennas and DLC (Diversity Logic Control) circuitry for reduced dropouts.

It also includes dielectric filters for image rejection, Fifth order filters for improved S/N ratio, multi-function LCD readout, XLR mic/line output and headphone output with level control.

The series also includes two matching transmitters — the 1000BT bodypack with LCD readout and various microphone options and the 1000XT XLR plug-in with LCD readout for dynamic or phantom powered mics.

System prices start at $1,350.

For more information contact Azden in New York at (516) 328-7500, fax (516) 328-7506 or visit the Web site at www.azdencorp.com

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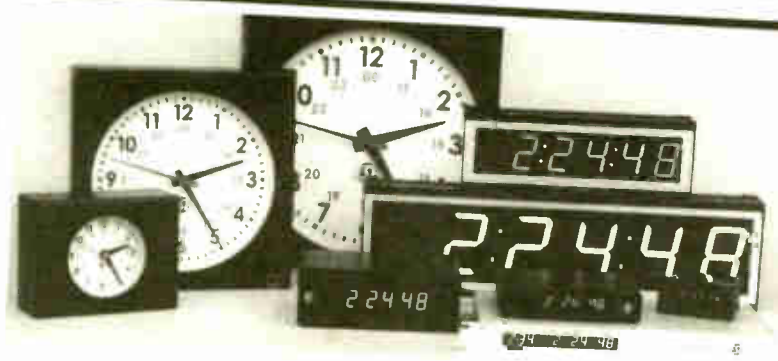

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The DS-8 features include:

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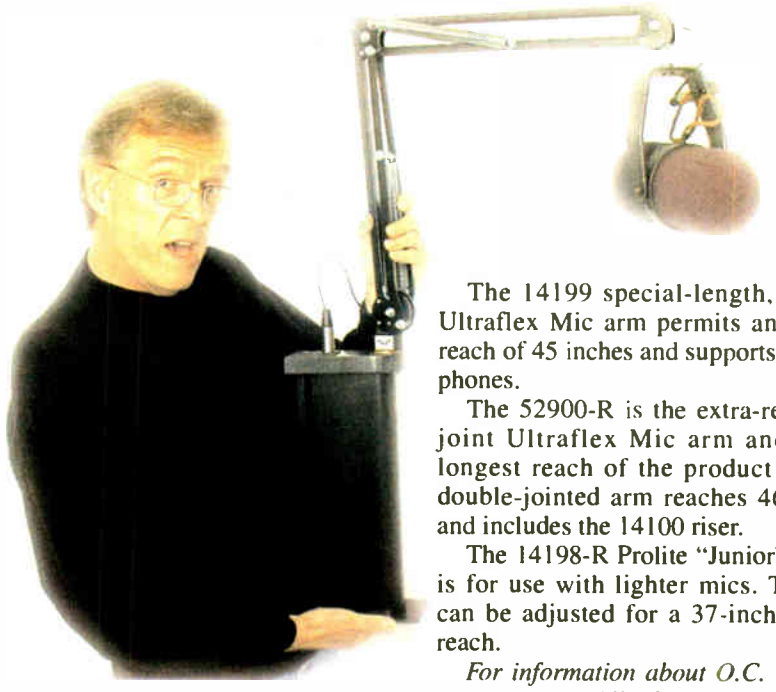

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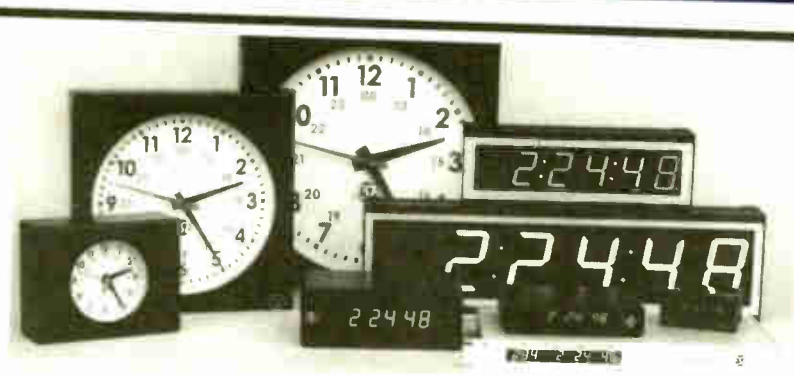

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TECH UPDATES

DPA Mics for Stereo Applications

The **DPA** Type 3532 is an A-B stereo kit consisting of two factory-matched omnidirectional large diaphragm microphones — Type 4041 — with 130V preamplifiers in a discrete class A design.

The microphones are matched within 1 dB on frequency response, sensitivity and self-noise. The maximum phase response difference from 50 Hz to 20 kHz is 10 degrees.

The frequency response from 10 Hz to 20 kHz features a 4-6 dB soft boost around 8 kHz and matches the response of the Type 4040 hybrid microphone.

The two 4041s are powered via the standard HMA4000 Microphone Amplifier. In this configuration, the A-B stereo microphone system offers a transparent audio path with a low noise floor of 7 dB(A) for the 4041-S and 10 dB(A) for the 4041-T.

