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**Internet Services
 for Radio
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Radio World®

Vol 21, No 3

Radio's Best Read Newspaper

February 5, 1997

Radio Nets Cover Inauguration

by James Careless

WASHINGTON The inauguration of President Bill Clinton on Jan. 20 was by all definitions a major news event, and America's radio organizations responded. CBS, ABC, Westwood One, Associated Press, CNN and many other news organizations were well represented.

Westwood One's eight-correspondent team had not just one service to feed, but three: the NBC Radio Networks, the Mutual Broadcasting System and the Westwood One Radio Networks.

"That's why we did the live anchored coverage show, short-form special reports, unanchored feeds of all of the speeches (and) many news feeds that contained short actuality cuts," said Bart Tessler, Westwood One's vice president of news. "We provided a number of dif-



Photo by Alan R. Peterson

Radio Stand on the Capitol's West Front
 ferent formats for all kinds of stations. You have to serve everybody."

On-site coverage

At the heart of Westwood's project was the coverage provided by both NBC

Radio and Mutual News. Anchored by correspondents Peter Maer and Bob Fuss, it featured two hours of continuous programming during the outdoor swearing-in of the president.

In addition, Westwood fed its affiliates one-minute specials through the day, covering the preparations, the ceremony, parade, luncheon and finally the 14 inaugural balls. Westwood also reported on the inaugural parade, not just from the roadside, but from within the parade. Other news organizations made similar arrangements.

CBS Radio News covered the inauguration with a series of reports on the day itself supplemented with long-form coverage of the proceedings, and a series of "morning-after" reports. On Inauguration Day, five 60-second reports were fed to the network's 515 affiliates during the morning. For the rest of the day, CBS Radio News provided a dozen two-and-a-half-minute reports featuring correspondents and reporters Nick Young, Barry Bagnato, Rob Armstrong, Pam Coulter, Al Freeman and Mark Knoller. The long-form broadcasts were anchored by CBS News correspondent Bill Lynch.

Bernard Gershon, vice president of news for ABC Radio Networks, said

before the event. "We are in the business of providing a large number of options for our affiliates," which number about 3,000. So, he said, "We'll have status reports, which are a series of updates 60 to 90 seconds long, four times an hour, from 10 a.m. Monday to 1 a.m. Tuesday."

He said ABC Radio would also provide hourly news calls with natural sound and other audio for use by stations; special reports as needed; and anchor coverage. ABC also arranged to provide live audio feeds from every major event of the day.

ABC's live coverage was anchored by correspondents Bettina Gregory and Vic Ratner, and commentator Steve Roberts.

ISDN and POTS codecs

Radio news services use a number of methods to cover this rare piece of political theater.

News organizations set up broadcast positions throughout Washington: at the AME church, at the White House, around the Capitol, at Lafayette Park, and along the parade route, as well as the evening ball locations. A center of coverage was the west front of the Capitol, looking out to the outdoor scene of the swearing-in.

For the parade, Gershon said ABC put its Marti RPU equipment on the TV/radio pool truck, and rented out space on the RPU system to the CBS and AP radio operations.

See COVERAGE, page 8 ▶

Billboards Removed; Jewell Suit Continues

by Bob Rusk

ATLANTA The attorneys for Richard Jewell, who was exonerated as a suspect in the Centennial Olympic Park bombing, requested a five-figure cash payment to settle his case against WKLS-FM, according to station Program Director Michael Hughes.

A suit, filed in DeKalb County Superior Court, alleges that billboards erected by the radio station invaded Jewell's privacy and portrayed him "as an evil, sinister person." About 100 of the billboards were put up in Atlanta, depicting Jewell's likeness next to the word "Freebird," the title of a 1975 song by the rock band Lynyrd Skynyrd.

The suit asks for punitive damages from WKLS and Hughes, who said the station would not agree to the settlement, but took the billboards down in December "as a show of good faith."

The suit states that Hughes contacted G. Watson Bryant, one of Jewell's attorneys, on several occasions, conveying the station's offer of several thousand dollars to use Jewell's likeness on a billboard. The station provided sketches of the proposed boards, but was informed each time that Jewell was not interested in having his likeness used by 96 Rock.

First amendment defense

The station put up the billboards anyway in November. Hughes, who is also named as a defendant in the suit, maintains that the Jacor Communications station did

not need Jewell's permission.

"The billboards came about as a celebration of the fact that he was no longer
 See WKLS, page 7 ▶

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Congress Looks Closely at Auctions, Liquor

by Lynn Meadows

WASHINGTON It is doubtful that the 105th Congress will do anything to shake the foundation of the radio industry quite as much as the 104th, which passed the Telecommunications Act that lifted national ownership caps in 1996.

This session promises to be quite lively, however, because the issue of spectrum auctions remains unsettled and two influential new chairmen are starting out with "vigorous" agendas.

New blood

Senator John McCain, R-Ariz., was officially named chairman of the Senate Commerce, Science and Transportation Committee when

See CONGRESS, page 6 ▶

Circle (17) On Reader Service Card

World Radio History

NEWSWATCH

FCC Makes Spectrum Available for Unlicensed Wireless Use

WASHINGTON The Federal Communications Commission will make available 300 MHz of spectrum for unlicensed national information infrastructure (U-NII) devices that deliver short-range, high-speed wireless digital communications. These devices will enable the creation of wireless local area networks and promise to facilitate access to the information highway. The spectrum is located at 5.15 - 5.35 and 5.725 - 5.825 GHz.

The U-NII devices will share the spectrum with incumbent services without causing interference to them. This will be

accomplished by applying power limits to each of the bands as follows: 200 mW EIRP (effective isotropic radiated power) in the 5.15 - 5.25 GHz band, 1 W EIRP in the 5.25 - 5.35 GHz band and 4 W EIRP in the 5.725 - 5.825 GHz band. FCC spokeswoman Rochelle Cohen said the range for broadcast would be only a few kilometers or so.

The FCC is gearing the spectrum to educational institutions, libraries and health care providers, although Cohen said the commission did not rule out the possibility that radio stations might use the spectrum for their own LANs.

According to Cohen there will no fees associated with use of the spectrum.

Tornado and Ice Down Towers

ALBANY, Ky. A tornado in Albany, Ky., toppled the tower of WANY-AM-FM. The tower crashed into a church and a mobile home, killing one man and injuring two others.

The tower and the station roof were destroyed by the January twister. A final damage estimate has not been assessed, although the cost to the Albany Broadcasting-owned station was greater than \$50,000, according to General Manager Randy Speck. At press time the station was hoping to get back on the air within a few days. A new tower is expected to be up in a couple months.

In a separate incident, the tower of WOLX-FM in Baraboo, Wis., collapsed under the weight of ice on New Year's Eve. General Manager Jonathan Little said it was impossible to tell how much ice was on the tower before it fell.

No one was injured in the accident, though the site manager's family was shaken up. It took 20 to 25 seconds for the tower to fall, so the Disneys thought they were going through an earthquake.

A nearby 60-foot tower was not damaged. Little said a single bay would be hung on that tower, and the station would be on the air within a few days of the accident. He also hoped that the larger tower would be rebuilt within five months.

See NEWSWATCH, page 3 ►

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1997: The Year of ... What?

by Lynn Meadows

WASHINGTON In the final days of 1996, the main topic buzzing across distributors' and manufacturers' phone lines was what equipment was necessary for the Emergency Alert System. With the Jan. 1 deadline a month past, chief engineers, distributors and manufacturers have turned their attention to a new year and new trends and topics.

If 1996 was the year of EAS, what will 1997 be? So far, there is no one new, "must-have" product. It is certain, however, that stations will continue to leave analog products behind in favor of becoming more high tech.

Making the transition

One item weighing heavily on every chief engineer's mind, especially in the major markets, is making the transition from cart machines to digital storage, according to Tom McGinley, chief engineer for WPGC-AM-FM Washington

and technical adviser for RW.

While many small- and medium-market stations took the plunge to digital in years past, he said, a significant number of stations in the top 10 markets are still running carts. McGinley, whose stations were recently acquired by Westinghouse in the Infinity buyout, said the transition to digital storage at his stations will probably not take place until late this year or 1998, as everyone waits to see how the new merger unfolds.

McGinley predicted that once a couple of major market stations choose a hard-drive system, other stations will follow suit, creating a domino effect. Stations are looking for validation, said McGinley, because the decision to replace a system that a station has used for 30 years or more is a big one.

Dave Burns, studio product manager for Harris Corp., noted that in just two years, the reliability of digital storage systems has increased tremendously. He said small-market stations led the

revolution to digital because it solved a problem and lowered overhead.

In larger markets, engineers and owners have delayed their conversion to digital because of concerns about storage capacity and reliability. Today, the mirroring and redundancy built into the systems have increased the level of comfort and security for large-market stations, said Burns.

Tim Schwieger, vice president of marketing for Broadcast Supply Worldwide, agreed that broadcasters will continue to replace old and outdated analog equipment like carts and reel-to-reel machines this year. He predicted a strong demand for two-track digital editing systems that are intuitive and "user-friendly to someone used to cutting tape," like the new 360 Systems Shortcut. Schwieger said he thinks the push for full- and part-time automation will also continue.

Judith Gross of J.G. Communications, a communications and marketing consulting firm for radio technology, said she thinks the industry will see more "pockets of consolidation" as groups move stations under one roof in a given market and share some equipment. Gross said another outgrowth of consolidation could be new and unique ways of sending and sharing programs.

Burns agreed that "consolidation, consolidation, consolidation" would be the big trend in 1997. He noted that systems integrators and equipment suppliers who

can provide turnkey systems will be increasingly important to operators who may find themselves with more stations than staff engineers.

Computers here to stay

Computers will continue to affect every aspect of the radio profession. McGinley said the micro-computerization of everything in the radio station and the whole high-tech revolution is accelerating. He predicted that more stations will add computer networks to automate and integrate their logging, traffic and billing systems with spots on hard drives.

"That's been a dream for years," said McGinley.

The downside to putting a station on a network, he said, is the line everyone has heard at least once: "Oh, our computers are down." Radio stations cannot afford to have their network go down, so every new network installed must have plenty of redundancy built into it. This means a continued and increased demand for engineers who understand both RF and computers.

The Internet will continue to be a big deal for broadcasters in 1997. Schwieger predicted that more stations will get up on the Internet this year and said this may even be the year that real-time listening on the Internet comes of age.

Gross said the Internet and other telecommunications services are changing the role of radio in people's lives. She said another trend that will play out is how the large radio groups establish their role in this new era.

See DIGITAL, page 8 ▶

NEWSWATCH

▶ NEWSWATCH, continued from page 2

FCC Stalling on Petition?

WASHINGTON The FCC continues to delay abandonment of the personal attack and political editorial rules.

The commission quit enforcing the doctrine in 1987. That same year, the RTNDA petitioned the commission to repeal the rules. The commission did not respond, and in 1990 the RTNDA and four other parties filed another petition.

The RTNDA asked the D.C. Circuit Court to intervene on Sept. 16, 1996. The next day the court issued a writ of mandamus demanding that the FCC act on its nearly 10-year-old petition. The court ordered the commission to act by Dec. 26.

The commission responded to the court on Dec. 20, informing it of the public notice issued by the commission a day earlier. The notice asks for comments on how the FCC should proceed in the matter. The deadline for comments is Feb. 10, and reply comments are due by March 12.

The RTNDA replied to the commission on Jan. 6, calling the public notice "an excuse to delay decision-making ... still further."

The response cites the time and money that broadcasters have to expend in order to comply with the rules as the major reasons for expediting the FCC decision process.

The FCC could not be reached for comment as to why it has delayed acting on the petition.

The Birch Is Back

CORAL SPRINGS, Fla. Birch Research Corp. is coming back to selected markets this fall with a new seven-day, diary-based radio ratings service. The company said that the new service will feature essentially the same methods as Arbitron, the dominant ratings service, but will cost 40 to 50 percent less.

In 1989, company President Tom Birch sold his first ratings service, which was based on phone retrieval instead of a diary, to Dutch publisher VNU, only to see it dropped two years later.

He said cost would be the primary motive for radio groups to adopt the new service. "We're not out to change the way radio inventory is priced, just the way radio ratings are priced," Birch said.

The new service came about after Birch surveyed radio executives and station general managers across the country. "Almost unanimously, broadcasters told us that they're comfortable with the diary methodology, but feel Arbitron is extraordinarily expensive," Birch said.

Arbitron would not comment on the return of Birch.

NAB Hall of Fame Inducts Morning Man Wally Phillips

WASHINGTON The National Association of Broadcasters will induct popular Chicago radio personality Wally Phillips into the Broadcasting Hall of Fame at this year's convention in Las Vegas. Phillips will be honored at the radio luncheon on Tuesday, April 8.

The Hall of Fame is made up of radio and television personalities and programs that the NAB feels are representative of broadcasting history.

The NAB described Phillips as "one of that small legendary group of pioneering 'morning men.'" For almost 40 years he was the morning drive person at Chicago's WGN(AM).

At the peak of his popularity almost 1.5 million listeners tuned in to his show — half of the Chicago morning audience and more than any other show in the United States.

Talk show personality Don Imus was inducted into the Hall of Fame at NAB '96.

NEURAL WHAT?

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Sink Your Teeth Into the Internet

The Internet is packed with powerful tools for radio engineers and managers. This issue of *RW* is packed, too, with information to help you learn how to manage your station better, find answers to engineering questions, find a job, or just chat with other radio people. Our special "Running Radio" coverage starts on page 12.

In two years, the number of U.S. radio stations with websites has increased 900 percent, from about 200 at the beginning of 1995 to about 1,800 at the end of 1996.

RW chief correspondent and resident Internet surfer Alan Haber contributed the information in this column. He reports that the number of stations around the world actually sending audio to listeners via the Web has risen to the hundreds. Progressive Networks alone claims more than 230 call-letter users of its RealAudio system. Competing for attention are many audio sources that "broadcast" only on the Internet, not over the air, such as HardRadio (<http://www.hardradio.com>) and Radio GRIT.

The audio-Internet industry has seen plenty of activity recently. Premiere Radio Networks announced a multi-million-dollar alliance with AudioNet, an Internet audio content provider, dealing largely with the distribution of radio programming in cyberspace. Telos Systems introduced its Audioactive technology, which at press time was used by four radio stations and the Macintosh Music Network online concert series; Telos Systems was expecting 100 more stations shortly.

Progressive Networks debuted its RealAudio Player Plus and RealAudio 3.0 player. RealAudio 3.0 introduced a more robust, cleaner sound to Internet audio. The RealAudio Player Plus helped web surfers find their favorite cyber-broadcasters more easily.

WebTV, a new product marketed by Sony and Philips, could bring Internet audio to even more people. This set-top box turns a television into a web browser

with RealAudio capabilities. And an industry group made up of prominent players has proposed a new multimedia broadcasting standard.

Even so, Internet efforts will only succeed with a lot of hard work. Peggy Miles, the president of Intervox Communications, an Internet consulting and development company, told Alan Haber, "It's just like any other business.

"RadioLink" has 11 major areas. The Daily Morning Show is a good place to start, a daily compendium of business news, copy suggestions, sales tips and top 10 charts of books, music and TV shows. Perhaps the richest area is the Radio Commercial Databank, stocked with about 1,000 actual commercial scripts and more than 1,000 RealAudio commercials in at least 60 product cate-



You have to promote your website, you have to program your website, and you have to do the things we do as advertisers and marketers to propel the advertising sells, which includes coming up with the media kits, training your sales force, and all that type of thing."

Miles thinks radio will increase its use of websites and broadcasting on the Internet in 1997, "... because there are different companies and players that see an advantage to partnering up with broadcast stations, radio stations specifically, to move the content in other places."

The Radio Advertising Bureau is doing its part. RAB's "RadioLink," accessible only by RAB members at \$25 a month, is a good-looking, exhaustive resource that can help any radio station strengthen its sales efforts.

gories. You must have a RealAudio player installed to listen.

RAB's Library Link takes you to articles from major publications covering various areas of interest. Simply fill in a short form and the articles will be faxed to you.

Other sections let you check out industry white papers, read briefs on 151 business categories, and help you develop new business and non-traditional revenue. Stuck for a great promotional idea? A simple mouse click on a particular category — auto dealers, for example — brings a bounty of usable ideas from the Promotional Idea Bank. A Radio Talk area consists of three discussion groups in which you can post messages. Share an idea or ask a question of your peers. The site also covers cooperative advertising, with more than 6,000 co-op plans!



To subscribe, visit the RAB at <http://www.rab.com> or call (800) 232-3131.

Your station also could realize solid benefits by plugging into ElectricVillage (<http://www.electricvillage.com>). The company can create a web presence for stations that aren't already active in cyberspace. It created RockVillage, a site for classic rock stations, and Earwig, for new rock stations. Sites for country, adult contemporary, contemporary hits radio, smooth jazz and oldies formats are planned.

ElectricVillage is looking to help radio stations jazz up their Internet presence and create revenue streams by giving them the opportunity to feature their local advertisers on its sites. Founders Ricardo Ramirez, John Felt and Ken Ketch "developed a way to provide 'syndicated' online content, combining the power of network radio with the popularity, interactivity and revenue enhancement opportunities of the World Wide Web."

ElectricVillage's sites operate transparently to users; they are adorned with a station's logo. Listeners simply link from a station's site to an ElectricVillage site; there, listeners can find celebrity interviews, CD reviews and sound clips, games, columns, and polls.

In order to provide a local, informational touch, links are provided on ElectricVillage's sites to alternative weekly publications and other sources based in a radio station's area; these links provide information on restaurants, concerts and the like.

At press time, 37 radio stations were enhancing their on-line presence with ElectricVillage sites. Nationally-sponsored webcast concerts are planned this year.

Until next time ...

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Engineer, mentor, friend

Dear RW,

I was saddened to hear that fellow broadcast engineer, Wayne Ely, had passed away on Nov. 20, 1996. He spent most of his later life in and around the Zanesville/Cambridge Ohio area. He was 63. I thought I would write this in his memory for friends that had not heard.

During the 1950s, Wayne served with the Army Corps of Engineers in France. After returning he worked at WABC(AM) in New York and later settled in Ohio. I met Wayne in 1978 when he was engineering WILE(AM) in Cambridge. He loved to talk and seemed to enjoy having me walking behind him asking every question in the book. Wayne later taught my broadcast engineering class at Ohio University in Zanesville and oversaw the studio engineering work we did. Wayne was never shy with criticism of our work, but it was always followed with an example of the proper way to do things. He was a great teacher.

Wayne was a life member of the SBE. He was the transmitter supervisor for WOUC-TV and served on the advisory board of the Muskingum-Perry Career Center volunteering for its radio and TV program. He had a cart full of goodies to take home. Which reminds me that he also was a well-known Santa Claus. I never knew this but he had the figure for it and a full white, bushy beard. With his glasses, his smile and his hearty laugh, I'm sure he was one of the best. He'll be missed.

Rick Funk

Senior Digital Sales Specialist
Harris Broadcast
Richmond, Ind.

Ten million watts at 560 kHz

Dear RW,

The guy who owns WDBS (RW, Dec. 25, 1996) should lose his license to broadcast and never get another one, including other companies with which he might be associated, if he doesn't go to jail or get fined until his teeth bleed. There are simply too many clean operators who work hard to get and to retain the privilege to broadcast granted by the American public, through the FCC, for one, or a few, errant souls to trample on the rest of us.

If this is allowed to continue, then the FCC might as well throw away its book for broadcasters and stick to telephone rates. Given the state of the broadcast industry, there's a lot better chance for some graft from those guys than from us.

To be honest I'm tired of hearing about folks who simply refuse to play by the rules which the rest of us decided were good for the majority and either flaunt their errant ways, or sue to get satisfaction for themselves at the expense of the rest of us. This disgust transcends the broadcasting part of my life and pervades everything else I do anymore. It's pretty sad.

What the heck ever happened to honesty, forthrightness and "respectability" as mature human values? Whatever happened to looking up to someone who did honest business on a handshake instead of looking up to someone who just "beat the rap" for some snaky deal?

Meanwhile, I think I'll drink a nice hot cup of coffee while I slip and fall on the lobby floor of the FCC where I'm going to file an application for 10,000,000 watts of 560 kHz because it's my First Amendment right to broadcast whatever I think is OK to everyone, whether they want it or not.

That way if I can't get the license, I can at least sue the building owner, the contractor who built it, the guy who made the floor tile, the company who made the wax, the janitor who cleans the joint, the place I bought the joe, the outfit that made the cup, my shoemaker, and the poor dead cow from whom they got the shoe leather (assuming cows have estates).

Later I'll forget about the license and build it anyway. It's not only my right, but I'll have all kinds of money to fight with later!

But Is It Radio?

If you are like a lot of radio people, you find it unsettling to hear about some guy who slaps up a site on the World Wide Web, equips it with audio streaming and calls himself a radio station.

Even though you know some real stations are also using the Internet to promote themselves this way, perhaps you get annoyed by the coverage you see in RW and feel that most of the audio sources on the Web have nothing at all to do with radio.

Think again. We've made the point before, but it bears repeating: Internet "broadcasting" is in its crystal radio phase. Today's radio manager and engineer must understand these tools and keep track of the upstart media outlets that are competing for their ad dollars. The development of more powerful computer processors, the move toward a protocol for the delivery of real-time multimedia, the improving audio streaming technology from players like Progressive Networks, XING and Telos Systems ... all suggest that Internet delivery will continue to improve.

In fact you'd be surprised how many radio people downplay the Internet in general. Perhaps they don't want to commit the resources to creating an interesting website and keeping it fresh. Maybe they don't believe they can make money on it yet. They expect that they will get sucked into a game they don't understand. Or they don't know the technology and secretly wish people would stop talking about it so much.

But the tools are astounding. Even if you do no more than buy a modem and get an account on America Online, you can access a wealth of regulatory, engineering and management information. Download equipment brochures or track an order on a dealer's website. Register to attend NAB '97. Research a question of radio history. Find a job.

Radio people can do their jobs better, and that translates into money. If you do choose to become one of the hundreds of radio station pioneers feeding audio over the Web, even better.

Is it radio? It doesn't matter. Radio managers can use this new medium, or be abused by it, but they certainly must understand it.

We hope you enjoy RW's first special issue focusing on Internet services for radio.

—RW

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Paul J. McLane ext. 117	Managing Editor
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Linda Sultan ext. 141	Editorial Assistant

Contributors: Lynn Meadows, Frank Beacham, Alan Haber, Bob Rusk, Lee Harris, Dee McVicker, Ty Ford, Sharon Rae, James Careless (Canada)



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Next Issue of Radio World
February 22, 1997

It's no wonder the rest of the world thinks we're crazy. I'm just thankful that you and I are still sane ... hmmm.

J.L. Sorensen

Vice President and Senior Engineer
Cottrill & Holland Inc.
Ft. Lauderdale, Fla.

This is re-regulation

Dear RW,

In the wake of the Telecommunications Act of 1996, here's what's happening to our radio broadcasting industry:

1.) A small band of internationalist bankers, and their Washington, D.C. cronies, moved successfully to take over the industry under the guise of "deregulation," with no little thanks to Sen. John Danforth, U.S.S., Retired.

2.) Seasoned, combat-trained radio broadcasters know the Act has produced ambiguous and confusing regulations leading to a climate of uncertainty, interpretation, litigation and administrative-law decision-making.

3.) To distance itself from criticism, the Federal Communications Commission now proposes that state broadcasters' associations handle compliance.

The shell game continues.

No, the radio broadcasting industry has not been "deregulated"; it's been re-regulated to suit the ambitions of a powerful few.

With guys like Eddie Fritts in their corner talking out of both sides of his mouth, who needs enemies?

Richard W. Fatherley
Kansas City, Kansas

Proud of WJR

Dear RW,

My chest puffed out a little bit more when I read the article about WJR(AM),

the Good Will Station (RW, Dec. 25, 1996), because I worked there in 1963.

Future radio stations in Minneapolis and Los Angeles seemed impressed when my resumé showed a stint at WJR Detroit.

I was impressed too because I grew up listening to WJR on our tobacco farm over in Ontario, Canada. I thought they'd made a mistake when they hired me.

Yes, I had to try a test to get the job. People have asked me about that for years.

When they said I'd passed, I was thrilled. It gave me bragging rights for years. "Yup, I passed that hard test at 'JR,'" I said to all who would listen.

Imagine working with Frank Tomlinson, Bud Guest and James Quello, the big boss, who went on to be appointed by the FCC. I was surrounded by class. It made me try harder.

It's been 33 years since I worked at WJR, but when I think about it, I sit up a little straighter, speak more distinctly, and still wonder if they made a mistake that day when they said, "You're hired."

Thanks for the memories.

Doug James
KJUL-FM
Las Vegas

Thank you, too

Dear RW,

Just a quick note to thank you for all you do. Really enjoy **Radio World**. I love the history articles on early radio. I learn so much. Plus current information on 1990s technology keeps me "on the cutting edge."

I'm sure each of you work extra hard, and wonder if anyone notices. I do.

Keep up the great work!

John Mack Flanagan
John Mack Flanagan Productions
Colma, Calif.

Congress' Taxing Agenda

► CONGRESS, continued from page 1

Congress convened on Jan. 7. McCain replaced Larry Pressler, who lost his South Dakota seat by a narrow margin in November. Those shoes will be tough to fill; Pressler was the primary catalyst for rewriting the Communications Act of 1934.

Two days after he was unanimously elected committee chairman, McCain wrote to Federal Communications Commission Chairman Reed Hundt, asking him to delay assigning new television and radio licenses until legislation authorizing the commission to auction those new licenses was introduced.

"The legislation I will introduce shortly will give the commission the authority to use auctions to assign licenses formerly assigned through the comparative hearing process," wrote McCain. He added that because similar legislation was passed by Congress in the Balanced Budget Act of 1995 before being vetoed for other reasons by the president, he expected it would move quickly this time.

"In my judgment, it would be unconscionable for the commission to give away new television and radio licenses without a guarantee that the public would receive the benefits to which it is entitled for use of its property," he wrote.

McCain has plenty of other items on his plate. He started his term with a hearing on improving the safety of air bags. He has promised early hearings on television ratings. A spokesperson said he also wanted to take a closer look at cable and telephone rates that have risen across the country despite the promises of the proponents of the Telecommunications Act.