The microphone system is able to handle very large sound pressure levels of 144 dB SPL peak.

The unit is designed as a modular system, allowing the capsule to be unscrewed from the preamplifier. Two versions of preamplifiers are available. The 3532-S is a solid-state preamplifier version and the 3532-T is a pentode vacuum tube preamplifier version driven as a cathode follower in a unity gain class A design, which adds a slight-musical, second harmonic distortion coloration to the recording.

Customers may order additional preamplifiers. Included in the kit is the Type HMA4000 two-channel high-voltage microphone amplifier and a stereo boom, packed with the special six-pin audio cables in a Samsonite briefcase with a foam insert.

For more information contact DPA Microphones/TGI North America in Ontario at (519) 745-1158, fax (519) 745-2364 or visit www.dpamicrophones.com

Sonifex Distributes Sound to Heads

The **Sonifex** RB-HD6 headphone distribution amplifier has been updated.

The outputs of the unit now can appear simultaneously on the front and rear panels; internal jumper switches allow this setting. This means that the insert inputs can also be parallel outputs.

Additionally, the master volume control on the front panel can be disabled for fixed-level installations.

For more information on Sonifex contact Independent Audio in Maine at (207) 773-2424, fax (207) 773-2422 or visit www.independentaudio.com

Crown Crafts a Match Made Stereo

Crown Audio CM-700 cardioid condenser microphones now are available in matched pairs. Each pair of microphones is guaranteed to be matched in sensitivity and frequency response to within 1.5 dB.

The stereo pairs of CM-700s — designated CM-700MP — feature a humbucking transformer, polycarbonate capacitors and a gold-plated three-pin connector.

The mics are designed to provide wide-range frequency and off-axis responses.

Protection against static and RFI is part of the design. The output is balanced, low impedance, which allows long cable runs without hum pickup or high frequency loss. The models are phantom powered by 12 - 48V.

Microphone pairs come with a carrying pouch, windscreen and swivel mount. The CM-700 is available in an MPS version — matched pair stereo — which includes a stereo bar, shock mounts and a stereo miking guide.

The CM-700 features a frequency response of 30 Hz to 18 kHz — 50 Hz to 16 kHz, ±2.5 dB — with a self-noise of 21 dBA.

For more information contact Crown Audio in Indiana at (800) 342-6939, fax (219) 294-8250 or visit the Web site at www.crownaudio.com

B&W Has Ears, Speakers to the Wall

The Signature 7NT In-Wall Loudspeaker from B&W Loudspeakers is based on the B&W Nautilus speaker series. The 7NT is intended for applications where there is no available floor space or in architectural builds where in-wall speakers would be needed.

The speaker features a 7-inch bass/midrange unit, which employs a die-cast basket with fixed plug; Kevlar diaphragm and oversized 1-1/4-inch, high-temperature Kapton-formed voice coil. The in-wall system yields sensitivity of >88 dB SPL at 1 watt/meter and offers power handling of 150 watts.

The low-frequency limit is 30 Hz (-6 dB), and response is 40 Hz to 20 Hz ±3 dB, with a top octave of -6 dB at 30 kHz. The 7NT incorporates a three-position tweeter-level control — -3, 0 and +3 dB.

For information call (978) 664-2870 or visit www.bwloudspeakers.com

Products & Services SHOWCASE

Radio World

Broadcast Equipment Exchange

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ACOUSTICS

Want to Sell

AMPLIFIERS

Want to Sell

Phase linear power amps, 400 lis, 700 lis, Pro700s, BO. Mark Hughes, 615-242-2907, email: markhugh@aol.com.

Shure SR105 mono power amps (6), 200W each, $400/pr. Mark Hughes, 615-242-2907, email: markhugh@aol.com.

Crown stereo power line, $195. J Price, 214-321-6576.

Radio Systems DA-16 audio distribution amp, $225. Steve, Bay Country Bdct Equip, POB 523, Chase MD 21207. 877-722-0131.

ANTENNAS/ TOWERS/CABLES

Want to Sell

360' ROHN 80 guyed tower, 6 months old, disassembled & ready to go! $20,000. 1-800-831-5060.

AM GROUND SYSTEMS: Reliable, On-time Installation, Quality Workmanship, Ground System Evaluation & Repair. www.amgroundsystems.com 1-877-766-2999.

Dielectric 3-5/8" motorized four port coaxial switch . Continental Communications, 314-664-4497. Email: contcomm@fiastl.net.

ERI SPHX, 6AC, 6 bay, high power, rototiller type, on 104.7 MHz with de-icers, less brackets. Packed in ERI boxes, ready to ship, $12,000/BO, others available, call for details. Ted Ronneburger, Dickey Broadcasting Co (WCNN/WALR), 2970 Peachtree Rd, NW #700, Atlanta GA 30305. 404-688-0068.

Various FM antennas, to many to list. Clay Freinwald, Entercom, 1820 Eastlake Ave East, Seattle WA 98102. 206-726-7071 or email: cfreinwald@entercom.com.

Dielectric/RCA 4" marman clamps, $20 ea. R Lankton, Clear Path Comm, 5053 Ocean Blvd #18A, Siesta Key FL 34242. 941-544-6842.

Shively FM 6810-4R-DA, 4 bay full wave with radomes, 30' long, good for 98.7 to 102.7 MHz, pole mount. $5000 FOB Colorado Springs. Jim Bruneau, KGFT, 6760 Corporate Dr, #340, Colorado Springs CO 80919. 719-531-5438 x124.

AUDIO PRODUCTION

Want to Sell

Presonus ACP22 stereo compressor/limiter/gate, new, $235; Auditronics stereo sliders model 340-560 +extender boards 110EX6-2-A & 110-EX9-2-A, BO; Fostex line amp model 5030, $195; Aiwa cassette deck model AD6900 MK II, BO; Otari auto locator CB111, $195; Altec AM-FM receiver M-725A, $195. J Price, 214-321-6576.

UREI 565 filter units (approx 20), all are balanced in/out, some transformer & some active, gd cond, sell singly or by the lot, as-is, BO. Bill Hineman, NPR, 202-513-2494. whineman@npr.org.

AUTOMATION EQUIPMENT

Want to Sell

Digalink III systems (2), complete with cables & manuals, currently operating & will be avail on March 1, 2001. Angie Sugalski, WCN, POB 444, Spartanburg SC 29304. 888-989-2299.

Scotts Studio complete system. Includes monitors, computers, voice track, touch screen. In great cond, currently on air, BO. Randy Anderson, KXRQ, 1420 East 2850 South #200, Vernal UT 84648. 435-781-1100.

COMPLETE FACILITIES

CONSOLES

Want to Sell

Samson Mixfad9, 9 channel compact mixer, includes 3 stereo channels with manual in very gd cond, $100/BO. Bob Rivkin, KJJZ/KPLM, 441 S Calle Encilia #8, Palm Springs CA 92262. 760-320-4550.

Shure mixers: M267, $325; M675 broadcast production master, battery operated, $325; M688 stereo, $200; M63 audio master M68, $150; M68FC, $150; M677, $175; M62V LevelLoc compressor, $200; Shure rackmount bracket for M Series mixers, $35 ea. Mark Hughes, 615-242-2907, email: markhugh@aol.com.

Speck vintage 16x8 console, 8 vu's, blue, external power supply, $2500. Mark Hughes, 615-242-2907, email: markhugh@aol.com.

Collins-Autogram IC10, 10 pot stereo console, gd condition, needs cue module, $1000 +shpg. Howard Espravnik, 915 N Water St, Gallatin TN 37066. 615-230-3618.

Soundcraft SAC 200, 13 input modules, 2 phone modules, 1 dual selector module. Dual power supplies with change-over, gd cond, as-is, BO. Bill Hineman, NPR, 202-513-2494. whineman@npr.org.

Want to Buy

RCA hi-level transformer isolation units, either single or dual channel, as used in BC-7/8 consolettes. Any available parts for this series. BA-73B manual. BCM-2B "sidecar" mixer. BC-17 three channel consolette. J Ballard, 39 Boston St, Middleton MA 01949. 978-774-4041. or email: TK41C@aol.com.

Western Electric stereo mixer wanted. Paying $10,000. Sumner McDanel, 1-800-251-5454.11AEAW SM600 & 152 monitors, $600 ea, cases $150 ea. Mark Hughes, 615-242-2907, email: markhugh@aol.com.

Radio World

DISCO-PRO SOUND EQUIP

Want to Sell

Technics Direct Drive turntables (2) with cartridges & needles in a blus anvil style road case, $500. Mark Hughes, 615-242-2907, email: markhugh@aol.com.

LIMITERS/ AUDIO PROCESSING

Want to Sell

OVER 15 PIECES, GATES, ALTEC, CBS, SHURE, UREI LIMITER-COMPRESSORS. EMAIL FOR PHOTOS. archaicaudio@webtv.net.

Automated Broadcast Controls STA-MAX, CRL Systems SMP800 stereo modulation processor, sell or trade for tube gear, mikes, compressors, etc. Mark Hughes, 615-242-2907, email: markhugh@aol.com.

Yamaha SPX90 digital multi effect processor, gd cond w/manual, $75/BO. Bob Rivkin, KJJZ/KPLM, 441 S Calle Encilia #8, Palm Springs CA 92262. 760-320-4550.

M.S.I. CP-803 composite clipper, $685. Steve, Bay Country Bdct Equip, POB 523, Chase MD 21207. 877-722-0131.

Optimod 8100, working & on the air, sounds great & updated, BO. Charlie Hall, KXRQ, 1420 East 2850 South #200, Vernal UT 84648. 435-623-4131.

Want to Buy

Teletronix LA-2A's, UREI LA-3A's & LA-4's, Fairchild 660's & 670's, any Pultec EQ's & any other old tube compressor/limiters, call after 3PM CST, 972-271-7625.