The Senate Commerce, Science and Transportation committee welcomes one new member this session: Republican Sam Brownback of Kansas. The returning Republican members are Ted Stevens, R-Alaska, Conrad Burns, R-Mont., Slade Gorton, R-Wash., Trent Lott, R-Mo., Kay Bailey Hutchison, R-Texas, Olympia J. Snowe, R-Maine, John

Ashcroft, R-Mo., William Frist, R-Tenn. and Spencer Abraham, R-Mich.

Democratic members remaining on the committee include Ernest F. Hollings, D-S.C., Daniel K. Inouye, D-Hawaii,

In my opinion it would be unconscionable for the commission to give away new television and radio licenses ...

— Sen. John McCain

Wendell H. Ford, D-Ky., John D. Rockefeller IV, D-W.Va., John F. Kerry, D-Mass., John B. Breaux, D-La., Richard H. Bryan, D-Nev., Byron L. Dorgan, D-N.D. and Ron Wyden, D-Ore.

On the House ...

The retirement of Jack Fields caused a stir in the House Committee on Commerce. The Texas Republican had chaired the House Telecommunications and Finance Subcommittee. Both Billy Tauzin, R-La., and Mike Oxley, R-Ohio, wanted the chairmanship. Tom Bliley, R-Va., chairman of the full House Committee on Commerce, split the subcommittee into two new subcommittees.

Tauzin was named to chair the new subcommittee on Telecommunications, Trade and Consumer Protection. Oxley will chair the new subcommittee on Finance and Hazardous Materials. Both men will be vice-chairmen of each other's respective subcommittee.

Tauzin has an "ambitious agenda," said his spokesman. The congressman planned to hold hearings on liquor advertising in early February before moving on to oversight hearings on the implementation of the Telecommunications Act. That dovetails with hearings Tauzin wants to hold

on the role and operation of the FCC.

Tauzin's spokesman said the congressman wants to ensure there are no impediments to full and open implementation of the act — including the FCC. Based on those hearings, the spokesman said Tauzin reserves the right to introduce legislation to reorganize the FCC.

Auctions are also on Tauzin's 1997 schedule. According to his spokesman, Tauzin "wholeheartedly" supports auctioning analog spectrum once it is returned by digital broadcasters.

He is worried about what harm a digital spectrum auction could cause small broadcasters, however. Like Fields before him, Tauzin is interested in a trust fund for public broadcasters.

He has floated the idea of leasing digital spectrum to broadcasters in exchange for easing some of the public service responsibilities. The trial idea is to put money from those leases into a trust fund for public broadcasting.

Issues to watch

The commerce committees in the two houses do not hold a monopoly on issues affecting broadcasters. Bill Archer, R-Texas, chairman of the House Ways and Means Committee, for instance, is expected to introduce another capital gains tax cut proposal this year. His proposal last year would have cut the top capital gains tax for businesses from 35

to 28 percent. If he is successful this year, such a cut would be good news for broadcasters looking to retire on the sale of their radio stations.

Also in the House, Joseph Kennedy, D-Mass., plans to reintroduce his "Just Say No Act" which would ban all advertising of hard spirits. He first introduced the bill in June after Seagrams started advertising its liquor on the air in Texas.

Although the bill does not ban beer and wine advertising, the congressman had filed a separate bill last May that would have banned all beer and wine advertising between 7 a.m. and 10 p.m. unless it contained no more than a picture of the product with a voice-over.

A spokesperson for Kennedy said the bill was to ensure advertisers did not use "dancing bears," cartoons or any characters that would appeal to children.

With the Distilled Spirits Council of the United States dropping its voluntary ban on hard liquor advertising, the Kennedy spokesperson said there is much more momentum for the Just Say No bill this session.

So, even though the Telecommunications Act has been passed, this will not be a dull period for broadcasters on Capitol Hill. Those with an activist streak and access to the Internet will want to check out two web sites that provide e-mail addresses for their congressmen: www.senate.gov and www.house.gov

BUSINESS DIGEST

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or FAX: 1(703) 998-2966

Premiere Radio Network acquisition: Premiere Radio Networks Inc. acquired After MidNite Entertainment Inc. for \$9.2 million, consisting of \$3.9 million in cash and 400,000 shares of Premiere's Class A common stock. If the market price of the Class A common stock is less than \$16 one year from closing, Premiere will pay additional consideration equal to the shortfall.

Based in Los Angeles, After MidNite Entertainment Inc. produces six network country music radio programs and services for more than 350 radio station affiliates in the United States.

Premiere Radio Networks is an independent creator, producer and distributor of entertainment programs, research and other services for more than 5,900 radio station affiliates.

Radio ad revenues experience healthy growth: The radio industry had its 51st consecutive monthly gain in November 1996, when combined local and national spot advertising revenue increased 12 percent vs. the same month in 1995. Local revenue increased 10 percent while national spot revenue achieved a 22-percent gain.

Year-to-date combined revenues were up 7 percent through November 1996; national year-to-date revenues were up 8 percent, and local revenue increased 7 percent compared to the first eleven months of 1995. Figures are based on the Radio Advertising Bureau radio revenue index of more than 100 markets.

Engles closes deal: Engles Enterprises closed on its purchase of two Santa Barbara, Calif., radio sta-

tions, KIST(AM) and KMGQ(FM), from Channel Islands Broadcasting. Engles is the licensee of radio stations KTMS(AM) and KHTY(FM), which also serve the Santa Barbara market.

KIST programs an "oldies" format and broadcasts at 1340 kHz. KMGQ broadcasts at 106.3 MHz.

New production music service: Jim Long, former chairman of FirstCom/Jim Long Companies, created the OneMusic Company. OneMusic will offer music for license to radio and TV stations, feature films, and post production facilities.

The new service will provide representation of independent record labs and turnkey film soundtrack development. In addition, OneMusic is developing hardware and software for distributing music for post production over the Internet.

Bonneville acquires station: Bonneville International Corp. of Salt Lake City and Entertainment Communications Inc. (Entercom) of Bala Cynwyd, Pa., will exchange properties affecting three cities.

Bonneville will obtain KLDE(FM), Houston, from Entercom in exchange for Bonneville's KIRO-FM and KNWX(AM) in Seattle and KMBZ(AM), KLTH(FM) and KCMO-FM in Kansas City. Entercom will also pay Bonneville \$5 million.

The transaction is subject to approval by the FCC.

Bonneville is headquartered in Salt Lake City. In addition to the Seattle and Kansas City stations, the company operates 14 radio and television stations in eight markets.



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Lawsuit In Atlanta

▶ WKLS, continued from page 1

considered a suspect," Hughes said. "It had nothing to do with Richard's image. We were simply making a First Amendment-protected public statement."

During last summer's Olympic games, a bomb exploded, killing one person and injuring 100 others. Jewell, who was employed as a security guard at Centennial Olympic Park, was the first person to notice the unattended package that was later found to contain the bomb. Prior to the explosion, Jewell assisted in moving park patrons away from the package.

He was initially lauded as a hero by the media, but was later identified in news reports as a suspect in the incident.

We wanted it to go away.

— Richard Jewell

In October 1996, the U.S. Department of Justice issued a letter to Jewell stating that he was no longer a target of the bombing investigation, and the FBI investigation of Jewell as a suspect was brought to a conclusion.

In the second count of the four-count suit, Jewell's lawyers argue that the use of the word "Freebird" on the WKLS billboard has a criminal connotation, implying that he had "previously been a 'jailbird.'"

"(It implies," the suit continues, "that Mr. Jewell had been, or should have been, charged with the commission of a criminal offense in connection with the Centennial Olympic Park bombing."

The station's interest in Jewell began, said Hughes, "right after he was so publicly accused. Television cameras were swarming him and we saw him get into his truck, which had a 96 Rock bumper sticker on the back of it. Our midday (personality) had remembered meeting (Jewell)."

WKLS subsequently contacted his attorneys and offered Jewell a job as a security guard at station events.

"We were trying to help him out and get back on his feet," Hughes said.

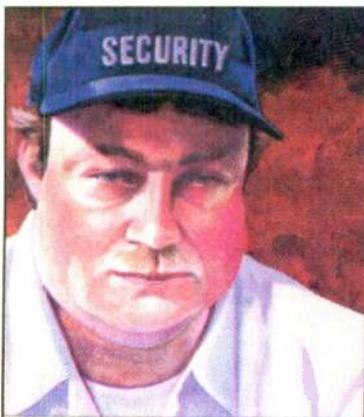
On CNN's "Larry King Live," Jewell explained that he turned down the offer because he "just didn't want any more publicity."

"We wanted it to go away," he said. "There had been 200 reporters outside our apartment for weeks ... (They) were filming every move we made through my mom's bedroom window. At this point we just wanted to be done with the press."

Tupperware party

During an FBI search of the two-bedroom apartment Jewell shares with his mother, agents confiscated belongings, including Mrs. Jewell's Tupperware. WKLS then sponsored a Tupperware party at a local club, broadcasting its morning show from the event.

Listeners made small cash donations that the station used to purchase Tupperware, and additional pieces were



FREEBIRD

LYNYRD SKYNYRD



donated, according to Hughes. He said the station delivered a "van full of Tupperware to Mrs. Jewell."

After showing its support for Jewell, Hughes stated that WKLS is "completely disheartened" by the suit. "It was very

The Billboard That Sparked the Controversy

risky for us to jump out and publicly side with (Jewell)."

Using the Internet, WKLS has put a transcript of the suit on its website

(<http://www.96rock.com>) and is asking the public to participate in a national poll on the subject.

At press time, WKLS was preparing its response to the suit. A court date had not been scheduled.

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Year of DAB and HSDS?

► DIGITAL, continued from page 3

Another question to consider, said McGinley, is where digital audio broadcasting is going. The past years have not yielded much tangible proof that in-band, on-channel (IBOC) DAB is around the corner.

Digital radio?

USA Digital Radio, a major IBOC systems developer, said it is trying to fix the problems found with its systems. McGinley wondered if people were putting off buying new FM transmitters or antennas until they know better how the new system will be retrofitted.

Gross said she did not think people

were waiting for DAB to make those decisions.

But she said that if IBOC is to be a force, this should be the year USADR shows some progress so people can sit up and take notice. Otherwise, she said, she thinks it will cease to be a force.

"Fish or cut bait," said Gross.

David Layer, senior engineer at the National Association of Broadcasters, said he did not think 1997 would be the big year of IBOC DAB because the work taking place now is research- and development-related.

Layer did say that this could be the year a voluntary standard for high speed data subcarriers (HSDS) is chosen. With

only a little work left to go on testing the systems, he thought odds were good that something would happen by next year. An HSDS standard, however, will take a while to affect engineers at radio stations, said Layer. Still, if a voluntary standard is adopted, manufacturers will be more willing to make subcarrier equipment and eventually stations will be more willing to buy it, he said.

Finally, even with the EAS deadline past, McGinley predicted the new emergency system would be an ongoing issue in 1997, as people grapple with implementing the hardware.

He said some stations, including his, have found, after receiving the first test, that the EAS box they initially ordered is not what they really needed. Also, states continue to work out details of their plans.

Inaugural Coverage

► COVERAGE, continued from page 1

Receive antennas were placed in numerous strategic city locations. Westwood's Joe Walsh was sitting on a flatbed truck, filing reports via a 15 W Marti RPU transmitter.

"To us the major challenge was the parade route," said Dick Owen, Westwood One's director of special events, "because here you are on a moving platform, trying to keep a steady beam to the antenna." In this case, Westwood relied on receiving equipment located in a nearby clock tower to get Walsh's reports back to the network. The connection between the tower and the Arlington studio was provided by telephone broadcast loops.

Westwood tied its coverage together with ISDN digital phone lines, carrying the feeds back to its Arlington, Va., studios for mixing and transmission.

For Westwood, access to digital-quality ISDN lines was critical to making the broadcast go off smoothly, said Owen. He called ISDN the best alternative for broadcasters to get quality audio from venues, thanks to its low cost, ease of use and return capabilities for IFB.

Wherever possible, Westwood installed ISDN connections at its broadcast booths, using Telos and MUSICAM USA codecs. Planners had backups in place, too, with a MUSICAM FieldFone POTS codec at Lafayette Park and a two-line Comrex frequency extension setup on Capitol Hill.

CBS also used dial-up digital ISDN to get its coverage back to the studios, said Tony Brunton, director of special events. For this it used CDQ1000 and Prima codecs from MUSICAM. For the network coverage of the inaugural ball it experimented with A.E.T.A. Scoop Reporter POTS codecs and also used Comrex frequency extenders and MUSICAM FieldFones.

Gershon said ABC Radio uses MUSICAM USA as well as other codecs for its ISDN feeds; those codecs send audio to Washington studios for mixing, and transmission on to New York via T1.

POTS codec bake-off

The inauguration lets news organizations put its field gear to the test, and Gershon said ABC planned to do just that with what he called the first live 'bake-off' of POTS codecs. ABC would use and compare the performance of three models: the Comrex HotLine, MUSICAM USA's FieldFone and the A.E.T.A. Scoop Reporter. He said at least two of each model would be used in ABC coverage, including its live feeds from the 14 balls. The network planned to repeat the test at the expected conclusion of the O.J. Simpson proceedings, then make its observations about the codecs known to its staff and owned-and-operated stations.

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Music	Spots	LIVE	3:07:15 P	Ins	Move	Edit	Clear	Swap	Del
Jingles	PreView	Promos	Mon, Sep 23						

15:05	ABC News		00/05/00/01
15:05	Station ID		00/00/12/01
15:05	Like A Virgin	Madonna	07/02/59/02F
15:08	Linger	Cranberries	47/03/15/05F
15:11	McDonalds		00/00/30/00
15:11	Home of the Hits Jingle		02/00/09/02
15:12	Dreams	Gabrielle	01/03/41/04F

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World Radio History

Gil Gross Is in the Cold Again

by Lynn Meadows

ANTARCTICA CBS called it broadcast history. Gil Gross, host of CBS Talk Radio Network's "The Gil Gross Show," spent a week broadcasting from Antarctica in January, relating information about polar research with listeners at his 140 affiliate stations.

The show was broadcast using satellite and Switched 56 lines. Despite the distance, the only technical difficulty was weather-related. After crossing seven time zones and the International Date Line to arrive at McMurdo Station in Antarctica where the broadcasts originated, Gross flew another 800 miles to visit the South Pole.

When heavy fog made it impossible to return to McMurdo on Monday, Jan. 6, he so notified his producer Gregg Cockrell by radio phone during the few hours that satellite transmission is possible from the pole. Before the evening's repeat show, listeners heard a static-filled recording from Gross telling them he was stuck in fog at the South Pole.

"Gil's very cool under stressful situations," said Cockrell, who said Gross was in good spirits when he called to report he was trapped at the South Pole. Although the fog was heavy on Tuesday, it lifted long enough for Gross to arrive at McMurdo to broadcast the

second half of his show live. Said Cockrell, who remained in New York to produce the show, the South Pole excursion and delay "added to the sense of adventure."

Guests and callers

Gross' first guest was Timothy Wirth, undersecretary of state for global affairs and former U.S. senator, who is familiar with U.S. interests in Antarctica. Much of the research taking place in Antarctica relates to astronomy, said Cockrell. It was in the Antarctic area that scientists found the meteor that suggests life could exist on Mars. The South Pole is also where scientists first discovered a hole in

the ozone layer.

Other guests during the week included Jeff Rubin, author of a travel guide to Antarctica, and Rep. Bart Gordon, D-Tenn., who had recently visited the continent. On Friday, Gross moderated an hour-long debate between two scientists about the hole in the ozone.

Despite the exotic location, the show maintained its current affairs agenda, addressing the major breaking news stories, said Cockrell. On the Thursday show, for instance, Gross moderated a debate on privatizing social security that included Steve Forbes, who spoke from his home in New Jersey.

But it was the Antarctic that listeners were most interested in.

"You couldn't have staged some of the phone calls we got," said Cockrell. One listener who called turned out to be the man who performed the first-ever religious service on the continent. A dancer with the New York City ballet called requesting tapes of the program because she was an Antarctic fan but could not pick up the show.

Mr. Freeze

Gross is no stranger to frigid regions. In 1995, the talk show host participated in a three-day, two-night Arctic military survival school north of Greenland with

Gil's very cool under stressful situations.

— Producer Gregg Cockrell

the New York Air National Guard 109th Airlift Wing. Unfortunately, broadcasting from the North Pole was not possible at that time. Antarctica, the world's coldest continent, with an ice sheet averaging 2,160 meters-thick covering all but 2.4 percent of its mass, turned out to be more user-friendly.

"Broadcasting 'The Gil Gross Show' from Antarctica is an opportunity that I just could not pass up," Gross stated in a press release. "The romance of Antarctica is the science that literally allows researchers to look at our future, and our past."

The week in Antarctica also demonstrated how radio can use the Internet. EarthLink Network, a nationwide Internet access provider, sponsored the week of broadcasts and enabled Gross to conduct chat sessions on-line with Internet users, an Antarctic first.

Gross was scheduled to "chat" on-line for 45 minutes after his Thursday night show. Because of the heavy response, he continued for an hour-and-a-half.

"The real-time chat capability makes Gil Gross' broadcast a truly interactive one, bringing information right from Antarctica to listeners nationwide," said EarthLink founder and Chairman Sky Dayton in a press release.

It may still be a while before Antarctica takes off as a broadcast hub of choice, however. Goggles, a protective face mask and three layers of mittens are everyday wear. In January, which is summertime at that end of the globe, temperatures range from 10 to -50 degrees Fahrenheit. At McMurdo Station, the average January temperature is -3 degrees Celsius.

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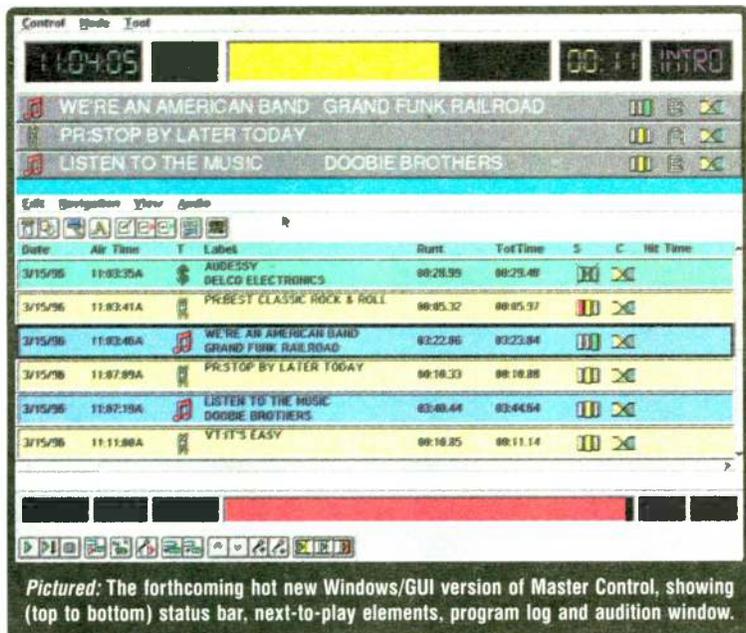
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Quello Is Leaving FCC in Peace

by Matt Spangler

WASHINGTON Commissioner James H. Quello is preparing to step down from the Federal Communications Commission this year.

In an interview with *RW*, his recent clashes with Chairman Reed Hundt on the broadcasting industry seemed tempered by nostalgia for his 23-year career with the FCC, which he called "a pretty good run."

Quello has asked the White House to allow him to remain through April, which marks the 23rd anniversary of his arrival at the commission as an appointee of President Richard Nixon. He said he will stay as long after April as the administra-

tion would like him to. He said a recent meeting with Greg Simon, Al Gore's telecommunications advisor, was "very cordial," and that his stepping down should be celebrated with much fanfare.

How long Quello will remain depends a lot on the nomination of a replacement and the length of the confirmation process. FCC General Counsel Bill Kennard and Russell Frisby, chairman of the Maryland Public Service Commission, are reportedly the front-runners to succeed Quello.

Quello said that Kennard is in Hundt's camp. "Once you are a bureau chief for the chairman," Quello said, "you pretty much have a record of going along with everything he wants." However, if

Kennard were his replacement, Quello said, "I assume he would exercise more independent judgment."

On Hundt, Quello said, "In broadcasting, he's way overregulatory for me. I came from that area years ago, and I think it's handy to have someone on the commission that has a proper responsibility for one of the communications industries. You see it in a different light." On the other hand, Quello said he and the chairman have not disagreed on all issues; interconnection and universal services and access areas in which they do see eye to eye.

An FCC spokesperson said that the rumors that Hundt himself may be leaving the commission soon are unfounded.

Many observers view Quello as an advocate of the broadcast industry, where he served as general manager of WJR(AM) Detroit and president of the Michigan Association of Broadcasters before coming to the FCC at the age of 60. (See *RW*, Oct. 16, 1996, page 1.)

Quello leaves Democrats Hundt and Susan Ness and Republican Rachelle Chong behind on the commission (Republican Andrew Barrett left the FCC in March 1996). The Clinton administration must nominate one Democrat and one Republican to balance out the remaining slots.

Commissioner Chong's term expires in June. She has not made any announcements about her plans.

As for Quello's plans, he confirmed that he may take a chair at Michigan State if it were offered to him.

NAB Supports FCC Allocation of Spectrum To Wireless, Though Still Concerned About DARS

WASHINGTON The National Association of Broadcasters is giving its support to the Federal Communications Commission proposal to allocate the 2.3 GHz range to wireless services and to create a Wireless Communications Service that would allow licensees to use spectrum as they see fit. But the NAB also repeated some of its concerns about the coming shape of satellite-based digital audio radio services (DARS).

Pursuant to the 1997 Appropriations Act, Congress required the FCC to reallocate the frequencies at 2305 - 2320 and 2345 - 2360 MHz to wireless services consistent with international agreements concerning radio spectrum, overlapping the original commission allocation of the 2310 - 2360 MHz band to DARS. In comments filed in December 1996, the NAB called the FCC move "a sensible compromise method of allowing market forces and consumer demand to determine the best and most efficient use of much of the spectrum."

The NAB had earlier opposed the granting of pioneer's preference status to the four major DARS technology developers because it thought the technology would damage the tradition of localism in radio.

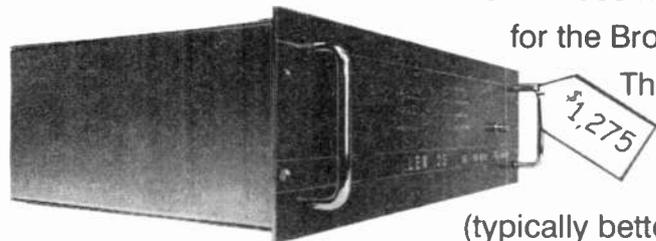
In the initial comments, the NAB also argued that, in practice, DARS would be used as a terrestrial and not a satellite radio service, and thus asked the FCC to ban the use of a terrestrial repeater network for the purposes of interference mitigation of DARS services. In the NAB reply comments, filed in December, it again asserted its belief that DARS, with its gap-filler scheme, is a terrestrial service, and further asserted that, with the technology terrestrial "repeaters" would actually be used as translators.

According to the congressional act, the commission must begin the auction of the spectrum no later than April 15, and deposit of the proceeds must be received by Sept. 30.

— Matt Spangler

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Internet Services For Radio A Special 'Running Radio' Feature



Engineers Find Tools on the Web

Thomas R. McGinley

While most chief engineers use computers, some still resist. Internet aside, those who are not yet computer literate may be seriously jeopardizing their future employability, as computers relentlessly take over the technical side of most radio stations.

It is amazing how some "old-school" engineers complain there isn't time to learn or deal with computers. This mindset needs a quick reality check.

The Internet is a vast resource of useful information that can help you execute engineering tasks better and more efficiently. I recently polled several dozen chief engineers who are active on the Internet to find out which websites and other Internet resources are helping them become better engineers. We boiled the list down to a composite top 10 in no particular order and invite all radio engineers to check them out. Ladies and gentlemen, start your modems and point them to the World Wide Web.

Precede all addresses in this article with <http://> when entering them on your browser.

The list

1. www.broadcastnet.com This pioneer website calls itself the "Broadcast Industry Home Page" and is the creation of fellow broadcast engineer Dave Biondi of Houston. Barry Mishkind, another former chief engineer turned computer expert and a contributor to *RW*, joined Dave in this effort as marketing director. *Broadcast.net* offers an extensive smorgasbord of useful offerings, and is organized into sections featuring equipment, programming, services and information.

BNet is loaded with links to sites of

commercial manufacturers and distributors, where an endless amount of info is available on products and hardware. Other sections include BWare, where broadcast-related freeware and shareware programs are available for downloading; BChat, which features a nightly open chatroom for broadcast professionals; and BLinx, an extensive listing of related websites.

2. www.broadcast.harris.com Harris Broadcast Division maintains a long-established website, with major areas including news and info, service, product info, features and e-mail. The feature

area includes the always interesting used equipment listings. A section called RadioSurf contains links to the MIT listing of all radio stations with websites, network radio and TV websites, and links



to related sites including USA Digital. For amusement, the site has featured a fun "name-that-tune" contest using .wav files.

3. www.radio-online.com This is a

popular site focusing on programming resources and services. It is subscription-based but does include an interesting technical section accessible at no cost called Engineer's Workbench. It contains links to numerous equipment suppliers, and sections featuring digital audio workstations, ISDN resources, automation software, links to FCC news, and access to the "Know-it-all" Electric Library. This is an extensive resource center and search engine available for finding answers to questions about anything to do with electricity and electronics. It offers a two-week free trial and a \$9.95 unlimited monthly subscription.

The basic Radio Online subscription fee is \$10 a month or \$90 a year and

See TOOLS, page 22 ►

GRIT Blends Radio's Past With Its Future

Frank Beacham

To call GRIT a radio station is a bit of a misnomer. Sure, it looks like a radio station; its state-of-the-art control room and studio resemble those in the best broadcast stations throughout the world. But then there's no transmitter or antenna tower. And, the programming ... well, it's not just audio, there are pictures and data too.

Though it's loosely called an "Internet radio station," GRIT actually is a new breed of broadcaster seeking to create an entirely new kind of programming. It starts with the traditional radio medium, but builds on it by adding visual and interactive elements of its own. For now at least, the station's programming is delivered to a global audience of individuals that sit in front of personal computers connected to the Internet.