Any kind of tube compressors, mixers, mikes, etc. Mark Hughes, 615-242-2907, email: markhugh@aol.com.

Old Federal Signal compressor limiter, any condition. Mark Wilson, 541-747-5205.

MICROPHONES

Want to Sell

Electro-Voice 644 Sound Spot, unidirectional dynamic, old classic, like new, $325. Gene Whittenberger, Whittenberger Studio, POB 396, Mexico IN 46958. 765-985-2224.

EV 642 shotgun dynamic, $200; EV N-D257B dynamic mike, $99. Mark Hughes, 615-242-2907, email: markhugh@aol.com.

Altec 683B, $295; EV 654A, $125. J Price, 214-321-6576.

Want to Buy

GOLDEN MIKE ORIGINAL AWARDS WANTED. PAYING TOP DOLLAR! 615-352-3456, fax: 615-352-1922, email: billbryantmgmt@home.com

RCA 77-DX's & 44-BX's, any other RCA ribbon mics, on-air lights, call after 3PM CST, 972-271-7625.

Ugly Altec 639 mic wanted. Paying $225. Sumner McDanel. 1-800-251-5454.

RCA 77-DX, 44-BX, KU-3A's, WE-639's, On-Air & recording lights wanted, top dollar paid! 615-352-3456, FAX: 615-352-1922. E-mail: billbryantmgmt@home.com.

MISCELLANEOUS

Want to Sell

Various FM notch filters. Clay Freinwald, Entercom, 1820 Eastlake Ave East, Seattle WA 98102. 206-726-7071 or email: cfreinwald@entercom.com.

Kohler 45 kW 3 phase 208/120 VAC or 480/277 VAC gas generator (convertible to propane), 502 hrs recently load tested w/Lexington Controls 400 A automatic transfer switch. Located in Denver CO, $6900. Mike Pappas, KUVO Engineering, 10115 W Washburn Way, Lakewood CO 80227. 303-988-0976.

Magnecorder electronics (4 sets) with 7 transport units mounted in a 72" rack, also one cannabilized transport unit for spare parts, BO, must pick up. JB Crawley, WMSK, POB 185, Campbellsville KY 42719. 270-465-8884.

Sportscaster headsets, BO. C. Hall, KXRQ, 1420 East 2850 South #200, Vernal UT 84648. 435-623-4131.

MONITORS

Want to Sell

Used Mod Monitors, McMartin & Belar. Many to choose from, tuned & calibrated on your frequency, full guaranteed. Goodrich Ent. 402-493-1886.

QEI 691/01 FM modulation monitor, test set, $2400. Steve, Bay Country Bdct Equip, POB 523, Chase MD 21207. 877-722-0131.

Want to Buy

Western Electric speakers. Paying $1000 for mdl 753 & $2000 for mdl 757. Sumner McDanel. 1-800-251-5454.

RECORDERS

Want to Sell

Revox PR99 r-r, poor cond, $50/BO. Bob Rivkin, KJJZ/KPLM, 441 S Calle Encilia #8, Palm Springs CA 92262. 760-320-4550.

Tanberg 15-21 Series 15 reels (2), like new, need belts, $60/pr. Will Dougherty, WLD, Music Valley, Rt 1, Box 1548, Mill Spring MO 63952.

RECORDERS (cont.)

Teac 133 AV 3 channel cassette, $500; Teac RC70, RC71 remote, $100; Ampex 440 1" 8 track, $2500. Mark Hughes, 615-242-2907, email: markhugh@aol.com.

Ampex 354-2 stereo r-r, excel cond, $495; Ampex 440 stereo, $495;Ampex 440C in console, 3.75 – 30 ips, $595; set of new Ampex 8 trk 1" heads, $750; set of new Ampex 16 trk 2" heads MM1100, $350 ea; MCI J.H. 110 stereo in console, $495; MCI stereo electr, $100; MCI power supplies, $100; Rusland recorder console, $125; Ampex 351-2 stereo r-r in carrying case, $1200; Ampex 351 mono r-r, $595. J. Price, 214-321-6576.

Sony B-67 analog 1/4" 2 trk. Complete, condition unknown. Many new parts in boxes including new heads. Tabletop version. Bill Hineman, NPR, 202-513-2494. whineman@npr.org.

Sony MDSB2P mini disk R/P, BO. R Lankton, Clear Path Comm, 5053 Ocean Blvd #18A, Siesta Key FL 34242. 941-544-6842.

Sony PCM-3203 digital 1/4" 2 trk & Sony PCM-3402 digital 1/4" 2 trk. Dash format, gd condition with manuals, one is in roll around, as-is, BO. Bill Hineman, NPR, 202-513-2494. whineman@npr.org.

Studer Revox PR99 Mark-2 recorder & **Revox monitor-PR99** with heavy duty stand on wheels, very little use & in gd cond; **Ampex 601 & 602** r-r's, nice cond, cable, case; **EV 644** shotgun mic, new, box, instructions, cable; **EV 647 & 648** mics, nice cond, cables; **EV 644** mic in nice cond with cable;**EV 649B** dynamic mini tie/clip mic, cable. Items from estate sale in excel cond with very little use. Make offer for entire lot +shpg. 914-949-5920, fax: 914-761-7419, email: hdeans@netzero.net.

REMOTE & MICROWAVE

Want to Sell

Marti RPT-30 RPU transmitter on 455.800, BO. R Lankton, Clear Path Comm, 5053 Ocean Blvd #18A, Siesta Key FL 34242. 941-544-6842.

Marti STL-10 stereo STL with combiners, $3895. Steve, Bay Country Bdct Equipment, POB 523, Chase MD 21207. 877-722-0131.

SATELLITE EQUIPMENT

Want to Sell

SATELLITE C/Ku gear, www.daveswebshop.com.

SOFTWARE/ DATABASES

Want to Sell

Computer tools by Ron Balonis at www.computertoolboxes.com.

TAPES/CARTS/ REELS/CD's

Want to Sell

Cartridge tape equipment. Clay Freinwald, Entercom, 1820 Eastlake Ave East, Seattle WA 98102. 206-726-7071 or email: cfreinwald@entercom.com.

TEST EQUIPMENT

Want to Sell

Ampex 300E vacuum tube voltmeter, $35; B&W Nidek 400 distortion meter, $20; Beta Scope non destructive thickness gauge, Twin City Testing Co, Lionel electronic, $30; Eico 250 AC VTVM & amp, $20; Electronic Designs 100 electronic voltmeter/ohmmeter, $25; General Radio Co Type 1564-A sound & vibration analyzer, $45; HP 330B & 330C distortion analyzer, $25 ea; (4) HP 400D vacuum tube voltmeter, $45/all 4. Will Dougherty, WLD, Music Valley, Rt 1, Box 1548, Mill Spring MO 63952.

Oscilloscope FM radar, AN/USM Dept of the Navy, bureau of Aeronautics; Model engineering & MFG Co OS-4A/AP in nice metal box with carry handles, $20. Will Dougherty, WLD, Music Valley, Rt 1, Box 1548, Mill Spring MO 63952.

IFR 1200S service monitor with spectrum analyzer, $6500. R Lankton, Clear Path Comm, 5053 Ocean Blvd #18A, Siesta Key FL 34242. 941-544-6842.

Tektronix 7614, 7618 RF spectrum analyzer, $4500. R Lankton, Clear Path Comm, 5053 Ocean Blvd #18A, Siesta Key FL 34242. 941-544-6842.

Tektronix digital multimeter DM 501A, $150; Tektronix digital multimeter DM 502A, $150; Eico 150 solid state signal tracer, $100; Nuvistors (assorted), $25. J Price, 214-321-6576.

TRANSMITTERS

Want to Sell

Harris MW-5-B five KW pulse modulated AM xmtr. Continental Communications. 314-664-4497. Email: contcomm@fiastl.net.

RCA BTF-20-E1 20KW FM xmtr. Continental Communications. 314-664-4497. Email: contcomm@fiastl.net.

RCA BTF-5-E1 5KW single phase FM. Continental Communications. 314-664-4497. Email: contcomm@fiastl.net.

Singer SCF 1/3/5, 2.5 kW transmitter, spare tube, spare drivers, other spare parts, 3 phase, no exciter, $2500/BO. Joe Schloss, KICD/KLLT, 2600 N Hiway Blvd, Spencer IA 51301. 712-262-1240.

Various FM transmimtters, to many to list. Clay Freinwald, Entercom, 1820 Eastlake Ave East, Seattle WA 98102. 206-726-7071 or email: cfreinwald@entercom.com.

Cunningham CM 30-50 type approved AM tube xmtr, adjusts 0-50W power, rack mount, measures 8.75"h x 19"w x 12"d, weighs 20lbs, special heavy duty case & other professional features, new, $900. James Cunningham, KEOR, Rt 2 Box 113B, Stonewall OK 74871. 580-265-4496.

Harris FM 25K. Good condition, cleaned, repaired, $16,500/BO. Paul Wolf, WAYJ, 1860 Boyscout Dr, Fort Myers FL 33907. 941-458-3777.

Harris MW1A transmitter, needs repairs, $4000; (3) 19" x 6' equipment racks, $100 ea; Gates #80 control board, $200. WSSG, 116 W Mulberry St, Goldsboro NC 27530. 919-734-1300.

CONSULTANTS

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Previous audio, video or computer maintenance experience is mandatory - prior broadcast experience is preferred. Requires the ability to troubleshoot and diagnose electronic and electromechanical equipment to component level. Must also be adept at fabricating cabling and connector wiring, and following wiring schematics. Knowledge of CAD is a plus.

Similar military experience in communications, satellite or radar maintenance – or a degree from a technical school with electronics training - would be considered.