The creation of GRIT, built last summer in a mid-town loft near Penn Station in Manhattan, resulted from the unique collaboration between a group of

20-something computer enthusiasts with no radio experience and a veteran broadcaster who knew little about computers.

It started in the spring of 1995 when Robert Gould, a young Wall Street lawyer, had a brief encounter with America Online and became instantly captivated by the possibilities of the Internet. Gould volunteered to help his synagogue create CD-ROMs and wound up making headlines later that year by producing the first live audio broadcast of a "CyberSeder" over the Internet.

Bob Casey

"The cantor called my mother and said that with the exception of a meeting with the Pope, he felt doing the first audio prayers over the Internet was the most important religious thing he'd done in his life," recalled Gould. "My mother told me 'you must do something with this.' I then realized I could have my own station and reach people all over the world."

Gould quit his job and at the beginning

of 1996 created WebSine, a company that would specialize in broadcasting



Photos by Frank Beacham

Producer/engineer Todd Goldstein works in the GRIT control room.

multimedia over the Internet. In June, construction began on GRIT, the Internet broadcasting facility whose call letters stand for Gould Resources and Internet Telecommunications.

Gould and his young staff knew nothing about radio broadcasting, much less how to build and program a station. They needed help and, through a friend's recommendation, found Bob Casey, a 25-year radio veteran who had worked for Armed Services Radio, NBC and several local stations.

Fortunately, Casey, now an audio consultant in New York City, had three essential skills. He had been an on-air announcer, a programmer and an engineer. "The consummate combo man," he quipped. For Gould, Casey was the right man at the right time.

"They were going to just set up a little closet and put a microphone in it," Casey said. "I told them they needed much better quality than that if they were going to succeed. I ended up designing an FM stereo studio with all the complements of any other studio ... everything but the transmitter."

Gould credits "Audio Bob" with bringing focus to an otherwise unfocused venture. "We were going to broadcast two hours a day," Gould said. "Bob said 'No, you must go on 24 hours a day. Even if it's tape or CD, you have to be on all the time with a signal.' He was adamant about it."

The computer and broadcast cultures worked well together. The facility was built in 21 days. At the wrap party Casey

See GRIT, page 13 ►

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World Radio History

Advertisers Eye GRIT

► GRIT, continued from page 12

presented his young clients with a 1960s-era broadcast On Air light that was re-lettered to say "On Line."

Now, with several months of broadcasting experience, GRIT is building an audience and starting to draw advertisers. Listeners in 70 countries have "tuned in" the station and audience members have begun to e-mail and call in questions live to studio guests.

One important listener boosted the staff's morale with unexpected praise. Doug Podell, program director of WRIF(FM) Detroit, called GRIT one of the best Internet radio stations now on the World Wide Web. "Exciting programming, good personalities and nice graphics on their website," he said.

"I'm a web nut and a program director and I've seen them all," said Podell. "These guys are a struggling enterprise that are doing some very impressive things. I like what I see."

The GRIT content is targeted to web surfers. Net jock Robert Petrusch is the "Hitman," a cyber guide who takes his listeners to "all the sites that are fit to hit." Petrusch sits in front of a computer, asking listeners to follow him on their own PC as he surfs for new thrills in cyberspace. The technology allows the audience to continue listening to GRIT as they move around the Web to other sites.

ON LINE

The GRIT air light is a modified version of a studio classic, suggesting the combination of traditional radio and the new medium of the Internet. For that reason we also placed it at the top of each page in this special section.

Other GRIT originals are "Disc, DAT and the Other," a music review program, and "Mind, Body & Computing," a relaxation guide for computer users. There is also a daily line-up of studio guests and programs on such topics as free speech, politics, media, sports and new software bugs. GRIT did a live remote from Internet World '96 and plans a major live 12-hour broadcast from BeatleFest in New Jersey in March, where it will transmit digital images along with the audio feed.

"Unlike a regional radio station, our content is geographically boundless," said Gould.

In addition to the 24-hour live audio feed, the GRIT website offers Reuters news and other audio programming on demand. It also features a search engine, a digital photograph gallery and links to recommended sites.

Because GRIT determined its largest audience is made up of office workers during the lunch hour ("People have high speed access in their office, not at home," said Gould), it now broadcasts live between 1 p.m. and 2 p.m. EST each weekday. On March 1, live programming expands to two hours daily between noon and 2 p.m. GRIT plans gradually to increase new programs throughout the year in a wheel format similar to all-news stations.

Live programs are recorded to DAT and then transferred to compact discs, which are re-played in an automatic CD changer to the encoding computers. GRIT now encodes and feeds RealAudio 14.4, RealAudio 28.8,

Streamworks and NetShow.

Not including the cost of the GRIT T-1 line (these vary from market to market), Gould estimates a station like his can be built for about \$80,000. For operation, GRIT has a full-time staff of five, four consultants and about "a dozen friends and believers."

Gould predicts that the ability to reach huge audiences simultaneously is about two years away. Until cost-effective multicasting is available on the Internet, GRIT will support itself by creating programming and offering corporate clients custom websites and broadcasting services.

"There are clients wanting to do their own live broadcast events," said Gould. "They pay us to produce a remote for

them." There is also unexpected income. Without solicitation, listeners began calling in requests for tapes of GRIT programs. "All of a sudden I had another revenue stream," said Gould.

Audio equipment manufacturer Altec became the first paying advertiser. A major bank has signed on for a series of original multimedia ads that feature a continuing dialogue between two people at an automatic teller machine. Several firms targeting computer users have also recently signed on. In most cases, GRIT is producing their ads.

"I don't know when we will be profitable," said Gould. "But I'm more enthusiastic than ever about the future



On the Internet, every time zone is local.

of Internet broadcasting."

Contact GRIT and WebSine at (212) 631-7456 or visit the site on the Web at <http://www.grit.com>. Bob Casey's audio consulting company, Virgo Sound, is at (212) 243-8581.

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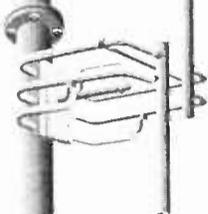
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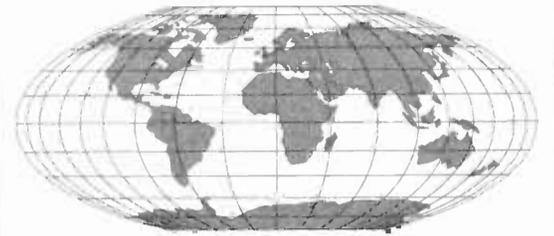
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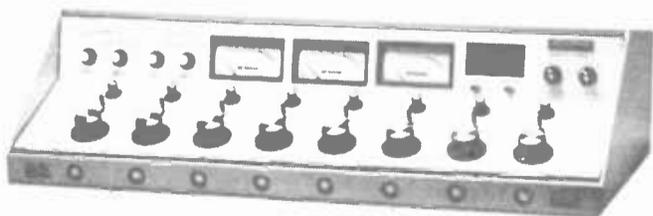
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READER SERVICE NO. 45

Station Staff Should Head for Web

Alan Haber

For this special Internet issue of *RW*, we asked Alan Haber to write about Web resources for non-engineers. Resources for engineers are covered on page 12.

It's a cliché, I know, but the old saying is right as rain: You can lead a horse to water, but you can't make him drink. Apply these words to the Web, throw in a couple of non-engineering types, and you've got a party.

Well, not a party, perhaps (at least not in the traditional global Haberspace headquarters sense), but a fun and, most of all, productive time looking for information you can use to help your station grow its presence on the Internet.

You can lead a station manager or program director or sales person to the World Wide Web, but you can't make him or her take advantage of the radio resources available there, especially if he or she doesn't know where to look.

Good ideas

Haberspace to the rescue! Here are some examples of the Web's radio resources.



From these sites, you can link to other radio resources, and link to more resources still, and so on and so on. The Web is never short on information. The

trick is finding it, and finding it fast. So, without further ado, a completely arbitrary list. Remember to add <http://> in front of all addresses below:

Radio stations on the Internet. If your station is planning on starting up a website, or it's had a site for a while and needs some help making it more effective, two lists may come in handy: The MIT List of Radio Stations on the Internet (wmbt.mit.edu/stations/list.html) and Gebbie Press's "Blue Ribbon" List of USA Radio Stations on the Web (www.gebbieinc.com/radintro.htm). Both are comprehensive and helpful; Gebbie's adds e-mail addresses for stations when known. Why not link to a couple of stations and contact the folks responsible for their sites ... you know, do a little bit of cyber-networking. Find out what works and why, and apply what you learn to your station's site!

Radio stations broadcasting on the



Internet. With more stations cyber-broadcasting every week, lists like these are becoming more important as jumping-off points for prospective listeners. They act as important "advertising" for your station's cyber-signal, too. Some good lists to make sure your station is listed on: MIT's (cyber-broadcasters are marked with a lightning bolt), Yahoo's! (www.yahoo.com), On the Air's (www.ontheair.com), and AudioNet's (www.audionet.com).

InterVox Communications' Broadcast Reference Desk. This useful site

(www.intervox.com/desk.htm) offers a wide array of information on topics of concern to broadcasters, like webcasting and telecommunications legislation. You'll also find FCC information, links to broadcasting-related industry associations and a list of Internet broadcasting "firsts."

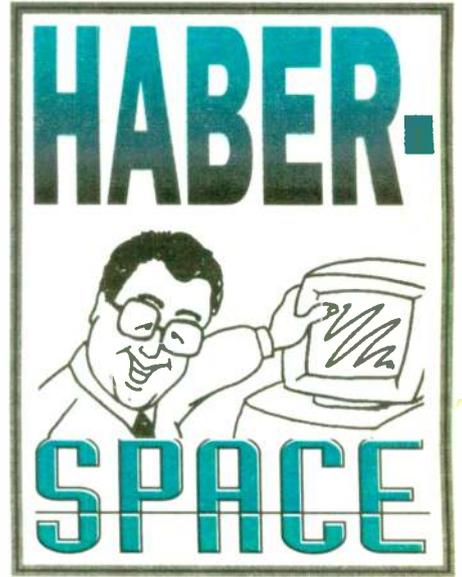
Radio Advertising Bureau's RadioLink. Open to RAB members only, this incredibly exhaustive site (www.rab.com) is a one-stop source for sales and marketing information that even includes more than 1,000 commercials in RealAudio. There's enough information here to help any sales person put together a dynamite sales presentation.

See page 4 for details.

Jobs and buzz

Broadcasting Museums. It's as important to keep radio's rich history alive as it is to keep forging on and filling the air with quality product. With that in mind, it's a good idea for your station to support this country's two major broadcasting museums, both trying to preserve radio's past while pointing to its future. The Museum of Television and Radio (www.mtr.org) offers virtual tours of its New York and Los Angeles buildings, among other information; The Museum of Broadcast Communications in Chicago

See HABER, page 19 ▶



Who Knows what lurks in the minds of the creators at SMARTS Broadcast Systems? The Spider Knows!

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PRODUCT GUIDE

Companies with new product announcements for Studio Sessions Product Guide should send them to:
Radio World, c/o Studio Sessions Editor, P.O. Box 1214, Falls Church, Va. 22041

Digital Wings for Audio

Metalithic Systems debuted Digital Wings for Audio (DWA), a 128-track digital audio studio for Windows 95.

DWA is a hardware/software combination that eliminates the problem of combining products from different manufacturers. A comprehensive DSP suite is included; it performs reverb, EQ, time companding, noise reduction and other functions.

DWA can import standard WAV files and has a "snap to grid" feature that causes audio playback to occur on beats or by time index. This makes DWA ideal for

dance remixes and syncing audio sound effects to video.

List price of Digital Wings for Audio is \$1,695 and includes the software with audio board. An optional breakout box is available for \$300.

For information, contact Metalithic Systems at (415) 332-2690 or circle Reader Service 161.

Behringer Eight-bus Console

Samson Technologies has the Behringer Eurodesk MX 3282 for multi-track recording, project studios and live sound.

The MX 3282 is an ultra-low noise 32 channel, eight-bus console with 24 mic/line channels and four stereo channels. Mic channels feature three-band semi-parametric EQ. Eight balanced Aux Sends and four balanced stereo effect Returns round out the flexibility of the MX 3282 console.

Solo and PFL switching is provided on all channels. Sealed Panasonic pots, true logarithmic taper faders and rugged construction assure dependability and reliability.

Suggested price of the Eurodesk MX 3282 is \$1,995.

For information, contact Samson

Technologies at (516) 364-2244 or circle Reader Service 181.

Sony PCM-7040 DAT

Sony Electronics has added to its line of PCM-7000 Series DAT recorders with the PCM-7040.

This deck replaces both the PCM-7030



and PCM-7050 recorders, and is a time-code-based DAT recorder offering a cost-effective solution for radio stations and production houses. It includes a timecode reader/generator, digital I/O, memory start and RS-232C interface.

An internal time-of-day clock and date function allows time-stamping of recordings which can be recovered by any other PCM-7040 deck. The deck can be locked to a variety of external reference signals, including composite video or 50 and 60 Hz square waves.

The PCM-7040 has a four-head rotary system, can varispeed to ± 12.5 percent and has a Search/Cue function that can move at 16 times normal playback speed.

Suggested price of the PCM-7040 is \$9,950.

For information, contact Sony Electronics at (800) 635-SONY or circle Reader Service 201.

Project Patch Studio Wiring

Signal Transport debuted Project Patch TRS, a lower-cost version of the plug-and-play Project Patch Studio Wiring System.

The TRS is based around a quarter-inch, 48-point patch bay and features premium-quality PC board-mounted TRS front-panel jacks. Each group of eight top and bottom jacks appears on a single gold-plated, rear-panel multipin connector. Mating cable connectors are end-to-end stackable for easy subdividing into groups. Reconfiguring the patch bay no longer requires soldering, punchdowns or crimping.

The Project Patch TRS has a suggested list price of \$250.

For information, contact Signal Transport at (510) 528-6039 or circle Reader Service 221.

Yamaha EQs

Yamaha introduced three new graphic equalizers and a compressor/limiter at the Los Angeles AES show.

The Q2015A is a two-channel, 15-band EQ with a suggested price of \$429. The \$749 QB2031B (shown) is an independent two-channel EQ with 31-band control over the 20 Hz - 20 kHz range. The monaural GQ1031 EQ also has 31-band control with a suggested price of \$399. All three units have balanced quarter-inch and XLR connectors and are rack-mountable.

The new two-channel GC2020C compressor/limiter has stereo link and two-channel mono operation, sidechain I/O

See PRODUCT GUIDE, page 33

Toning up your vocals is a snap



with the 528E!

- Boost low level mic signals
- Curb uncontrollable signal peaks
- Trim wide dynamic ranges
- Pump up whimpy tone quality
- Shed unwanted sibilance

Noticed a lack of energy and punch on the air? Need some extra vitality and zip in your sound? Check out the Symetrix 528E. With a complement of features such as a studio grade mic pre, compressor/limiter, downward expander and parametric EQ, the 528E has everything needed to get your vocals in shape! Don't let the competition kick sand in your face - buy the Symetrix 528E, on sale now, from BSW.

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World Radio History

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Radio is complicated. Zephyr makes it easier.

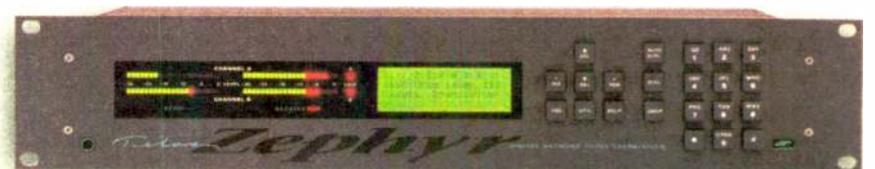
Zephyr is number one among US radio stations for sending high quality audio over ISDN. Once programmed, anyone can Auto-Dial ISDN calls. Not sure what to do next? Press the HELP button for plain English information.

Telos will even help you get your ISDN line ordered. Just call our Customer Support guys or check our web site.



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- The ideal solution for remote broadcasts, ad hoc networks, voiceovers, distribution of commercials, backup to satellite and microwave links, and many other applications.
- Designed by Telos specifically for radio applications over ISDN.
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- Built-in input protection limiter. When your talent screams, your audio doesn't distort.
- Zephyr has an integrated ISDN terminal adapter designed for the non-technical operator. You can even place a standard voice-grade call to a Plain Old Telephone Service (POTS) telephone.



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World Radio History

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When you need to send audio, CDQPrima gives you three or four times the features of any digital audio codec on the market.

NOW CDQPrima adds the Layer III algorithm to give you increased compatibility and 15 kHz response on a single ISDN B channel.

NOW your new CDQPrima is compatible with more codecs in more locations than any other codec, with CCS MUSICAM®, Layer III and G.722.

NOW because of CDQPrima's incredible 92 dB dynamic range and ultra-low distortion, Layer III NEVER SOUNDED BETTER.

AND, because CDQPrima works at all bit rates up to 384 kb/s in MUSICAM and 320 kb/s Layer III, you can produce *contribution quality* audio feeds.

PLUS you get all the terrific features that only CDQPrima offers:

- ♥ Programmable functions to do automatically what other codecs make you do yourself: dial-on-audio/hang-up-on-silence, and more
- ♥ 18-bit A/D and D/A converters for the best audio quality
- ♥ AES/EBU with automatic rate adaptation is standard in all but the budget Model 110
- ♥ Gold-plated Neutrik® XLR connectors to preserve maximum signal-to-noise ratio
- ♥ SMPTE Timecode, stereo audio, two ancillary data streams and up to eight contact closures in only 128 kb/s
- ♥ Downloadable software directly over ISDN—no need to take CDQPrima out of the rack for software upgrades
- ♥ Sophisticated but simple Speed Dial stores not only 256 addresses but all configurations for fast, easy connection. You never need to change sampling or bit rates—just dial!
- ♥ Send audio to up to six locations with no additional hardware
- ♥ ISDN J.52 IMUX BONDING puts CDQPrima ahead of the industry curve for error-free connectivity

What's Not To Love?

Call us today and we'll help you select the CDQPrima that's just right for you.

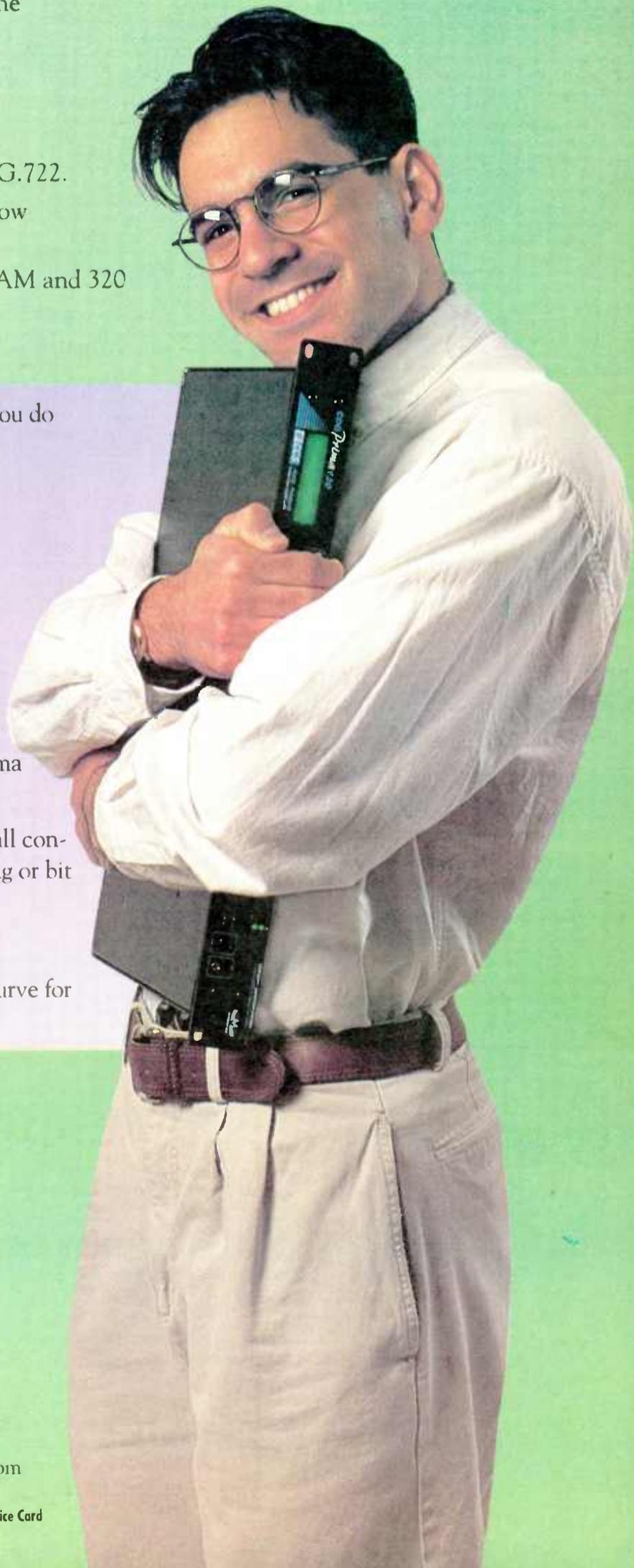


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Internet: <http://www.musicamusa.com>

Circle (7) On Reader Service Card

World Radio History





Radio Finds Lots to Like On Line

► HABER, continued from page 15
(www.neog.com/mbc/) offers information on its Radio Hall of Fame.

Job Sites. No, not as in construction job sites, but, rather, as in sites to visit if your station is looking for a new morning person or sales person or general manager. Perhaps you're an out-of-work DJ or program director.

Searching for a job on the Internet isn't going to replace the more traditional sources of job listings any time soon, but it's a good way to go if your aim is to get your job listing to the right people as immediately as is humanly (or cyberly) possible. Start at the Unemployed Radio DJs site (204.251.230.2/users/awhite/) and link from there to other job search sources.

general, find out what's happening that is of interest to broadcasters.

It is also the place to link to live and recorded broadcasts of FCC events, such as the Dec. 13, 1996, open commission meeting.

Links. On the Web, links are the way to get from here to there. Bookmark your favorite sites for later perusal — you never know when you might need to know something!

Useful link lists can be found at such sites as Hepburn's Broadcast Connection (hbcmedia.com), Yahoo!, Radio Online (www.radio-online.com), and 440:Satisfaction (www.440int.com).

Show prep. In today's competitive

marketplace, it is more important than ever to be prepared for a show. Show prep is the name of the game at such sites

What's happening in the industry? Get the scoop from the FCC and NAB sites.

as InterPrep Online (interprep.com) and Radio Online, which lists a plethora of

links to sites with information that can make just about any show shine.

Webcasting mailing list. This is a new mailing list, covering new technologies



and the related activities of broadcasters, datacasters, marketers and advertisers, and it is worthy of your time, especially if your station's goal is to create a buzz on the 'net.

If your station is cybercasting, you should consider subscribing. Simply send an e-mail to majordomo@broadcast.net; leave the subject line blank and put "Subscribe webcasting," minus the quotation marks, in the body.



Industry Buzz. When you want to know what's happening in the radio industry, get the scoop from the authoritative sources at the National Association of Broadcasters (www.nab.org) and Federal Communications Commission (www.fcc.gov). NAB's cyber-home contains information on the association's various radio-oriented activities, including the monthly "\$wap \$hop" small market newsletter.

There is also information on NAB '97. The FCC site is the place to go to read the informational "Daily Digest" and, in

All This and More

If immediacy is the name of your game, Internet newsgroups are for you. You can fire off a request for information or answer someone else's query. Newsgroups are great places to network, cyber-style. They're all accessible through your web browser.

By far the best and one of the most active radio-oriented newsgroups is *rec.radio.broadcasting*, which includes regular coverage of regional radio in addition to musings about this, that and every other radio-oriented thing. *Alt.radio.talk* is also active, as is *alt.radio.pirate* (ahoy mateys, indeed).

Wanna take a break from the 'net? Surf on over to CompuServe and log on to the Broadcast Professionals Forum (*go bpforum*). There are a few radio-oriented areas in which you can leave messages — there is a general radio area, one that covers radio/TV talent, and another that looks at talk radio. You can throw in your two cents during the weekly Sunday evening chat sessions starting at 9:00 p.m. EST.

— Alan Haber

"Check's in the mail."
"My dog ate it."
"Use a live board for recording..."
"No such thing as a quality recording console for \$1699."

WE WON'T INSULT YOUR INTELLIGENCE.



Breakthrough: You Can Buy an 8-Bus Recording Console for \$1699

It's funny that some companies will try to fool you into believing that their 4-bus mixer designed for live gigs and sound reinforcement will be a great console for your personal or project studio. We know you're much smarter than that. Fact is, you can buy a quality 8-bus recording console for a lot less — from TASCAM.

You Can Expand It, Too!

Best part is you can buy the M1600 and its optional meter bridge for about the price of a basic live board. How can TASCAM do it? By not making you pay for stuff you'd never use — like mic inputs. When was the last time you used more than 8 microphones simultaneously for recording? Chances are never. But if you ever do, you can easily expand your M1600 with the optional TASCAM MAB eight channel mic preamp — giving you 8 more killer mic preamps.

Live Boards Waste Inputs When Used for Recording

Don't depend on your salesperson to know, but for every track of your recorder, a live board wastes 1 input (8 tracks = 8 wasted inputs). Not very efficient. A true recording console, like the M1600, has dedicated ins/outs specifically for your multitrack, so all input channels remain available for necessities like guitars, keyboards, mics — whatever you need.

Killer Mic Preamps and the Sweetest EQ

The M1600 has the EQ you need. Three bands including a semi-parametric mid sweep with more range than anything in its price class. Plus, the M1600's next-generation mic preamps are optimized for digital recording. Much cleaner and quieter than those on a live board. Check out the specs.

No Patching and Repatching

Another thing a recording console will save you is hassling with cables. That live board has only 4 sub-masters. So, if you want to send multiple signals to any of the 8-tracks, you'll need to patch and repatch. And forget

Serious Monitoring. Inputs a Plenty

You'd be hard pressed to find the M1600's monitoring capability on another mixer — let alone a live board. With 6 AUX sends you can create stereo cue mixes and still have plenty of AUX power to spare. Plus, you get 4 fully assignable effects returns. Thanks to its inline design the M1600/16 gives you 32 inputs at mixdown.

You're smart. So buy the right tool for the job. For gigs and sound reinforcement, get the live board. But for recording on a tight budget, get the TASCAM M1600. At only \$1699* for 16-inputs, or for more bang get 24-inputs — only \$2199. You won't find a better value. Want to know more? Read the M1600 story. Call TASCAM FaxBack today. Document #6610.



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*16 input model gives you 32 mix positions; 24 input model gives you 48. Manufacturers suggested list prices: \$1699 for 16 inputs and \$2199 for 24 inputs.
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ON LINE

Radio's Cyber-Market

► BUY, continued from page 16

was prepared by John Garziglia of the Washington law firm of Pepper & Corazzini."

This doesn't seem like the sort of place Mel Karmazin would go surfing for new radio stations to add to his CBS/Westinghouse/Infinity stable, and Kauffman isn't really expecting Mel to drop by anytime soon. "Contrary to popular belief, mom-and-pop stations are still out there and many of them are doing quite well," he said. "I'm hearing from a lot of single station owners who are looking to expand, maybe in their own vicinity, and there's also a lot of interest from smaller group owners."

Among the early posters on the site was a Russian national, holding a construction permit to build a station in a fairly large Russian city. "He's looking for an American partner with some radio experience, and I suspect some radio money to help put this thing on the air," Kauffman said.

He does not consider himself in competition with brokers; in fact, he encourages them to list their properties on the site. "Stations can be added and deleted instantly, and the brokers can post as much or as little

information as they like. They can also send a packet of information to a prospect instantly, by e-mail."

The big question, of course, is whether *buysellradio.com* has resulted in any done deals. So far, the answer is no. "We've only been up since Nov. 1," Kauffman said. "and you know these things take time. Some of the people looking for investors and several people looking for stations have gotten some traffic, but it's probably premature to say we've closed any deals at this point."

Lee Harris is morning anchor at all-news WINS(AM) and a former station owner. He is also president of Harris Media, a website design and hosting firm. You can contact him via e-mail at lee@harrisnet.com



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255 "Spectral Loading" Processor

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260 Multifunction "Utility" Processor

This simple stereo AGC/Compressor/Limiter is ideal for budget-FMs, uplinks, TV-aural and many other station chores. Split-spectrum processing utilizes PWM dynamic control.

708 Digital-Synthesis FM Stereo Generator

A basic Stereo-Gen with outstanding specifications. Built-in, adjustable Composite Processing, RDS/SCA combining, and accurate front-panel metering for easy setup.

716 "DAVID-II" FM Processor/Stereo-Gen

A gated-AGC/Compressor/Limiter, plus clean digital synthesis of the multiplex baseband signal. This second-generation design features PWM gain control, an adjustable Composite Processor and RDS/SCA combining. A fantastic performer!

630 FM "Relay" Receiver

A tunable, single-channel re-broadcast receiver for FM translator service and similar, critical off-air pickups. Features both composite multiplex and left/right audio outputs. IF bandwidth, auto-mute and auto-blend functions may be remotely selected; alarm outputs for loss of carrier and loss of program audio.

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World Radio History

Looking for Work? Log on!

Alan Haber

To the unemployed radio professional, the cost of a monthly Internet connection may well be out of the question. Yet such an investment is an important part of a thorough job search, whether you are employed or not. Although publications remain the primary sources of job leads for radio professionals, World Wide Web sites are fast becoming viable alternatives.

Take, for example, Interscape's Radio Pages at 205.216.138.197/~websites/scape/radio.html (remember to enter <http://> before all URL addresses in this article). Webmaster Hal Abrams has been a morning DJ for the past 13 years; he now works at alternative rocker KHTY(FM) in Santa Barbara, Calif. He said there was a time he was out of work and decided to start his own business, a syndicated radio company, which "branched out into a consultancy for radio stations across the country."

Abrams subsequently took a job in San Francisco for about six months, after which he once again found himself without a job. "What I decided to do was use the 'net as a tool to find employment," he said, adding that he put up his own web page containing his resume and picture.



"I would e-mail consultants ... and program directors and ask them to come and look at my web page," said Abrams. "I found out there (were) a lot of people, especially morning talent, that used the 'net to prepare their shows (and) get show prep, including myself."

Abrams realized there was a need for a "central area" where employers could post their Help Wanted ads and where people looking for jobs could post jobs wanted. As an experiment, he started Interscape's radio pages, which included job listings and show prep links, in an effort to provide help to those in need. He described the initial response as "phenomenal."

Interest in the Interscape site has grown since it went up on the Web about a year and a half ago. At first the site received about 500 hits a month; it now receives about a hundred a day from around the world.

Listings are updated on a weekly basis. Abrams doesn't charge for listings to be posted to his site, although he does offer some services for a fee, including a weekly e-mail listing that includes job leads not posted on the site and a Website

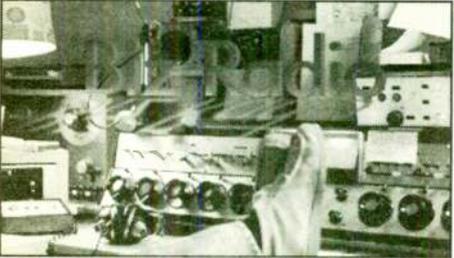
See JOBS, page 21 ►

Get a Job ... On Line

► **JOBS**, continued from page 20
design and development service for job seekers that can accommodate .aiff or .wav audio file clips of airchecks.

With a resume and an aircheck sample posted on the Web, you give program directors "the chance to hear what you sound like and either give you a call or discard" the information immediately, said Abrams.

"If someone sent me something that said, 'Hey, I'm looking for a job, please check out this site,' then I can say, 'Well,



you know, I'm looking for somebody like this.' I'll go to the site, I can check it out real fast, I can get an audio clip if I find that I'm interested, I don't have to shuffle through a whole bunch of papers ... or anything like that, I can get the information that I want instantaneously. It saves a lot of time." And postage.

Making it easier

Chris Shackelford was a DJ for 10 years, mostly in the Raleigh-Durham and Chapel Hill, N.C. area. He posts Help

Wanted and Seeking Position ads for out-of-work radio people on his Biz Radio site, www.bizradio.com

Biz Radio "is basically my way of kind of getting back into radio without actually being in radio," said Shackelford, who has been out of the medium for five years and works as a 911 telecommunicator in Durham.

In an effort to help program directors sift through the applicants listed, he does not post ads from people who have not been on the air in the past year. "I limited it because, when I first started (the site), I was being bombarded by kids wanting jobs in radio who had zero experience," he said.

Free ads

Biz Radio, he said, is updated "as often as necessary." The site provides an on-line form to be filled out; ads are posted free of charge. "There will never be a charge on Biz Radio," he said. Shackelford does offer web site authoring services for a fee.

Shackelford believes in the Internet as a job source. "I think jobs will be gotten on the Internet on a regular basis in the next two to five years," he said. "I think it'll move into being a primary source."

An interesting change of pace from the grind of looking for radio work is found on the site of Washington media consultant Holland Cooke, users.aol.com/cookeh/job.html. Here, Cooke posts various "factoids" from his book "How to

A Job Seeker's Asset

For job seekers, program directors in search of new blood, and those who simply want to "stay ahead," the accompanying selection of additional

TRAINING NETWORK

web sites with job listings may well be a godsend. It is by no means comprehensive; the Web is too large and changes too fast. Type <http://> before all URLs listed.

Broadcasters Training Network (www.learn-by-doing.com). BTN "serves its industry as a kind of supplier, connecting a motivated student apprentice with a local seasoned pro who's interested in teaching."

Dynamic Radio Marketing Strategies (websites.radio-online.com/dynamicfm/). This radio consulting company offers an employment search service for a fee.

Jockline (www.jockline.com). This site provides a listing of tapes available for listening by radio station managers, through Jockline's telephone number, along with talent names and

contact phone numbers.

Radio-Online (www.radio-online.com). Radio people and stations can post job ads at no cost; a subscription, starting at \$10 a month, is necessary to view job openings.

Saludos Web (www.saludos.com/saludos/jobs.html). A listing of jobs



available from employers "actively recruiting qualified Hispanics for positions in their companies" is available here.

Society of Broadcast Engineers Job Line (www.sbe.org/jobline.html). A large listing of engineering-oriented jobs, and contact information, appears on this site as a service to SBE members.

Unemployed Radio DJs (204.251.230.2/users/wwhite/). Job listings can be posted free of charge; they are only part of this site, which also offers links to radio stations around the world.

— Alan Haber

Get a Better Job in Broadcast News," tips that apply to just about any prospective radio job applicant.

Visitors to the site can find ways to get past the receptionist at a station, the best

and worst questions to ask in a job interview, and the safest answers to give in response to the most dangerous job interview questions ... in other words, how to look smarter than other applicants.

Internet@NAB Returns

Chris Hamaker

If you need convincing that broadcasters are interested in the Internet, look no farther than the industry's biggest trade show, the National Association of Broadcasters convention in April.

For the second year, the Internet merits its own special focus at the show. To accommodate interest in this hot arena, organizers of NAB '97 will hold a new Internet-related conference and offer a new product demonstration theater.

The Sands Expo Center is the place to be for Internet-related activities and exhibits. The Sands houses the Internet pavilion of exhibits and also hosts the brand-new NAB Multimedia World Internet Business Conference.

The "What's New! What's Cool! Internet Theater," which debuted at NAB '96, continues at Internet@NAB.97. It features product demonstrations and seminars every 45 minutes, as does the new "Intranet Business Theater," focusing on business communication among employees, associates and customers.

"The Internet is a growing area for broadcasters," said Patti McNeill, NAB director of media relations. "We're constantly trying to ... attract any kind of new and allied technology areas for the show. This happens to be an area that's growing," she said.

Kristi Larson, director of developer relations at Progressive Networks Inc., which makes RealAudio products, said she is impressed with the NAB's efforts to put Internet technology front-and-center at NAB '96. "During the Radio Show the fall before NAB '96, we spent

a good deal of the time explaining what the Internet was. So I felt the industry had made a pretty big leap, getting to understand the Internet in six months."

Larson said Progressive Networks ran product demos in the "What's New! What's Cool!" theater during NAB '96. "That actually attracted a lot of people to come to our booth," she said. Progressive Networks is returning to the Internet pavilion for NAB '97.

The Multimedia World Internet Business Conference, encompassing Internet and intranet applications, runs from Saturday, April 5 through Thursday, April 10.

NAB Director of Technical Conferences John Marino said the idea of the Internet Business Conference grew out of comments from last year's Multimedia World attendees. "What we've had in the past is Internet sessions scattered among a variety of different conferences. We decided to just pull this whole thing together ... and put it into one specific conference."

Marino said Internet exhibitors are part of the continuing growth of Multimedia World. "NAB Multimedia World is held at the Sands. It used to be in conjunction with the entire conference at the Las Vegas Convention Center. Everything was there, and (Multimedia World) started growing so rapidly that we had to have more space."

NAB '97 and NAB Multimedia World conferences are held April 5-10. Exhibits halls and the Internet@NAB.97 exhibits and theaters are open April 7-10.

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Recommended Sites for Engineers

► TOOLS, continued from page 12

offers access to additional technical resources including freeware and shareware downloading, and database retrieval.

4. www.sbe.org The Society of Broadcast Engineers offers a well-organized website that includes the electronic version of the publication "Short Circuits," job listings, a complete listing of and links to local SBE chapters, all local frequency coordinators, a directory of SBE members useful in locating old friends, certification information and a useful section on EAS.

5. www.nab.org The National Association of Broadcasters sports an impressive presence on the Web. You can buy any NAB technical publication with a credit card from the NAB Store and search through the complete listings of the Employment Clearinghouse.



For broadcast engineers, the Science and Technology area offers information on NAB standards-setting activities, technical conferences, technical publications and FCC news. The handy Broadcast Engineer's Guide to the FCC lists all FCC departments, staff

members and phone numbers. If you have a postscript printer, you can download and print the official AM ground-wave charts and family of reference curves. An impressive array of links to other broadcast-related sites includes some useful ones not found elsewhere. Dan Kegel's ISDN Page at www.alumni.caltech.edu/~dank includes links to possibly every site on the Web related to ISDN. If you want to know about ISDN, this site will guide you.

6. netrunner.net/website "Close-up with Joe Fedele" is one of those links from the NAB site to a lesser-known, but exceedingly well-done offering designed for broadcast engineers. Joe Fedele is a former WCBS-TV chief engineer, now an engineering consultant and FIU professor who has built a site chock-full of goodies like Technology News of the Present and Future. Joe's Tech Notes section features Frequently Asked Questions (FAQs) about the Internet, definitions of Internet terminology and acronyms, and useful links to HTML and website authoring resources. The Jobs Search area includes links to every known broadcast engineering jobline listing service on the Web.

7. www.fcc.gov Perhaps the only broadcast website larger than the NAB's with native content belongs to the Federal Communications Commission. The Finding Info and Site Map tabs will

guide you through this electronic maze. The Mass Media Bureau's Audio Services Division (ASD) offers the complete AM and FM station databases available for downloading.

Another useful area features status reports on all pending applications on file, as well as all recent actions on applications. No longer must you call on FCC staff secretaries; they merely look up this same database.

The Engineering and Technology (OET) section provides timely information regarding EMF measurements, ANSI guidelines, and related "hot topics." The Compliance and Information area provides electronic copies of the consumer electronics and telephone interference troubleshooting handbooks, plus the AM/FM Station Self Inspection Check List kits.

8. www.radiostation.com Mike Elliott Broadcast Services offers a site that has converted all the FCC AM and FM station databases into a more user-friendly format. The daily FCC updates of actions on applications are also here. The AM database does not yet include all directional antenna system parameters, but Mike promises that will be added in the near future. When Mike is not working on his rather ambitious website, he's doing high-tech remotes for major sporting events all over the country.



9. www.radioinfo.com This site aptly calls itself "Radio's Complete Resource Center," featuring a massive directory of 10 main categories, 318 specific needs areas, listings of 8,401 industry suppliers, and 3,176 links to other industry topics. One of the 10 main categories is engineering, where a Keyword search engine allows you to type in the name of any company. Subsections include audio production, broadcast equipment and broadcast services. An area covering consultants is divided into maintenance and installation contractors, engineering station design and general applications consultants. Radioinfo.com is truly a must-use broadcast industry electronic buyers guide.

10. rec.radio.broad-casting This is not a website but rather a long-running Internet news group forum moderated by Bill Pfeiffer, a dedicated radio information junkie. It is a large serial collection of topical postings and replies dealing with the radio broadcasting industry.

While much of it is oriented toward programming, there is a lot of tech-talk that fellow-engineers have found quite valuable. A posting might ask, "How do you fix cueing and skipping problems with a Denon CD Player? The manual is of no help." Such a query usually evokes several helpful responses.

Used equipment buy and sell postings also appear. Bill Pfeiffer is now building a website at www.airwaves.com which will include many useful links and resource areas.

Unfortunately this effort was interrupted when Bill's house burned in December.

Other important resources

Any of the Internet "search engines" offers the quickest on-ramp to the Internet when you are looking for information. Several companies have built these fast info-fetching machines. Netscape, the most popular Internet browser, rotates among five search engines when you select "Netsearch," including Magellan, Excite, Yahoo, Infoseek and Lycos. All have direct access via their own websites. Two other good ones are Alta-Vista and WebCrawler. Just type in the word or phrase you want information about and press the Search button. Numerous "hits" will usually be found, with the most likely matches listed first.



Another group of useful websites includes the on-line service providers of resources needed for preparation of FCC applications. Dataworld at www.dataworld.com, Communications Data Services at www.comm-data.com, and Doug Vernier's V-Soft Inc. at www.v-soft.com all provide numerous software tools for frequency searches, contour predictions, mapping, population counts and other data services on a fee-per-task basis.

If you are responsible for advising your station owner on allocations issues or need to prepare technical data for FCC applications, you will want to establish an account with one of these services.

The last resource you will want to visit on the Internet regularly is your local SBE chapter website, if you have one. Visit www.sbe.org, which lists them all. Many of these SBE chapter home pages rival those of large companies in terms of graphics quality and innovative features.

If your chapter doesn't have one yet, Dave Biondi at www.broadcast.net will construct a basic one for you and will also provide free server space for it on BNet. That's rather generous, to be sure,

and we're certain many broadcast engineers appreciate your efforts, Dave.

We suggest placing most all the websites mentioned in this article in your "Bookmark" or "Favorite Places" area for handy access.

When surfing the Internet, remember

that time is perhaps the most valuable resource of all. Don't let yourself get bogged down in areas that are not relevant to your needs. The next time the general manager comes into your office and "catches you spending too much time at the computer," you can show him these useful websites and tell him how they are making you a better engineer!

■ ■ ■

Tom McGinley is chief engineer of Infinity Broadcasting stations WPGC-AM-FM in Morningside, Md., serving Washington. He also serves as technical advisor to *Radio World*. Reach him at (301) 441-3411 or via e-mail at k7qa@aol.com



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World Radio History

PRODUCT EVALUATION

Westlake Lc8.1 a 'Classy' Monitor

**Bruce Bartlett with
Jenny Bartlett**

Westlake Audio has produced highly respected, full-size monitors for 25

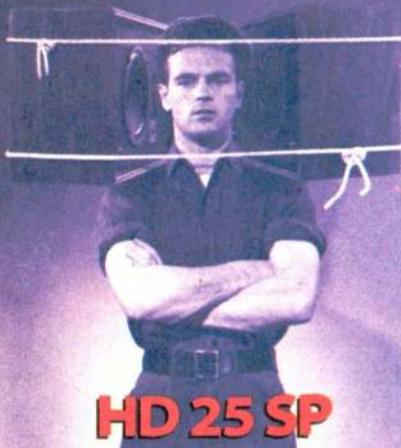
it for stations with a classical music format.

Overall the sound is very smooth and accurate, with no coloration. Deep bass is impressive. Since the speaker does not hype up the upper-mids or highs, you will EQ in enough of those frequencies to get clear, punchy mixes. The effect of the foam muff is sub-

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years. Its latest effort is the model Lc8.1. It is impressively large for a closefield monitor, and has an understated pro look.

"Classy" and "musical" are the words for this superb monitor speaker. It is so smooth and so easy on the ears, it may be the ideal speaker for daily monitoring of your station signal.

Suggested applications are control rooms, mobile recording, on-air or production broadcast, quality control, editing suites, and offices for auditioning by the executive producer.

Construction

The Lc8.1 employs an 8-inch polypropylene woofer and 1-inch soft-dome tweeter.

Two front-mounted ports extend the bass response.

The woofer baffle is stepped or beveled out past the tweeter to align their signals.

This is said to improve the transient response and to smooth the response in the crossover region.

A special accessory is the speaker muff. This is a foam rectangle that

The response with the grille is only slightly rougher. The foam muff help fills a dip at 250 Hz and flattens a peak at 900 Hz.

The direct-sound spike is very sharp, showing the woofer and tweeter are signal aligned.

Total Harmonic Distortion (THD) is exceptionally low so you can count on the Lc8.1 to produce low listening fatigue.

Ear test

With the Lc8.1 on stands at the height of my mixer, the speaker was bass-heavy and weak in the highs. So I raised it a few inches to get it away from the mixer plane. This reduced the bass and gave a better tonal balance.

In my control room, the Lc8.1 sounded best when mounted 6 inches from the rear wall, 4 feet apart and 4 feet away, vertical, toed in, without the grille, and with the speaker muff.

Here is how the Lc8.1 sounded to me on various instruments:

- Cymbals and percussion: Sweet, delicate, clear, no edginess.
- Drums: Smooth, weighty, crisp. Deep bass-drum rolls have a sense of weight.
- Acoustic guitar: Naturally clear, not edgy, gentle and detailed.
- Electric guitar: Rich. Has a little less bite than with many other speakers.
- Bass: Full and deep, tight. Different bass notes have equal loudness — no boomy notes.
- Vocals: Warm and human. Not overly sibilant.
- Strings: Lovely string tone. True timbres — not edgy, steely or brittle. A natural sound, very much like you hear in a concert hall. "Air" is not exaggerated.
- Author's master tapes: My mixes translate well to the Westlakes, but sound a little more warm and smooth than I remember.

Impressions

The Lc8.1 is the most musical-sounding monitor I have had the pleasure to review. Especially with classical music, there is such naturalness and realism.

The speaker would be a fine choice for monitoring at an orchestral recording session. I would also recommend



Westlake Audio's Lc8.1 Monitors

**The Lc8.1 is
the most musical-
sounding monitor I
have had the pleasure
to review.**

slides around the front baffle. It is said to absorb sounds that would otherwise re-radiate from the cabinet edges.

Claimed benefits are a smoother response, better apparent bass and sharper imaging.

According to Westlake, the Lc8.1 has a response from 55 Hz to 18 kHz, ± 3 dB. Impedance is an easy-to-drive 7 ohms (5 ohms minimum). Sensitivity is high at 90.5 dB/watt/meter and the claimed power handling is 85 W continuous.

The black, dense cabinet is sized at 18 x 10 x 11.6 inches. Weight is 31 pounds. On the back is a pair of binding posts that accept a dual banana plug or spade lugs.

Although the speaker comes with a fabric grille, you can remove it for critical listening.

The response is even better than the advertised specs: 44 Hz to 20 kHz, ± 2 dB. There is a small anomaly from 5 to 7 kHz, but it was not audible in the listening test.

tle. It makes the sound a little more like real music and less like boxy speakers.

The monitor is exceptionally good at revealing details such as miking distance, reverb density, and reverb placement.

Imaging is quite sharp.

Most of all, the Lc8.1 will delight

Product Capsule:

Westlake Lc8.1 Monitors

Thumbs Up	Thumbs Down
<ul style="list-style-type: none"> ✓ Very smooth and wide-range ✓ Deep, tight bass ✓ Fine detail and transient response ✓ Very low fatigue and distortion 	<ul style="list-style-type: none"> ✓ Expensive

For more information contact Westlake at (805) 499-3686, or circle Reader Service 68

you with its effortless sense of ease. There is no listening fatigue, no harshness. I suggest that you treat yourself — and your station personnel — to this fine monitor.

The price is \$1,299 per pair. Westlake's address is 2696 Lavery Court, Unit 18, Newbury Park, Calif., 91320. The company website is at <http://www.westlakeaudio.com>

■■■
Bruce Bartlett is a mic engineer, writer, recording engineer and author of "Practical Recording Techniques," published by Howard Sams. Jenny Bartlett is a technical writer. Bruce can be reached at (219) 294-8388.



Miami dazzles visitors with Cuban cuisine, tropical sun, and hot radio from Paxson Communications, with its six market-leading stations. These stations all operate from a consolidated facility, with AudioVAULT® from Broadcast Electronics linked internally on a local area network, as well as throughout Florida on Paxson's wide area network.

Paxson in Miami is working proof that the Broadcast Electronics' AudioVAULT is the most reliable, flexible, and expandable digital audio system for radio stations in this new era of studio consolidation.

By combining AudioVAULT's powerful networking with its suite of flexible creative tools, and newsroom management software, Paxson's productivity and efficiency have "increased dramatically," according to Ramon Mejia, MIS Director for Paxson, Miami. Simply put, AudioVAULT from Broadcast Electronics gives Paxson Communications a competitive advantage in Miami.

Miami is the gateway to Latin America - from AM transmitters bound for Bogota, FM transmitters for Sao Paulo, consoles shipping to Santiago, Marti's to Mexico City, and AudioVAULT to Caracas - Miami is indeed, a Broadcast Electronics City.

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AMERICA'S HIGHEST BILLING RADIO STATIONS

Rank	Station	City	Billing (\$)
X 1.	WGN	Chicago	\$ 35,800,000
X 2.	WFAN	New York	35,100,000
3.	WINS	New York	29,300,000
X 4.	WXRK-F	New York	29,000,000
X	KIIS-AF	Los Angeles	29,000,000
X 6.	KRTH-F	Los Angeles	28,500,000
X 7.	KGO	San Francisco	27,800,000
X 8.	WCBS-F	New York	27,300,000
X 9.	KROQ-F	Los Angeles	26,700,000
X 10.	KABC	Los Angeles	26,600,000

NOTE: Revenue totals are gross with no trade. Network compensation is included if known. Estimates are based upon input from managers in each market. Surveys sent to group CEO's and my own judgements and formulas.

5 DUNCAN'S RADIO MARKET GUIDE
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Others like to brag about their client list. We let Duncan's do it for us.

Nine out of the ten highest billing radio stations listed in Duncan's rely on PR&E. *Why?* Maybe it's our durability. Virtually all of our original BMX consoles are still in service today. Or maybe it's our reliability. After all, downtime and make-goods cost money. Then again, it could be our decades of industry experience. Whatever the reason, our clients are happy. Better yet, they're successful. Just look at the list.

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Air Consoles PR&E on-air consoles are the first choice of many of the nation's top broadcast personalities.



Production Consoles Similar layouts between production and on-air boards let operators work seamlessly on both.



Digital Workstations Familiar analog features enable a smooth transition from cut-and-splice to digital editing.



Cabinetry We offer a range of studio furniture, including custom, modular and ready-to-assemble designs.



Integrated Systems Our turnkey solutions cover your entire project—from design through installation.



PACIFIC RESEARCH & ENGINEERING

Circle (23) On Reader Service Card

World Radio History

SHORT TAKE

Henry Message Machine

Pity the poor production person who, in addition to spots and promos, must cut audio for the station's listener information telephone service each day.

Sometimes the core of the "service" consists of an old, semi-retired Tape-caster cart machine tied together with a ring sensor. Maybe two or three consumer-style answering machines are in use as the call-in system. Either way, these tape-based systems can be cumbersome and prone to failure.

Henry Engineering, the company that makes those nifty do-everything blue boxes, has a new product to relieve some of the load called Audio Online.

The cure

This product solves two conundrums: first, how to simplify recording the station's listener information service, and second, what to do with that unwanted 386 non-Windows computer in the storage closet.

Audio Online consists of software and a special modem that drops into a DOS-based PC (DOS 5.0 or higher). The system is easy to learn and

each message. Password safety keeps unauthorized messages out of the system and a screen-saver prevents burn-in of the monitor.

If higher-quality audio is desired, an optional Line Simulator records directly into the modem. A demo system is in use at KPWR(FM), Los Angeles, and Henry Engineering suggests hearing it in action at (213) 520-1000.