Interested applicants should forward a cover letter and resume via fax to 718-355-2472, or in the body of an e-mail to uplinkdesk@aol.com
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POSITIONS WANTED

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New broadcaster ready to show you I have the skills to pay the bills. Currently working on-air, willing to relocate now. Ebony, 405-601-8748.

Professionalism, talent & smarts, equal a wealth of opportunity, for both of us. Call Kris, 405-391-2290 or email at: cnktucci@yahoo.com.

12 years at college radio playing oldies. It was fun & I miss it. Now seeking same PT radios of St. Louis. Dennis Holenmiller, 4612 Theiss Rd, St Louis MO 63128. 314-894-8194.

PD wanting challenges. Love Country, Oldies & AC. Oklahoma, Kansas & Texas. Email Jerry at jerry_mccall@hotmail.com.

Ramsey AM-25 hobby broadcast transmitter, FCC Part 15, 540 to 1710 kHz PLL, can be jumped for 1W, $125. Gene Whittenberger, Whittenberger Studio, POB 396, Mexico IN 46958. 765-985-2224.

Want to Buy

Western Electric 250W-1KW xmtr wanted. Sumner McDanel. 1-800-251-5454.

TUBES

Want to Sell

AMPEREX, EIMAC, SVETLANA 3CX400A7/8877, 3CX3000A7, 3-500ZG, 4CX250B, 4-400, 4CX400A, 807, 833C, ETC. Westgate 800-213-4563.

SERVICES

TURNTABLES

Want to Sell

QRK 12C turntables (2) with Rek-o-Kut disco-tech mixer, BO or trade for tube gear (comp/mixer/mikes). Mark Hughes, 615-242-2907, email: markhugh@aol.com.

ACTION-GRAM

EQUIPMENT LISTINGS

Radio World's Broadcast Equipment Exchange provides a FREE listing service for radio stations *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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38	Digigram	www.digigram.com
66	Econco	www.econco.com
70	Electronic Research Inc.	www.eriinc.com
21	ENCO Systems	www.enco.com
72	ESE	www.ese-web.com
70	Excalibur Electronics	See ad for contact information
42	Ghostwriters	www.radio-mall.com
15	Harris	www.harris.com
51	Harris	www.harris.com
67	HHB Communications U.S.	www.hhbusa.com
3	Inovonics	www.inovon.com
19	Inovonics	www.inovon.com
23	Inovonics	www.inovon.com
72	J Squared Technical Service	jsquared@cdsnet.net
72	JK Audio	www.jkaudio.com
28	Kintronic Labs	www.kintronic.com
43	Klotz Digital AG	www.klotzdigital.com
8	Logitek	www.logitekaudio.com
56	LPB Communications	www.bluesc.com
18	MARTI	www.martielectronics.com
35	MediaTouch	www.imediatouch.com
49	Modulation Sciences	www.modsci.com
20	Moseley Associates	www.moseleysb.com
24	Neumann	www.neumanusa.com/105air
73	NICOM	www.nicomusa.com
66	Nott Ltd.	www.tjantenna.com
45	NPR Satellite Services	www.nprss.org
69	Omnia, a Telos Company	www.omniaaudio.com
11	Orban	www.orban.com
32	Prime Image	www.primeimageinc.com
70	Progressive Concepts	www.progressive-concepts.com
37	Prophet Systems Innovations	www.prophetsys.com
44	QEI	www.qei-broadcast.com
17	Radio Frequency System (RFS)	info@rfsbroadcast.com
5	Radio Systems	www.radiosystems.com
72	Register Data Systems	www.registerdata.com
72	S.C.M.S., Inc.	www.scmsinc.com
46	Scott Studios	www.scottstudios.com
61	Sierra Automated Systems	www.sasaudio.com
10	Sine Systems	www.sinesystems.com
33	SMARTS Broadcast Systems	www.smartsbroadcast.com
70	Studio Technology	www.studiotechnology.com
55	Syntrillium Software	www.cooledit.com
9	Telos Systems	www.telos-systems.com/smartsurface
13	Telos Systems	www.zephyr.com
73	Teracom Components	
79	Wheatstone	www.wheatstone.com
80	Wheatstone	www.wheatstone.com

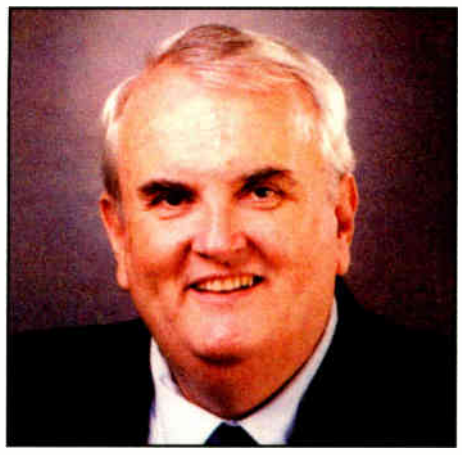
◆READER'S FORUM◆

Caughill protégé

I am proud to say that I was a protégé of the great radio engineer, Clayton Caughill, whom you featured in your Feb. 1 issue ("He Helped Build Hawaii Radio").