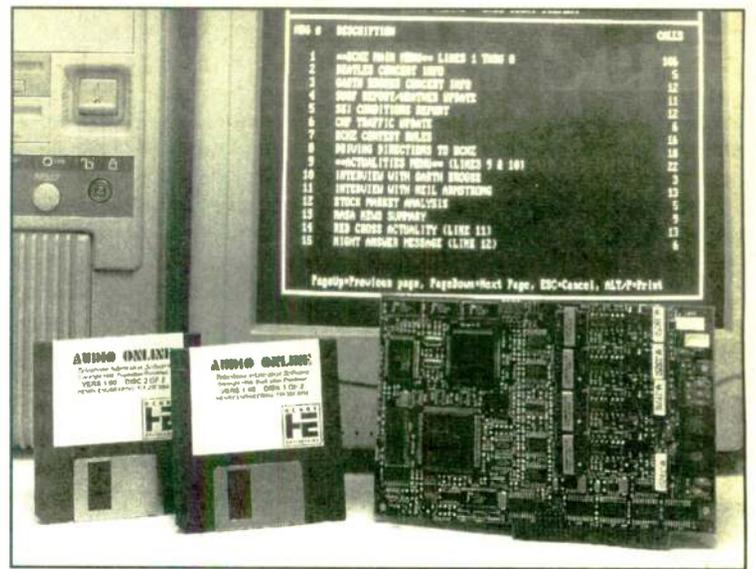
Minimum system requirements are a dedicated 386 PC to handle up to four incoming lines

or a 486+ to handle five to 16 lines.

Audio OnLine will work with a hard drive as small as 40 MB, but the older MFM-style drives are generally too slow and unreliable.

If you are a production person and you have had it with recording concert information onto carts now on their third repack, take a look at Audio OnLine.

Contact Henry Engineering at (818) 355-3656 or circle Reader Service 48.



Henry Engineering Audio Online

Move Up from Carts to Touchscreen Digital Audio

Play Any Audio at a Touch

Nothing else makes radio as fast or easy as having all your spots, sounders and sweepers start with your fingertip—**always on-line and ready** to play from hard disk. And **nothing else** makes your station sound as good or as exciting as touchscreen digital and creative talent with the **new Scott Studio System!**

Here's how it works: Six buttons on the left of the 17" computer touchscreen play what's on your program log. Scheduled spots, promos, PSAs and live copy come in automatically from your Scott System Production Bank and your traffic and copy computers. You see legible labels for everything, showing full names, intro times, lengths, endings, announcer initials, outcues, posts, years, tempos and trivia. Your jocks can rearrange anything easily by touching arrows (at mid-screen), or opening windows with the entire day's log and lists of all your recordings.

On the right, 18 "hot keys" start **unscheduled** jingles, sounders, effects, comedy or promos **on the spur of the moment**. You get 26 sets of 18 user-defined instant "hot keys" for your jocks' different needs.

Large digital timers automatically count down into times, and flash at 60-, 45-, and 30-seconds before endings. You also get countdowns the last 15 seconds of each event.



The Scott Studio System is your **best** way to make the move to digital audio and eliminate troublesome carts. Each button on the touchscreen plays whatever you want instantly. All scheduled spots, jingles, promos and scripts come in from your traffic and copy computers.

Audio OnLine can make hundreds of messages available.

operate. Messages are recorded onto the hard drive using 8-bit Mμ-Law encoding, allowing close to 20 minutes of recording time for each 10 MB of disc space. Even chronically small 125 MB drives can hold nearly four hours of audio for telephone playback.

Audio OnLine is not a voicemail system and does not record messages from callers. But it does allow callers to hear information about concerts, weather, directions to your station, contest rules and anything else considered important.

Place the call

Audio OnLine can make hundreds of messages available to callers. A simple DTMF-driven menu ("For the weather, press 5") lets callers select the message they want to hear.

Recording a message into Audio OnLine is done by "calling in" to the system, much like a conventional answering machine. The Edit function allows updates, deletions and changes. A Call Counter registers calls for



The World's Fastest Playback!

Touch either of the two buttons at the top right of the main screen to see our "Wall of Carts" with all your audio **on-line!** Touch the sound, spot, jingle, promo, PSA or comedy you want and it plays **instantly**. Or, you can put it anywhere you want in the day's schedule. Audio is displayed any five ways you like.

The Scott System also gives you a "Make Good" button so it's quick and easy to reschedule missed spots or promos.

Instant Requests from Hard Drive

Our most popular option is a 9 gigabyte disk with digital music. The audio quality of the Scott System hard drive meets or beats the best CDs. We'll pre-dub **1,000 songs** from CDs off **your playlist free!**

Nothing is faster than requests from the Scott System! You get five "Wall of Carts" with music that plays at a touch! Songs are displayed by title, artist, year, length, category, or any ways you like.



Live Copy On Screen

Live tags, weather, promo copy, music trivia, contest copy and winners' lists automatically pop up on your Scott System's screen.

The Best Digital Audio

When spots, promos, PSAs, or any other digital audio events are recorded, they're immediately playable in **all** your Scott System air studios. Nobody wastes time carrying carts down the hall or redubbing spots for additional stations.

One question you **don't** have to worry about with the Scott System is "What if it breaks?" The Scott Cart Replacement System comes complete with **every** spot and jingle stored **redundantly** on **two** hard disks with a **split-second** switch to the "hot standby" computer and its own backup audio outputs! You get touchscreen convenience, digital quality, and backup redundancy for no more money than cart machines and commercial carts.



Sound Better With Digital Editing

Scott Systems' graphic waveform editors work wonders with phone calls in the air studio and creative spots and promos in production.

Your Best Investment

The Scott System **leads the industry** with the biggest broadcast groups like Shamrock, Alliance, Salem, Saga, Liggett, Regent, Tichenor, Heftel, Waterman, Max, Atlantic, and Rawlin in Canada. Our major markets include Detroit, D.C., Dallas, Miami-Ft. Lauderdale, San Diego, Denver, Oklahoma City, San Antonio, and others large and small from Bangor to Bakersfield.

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 - **Dual audio outputs for On Air and Cueing (DL2 has one)**
 - **Do On Air & Production from a single workstation !!!**

Digilink III is a *NEW* multipurpose digital audio workstation for Live On Air, Production, and Automation. Fully compatible with the #1 selling and industry standard Digilink II, the Digilink III has four times the raw processing power of the Digilink II and features a second audio output for cueing an audio piece while playing on air.

The triple play and dual output capability of the Digilink III makes it ideal for very sophisticated Live On Air operation -and- makes it capable of operating an On Air & Production studio from a single workstation. For fast and complex live on air applications, the DL3 can play 3 files at once so that you can lay down a bed, play a phoner, and drop in a sound effect at the same time. Or, you can be playing on air with crossfade while independently recording, playing, and editing a phoner.

A unique capability of Digilink III is its ability to operate two studios from a single workstation. The most common application would be to use one workstation for both on air and production studios. The DL3 is placed in the production studio while a PCAT computer running Arrakis remote control software is placed in the on air studio. The production studio has complete single play-record-edit capability while the on air studio can independently use dual play for on air. While not a redundant system, it does provides a dual studio workstation solution for under \$11,000.

To make the DL3 even more easy to use for air, a 99 button Gemini control panel can be added to the system for only \$1,195. It places hundreds of carts at the jocks fingertips and the files assigned to each button change to support up to 40 different jocks. The Smart*Record feature of the controller even allows you to record a phoner at the push of a button. The DL3 will automatically trim the front and end of the phoner, and then you just push the button again to play it to air. The Gemini control panel makes the Digilink III workstation fast and easy to learn and use.



The 99 button Gem-6CC control panel places hundreds of carts at your fingertips for only \$1,195



The 22,000 series console integrates the 99 button Gemini control panel into an easy to use console

The powerful Digilink III is fully compatible with Arrakis Digilink II and Trak*Star workstations so that it may be easily added to an existing network.

Call now to find out how this amazing new workstation can be made to work for you.

for more information call... (303) 224-2248

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Sale !!!

DL3-600

\$7,995

(a \$9,995 value)



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Audio Consoles

The standout #1 leader in reliable, high performance, digital ready consoles for radio, Arrakis has several console lines to meet your every application. The 1200 series is ideal for compact installations. The modular 12,000 series is available in 8, 18, & 28 channel mainframes. The 22000 Gemini series features optional video monitors and switchers for digital workstation control.

1200 Series Consoles



1200-5	Five ch	\$1,795
1200-10	Ten ch	\$3,495
1200-15	Fifteen ch	\$4,995

12000 Series Consoles from \$3,995



22000 Series Consoles from \$6,995



Digital Workstations

#1 in digital workstation sales, Arrakis has over 1,600 workstations in use around the world.

As a multipurpose digital audio record-play workstation for radio, it replaces cart machines, reel machines, cassette recorders, & often even consoles. Digilink has proven to be ideal for live on air, production, news, and automation applications. Place a workstation in each studio and then interconnect them with a digital network for transferring audio, text, & schedules between studios. Arrakis is the #1 choice of broadcasters.

Satellite Automation



CD Automation



Use for
Live On Air,
Automation,
Production,
News &
Scheduling



Digilink & Trak*Star Workstations

Studio Furniture

With over 1,000 studios in the field, Arrakis is #1 in studio furniture sales for radio.

Using only the finest materials, balanced laminated panels, and solid oak trim, Arrakis furniture systems are rugged and attractive for years of hard use.

Available in two basic product families with literally thousands of variations, an Arrakis studio furniture package can easily be configured to meet your specific requirement, whether it is simply off the shelf or fully custom.

Call Arrakis to find out how easy it is to design and build your next studio.

Desk*Star studio furniture systems



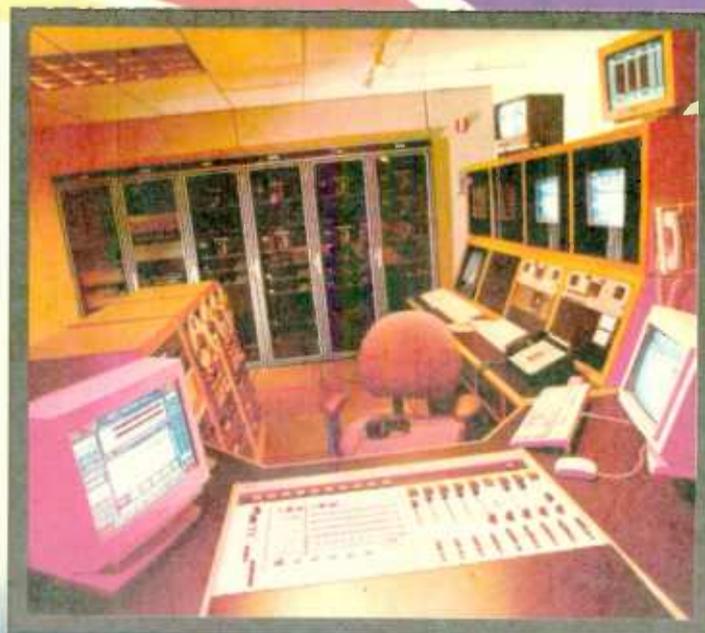
Modlux studio furniture systems

Complete systems...

As illustrated in the Sony Worldwide Networks master control studio on the right (one of seven Arrakis studios in the Manhattan, New York complex), Arrakis can provide complete major market studios with Arrakis consoles, digital workstations, video-audio switchers, furniture, and system prewiring.

With a choice of several console lines; digital workstations for live air, production, news, and automation; and two major studio furniture product lines, Arrakis can meet broadcasters needs from the compact news studio to the major market network origination center. Complete Arrakis equipped studios can be found around the world from Tokyo, to Moscow, to Japan, to Tahiti. Call Arrakis today for your equipment or studio needs,

Sony Worldwide Networks
Manhattan, New York



High Honors for Marsalis Series

Rich Rarey

Sure, it's a new year with resolutions, wish lists and little baubles to buy that Santa never left in the fireplace stocking. Before moving headlong into the year, though, we want to look back briefly at 1996.

One of the big news events in our neighborhood was the award of a George Foster Peabody Award for an NPR radio series about American jazz called "Making the Music." The Peabody was shared with Sony Classical Films and Video for the PBS series "Marsalis on Music."

Wynton Marsalis, the program's host and creator, designed the series to give listeners insight into the indigenous American art form "jazz."

Traveling with the band

In 26 one-hour installments, Marsalis took listeners all over the jazz landscape ... up onto a bandstand, into a jam session and into the middle of story-telling

sessions and discussions between those notable and novice alike.

NPR engineer John Carrillo was tapped in 1995 to be project engineer for "Making The Music." He would oversee the recording, mixdown and editing and would maintain technical standards throughout the project.

He says that Wynton Marsalis made the task easier, because Wynton knew exactly the sound he wanted the series to have.

"We were doing 26 programs," said Carrillo. "That included studio performances, live performances, interviews and demonstrations. I was trying to keep a consistency of the quality of music throughout the series."



PUBLIC DOMAIN

Marsalis is particular about his sound, and knows what he likes. He likes a "Big Sound," a sense of place of the environment, and likes to hear the room.

When asked how to define the "Big Sound," Carrillo responded with a knowing smile.

"It's where the instruments sound bigger than life. Kind of like putting your head in the middle of the ensemble. It reflects the way the sessions were set up; even though we used a 24-track digital recorder, the session was still 'played' as ensemble."

Although the music was not built in the traditional multitrack way, layer by layer, Carrillo said certain mic techniques helped combat excessive acoustic leakage and get the Big Sound.

"We tightly miked the players, using cardioid patterns and exploiting the mic's proximity effect to get that big fat sound. Close-miking won't give you the sound of the room, so we typically used ambient mics. The number of ambient pickup mics varied according to the session, from two B&K omnis to sometimes four: two on a far perspective on the piano, as well as the two for the room."

Wynton Marsalis, striving to capture the ensemble's energy, likes to have everybody playing.

"He didn't like overdubs and isolation booths either," said Carrillo. "Everything is happening at once and we had to get it right the first time. It was like playing a very long club date. Since we had no control over building the layers of a session, we used strategic placement of the players, instruments and microphones to make a natural acoustic balance."

The gobo is a no-go

For instance, all sessions had a piano in them. They were not allowed to isolate it with a gobo so the piano was positioned with the open lid facing the rest of the ensemble which helped isolate the piano somewhat.

This was easier for the world class musicians to do their best work.

"One of the things we did to make the sound consistent was use the same mics on the same instruments and use the same mic placement. We tried to do most of the recording sessions in NPR's Studio 4A, but we still had to do field recording and recording in other studios. We worked at Clinton Recorders in New York City and at Sony, among others, plus we had two live dates in Alabama and New York City."

Mic placement included a Neumann

KM84 on snare drum and hi-hat. A Neumann U87 was overhead above the drummer, and an Electro-Voice RE20 was on the kick drum.

An MKH40 pair was used for the piano in an ORTF pattern (17 cm apart with a 110-degree angle between axes) at the crook of the piano. A slightly smaller angle on the ORTF placement tightened the stereo image.

The results of one mic technique I heard in playback floored me. The sound of the acoustic bass was velvety, striking, well-defined and deep. Carrillo used two MKH40 mics — one on the neck, one on the body.

"It gave us the desired sound and brought out the natural sound of the instrument," said Carrillo. "The result had good phase and required very, very



Engineer John Carrillo (r) takes the prize For NPR.

little EQ if any at all and just a light touch of compression."

All mixdown sessions were conducted in NPR Studio 4A control room at the SSL G+ series console. Carrillo made the first mixes, producer Margaret Howse listened and added her critique, and mixdown DATs were shipped for Wynton Marsalis' approval to wherever in the world he was performing.

Man with the horn

Carrillo said he approached each mixdown with the thread that Wynton's horn was the focus.

"For me, I really like to listen to the individual instruments to see what I've got on tape. If you've got all faders open at one time, you may be missing something good.

By asking myself questions like 'Is the drummer doing something interesting on the high hat?', or 'Is there something in the toms that need to be brought out?' I was able to make a better mix than otherwise. After that close inspection, you can start to put the parts together, and really listen to it as a whole, and then consider sweetening the mix with the ambient mics."

Of the project, Carrillo says one of the things he's most proud of is changing how NPR is viewed.

"People looked at NPR as being a news network only. This project proved that NPR is more than that, that we've got the talented people and the facilities. These Peabody awards are given out for excellence, with respectably stiff competition. It says a lot about what NPR is, and what it can do."

Until next month, I remain, Your obd'n't eng'r.

Rich Rarey is Technical Director for NPR's Talk of the Nation, and can be reached at rrarey@npr.org

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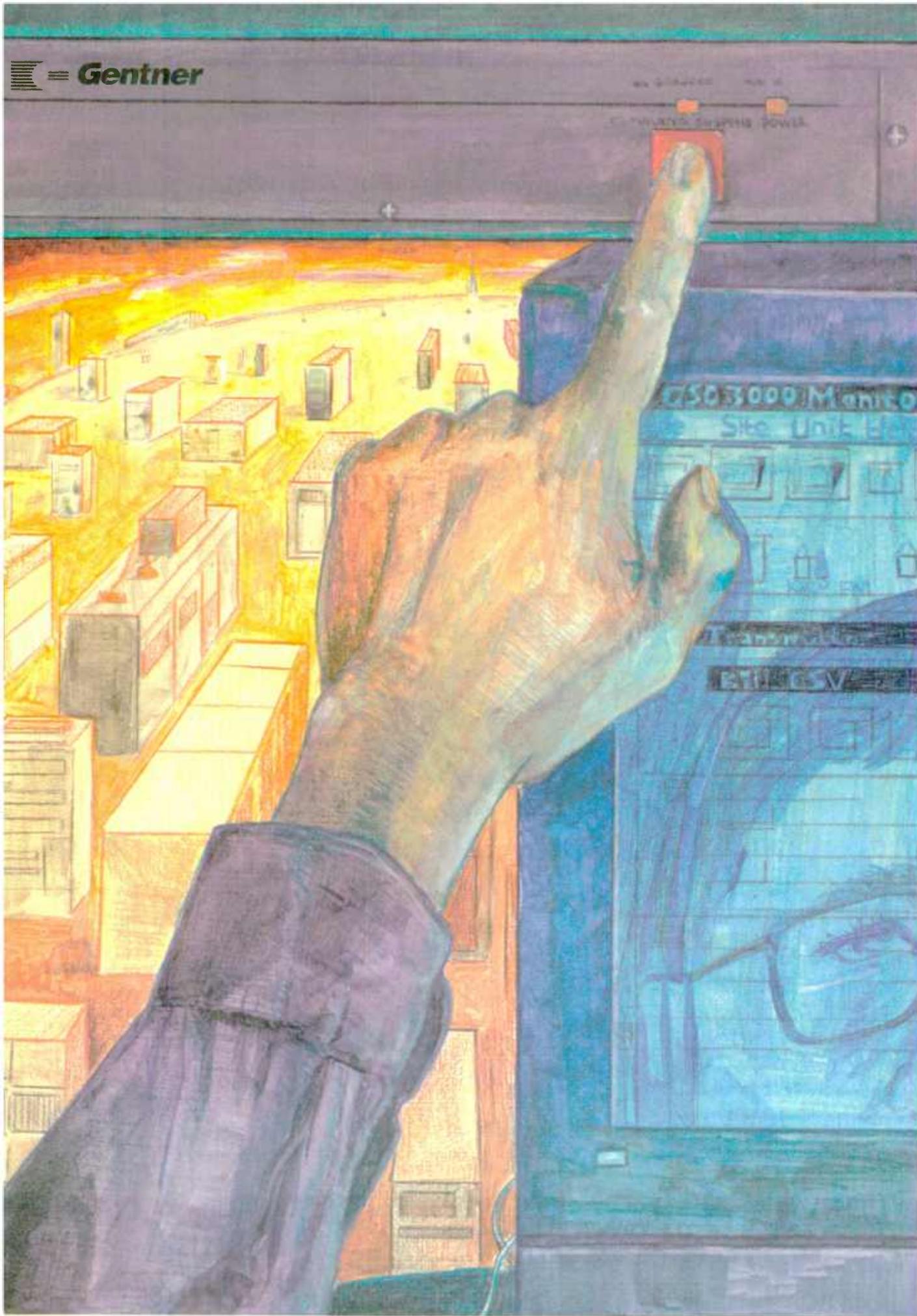
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For more information on the GSC3000, contact Harris.

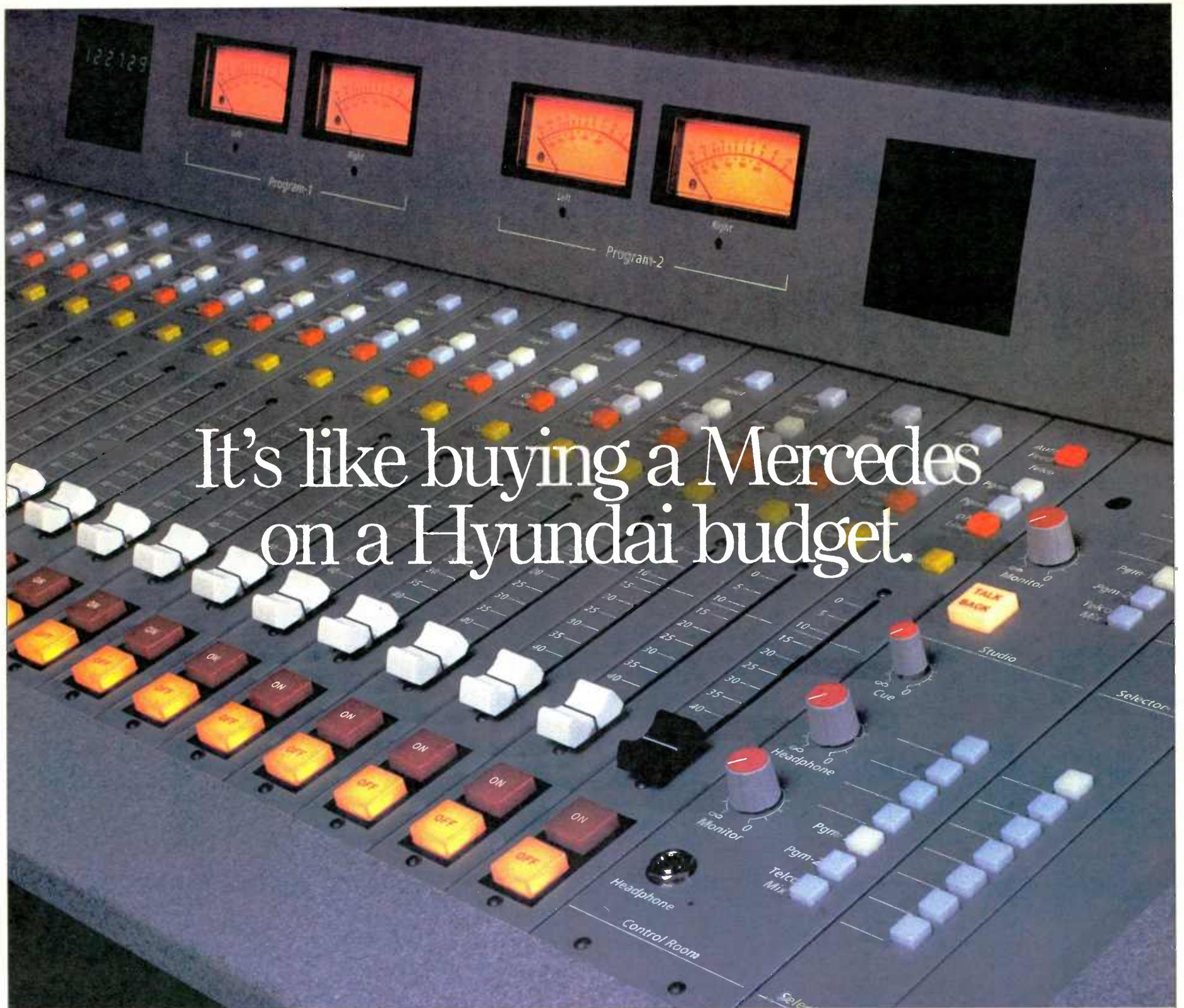
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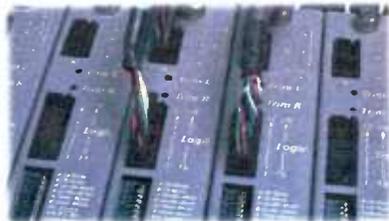
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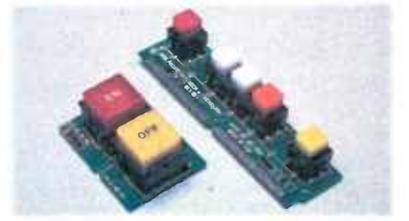
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World Radio History

Slick, Slim Mixer From Intelix

Alan R. Peterson

When you need a small rack-mountable mixer to take with you in the remote van — one that can be bolted in place and not slide around — you should look at the Intelix 8002MCB mic/line mixer.

This is an eight-channel, dual bus microphone mixer designed for broadcast, field production, sound reinforcement and recording use.

The good stuff

It features balanced inputs and outputs in a 1U chassis, phantom power and limiter at an extremely cost-effective price. An LED bar graph, front-panel headphone output and dual busses combine to make the 8002MCB a good value.

Controls are kept remarkably simple. There are no serious EQ considerations here, just a high-pass rumble filter and a level control. Sometimes simple is good. The dual bus structure is similar to having two mixers in one chassis, as each channel's audio signal is added or subtracted to each bus via front-panel selection switches.

The Intelix 8002MCB has been installed in numerous television, remote recording, post production and studio applications as well as public address systems for churches, auditoriums and education facilities. It would be a natural performer in a radio studio or remote vehicle.

Frequency response of the Intelix is ± 0.5 dB from 20 Hz to 20 kHz; +0, -3 dB from 10 Hz to 30 kHz. It's more than enough for FM radio and wide enough to

record with.

A 15 VDC phantom power circuit provides power for condenser mics. The compressor/limiter tames levels of jocks shouting into mics at a remote site, avoiding heavily-clipped signals being sent back to the studio.

The adjustment range of the 8002MCB's limiter is +20 dB to -40 dB, with the ratio adjustable from 0 to 100 percent.

Power requirements are 18 VAC from a center-tapped supply or (18-24 VDC worth of battery power. The 8002MCB weighs 9.5 pounds.