Incredibly, the feature was placed immediately next to the BSI ad for our WaveStation digital automation software. It was in the early '90s while I was in Hawaii that one of my engineering friends said, "*Ron, you did so well with that* cart machine software, why don't you try your hand at writing an automation program?"

I said, "Good idea, Clayton."



Clayton Caughill

Later on, he also prevented me from making what could have been a product-killing decision. My original name for the program was "Simian," as in monkey. Clayton said, "Um, someone may take offense to that." So, WaveStation was born.

Clayton was a great friend and broadcaster. We will miss him.

Ron Burley
President
Broadcast Software International
Eugene, Ore.

Krock vs. Trapani

I enjoyed your Jan. 3 issue very much, especially the letters from Jim Trapani in the *Countdown to LPFM* column. I really thought Fred Krock was way off in his estimate of interference caused by LPFM stations, but I lacked the proof. Jim provided the real-world testing that showed Krock was wrong.

The real story is that high-power broadcasters are interfering with American citizens' access to the media by using political influence and "lobbying."

The text of the Radio Broadcast Preservation Act of 2000 passed by Congress prohibits anyone who's ever broadcasted illegally from ever getting an LPFM license. The dirty little secret no one wants to talk about is that lots of gainfully employed radio professionals have been involved in "pirate" radio at one time or another.

How about some amnesty for violators? If it weren't for all the little stations out there challenging FCC regulations, LPFM would have never been proposed. If the radio dial wasn't clogged with bland cookie-cutter stations that all sound the same, there would be no need for outlaw broadcasting.

Thanks for letting both sides of the LPFM issue have their say in your paper.

Paul Griffin
Founder
Association of Micro-Power Broadcasters
Berkeley, Calif.

Station streaming

I don't understand why listeners would even bother checking streamed audio. I can't find many unique stations on the Net at all.

What I believe is missing is what radio was originally designed to do. Let's say Lamesa, Texas, boy Jeff has moved to Chicago for college. It would be nice if he could get on the Net to hear his Golden Tornado High School team take on Midland. I'm sure transplanted professionals with family ties in Lamesa would want to do the same thing.

Case in point: Whitharral High School went very far in the state playoffs over Thanksgiving. Our Levelland, Texas, radio facility was flooded with calls from Whitharral folks away with their families wanting to check on scores.

Problem: Audio streamers haven't geared up to allow us an opportunity to do this at a reasonable cost. We're ready to sell it but we have to see at least a dollar bill out of it in the end.

Our prospective advertisers would *love* to get their word out to folks scattered around the country or even military personnel overseas where "home town" is just a mouse click away.

Anthony Garza
Chief Operator
KLVT(FM)
Levelland, Texas

AM signal quality

I have been reading the recent guest commentaries with interest on the quality (or lack thereof) of AM signals.

In the Feb. 1 commentary by Larry Langford ("AM Signals *Can* Sound Good"), Mr. Langford attempts to once again "beat the dead horse" of how AM can sound as good as FM.

Obviously with the advent of the NRSC mask for AM stations, AM simply can't sound as good as FM in frequency response, distortion or noise level, no matter what receiver one uses, period.

Can we please move on now? As a follower of the debates over AM audio, AM stereo and IBOC since the '70s, I find myself confused as to the point of the debate. In the vast majority of major markets within the United States, AM stations are commonly included within the top-five stations in ratings.

So I ask you, what's the problem? AM is obviously not dead, but still dominates a niche as a popular source of news, talk, (and still in some cases), music in many markets. The whole rhetorical argument of the role of AM stereo vs. FM stereo is done now. For those of you who wish you could turn back the clock 20 years in an attempt to recapture the glory of the AM vs. FM quality debate, I say its time to look to the future of radio, not remain upset about what could have been.

Kelly D. Alford
Vice President of Engineering
The Ackerley Media Group Inc.
Seattle

Slow But Solid Growth

When radio revenues rode the crest of the new American Silver Age of the 1990s, cash poured in and broadcasters' coffers swelled. As that wave begins to fall, riders of the radio waves need to readjust their expectations.

But unlike surfers, radio stations likely aren't heading for a crash after the big rush. Instead, we're likely to see a slowdown that will still provide solid growth for the coming year.

BIA Financial Network, which annually releases guides to investing in radio, reports that 1998, 1999 and 2000 all saw double-digit increases in revenues, with radio last year posting an 11-12 percent growth rate and station revenues of close to $18 billion.

The combination of the Formula 1 racer of the U.S. economy and massive consolidations of station ownership brought about these huge increases.

"Since the relaxation of ownership rules from the Telecom Act of 1996, radio groups continue to grow, both in the number of radio stations and the revenues they generate," said Mark Fratrik, vice president of BIAfn.

In the macro view, at least, consolidation is better for business. Facility and management consolidation leads to efficient, streamlined broadcasting groups, which improves revenue. According to BIAfn, in 2000, station trading increased to 1,749 stations sold for $24 billion. That's compared to 1995, when 1,259 stations were sold for $5.4 billion.

"Collectively, BIAfn's top 50 radio groups ranked by estimated revenues own more than 3,000 stations and generated more than $11 billion in estimated revenue in 2000," observes Fratrik. By comparison, in 1995 the top 50 groups owned 804 stations and brought in $4 billion.

Barring further changes in regulation or industry trends, the bulk of consolidation probably is past. Combined with a sliding economy, the result is dropping growth rates. BIAfn estimates that radio ad revenues will grow 5.4 percent in 2001.

Anxiety-prone advertising managers and owners should note, however, that this decrease is only in the growth *rate*. Radio itself is still growing and advertising dollars are still going up, just not as quickly.

"Despite a slight downturn in the first half, radio looks like a formidable competitor in 2001 and beyond," Fratrik said.

Recent marked volatility on Wall Street may further compound the picture. If investments go in the tank long-term, the slide will affect radio's clients and their spending power. The ramifications could be more severe than expected.

Regardless, radio must prepare for slower growth in the near term. But as long as people continue to buy goods and services — and they will — radio should be well-positioned to sell advertising to manufacturers and retailers who want their goods sold.

— RW

Write to Us

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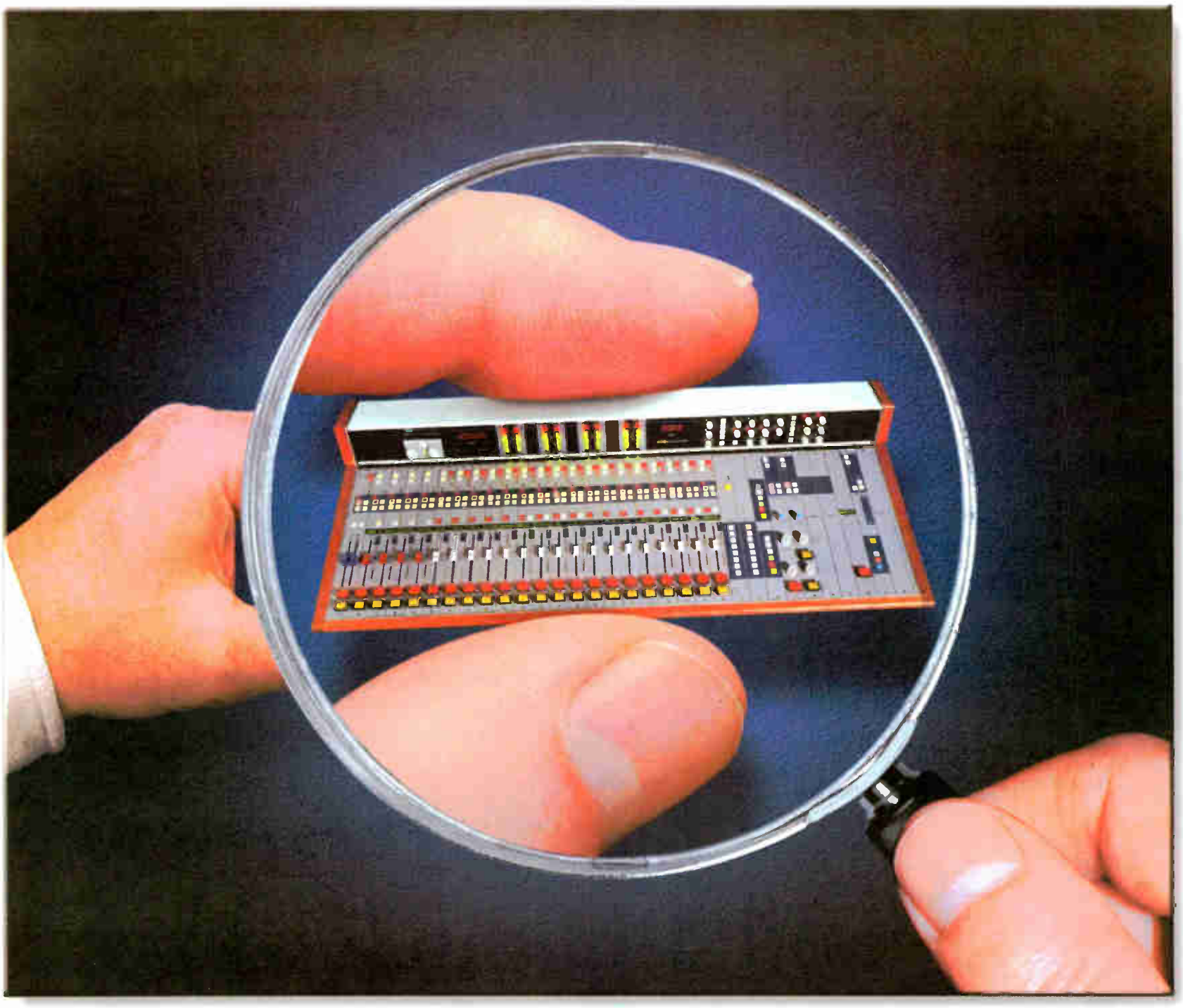

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