The 8002MCB is a handy portable mixer for field recording and over-the-shoulder remote broadcast applications. The

8002MCB package combines the dependability of an

8002MCB with the portability of a lightweight, solid-framed cloth rack bag and Ni-cad batteries, allowing engineers high-quality audio performance and complete freedom of operation in a small, mobile package.

This application was first used by remote camera operators during the Olympic games in Atlanta. Complete roundtable recordings could be made

outside the studio with the Intelix 8002MCB, a handful of mics and a portable DAT or MD recorder.

This flexibility should not diminish the 8002MCB's potential role as a permanent submixer in the studio.

Eight extra mic or line inputs are always welcome for live in-house music performances or when a few extra guest mic positions are needed for a talk show. The Intelix is a lot less expensive than gutting the room and putting in a larger console.

In a world where one mixer manufacturer after another is turning out similar-looking designs, the Intelix 8002MCB mic/line mixer is an interesting departure in design and a solid device to boot.

For information, contact Steve Cohan at Intelix at (608) 831-0880 or circle Reader Service 163.

Product Guide

► continued from page 32

and an expander gate feature for noise and hiss suppression. Suggested price of the GC2020C is \$469.

For information, contact Yamaha Corporation of America at (714) 522-9011 or circle Reader Service 182.

AdB Soundcard Upgrades

AdB International, makers of the Multi!Wav series of Windows audio cards, announced two new capabilities to its products.

Upgrades to full 24-bit digital I/O are now available for the Multi!Wav Pro18. Combined with current 24-bit mastering programs — such as Steinberg's WaveLab, Hohner Midia's Samplitude and Red Rooster — CD mastering under Windows has become easier.

Also unveiled for the Pro18 was the Quad Output Driver, allowing four simultaneous independent outputs from one soundcard. A pre-configured card, the Multi!Wav Pro18/4, will soon be available at an estimated list price of \$595.

For information, contact AdB International at (770) 623-1410 or circle Reader Service 162.

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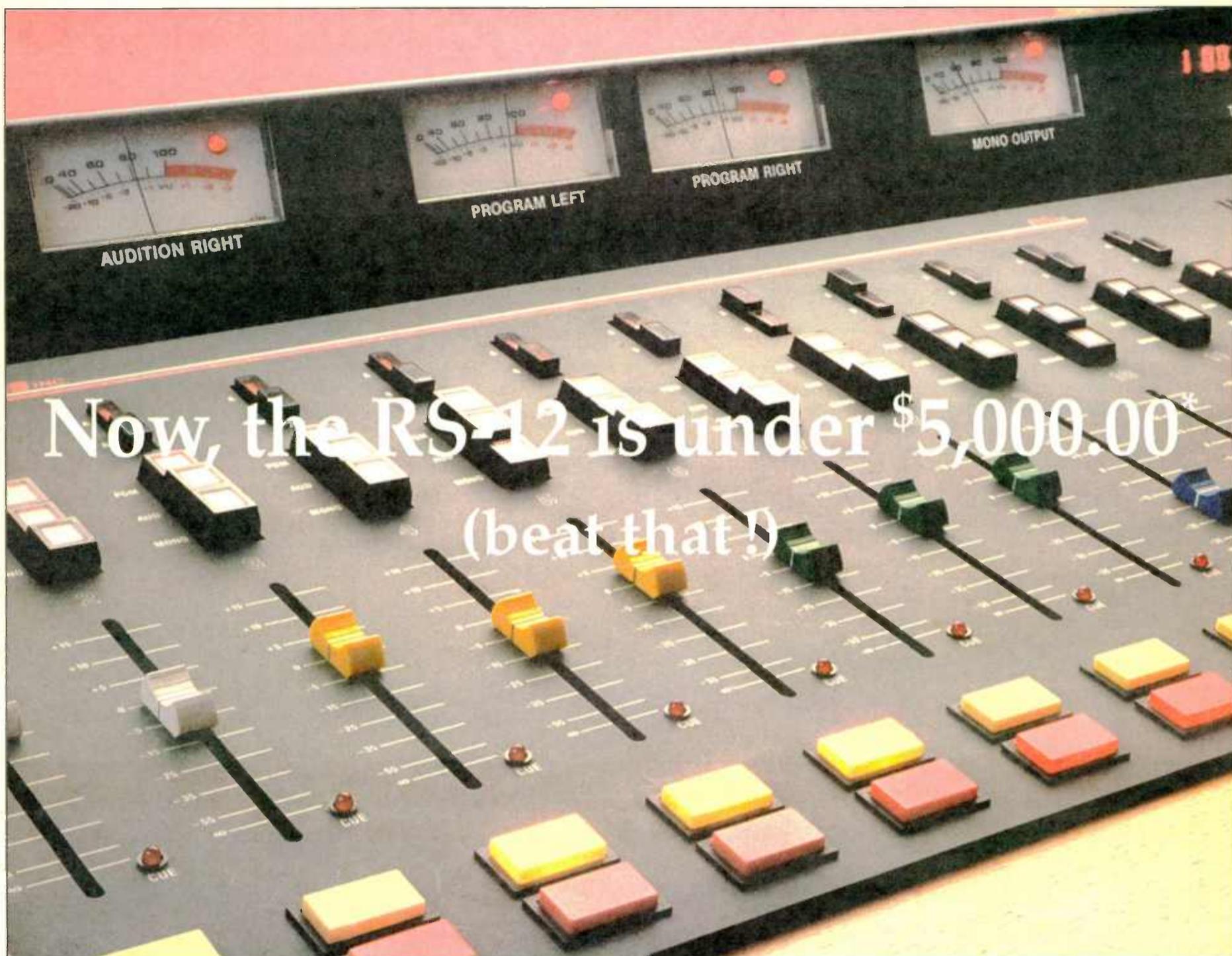
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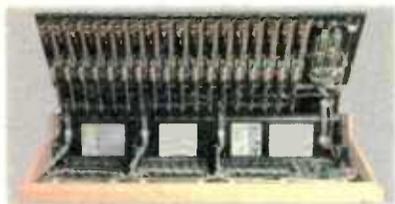
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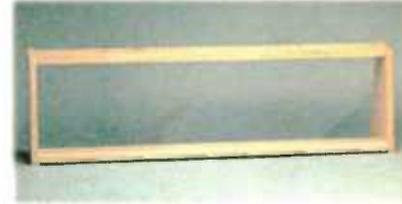
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February 5, 1997

Lessons From the History of FM

Ed Montgomery

This is the fourth installment in a multipart series intended "to make the new generation of FM broadcast station managers aware of the equipment for which they are responsible and to help them periodically review how the equipment is operating." The previous installment appeared Dec. 25, 1996.

The frequency modulation system for radio broadcasting was perfected by Howard Edwin Armstrong. He had a keen understanding of electronics and took the technology at hand to levels that others could not conceive. It was Armstrong who discovered the principle of regeneration. The triode vacuum tube had been invented and was being used to amplify voice. Armstrong discovered feedback and turned the amplifier into an oscillator. This greatly improved the ability to transmit radio signals. He used the regeneration principle to make a radio receiver that amplified the incoming

signal thousands of times, making it easier to detect.

Later, while serving in the army in World War I, he developed the superheterodyne receiver. This amplified incoming radio signals even more than the regenerative receiver. Armstrong later agreed to give RCA the rights to this invention. He became wealthy, receiving compensation for every superheterodyne receiver made. The superheterodyne concept is still used today in just about every radio and television receiver.

David Sarnoff was managing RCA and encouraged Armstrong in his research. One problem that plagued broadcasters was noise. Amplitude modulation (AM) suffered from interfering noise from electrical storms, electric motors and other devices that emitted radio energy. Armstrong

wanted to try to solve the problem, and Sarnoff told him to do what he could. The theory of frequency modulation had been around for some time. AT&T had experimented with it and deemed it a failure. Most of these experiments were in what is now known as narrow-band FM. Armstrong developed "wide-band FM."

For all its shortcomings, AM is capable of transmitting a significant amount of audio fidelity within a very narrow bandwidth. AM radio stations in the United States are separated by only 10 kHz across the dial. (In the same city, a minimum of 40 kHz separation is required, although stations can seem closer together where more than one city of license serve a common larger market.) If FM were transmitted within this spectrum, it would produce an inferior audio signal when compared with normal, wide-band FM broadcasting. This is narrow-band



FM and it is similar to what you hear when listening to police radio, or business two-way radio. (Narrow-band FM can, however, produce decent audio quality, as employed today in remote broadcast, or RPU, systems.)

Armstrong tried using more bandwidth and came up with high-fidelity, noise-free FM. He had one problem: It was totally incompatible with AM. This led David Sarnoff and RCA to withdraw their support for this new medium. A nasty battleground developed between Armstrong and Sarnoff, lasting for decades. Armstrong focused on the invention of wide-band FM and reportedly saw himself as a failure because it was not accepted as a superior method of broadcasting. The legal battle that ensued resulted in Armstrong taking his life. Ultimately his wife continued the battle and won all suits against RCA.

Moving a band

The FCC authorized FM broadcasting in 1939. In the late '40s, it moved the old 45 MHz FM band to the part of the spectrum occupied by FM today, 88-108 MHz. The service held a new attraction after World War II but interest dropped off quickly with the introduction of television. By the end of the 1950s, many broadcasters were not renewing the licenses on their FM facilities and some talked about abandoning the service.

A second wind for FM came in 1961 when the FCC permitted stereo broadcasting. Receiver designs also were improving, allowing reception free from dropouts and multipath interference. The introduction of circularly polarized transmitting

PERSONNEL LEVEL

Manage Your Boss

Sue Jones

Most people do not think in terms of managing their boss. However, it could be one of your best career skills. The correct definition of a department head is someone who is responsible for the performance of all the people who can affect his own performance and evaluation. Individuals who do not have subordinates are responsible for performing their own assigned tasks. The first person who affects your performance is the boss, so the boss is the first person you must understand and respond to. From that perspective, learning to manage your boss should be one of your highest priorities.

Managing your boss is understanding your boss's pressures and needs so that you can both respond in the most effective way. You may not personally like your boss; that is OK. However, your performance often is evaluated on how well you respond to the boss's directives and helping her achieve the station's goals.

Do your homework

So how does one manage the boss?

1. Make the boss as effective as possible. Ask your boss: "What do I do and what do my people do that helps you do your job? And what could we do better to help you do your job?"

2. Keep in mind that your boss is a human being. Part of your job is to enable your boss to perform as a unique individual. Every boss has

idiosyncrasies and preferred ways in which he likes to work with the staff. If he does not tell you, ask other people and make your own observations about the following:

- How often does the boss want

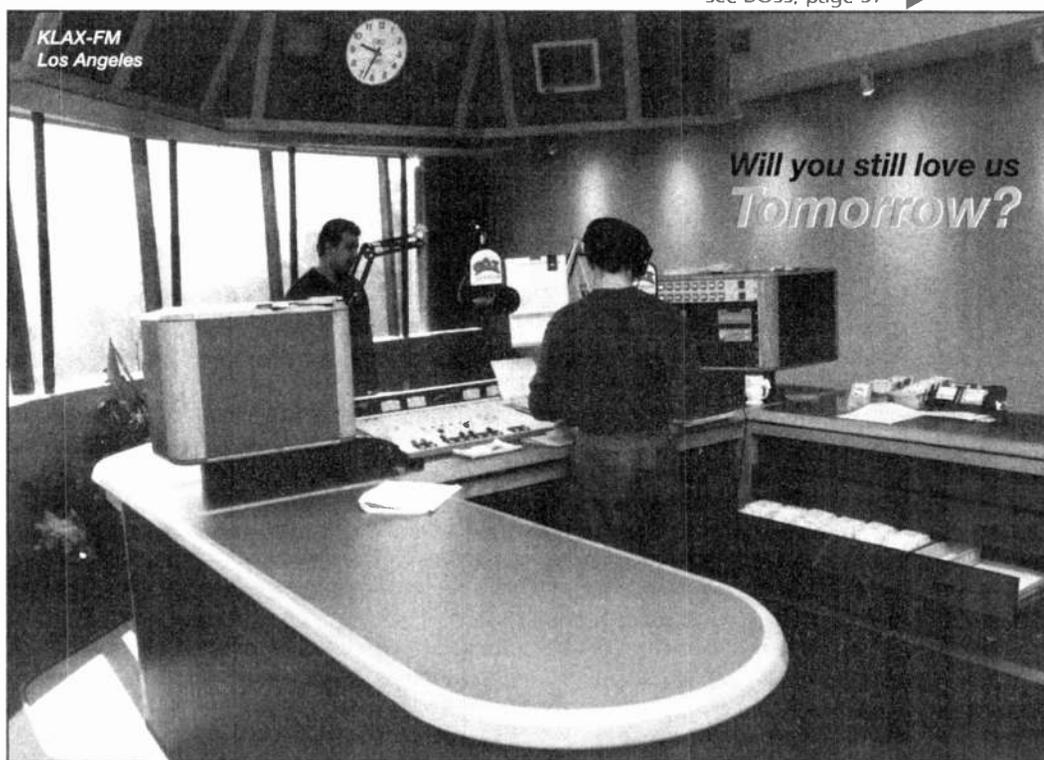
reports? Does he want them once a month, once a week or any time something changes?

• How does she like to get the information? Is she a reader or a listener? Make sure you respond the way your boss likes to receive information, not the way you do.

• Does the boss require figures to support everything, and should you report

See BOSS, page 37 ▶

See FM, page 37 ▶



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World Radio History

Mic Processing: Radio's Holy Grail

Walt Lowery

In our Buyer's Guide section, you'll find articles by users of many kinds of mics. As part of our coverage, RW asked Walt Lowery, broadcast sales manager of Symetrix, to write about the uses of mic processors for Running Radio.

Often the difference between a good and great-sounding station comes down to the type of processing applied to its microphones.

The most immediate improvement to vocal tones comes from strategically applied equalization. A few minutes of careful listening with an equalizer

between the microphone preamp and the console input reveals that improvement comes easily. Most tests prove that a 3 dB to 6 dB boost at around 150 Hz adds a pleasing fullness to male and female voices. A 4 dB boost between 4 kHz and 8 kHz adds clarity. All voices are different. Find the "sweet spot" for each by tuning a small boost across this range.

Add seasoning

Do not overdo your newly found power. Treat equalization like salt and pepper: use it sparingly, only to add flavor. How do I tune by ear? Find the right frequency for correction by applying a 15 dB boost across each frequency in the

suspected problem area of the audio spectrum. When the undesirable quality becomes most objectionable, a transition from large boost to a modest cut minimizes the artifact.

If using a graphic equalizer, raise each knob individually until the problem exhibits itself a real monster. The job becomes easier with a parametric equalizer. Dial in the 15 dB boost and tune across the spectrum with the frequency control until the trouble spot becomes truly annoying.

What type of equalizer works best? A third-octave graphic offers the shortest learning curve: it provides a visual representation of the cuts and boosts applied

to the spectrum. Precise vocal correction demands a parametric equalizer, which allows engineers to hone in on frequencies for precise problem solving. Choose an equalizer with a minimum of three true parametric bands.

The next largest bang-for-the-buck comes with the addition of dynamic range compression. Most of us can produce a dynamic range of over 100 dB as we transition from a whisper to a shout. Maintaining a decent modulation average on the transmitter requires an audio compressor somewhere between the mic and the transmitter.

Compression also smoothes the transition between dry voice and produced program material as an announcer talks over CD intros and back-announce music. Without compression the produced music buries the dry voice.

The ratio of the compressor is the first control to attack. Easy listening formats typically use low ratios (3:1). Rock 'n' roll animals want 10:1 ratios. Good compressors allow a choice. One popular model provides a fixed compression ratio of 20:1. This redefines the compressor section as a peak limiter and quickly over-processes any voice exhibiting a wide dynamic range, producing harshness and distortion. It dictates the use of a high threshold setting, which limits processing to only the loudest components of the voice. The compressor threshold control tells the circuitry when to start working. Any input audio above the user-set threshold (typically -25 dB) incurs level correction.

Searching for perfection

If set too high, the threshold control prevents the compressor from working on any but the loudest audio. If set too low, every sound from the mic gets squashed. Find the right setting for each voice by adjusting the threshold control to provide around 9 dB of compression on your best "radio" voice. This is a good starting point for optimization.

Suppose we could make the compressor smarter? If a compressor is more sensitive at certain frequencies, it would attack only when audio at those frequencies rises above the threshold. The configuration lets audio outside the selected frequency band pass unscathed by the action of the compressor. This "smart" compression scheme describes the action of a de-esser, which applies compression only when sibilance, pesky hissing noises, rises to an objectionable level. The antithesis is a downward expander. An audio compressor limits the dynamic range of a voice; an expander amplifies dynamic range, making changes in level greater. The expander, too, has a threshold control. When set at -30 dB, the expander begins operation only when the input signal falls below -30 dB. Use the downward expander like a noise reduction system to quiet undesirable low-level audio.

Frustrated callers ask for advice on setting up an audio processing chain to achieve perfection from both music program material and live mics with a hodgepodge of processing "boxes" in front of the transmitter. There is no single magic bullet: adjust your processing chain for the program material. Then use separate voice processing to bring the station voices to equilibrium. Trying to compete in an active radio market without processing exclusively for your microphones? Go shopping for a good voice processor.

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Why FM Is What It Is

► FM, continued from page 35

antennas also improved reception in moving vehicles. A new interest in FM developed, and has grown over the decades so that FM is now the primary listening medium in most markets.

The noise that degrades amplitude modulation reception does not interfere with FM signals. The audio signal is encoded into frequency deviations that are immune to most noise sources.

The operating frequency of an FM broadcasting station can be termed its carrier. A station operating at 93.1 MHz ("Megahertz") is radiating an alternating current frequency of 93,100,000 times a second. When audio is applied to this carrier, power is distributed into "significant pairs of sidebands" on each side of the carrier. This can be explained through a rather complicated mathematical principle known as the Bessel Function. The lower the frequency, the greater the number of sideband pairs exist. This created a problem for Armstrong. Higher frequencies could not generate a signal sufficiently above the noise level to achieve full-fidelity reception. Armstrong overcame this with a noise reduction system he called "pre-emphasis" in the transmitter

and "de-emphasis" in receivers. Frequencies between 1 kHz and 15 kHz are increased successively in amplitude during transmission. "De-emphasis" in the receiver deamplifies the signal in a manner exactly opposite that of the transmitter, resulting in a flat response.

Frequency modulation allows us to multiplex signals or transmit more than one channel of information at any given time. This was first used in the 1950s to generate "store-casting" or background music for retail outlets. This was and is a source of additional income for FM. Today, a station can transmit much more than voice and music on its overall FM broadcast channel. These subcarriers are known as the Subsidiary Communication Authorization. SCA channels take up a small part of the whole channel, and are transmitted at super-sonic frequencies between 53-100 kHz that are detected by special receivers.

FM stereo requires two channels that can produce equal amounts of loudness and frequency response: a *sum* channel consisting of the left and right information added together, and a *difference* channel containing information that is only found in the left or right channel

alone. The sum channel is transmitted as a normal FM broadcast signal that all radio receivers can detect. The difference channel is transmitted super-audibly, detected and converted to an audio signal by the receiver and combined with the sum channel in the receiver to produce right, left and center channel.

For FM broadcast, 100 percent modulation has been set to be ± 75 kHz total deviation around the carrier. This 100-percent modulation produces a channel width of 150 kHz and includes the main or sum channel, plus the stereo sub channel. The FCC allows modulation of up to 110 percent to accommodate the SCA channels. The total FM channel is 200 kHz wide, allowing for occasional peaks of audio to pass without creating interference with adjacent channels.

The mod monitor

The FM modulation monitor is designed to show what is happening with the broadcast signal. Because the total FM signal consists of sum and difference channels, as well as SCA, the monitor will not read the same as the VU meter on the audio console.

When FM stereo was authorized, many said that these stations suffered a "stereo penalty" because their main channel audio was lowered to accommodate the stereo channel.

This was true, and even today FM stations face an increased possibility of noisy reception in stereo outside of their primary service areas. Many receivers have automatic cut-off stereo circuits in autos; many home receivers have monophonic switches to shut off the stereo circuitry of the receiver, reducing the noise.

For this reason, make sure your right and left channels are always in proper phase and balance. An imbalance will cause partial cancellation of the monophonic audio, producing degraded reception. Some receivers also contain a narrow bandwidth switch to reduce noise.

The modulation monitor of a monophonic station with no SCA will not necessarily follow the console VU

meter. The transmitter has added pre-emphasis into the signal, making the high frequencies peak much higher than they were coming out of the console. Develop the habit of spot-checking the modulation monitor and its various functions. The "L-R" position will tell you whether the stereo channels are in or out of phase, and along with actual listening can verify the quality of the monophonic "air" signal. The SCA monitor can let you know if the audio or data is actually being transmitted. An RDS monitor is necessary for set-up and proper operation of the RDS/RDBS signal that many stations are employing in their transmission.

You may be tempted to add leased SCA channels to the broadcast transmission to create additional revenue. Keep in mind that these services may introduce background tones or chirps into the broadcast channel. They may also introduce a "swishing" sound, similar to a quiet sea in the background of the main channel. Some problems are caused by poorly designed receivers, and are always more prevalent in high multipath areas. However, your exciter circuits may also be out of adjustment, and although the exciter accepts SCA inputs, they may produce unwanted noise in the main channel. Adding SCA may require upgrading the transmitter with a new exciter. Discuss this with your engineer.

The design of the FM receiver permits it to minimize interference from unwanted radio stations or stations on the same and adjacent channels. This is known as "capture effect." When listening to FM in a car, often you will hear the signal cut in and out as you leave the listening area. An AM receiver will not do this; instead the radio signal will slowly fade away into noise. The "capture effect" of the FM receiver will "lock" on to the stronger signal, suppressing the weaker.

The receiver rejects weak signals the same way it rejects noise. Rarely will you hear two signals simultaneously in an FM receiver.

Make the Boss Shine

► BOSS, continued from page 35

them in tables or graphs? This may seem like splitting hairs, but information in his preferred format speeds his digestion of the material and simplifies his job.

- When does the boss want the information? Does she want it waiting for her Monday morning, or at the end of the day or week? If you deliver on Monday morning a report that the boss wanted to read over the weekend, she will remember that you do not deliver as expected. This will damage the trust that you want to develop.

- How does he like conflicts handled? Does he prefer to have the individuals or group work them out and report the consensus, or report disagreements in detail, complete with documentation?

The strengths of the boss

3. What are the boss's strengths, her limitations or weaknesses? These are areas where you must support the boss and help her to look good. Your job is to make the most of the boss's strengths and make her weakness irrelevant.

4. Create a relationship of trust. This requires confidence on the part of the boss that you will play to her strength and safeguard her against her limitations. Do not point out her flaws or failures in front of others. If the problem affects how you do your tasks, talk with her privately.

Deliver on assigned tasks when you are expected to deliver. It goes a long way in establishing trust.

5. Keep the boss aware. Make sure the boss understands what can be expected from you, where you are concentrating your energies, the

priorities as you understand them, and equally important, what they are not. Bosses are held accountable to their own bosses for the performance of the station and its staff. They must be able to say to their bosses: "This is what Anne (or Joe) is trying to do." If they understand your plan and justifications, they can support your new sales plan or bad debt collection activities.

6. Never expose your boss to surprises. Protect the boss against surprises, even pleasant ones. To be exposed to a surprise in front of the station staff is humiliating.

Bosses differ on how they want to be advised. Some only want a warning that things are not going to plan. Other bosses demand a detailed report even if the chance of surprise is slight.

7. Never underrate the boss! The boss may look illiterate or he may look stupid. But to overrate the boss incurs no risk at all. Remember, the boss holds that position for a reason that may or may not be obvious to you. Also remember that he has the power to determine your future with the station. The worse that can happen if you overrate the boss's skills and talents is that the boss will feel flattered. But if you underrate the boss, he will resent you bitterly for it, or associate you with the deficiency in brains or knowledge you attributed to him.

Managing the boss is part of your job and one of the keys to your effectiveness and promotability.

■■■
Sue Jones is a principal in Bisset Communications, a communications management firm located in the Washington area. Contact her at (703) 505-4999.

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USER REPORT

Superlative Performance From Electro-Voice

by **Linden L. Williams**
Senior Vice President &
Director of Engineering
Lotus Communications Corp.

HOLLYWOOD As broadcast engineers, every once in awhile, we run into something that makes life easier, the station louder and a DJ sound better. If we find such a device, we always like to think that we found it first. Well, I did not discover the RE27N/D mic. What's more, I was about the last one in the company to know.

This is one of those products that many people in the broadcast market never got around to trying, though it has been with us for a number of years.

To describe the RE27N/D as a major sales success story would be pushing it a bit. The RE27N/D is built by a leading manufacturer in our industry, **Electro-Voice**, which also manufactures its look-alike brother, the RE20. Perhaps we have grown so comfortable with the RE20, there is never been a need to look for something better.

Lotus has a fair share of RE20s in all of our stations. Great sound, and you can use them for a hammer in a pinch, right? I think Electro-Voice has done such a remarkable job with the RE20, that the introduction of the RE27N/D has virtually slipped by unnoticed because we broadcast engineers are creatures of habit.

High praise

Since this is a review of a microphone, I will try not to bore you with how well it picks up an instrument or some esoteric recording studio jargon. I do not even talk into a microphone anymore, so the information I am passing along is mostly from airstaff who use it every day.

They do not speak "techie" so their superlatives hopefully will give you an idea of their delight with this product. After all, isn't that what we, engineers, are looking for anyway?

A few weeks later I saw the mic. It did not look special, in fact, it looks almost identical to the RE20 except it had a shiny silver finish and three little slide switches near the back. By this time, there were already three of these mics in the building, and more daily. It would not be so bad if the RE20s were performing poorly, but they were fine. I asked some of the air staff what they like about this "new" mic and they seemed to respond with terms that are relatively meaningless to engineers. I persisted. Finally, I picked up a few terms with which I could relate: "brighter, crisper, high-end," "better definition" and "louder."

I have since had the opportunity to drag the RE27N/D and RE20 into a production studio and practice my golden

throat delivery. At first I thought something was wrong. I even grabbed another RE20, thinking that maybe the first one had a problem. Same thing. The difference was startling. The level was much

**The RE27N/D
has been around for
several years and it
has to be the sleeper
of the industry.**

hotter. (If you have a mic preamp without a gain adjustment, you might need to pad this mic a couple of dB.) The sound was rich and full, but it remained full considerably off axis, and yet, it had excellent rejection off the back.

I would call it a tight, uncolored pattern. Make sure low frequency roll-off is on, just like the 20's.

Although the 20 has two of them at

different frequencies. I found one switch was more than enough, adding the second switch caused the sound to be too thin. It also has a high frequency roll-off. Surprise! This mic is crisp enough on the top, but I doubt you will use it in a control room. Mics are so subjective to personal taste, but to me, the RE27N/D sounds superb.

The major difference between the RE20 and the RE27N/D is the composition of the magnet. The higher flux density of the magnet in the RE27N/D makes it more efficient.

It would also hold true that the higher the flux density, the more control the field would have on the coil and diaphragm, thus the lower the distortion, tighter and more accurate the transient response, the flatter the frequency response.

This must be why more than one user has replaced expensive condenser microphones with the RE27N/D. Whatever the reason, all the engineering seems to work well in this "old" mic.

The RE27N/D has been around for several years and it has to be the sleeper of the industry, even though the cost is

only modestly higher than the RE20 you're probably using now. Yet every word that goes over the air from the control room or production studio goes through one of these energy-state-transformation systems. I say convert that energy as wisely as possible.

Dilemmas, dilemmas

In doing this review, I open myself up to a problem. I will be hearing from every engineer, program director and even a few GMs from Lotus asking the same question, "When do we get ours?" No one ever worries about my budget.

The only flaw with this mic is there are too many equalization switches for the inmates to play with. I have threatened to put crazy glue in the switches of one RE27N/D in the control room of our L.A. station.

If I thought it would do any good, I'd hire a cadre of nuns with rulers to stand there and smack the jocks' hands each time they tried to change the settings.

For more information from *Electro-Voice*, contact the company in Michigan at (616) 695-6831; or circle **Reader Service 67**.

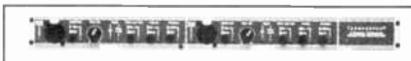
TECHNOLOGY UPDATES

APHEX SYSTEMS

SUN VALLEY, Calif. The **Aphex Systems** model 107 dual-channel microphone preamplifier with Tubessence combines both tube and solid-state circuitry. The one rack-unit, dual-channel preamp is a mic preamp designed to provide sonic quality at an affordable price.

Mylar capacitors are built into the transformerless, solid-state front end. Gold contact relays are used for both the front panel 20 dB pad and polarity switch for better transient response and lower distortion. Tubessence imparts the sonic characteristics of tubes without the extremely high voltages, heat, fragility and short life span of conventional tube circuitry.

The front panel provides two independent channels with balanced XLR mic inputs, mute LED, 20 dB pad, 18 to 64 dB continuously variable gain pot, two signal level LEDs, 80 Hz low-cut filter switch, polarity reverse switch, phantom power and more. The back panel



houses two output TRS jacks equipped with -10 and +4 operating level switches and a footswitch jack for muting.

The model 107 is compatible with all microphones including dynamic, ribbon, electret condenser or large diaphragm studio condensers.

For more information from *Aphex*

Systems, contact the company in California at (818) 767-2929; or circle **Reader Service 88**.

SENNHEISER

OLD LYME, Conn. The MD421 II from **Sennheiser** has incorporated all of the characteristics of its 421 predecessor and moved one step forward. Its five-position bass roll-off switch makes it highly adaptable for most audio applications, ranging from on-air radio broadcasting to vocal recording and instrument miking. A frequency response of 30-17 kHz and freedom from distortion to more than 175 dB SPL ensure little dynamic loss or overload. The MD421 II utilizes a pressure-gradient dynamic transducer with a cardioid pick-up pattern. This gives the microphone excellent directionality and



The MD421 II has a five-position bass roll-off switch.

feedback suppression as well as noise rejection. A built-in hum compensation coil added to the design makes the

MD421 II a quiet microphone.

A faster, more open and transparent microphone than the 421, the MD421 II still retains the same quality of precision in sound reproduction. Improved materials and modern manufacturing techniques make the MD421 II built to withstand most mishaps. A locking mic stand holder is included.

For more information from *Sennheiser*, contact the company in Connecticut at (860) 434-9190; or circle **Reader Service 49**.

EARTHWORKS

WILTON, N.H. **Earthworks**, whose recording microphones are turning ears, announces the release of a new series of measurement mics.

The M30 (9 Hz to 30 kHz) and the M55 (9 Hz to 55 kHz) are affordable precision omnis. Their accurate frequency performance makes them useful for RTA, TEF, MLSSA and SMART analysis systems. Their fast, clean impulse response and coherent behavior in the time domain means they also sound great for recording.

Earthworks also has introduced the LAB 1 measurement preamp to be available mid-March. A recording preamp will follow shortly.

For more information from *Earthworks*, contact the company in New Hampshire at (603) 654-6427; fax: (603) 654-6107; or circle **Reader Service 50**.

USER REPORT

Curtis Microphone Runs Engine Studios

by **Doug Connell**
Owner & Engineer
Engine Studios

ROCKFORD, III. I wanted a good multi-purpose microphone that would upgrade Engine Studios' microphone collection significantly beyond dynamic mics. We had been using the Shure SM-57 and an RE-20 for all voice applications. We wanted a mic for radio work that would handle high-definition

voiceovers, as well as sampling and special effects.

The Curtis Technology AL-1 mics were popping up in some major recording studios throughout the country, so we requested a demo to see if the mics would be applicable to our radio and video work.

The AL-1 System consists of a stereo pair of tube condenser microphones that are matched closely for gain and sonic signature. Each mic has a single 12AU7



The Curtis Technology AL-1 Microphone

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"In our pre-purchase research, we found that the most common compliment paid to competitive units was that their technical support staffs were always there when the system crashed. When we talked with DAD users, they hardly knew anyone at ENCO since their systems had never gone down. That's the kind of compliment I was looking for! DAD's segue editor feature revolutionizes automation. We pre-program the entire station, then the talent previews and customizes their breaks to give us a totally live feel. Plus, we simulcast both stations and DAD lets us easily set up separate spot schedules. It's major market ready, and built like it."

Philip Urso, GM
WDGE/WDFG,
Providence, RI

"We've had five DAD workstations in action for over a year, and I really don't know how we could get along without the system. It allows all three of our stations to present a consistent on-air sound and frees the talent to concentrate more on communicating with the audience. We're still finding new and innovative ways of using the system a year later. In my opinion, if you're planning on automation, you can't do it RIGHT without ENCO!"

Chris Andree, Asst. PD
WWKL/WYMJ/WCMB,
Harrisburg, PA

"We're a news programming provider and deal with a large number of actualities every day, so speed in production and getting it down the line are paramount. DAD allows us to bring information in, and seconds later it's ready to go. The greatest feature is the ease of editing and file transfer between our four workstations. On-air is a breeze."

Dane Wilt
Radio News Company,
Las Vegas, NV

"Way cool. The greatest thing about DAD is that it acts and thinks like a cart machine and doesn't intimidate the talent. We use touchscreens, and the learning curve is about 2-1/2 hours before they're up and running. From an engineer's standpoint, it's great because DAD uses off-the-shelf hardware, so maintenance is a snap."

J.R. Rogers, Asst. CE
KSON/KIFM,
San Diego, CA

"The DAD system was on the cutting edge of systems we looked at, and there was some initial reluctance to enter the digital arena. After having the system in-house for a month, the entire production and on-air staff felt like they could never do without it again. Now our news staff has a system of their own, and we're getting a third system for our sister TV station."

Chuck Whitaker, PD
WSBT, South Bend, IN

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tube inside. The mics have a polished silver metallic look, and are quite rugged. The diaphragm size is slightly over one inch. Overall, the mics are designed with simplicity, aesthetics and ruggedness in mind.

The system comes with a 19-inch rack-mountable dual channel power supply with four gold-plated conductor Neutrik connectors on the front face plate. On the back of the supply are two gold-plated three-pin XLR connectors that provide balanced mic level outputs.

Complements other gear

The power supply has been great for rack mounting with any stereo mic pre-amp. We used a short lead length high-definition audio interconnect between the mic outputs of the AL-1 power supply to the stereo mic preamp inputs. Curtis really thought about how to make the mics work with other gear. A lot of the vintage tube mics and even most of the other new tube mics on the market did not offer a rack mountable power supply.

I like the convenience of being able to move a single rack case with the AL-1 in combination with a stereo mic pre-amp — that way I can boost the signal out near the microphone source in any of our vocal booths and send a line level signal back to the mixing board.

Initially, the AL-1 power supply scratched easily and we needed the system to be portable so we could transport it to our sister studio in Chicago. Curtis has addressed this problem since releasing the product. When I bought a second AL-1 system to be based out of our sister studio, Curtis improved the chassis with a black powder-coated finish that is more scratch-resistant.

Several technical features stand out. The ground lift switch on the back of the supply has been handy because we move the mic system to different environments with varying line power wiring arrangements. The audio signals are shielded inside the power supply and are routed far from the power transformers making the mics very quiet.

In other manufacturers' small single-channel power supplies, I suspect that due to the limited physical chassis size, they are not able to route the audio signal as far from the power supply transformers. If you want to change the tube in the microphone, simply remove the three screws at the mic base.

Because of the protected diaphragm, the rigidity of the tube socket mounting scheme, and the isolated encapsulated circuitry, the AL-1 is less fragile and more durable than

See AL-1, page 42 ▶

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USER REPORT

Musiflex Eases Wiring Process

by Kevin Short
Owner/Engineer
Mid South Audio

GEORGETOWN, Del. I am always looking for ways to make my life easier. If there is a new technique or a better way to accomplish a mundane task I can easily be convinced. Sometimes this approach has not proved successful, but when trying new things has worked to my satisfaction. I am quite happy to pass that information along.

Let's face it, preparing shielded cable for wiring is not much fun. If you can manage to strip the outer jacket without damaging the internal shield, the

separating, twisting and tinning of the outer strands takes far too much time. After repeated complaints to various cable suppliers about the lack of significant improvements toward user friendliness in shielded cable, I have been saved from an eternity in "braided shield hell" thanks to Musiflex microphone cable manufactured by **Connectronics**.

Connectronics thermoplastic shielding technology makes the connecting of shielded cable much simpler. I received my sample of Musiflex, with one end already stripped back, and the difference was immediately obvious. Instead of the usual braided or spiral shield, there is a

black conductive thermoplastic tube that surrounds the signal conductors and the non-insulated drain wire. Without the braiding to contend with I can now make connections up to 50 percent faster. With Musiflex I cut the cable to length, strip back the outer PVC jacket, remove the insulation from the internal signal wires and solder onto the connector.

Musiflex is the most flexible and durable mic cable. The conductors in Musiflex are made from 30 separate strands of plain copper wire (tinned copper is not as flexible as plain copper and the more strands in the conductors, the more flexible the cable.) This adds flexibility

making Musiflex great for insertion into a mic boom that will be swiveled countless times in a broadcast day. Musiflex cable is also great for remote broadcasts.

The flexibility of this cable makes it very easy for the "talent" to work with. A flexible mic cable is great, but can deteriorate rapidly if the cable is not durable. The durability of Musiflex is a due to the outer PVC jacket. The PVC is soft enough for maximum flexibility and tough enough to endure much abuse. It retains its flexibility and durability even in cold temperatures. I have enjoyed years of great service using Musiflex cable in a variety of applications. Musiflex has proven reliable day after day, month after month, and year after year.

Thumbs up

The conductive thermoplastic tube used inside Musiflex offers other benefits for broadcasting. This "tube" runs the entire length of the cable providing an almost perfect electrostatic shield. Interference attenuation is much greater than any conventionally shielded cable I have used. Without braiding to work open over time Musiflex remains very stable over the long term. Signal loss on long runs is unnoticeable, due to the lower capacitance exhibited by Musiflex. I have used mic runs on remote broadcasts that exceeded 500 feet with no audible signal degradation.

Musiflex has taken the chore out of preparing shielded cables. I have shared cable with many colleagues, who are now using Musiflex on a regular basis. It may seem strange to be this excited about mic cable, but unless you have a morbid fascination with separating, twisting and tinning conventional braided shielded cable, you should give Musiflex a try. It will save time and who knows, it could change your life.

For more information from *Connectronics*, contact the company in Connecticut at (800) 3-CABLES; or circle Reader Service 87.

High Score For AL-1

► AL-1, continued from page 40

other tube mics on the market. These mics have been transported to live venues for recording and have been bounced around without any degradation of their sonic quality.

Big bang for the buck

In comparison to other tube mics, we think that a pair of matched tube mics with a balanced dual power supply at under \$2,500 is an incredible value. Working in a studio with a strong emphasis on video, I was not sure why I wanted to invest in a pair of mics.

The AL-1 has proven to be an excellent multi-purpose cardioid mike for Engine Studios. It excels in voice-over applications, recording sound effects and sampling acoustic sources. It truly has the ability to capture the excitement and energy of a musical event.

For more information from *Curtis Technology*, contact the company in Illinois at (815) 968-0173; fax: (815) 968-0174; or circle Reader Service 47.

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USER REPORT

Lightwave System On-Air at 'Tonight Show'

by **Bob Whyley**
Senior Mixer/Audio Director
'The Tonight Show with Jay Leno'
& Fox Sports

BURBANK, Calif. When asked to write an article about Lightwave System's Fibox and its uses for broadcasters, I said sure.

I thought that perhaps many folks in radio and television may not even know what a Fibox really is. So, here goes.

It is the digital equivalent of wire.

The Fibox is really a simple little device consisting of a digital transmitter and receiver, both only one rack space high and one-half rack space across.

The transmitter has two female XLR connectors on the rear panel and two level controls along with the two mic/line and two phantom power switches on the front.

It comes with its own built-in stereo mic preamps. Switching 48 V phantom mic

power in or out means that you can plug in any type of mic and remember. No losses.

A flip of the switch and there is +4 dB of line level audio. The receiver box is just as simply laid out. The rear panel holds the two male XLR connectors, while the front has a one-quarter inch stereo headphone jack.

In between the two units you can connect two feet or two miles of fiber. It does not matter.

Each device accounts for a single stereo/dual mono pair. If you need the facilities for more audio channels, daisy chain the transmitters at one end and receivers at the other.

Technically, the Fibox accepts dynamic or condenser microphones or a +4 dB line input. The Fibox converts analog audio to a true 20-bit/48 kHz sampled digital audio signal.

At the receiver, the Fibox reconstructs

the digital signal back into a +4 dB analog audio output.

By the way, the mic preamp section has about 70 dB of gain and sounds great.

Applications

The actual fiber is only about a one-eighth inch in diameter and is lightweight. I would rather carry 4,000 feet of Fibox fiber than 4,000 feet of multi-pair cables on a sports remote any day.

Here are a couple of applications. Suppose you need to make a 5,000-foot audio run that will have no audio losses at all.

Not only will the level and fidelity remain 100 percent, but there will also be no hum or buzzes, magnetic or RF interferences.

This single run can carry many "stereo pairs" in each direction. In addition, the audio can either be in standard analog form or digital AES/EBU.

Or let us say that it is time to build or modify an audio production facility and interconnect a couple of rooms

together.

Why use wire? In critical areas near high RF or large electrical fields, the Fibox allows for transporting good clean buzz, hum or SMPTE code-free audio.

Little improvement needed

The only negative aspect of the Fibox is that there is no level metering on either the transmitter or receive units.

There are two absolute peak LEDs on the transmitter (one for each channel).

Although these are adequate, it would be nice to more accurately watch the digital audio levels.

You get the picture. The Fibox is probably one of the best-kept audio

The Fibox is probably one of the best-kept audio secrets in broadcasting.

secrets in broadcasting.

Whether doing a sports remote or interconnecting audio control rooms or just about anything else requiring high-quality audio signals from here to there, Fibox is the way to do it.

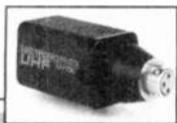
For more information from Lightwave Systems, contact the company in Texas at (214) 741-5142; or circle Reader Service 107.

TECHNOLOGY UPDATES

LECTROSONICS

RIO RANCHO, N.M. Convert any microphone to wireless operation and expand your possibilities on remotes with the Lectrosonics UH190 "plug-on" transmitter. The UH190 will attach directly to any microphone with a three-pin XLR connector to add wireless mobility. Use any microphone and work up to 2,500 feet away from the receiver.

The machined aluminum construction can stand up to



the rigors of field production.

The matching UCR 190 compact receiver can be powered by an internal 9 V battery or external 12 VDC source. It will connect to balanced or unbalanced mic level inputs on a console. A secondary audio output on the front panel will feed a recorder while the main XLR audio output is used for program feed. UniChancel filtering in the receiver rejects RF interference for solid reliability in the field.

For more information from Lectrosonics, contact Bruce Jones in New Mexico at (800) 821-1121; fax: (505) 892-6243; or circle Reader Service 69.

TELEX

MINNEAPOLIS Telex introduced two microphone systems, the VHF and UHF ProStar series wireless microphone systems.

The UHF system occupies the 690 to 725 MHz range and offers a frequency response of 50 Hz to 15 kHz. Frequency stability measures 0.05 percent with an unweighted signal-to-noise ratio of 91 dB with less than 0.5 percent third harmonic distortion. Ultimate quieting measures 97 dB.



The VHF system occupies the 174 to 186 MHz range and offers a frequency response of 50 Hz to 15 kHz. Frequency stability measures at 0.05 percent with an unweighted signal-to-noise ratio of 85 dB with less than 0.5 percent third harmonic distortion. Ultimate quieting measures 91 dB. Both units are housed in a one-half rack space plastic case.

For more information from Telex, contact the company in Minnesota at (612) 884-4051; fax: (612) 884-0043; or circle Reader Service 89.

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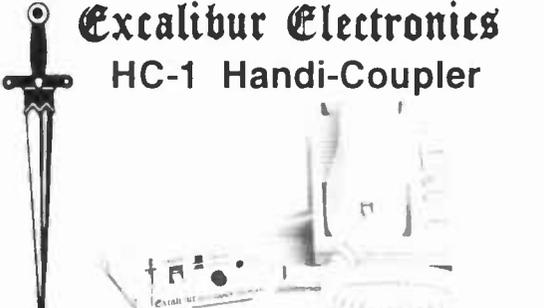
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You can find many uses for the HC-1 around your station: on-air studio, production room, newsroom, sales office, field news kits, sports remotes, etc.

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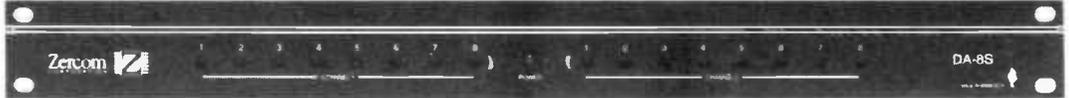
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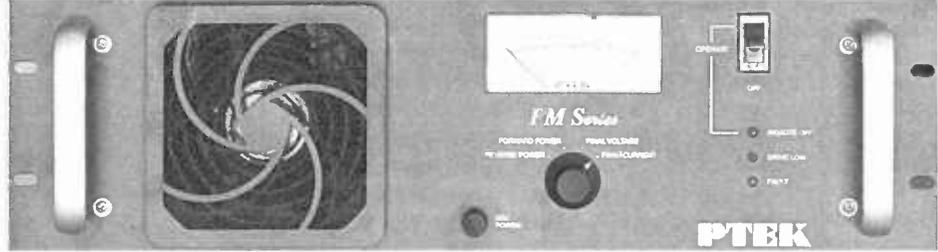
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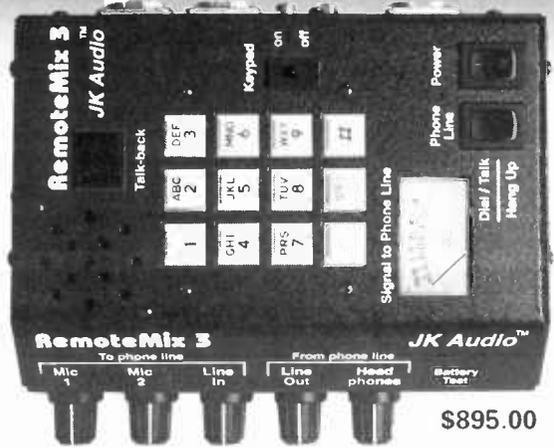
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READER SERVICE NO. 145

USER REPORT

Loud and Clear With the CAD-Equitek E-200

by Dave Youell
Chief Engineer
CFUN(AM) & CHQM(FM)

VANCOUVER, British Columbia

In the 30 years I have been in broadcasting — from rookie operator to chief engineer — I was taught by my mentors the key to a good sounding radio station was to start out with the best microphones the station could afford. I was also taught that one of the best microphones money could buy was the Neumann U87. It was considered the industry standard.

In the summer of 1993, CFUN(AM) and CHQM(FM) were preparing to move. Part of this process was the evaluation of new microphones for both

production and on air at both stations. At the time we had a mix of Neumann U87s and AKG C535s. One day, Chris Marcellous and Peter Kelly of Vancouver-based All Electric brought a strange-looking microphone from **Conneaut Audio Devices (CAD)** and asked me to try it out. It was the Equitek E-200.

Testing 1, 2

I immediately took the microphone to our production studio to check it out. Our FM morning host was reading a spot at the time using a Neumann. Our production manager then set up the CAD Equitek E-200 and had the announcer read the same spot. The result was impressive.

There was very little difference between the two microphones.

The FM morning man was so impressed with the sound, he asked if he could use the Equitek on air the next day. The results were such a vast improvement over the microphone he was using, they bought three units.

When the stations moved in March 1994, we purchased five CAD Equitek E-200 microphones. Since then, we purchased two CAD Equitek E-100 microphones for use in a remote studio.

When we bought the E-200 mics, the station was prepared to spend the necessary funds to purchase industry standard microphones. When told the price of CAD Equitek E-200 mics, we were floored — it was a third the cost of the industry standard. The savings enabled the station to purchase items on our wish list.

The electronics inside make this microphone sound good. The preamp uses a servoed head amplifier with an

active balanced (transformerless) output. The power supply was designed with a power storage system that can store 10 times the power available from the phantom power supply.

The result is instantaneous peaks do not go flat because the power supply runs out.

From a mechanical point of view, the CAD Equitek E-200 microphone is well-built.

The capsule is held in place by two cantilevered shock isolators. It will stand up to jostling from your announcers. The capsule is also protected by a stainless steel pop/EMI filter. In our setup, the microphones work within 18 inches of our on air system computer monitors without any noticeable hum.

Features

The E-200 has options that make it a versatile mic useful for both AM and FM operation. Our FM station is an adult contemporary music operation. As a result, we want our announcers to have a full spectrum microphone.

The mic has a frequency response of 10 Hz to 18 kHz. By comparison our AM station is talk. In order for both hosts' voices to cut through the noise associated with AM, it is necessary to roll off the low frequencies by switching in the low end roll off filter.

Anything below 80 Hz is attenuated by 10 dB. Because the rest of the spectrum is unaffected, we still achieve a natural sound.

The variable pattern switch on the CAD Equitek E-200 mic has come in handy at times, particularly on our open line shows when we have more guests than microphones. Normally, the microphones are set on the cardioid pattern, but

can be set on a figure 8 or omni pattern.

The only drawback is the weight of the mic. At 12 ounces, we had to use a heavier mic arm. From a maintenance standpoint, the CAD Equitek has been a joy. After two years of use all we had to do was clean the pop filter. We also noticed a slight discoloration of the capsule.

We have been pleased by the past performance of the CAD Equitek E-200, and we will not hesitate to buy more in the future.

For more information from CAD Equitek, contact the company in New York at (516) 365-7810; or circle Reader Service 127.

TECHNOLOGY UPDATE

SUMMIT AUDIO

SOQUEL, Calif. Summit Audio debuted its MPC-100 mic preamp/comp limiter. The single-channel unit features a tube pre-amplifier section followed by a separate tube compressor limiter section.

The MPC-100A offers microphone, Hi-Z (for musical instruments) or line inputs preamplified by the first vacuum tube stage. This signal in turn drives a new compressor/limiter section that offers fast attack times, insuring clipping confidence before entering a digital audio system. A switchable, high-quality, front panel VU meter reads input, output and gain reduction accurately.

The MPC-100A has an input pad, an attenuator and clip indicator with support for both XLR and quarter-inch jacks.

The input is electronically balanced or unbalanced with an input impedance of 20 k ohms. The maximum input level is +25 dBu. The microphone input incorporates a premium Jensen input transformer as well as a Hi-Z input with a loading control for optimizing impedance. This adds a tonal range selectable by the user.

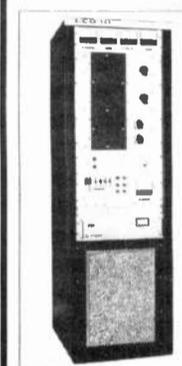
The compressor/limiter section features variable threshold and release controls, attack and release pre-set switches with a dedicated clip indicator.

The output is electronically balanced or unbalanced using series 990 Summit discrete operational amplifiers with an output impedance of 75 ohms. The MPC-100A provides a maximum output level of +25 dBu with both +4 balanced and an additional -10 dB unbalanced quarter-inch phone jack output.

Both outputs can be used simultaneously. The overall output gain control allows one to establish an input sound and then optimize that sound for recording without having to reset the entire gain structure.

For more information from Summit Audio contact the company in California at (408) 464-2448; fax: (408) 464-7659; or circle Reader Service 70.

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Radio World, February 5, 1997

Build This AM Loop Antenna for Your EAS

John Bisset

With the new EAS requirements upon us, it was only fitting that the folks at Southern Coastal Marketing in Pineville, N.C., provided us with the schematic for an easy-to-construct passive AM loop antenna. If one of your EAS monitoring assignments includes an AM, installing one of these to feed your receiver should help. Although you can use pretty much any type 50-ohm coax, RG-8 supported in PVC pipe is my favorite. The PVC pipe fits together easily — and with the proper fittings and glue, it's not going anywhere! Thanks to Bob Cauthen for this useful tip. He can be reached at (800) 438-6040.

★★★

If you build your loop antenna, and are looking for a way to weatherproof the coax connection, circle **Reader Service 71**. Andrew Corporation recently provided me with some samples of

can easily heat shrink a standard weatherproofing boot outdoors.

The 3M Cold Shrink assembly is an expanded weatherproof tube that is stretched open by a unique plastic core spiral wrap tape. The hollow core is wrapped so that the boot remains expanded, as you slide it over the connector to be weatherized. While holding the boot in position over the connector with one hand, you pull the end of the plastic tape with the other. As you pull, the spiral-wound core slowly is unwound, and the expanded tube begins slowly to contract over the connector. After the core has been completely removed, the result is a tight, weather-

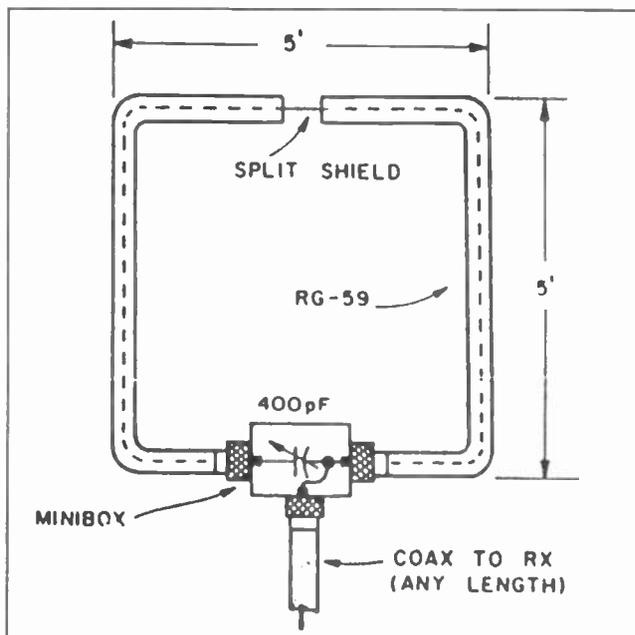
proof seal that maintains compression even after many years of aging and exposure. Another plus is that no adhesives are used. If you've ever tried to cut through a "standard" heat shrink boot, removal is hampered by the resin compound that helps form the seal by melting and hardening around the connector. Since there are no adhesives in the 3M Cold Shrink, slice the tube with a knife, and peel it away. The product has been field-tested for more than 15 years, in response to a demand by the high-power industry for a completely watertight, weatherproofing method for high-power cable applications.

you threw a switch — rain starts, the noise starts and the signal drops off. Rains stops, and the reception is perfect. Remember, we're talking 160 MHz! The reception problem doesn't matter if the transmitter is three miles away or 10 miles away. They've connected the transmitter to the receive antenna input, and there's no VSWR. The line up the tower is dry, and has been inspected for slices in the jacket or other imperfections. None have been found.

The Gamma match was disassembled, but no water was found in it. The receiver has been aligned, the antenna output was fed into a spectrum analyzer and nothing unusual was seen, they even tried a different frequency. With five remotes a week, and the morning show doing a live RPU broadcast each morning, you pray for dry weather ... and a solution. Got any ideas? Send them by e-mail or fax them to (703) 764-0751.

■■■

John Bisset is a principal with Multiphase, a technical service company based in the Washington suburbs. Reach him on line at wrwbench@aol.com or at (703) 323-7180. Fax Workbench submissions to (703) 764-0751. Published submissions qualify for SBE recertification credit.



en down and opened up — nothing wrong here. A 10-element Yagi was reinstalled. The problems don't fade in and fade out, like water in a connector drying out, rather, they materialize like

$$X_L = 2\pi fL \text{ ohms}$$

$$Q = \frac{f}{\Delta f} = \frac{X_L}{2(R_R + R_L)}$$

$$R_R = 3.12 \times 10^4 \left[\frac{NA}{\lambda^2} \right]^2 \text{ ohms}$$

$$V_C = \sqrt{PX_L Q}$$

$$I_L = \sqrt{\frac{PQ}{X_L}}$$

WHERE:

X_L = inductive reactance, ohms

f = frequency, Hz

Δf = bandwidth, Hz

R_R = radiation resistance, ohms

R_L = loss resistance, ohms (see text)

N = number of turns

A = area enclosed by loop, square meters

λ = wavelength at operating frequency

V_C = voltage across capacitor

P = power, watts

I_L = resonant circulating current in loop

Loop Equations

its 3M Cold Shrink assemblies. Even with a torch, there aren't many places in the country this time of year where you

is mounted about 250 feet up a tower, and every time it rains, the reception gets very noisy and the signal strength

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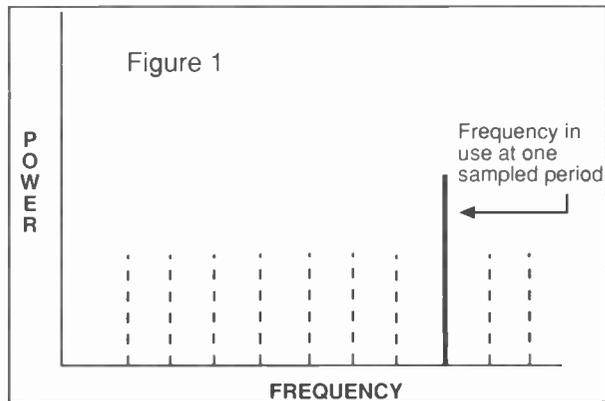
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Circle (41) On Reader Service Card

Spread Spectrum: No License at All

Alan R. Peterson

WASHINGTON Time was, to get a signal from studio to transmitter, a radio station had three options: a microwave studio-transmitter link (STL), leased equalized analog phone lines or — if the tower was right behind the station — a simple run of some balanced audio lines out the window to the shack.



Options were similarly limited for broadcasts from remote locations. POTS lines would work, but could only return a severely frequency limited product back to the studio.

Audio signals can now ride as a digital bitstream and retain complete CD quality. T1 and fractional T1 digital teleo circuits can carry signals over landlines. Digital technology has benefits not only for STLs, but for remote pickup units (RPUs) as well. New products now on the market use spread spectrum technology, which provides advantages including speed of setup, low-cost, CD-quality stereo ... and no licensing.

Units now available include the Starlink 9001SS from Moseley Associates and QEI's Quick-Link II. The Intraplex STL Plus uses spread spectrum technology provided by Glenayre/Western Multiplex and Cylink.

From Belfast, Northern Ireland, come

the Audio Processing Technology (APT) SBL128 and SBL256 "wireless codecs." The units were introduced at the fall AES show in Los Angeles.

Defining the technology

It seems unusual that any wireless technology could escape FCC licensing, particularly because spread spectrum sprays data over many frequencies rather than centering around one single carrier. Having this much bandwidth available without a license and not interfering with other users seems too good to be true.

Spread spectrum design is an outgrowth of military communications technology in which transmitted bandwidth is made much greater than normally necessary for conventional data transmission. For example, the Moseley Associates' Starlink uses the 2.446-2.482 GHz range, while Glenayre uses 2.4 and 5.8 GHz.

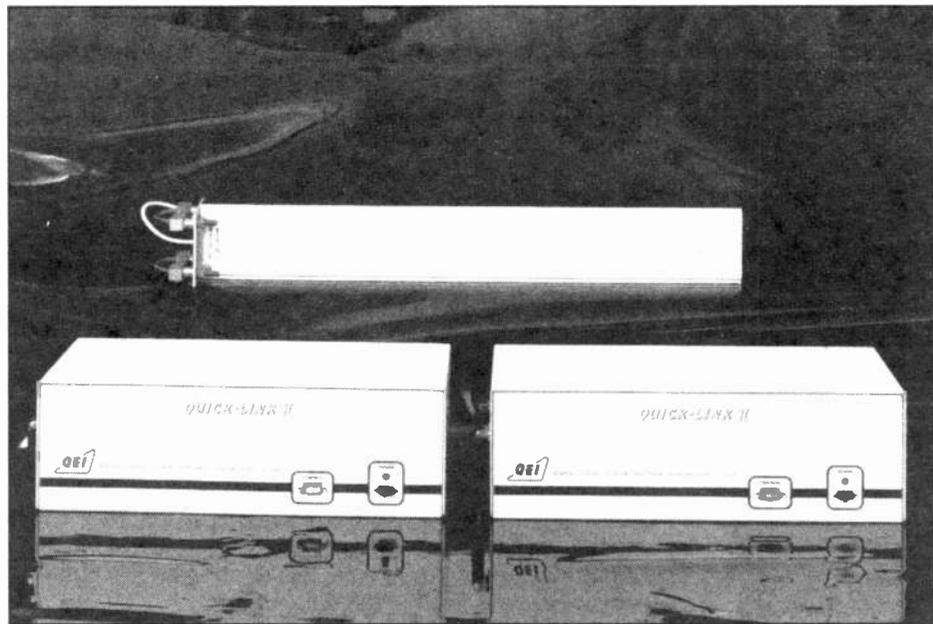
To the linear analog thinker, a 36 MHz window (in the Starlink's case) is rather extreme for music programming that typically would top off at a 15 to 20 kHz response. But it is that space that gives spread spectrum technology the ability to reject interference.

A method called "frequency hopping" rapidly changes the carrier frequency in a predetermined sequence (see Figure 1). Digital data is sent only when the carrier frequency locks. The coding sequence then shifts the carrier again. Digital information is converted into a pattern that almost resembles wideband noise.

The receiver has a replica of the coding sequence in ROM so it moves "two steps to the right, three steps to the left" in sync with the transmitter. The digital signal is tracked, recovered, reconstruct-

ed into audio and sent along its way. The wider the bandwidth, the more space is available to shift carrier frequencies.

A high degree of interference immunity is assured by the likelihood that no two transmitters will be frequency hopping in the same sequence. However, *periodic* interference can occur when two transmit-



QEI's Quick-Link II

ters stop on the same carrier frequency simultaneously. This probability increases with the number of spread spectrum users.

Second method

In direct sequence coding, each bit of information is broken into elements called *chips*. These chips are then switched in phase by a pseudo-random numeric sequence known as a PN code. The greater the number of chips per bit of information, the higher the broadcast bandwidth. The more random the PN code seems, the greater the system's ability to shake off interference.

Immunity against interference is extremely high with this method. The receiver contains the same encoding instructions as the transmitter and looks for and decodes only specified data. The rest is filtered out.

Directional antennas obviously improve the signal path, but because of the coding scheme, it is possible to have multiple signals aimed at a receiving antenna before a critical threshold is reached and the lock is lost. According to Jeff Detweiler, sales and marketing manager for QEI, as many as 13 signals can be seen at an antenna before signal integrity is affected.

Despite the bandwidth, the digital signal has hardly any vertical power structure. The method depends on a receiver with a very specific synchronization scheme and one that is broad enough to capture the entire signal. Put simply, what would normally look like a 40 W carrier signal is spread out over 18 MHz or greater. There is so little peak power, a conventional receiver would simply read it as noise.

This is how spread spectrum transmitters work without the need to be licensed.

With the number of choices available for sending a signal across space, why is spread spectrum a popular consideration?

Detweiler said, "First of all, it is license-free. Also, it's getting difficult for many facilities to find available spectrum. Spread spectrum is inherently interference-free, so it can be used in that capacity: It will allow point-to-point transmission as an inner-city relay, an STL or in an RPU capacity."

He found most users thought spread spectrum would "go through mountains" when used as an RPU replacement. "But for

point-to-point up to 18 or 20 miles, (it is really not a problem at all," said Detweiler.

On the topic of compression, companies have their own philosophies. The Quick-Link II and the Intraplex STL Plus transmit linear (uncompressed) audio data, while the Moseley Starlink offers the choice of MPEG Layer II or apt-X source coding. According to Dave Chancey,

Audio signals can now ride as a digital bitstream and retain complete CD quality.

national sales manager for Moseley, "Compression is more robust. It uses less data and less spectrum."

Chancey noted several stations using the Starlink 9001 as

a transmitter-studio link (TSL), relaying high-quality audio back to the studio location from the tower site. However, he also said Minnesota Public Radio (MPR) is considering the Starlink as an RPU device for remote location broadcasts.

Dennis Hansen, operations coordinator for the MPR network, said, "In our grant, we indicated we would need a digital RPU link, so when the money came through, that's what we had to get. Our old RPU works in the 450 MHz range, and it is starting to get noisy there with pagers and the like."

Hansen went with the Moseley system with the intention of using it for spot news in the field. If audio quality and data integrity prove sufficiently robust, the system will likely be used for classical music remotes on MPR as well.

Broadcast applications of the Glenayre Lynx radios — which are more popular for industrial uses such as railroad communications — have been limited to STLs across to repeater transmitters. Use of the QEI Quick-Link is split 50-50 between RPU applications and linking studio to transmitter.

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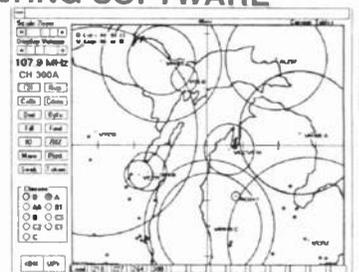
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Samson wireless system, like new w/documentation, Shure SM58 & SR-33, \$350; EV RE-20 studio mic, suspension shock mtnt & desk mtnt/mic arm, \$415. G Beckmann, B-Mann Prod, 24 Alta St, Glen Carbon IL 62034. 618-920-8989.

Shure SM-7 cardioid dynamic studio mic, like new, \$275. J Ellingson, Jeff Ellingson VoiceOvers, 923 Barnett Dr, Cedar Falls IA 50613. 319-277-8535.

AMS Soundfield MK-V stereo mic, complete system w/mic, 20 meter cable, control processor, \$6250; Countryman TVH tie-clip mic, miniature hypercardioid condenser, requires phantom pwr, \$165; AKG D-140 dynamic cardioid mics (3), \$115 ea; Schoeps Colette KC5L, w/Lemo connector & adaptor, like new cond, \$335. R Streicher, Pacific A/V Enter, 545 Cloverleaf Way, Monrovia CA 91016. 818-359-8012.

RCA 74 ribbon mic, chrome & black, also other RCA & Shure mics; RCA 77 & 44 "Forks". B Mayben, WRGA, 104 E 6th Ave, Rome GA 30161. 706-291-9742.

RCA Junior velocity in excel cond, just re-ribboned, \$800; Stromberg Carlson MD-36AS, like small Shure 55, \$200/pr; EV 664 in gd cond, \$100. M Schackow, Mark Schackow Recdg, 307 4th Ave E, Lemmo SD 57638. 605-374-3424.

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Triad HS-1, HS-25, also UTC HA-105, HA-106. L Blackmon, Requin Audio, Hillcrest Rd #10, Medfield MA 02052. 508-359-1796.

Fostex MIIRP printed ribbon, must be in excel cond. M Schackow, Mark Schackow Recdg, 307 4th Ave E, Lemmo SD 57638. 605-374-3424.

RCA 77-DX's & 44-BX's, any other RCA ribbon mics, on-air lights, call after 3PM CST, 214-271-7625.

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Sennheiser, Neumann, AKG, many models. W Gunn, Box 2902, Palm Springs CA 92262. 619-320-0728.

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Telfax TFX 30 sports mixer, \$350; Nikko AM-FM tuner, \$50; 1929-1945 vintage AM radio collection, \$800; Delta Lab DLA effect-delay, \$200; Fostex EQ, \$100. D Rose, KDUC, POB 432, Barstow CA 92312. 619-256-2068.

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Marantz PMD 360 stereo, 3 heads, VU meters, battery/AC powered, low mileage & no head wear, excel cond. \$250 incl shpg. S Lawson, KAK Prod, 928 Hyland Dr, Santa Rosa CA 95404. 707-528-4055.

Russ Lang RL600, excel cond, \$200; ADC Pro Patch Series, \$450; ADC Pro Patch Series, \$200. D Bailey, Rock Shoppe Prod, 10027 Church Rd, Dallas TX 75238. 214-343-0879.

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Russco Studio-Pro w/Micro-trak tonearms, Stanton cart, \$100 ea. Russco Micro-trak preamps, \$50 ea. D Rose, KDUC, POB 432, Barstow CA 92312. 619-256-2068.

Technics SL1200 w/Stanton cart. \$350; KLH Burwen TNE/DFN NR system. \$300; Dual 721 w/cart. \$100. D LeVan, Narwood Prod, 211 E 43rd St #603, New York NY 10017. 212-983-3320.

NEEDLES, CARTRIDGES, BELTS...all major brands including old/obsolete models, one of the largest stocks in the country. Expert consultation. NEEDLES EXPRESS (800) 358-2030 or www.needlexpress.com

For details on space availability contact Simone at **1-703-998-7600 Ext.154**

ACTION-GRAM

EQUIPMENT LISTINGS

Radio World's Broadcast Equipment Exchange provides a FREE listing service for radio stations and recording studios only. All other end users will be charged. Simply send your listings to us, following the example below. Please indicate in which category you would like your listing to appear. Mail your listings to the address below. Thank you.

Please print and include all information:

Contact Name _____
Title _____
Company/Station _____
Address _____
City/State _____
Zip Code _____
Telephone _____

I would like to receive or continue receiving Radio World FREE each month. Yes No

Signature _____ Date _____

Please check only one entry for each category:

I. Type of Firm

- | | |
|------------------------------------------------------|---------------------------------------------------------|
| <input type="checkbox"/> D Combination AM/FM station | <input type="checkbox"/> F Recording Studio |
| <input type="checkbox"/> A Commercial AM station | <input type="checkbox"/> K Radio Station Services |
| <input type="checkbox"/> B Commercial FM station | <input type="checkbox"/> G TV station teleprod facility |
| <input type="checkbox"/> C Educational FM station | <input type="checkbox"/> H Consultant/ind engineer |
| <input type="checkbox"/> E Network group owner | <input type="checkbox"/> I Mfg. distributor or dealer |
| | <input type="checkbox"/> J Other |

II. Job Function

- | | |
|---------------------------------------------------|--------------------------------------------|
| <input type="checkbox"/> A Ownership | <input type="checkbox"/> G Sales |
| <input type="checkbox"/> B General management | <input type="checkbox"/> F News operations |
| <input type="checkbox"/> C Engineering | <input type="checkbox"/> H Other (specify) |
| <input type="checkbox"/> D Programming production | |

Brokers, dealers, manufacturers and other organizations who are not legitimate end users can participate in the Broadcast Equipment Exchange on a paid basis. Line ad listings & display advertising are available on a per word or per inch basis.

WTS WTB Category: _____
Make: _____ Model: _____
Brief Description: _____
Price: _____

WTS WTB Category: _____
Make: _____ Model: _____
Brief Description: _____
Price: _____

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Make: _____ Model: _____
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Price: _____

WTS WTB Category: _____
Make: _____ Model: _____
Brief Description: _____
Price: _____

WTS WTB Category: _____
Make: _____ Model: _____
Brief Description: _____
Price: _____

*Closing for listings is every other Friday for the next month's issue. All listings are run for 2 issues unless pressed for space or otherwise notified by listee.

Broadcast Equipment Exchange
PO BOX 1214, Falls Church, VA 22041 • Tel: 800-336-3045 • Fax: 703-998-2966



Call Simone Mullins, Classified Ad Manager, to reserve space in the next issue. Use your credit card to pay, we now accept VISA and MASTERCARD.

5827 Columbia Pike, 3rd Floor Falls Church, VA 22041 • PHONE: 703-998-7600 • FAX: 703-998-2966

Select from these categories for best ad positioning:

- | | | | |
|----------------------------|-----------------------|--------------------------|----------------------|
| Acoustics | Computers | Receivers & Transceivers | Test Equipment |
| Amplifiers | Consoles | Recorders | Transmitter/Exciters |
| Antennas & Towers & Cables | Disco-Pro Sound Equip | Remote & Microwave Equip | Training Services |
| Audio Production (Other) | Financial Services | Repair Services | Tubes |
| Brokers | Leasing | Satellite Equipment | Turntables |
| Business Opportunities | Limiters | Software Stations | Positions Wanted |
| Cart Machines | Microphones | Stereo Generators | Help Wanted |
| CD Players | Miscellaneous | Tapes, Carts & Reels | |
| | Monitors | Tax Deductable Equipment | |

Classified Advertising Rates Effective January 1, 1997

	1x	3x	6x	13x
1-9 col inch (per inch)	\$69	66	61	55
10-19 col inch (per inch)	52	59	55	50
Distributor Directory	105	100	95	90
Professional Card	74	68	62	56
Classified Line Ad	\$2.00 per word			
Blind Box Ad	\$15 additional			

To compute ad costs: Multiply the number of ad inches (columns x inches) by the desired rate schedule for your per unit cost. Example: a 3" ad at the 1x rate is \$207, at the 3x rate \$195, at the 6x rate \$183, at the 12x rate \$165, etc.

TRANSMITTERS

Want To Sell

CCA AM 5000D 5 kW, 1 kW cutback, 3CX2500F3 final two 4CX3000A modulators, excel cond, \$12,500 FOB; Kintronics 1 kW AM cutback to 500 & 200 W, adjustable, \$500 FOB C Jones, WMNY, 7610 Old #6 Hwy, Santee SC 29142, 803-854-6396

Gates FM 5 K in gd cond used as stand-by, \$6000, T Hodgins, KUJ AM, Rt 5 Box 513, Walla Walla WA 99362, 509-527-1000.

Harris MS-15 FM exciter, \$1350, Kathleen Cherrier, Vital Music, 352-669-2098 or 1-800-796-2941.

Wilkinson FM-1000E w/SGC stereo gen & FMR 10 exciter on 106.1 MHz, \$1600, F Hoffmann, KXCC, 826 S Padre Island Dr, Corpus Christie TX 78416, 512-851-1725.

Gates FM5H 5000 W at 92.1 w/TE3 exciter, \$10,000, R Miller, Miller Media Group, 111 W Main Cross, Taylorville IL 62568, 217-824-3395.

Harris MW1A AM on 1430, recent upgrades to PA modules, spare kit, on air, \$7000, J Ferguson, WCLT, 674 Jacksontown Rd, Newark OH 43058, 614-345-4004.

Harris FM 10H in service, problem free unit, \$11,500, Call 603-668-6400.

Want To Buy

McMartin AM/FM xmtr, any model, exciter or stereo modules, Goodrich Ent., 11435 Manderson, Omaha NE 68164, 402-493-1886. **50 kW RF components** in gd cond, inductors, at least 12 microhenrys at 50 amps, capacitors, 500 pF, 15 kV at 50 amps vacuum fixed or variable, RF contactor rated at least 80 amps, 30 kV, 220 V coils or complete 50 kW ATU, G McLintock, WNQM, 1300 WWCR Ave, Nashville TN 37218, 615-255-1300.

FM xmtrs, 3-5 kW, late mdl in excel cond, D Murray, WLJO, 1028 Woodstone Dr, Kingsport TN 37663, 423-239-4745.

QEI FM exciters and low power transmitters. Will make reasonable offer for used gear manufactured by QEI. Preferably 675 exciters or QEI exciters that were built for other broadcast companies. Call or fax (609) 232-1625 and ask for Bob Brown.

ADVERTISING SPACE IS AVAILABLE!

Call
800-336-3045
Ext.154

USED FM TRANSMITTERS:

- Harris FM-25K 1983 vintage excellent
- Energy Onix MK-22 20 KW FM 1995 vintage, like new
- McMartin BF-25K 25-KW FM 1979 vintage, vgc.
- RCA BTF-5B 5-KW FM 1960's vintage, clean, only \$2,595!
- FM Exciters, several available call Chris at RF Specialties 816-628-5959

WHEN YOU'VE GOT SOMETHING THIS GOOD, YOU CAN'T HELP BUT BLOW YOUR OWN HORN!



There comes a time when a company knows it has a break through product. And for Energy-Onix, that time is now.

The **ECO 15-30**, Single tube, High Power Grounded Grid Transmitters up to 32 KW.

- ◆ Solid State driver up to 2 KW serves as emergency transmitter
- ◆ Straight Forward field proven control system
- ◆ VSWR Protection & More

◆ BEST OF ALL THEY ARE ECONOMICALLY PRICED!



"The Transmitter People"
Energy-Onix

518-758-1690
FAX: 518-758-1476

1306 River St, Valatie NY 12184

TRANSCOM CORP.

Serving the Broadcast Industry Since 1978

Fine Used AM & FM Transmitters and Also New Equipment

For the best deals on Celwave products, Andrew cable and Shively antennas.

100 KW FM 1985 Harris FM100K	1 kW AM 1978 Harris MW-1
1 KW FM 1988 Harris FM1K	1 kW AM 1980 Continental 314R-1
2 KW FM 1971 Collins 831D-1	10 kW AM 1980 Harris MW-10
5 KW FM 1969 RCA BTF 5D	10 kW AM 1976 Continental 316F
10 KW FM 1976 RCA BTF 10E	25 kW AM 1982 CSI T-25-A
20 KW FM 1975 Harris FM20K	50 kW AM 1978 Harris MW50C3 (1100 KHZ)
20 KW FM 1974 Collins 831G2/Cont 816R2	50 kW AM 1978 Continental 317C-1
20 KW FM 1967 Collins 830H-1B	50 kW AM 1973 Continental 317C
20 KW FM 1977 RCA BTF 20E1	50 kW AM 1981 Continental 317C-1
20 KW FM 1983 RCA BTF 20ES1	50 kW AM 1982 Harris MW-50B
20 KW FM 1974 Harris FM20H/K	

1077 Rydal Road #101, Rydal PA 19046
800-441-8454 • 215-884-0888 • FAX No. 215-884-0738

IF YOU WISH TO CONTACT OUR HOME PAGE,
WE ARE AT WWW.TRCORP.COM

IF YOU WISH TO E-MAIL US, WE ARE AT TRANSCOM@TRCORP.COM

HELP WANTED

Moss Entertainment is looking for a Chief Engineer for our Napa CA stations. Requires knowledge and experience with maintenance, repair, and construction of directional AM and FM facilities, studios, automation, and PC's. It's a great station in a wonderful part of the country. Resume and salary requirements to Jon Banks, Moss Entertainment Corp, 809 Grand Ave South, Glenwood Springs, CO 81601, or fax 970-945-1237. EOE.

Christian FM Network, headquartered in upstate New York, has immediate opening for morning drive co-host. Individual must be quick-witted, conversational, positive, creative and ministry motivated. Competitive salary and benefits. Call 1-800-927-9083. EOE.

Broadcast Radio Engineer
Paxon Miami accepting applications for future openings. 2-yr's experience required. Knowledge of studios, transmitters, remote broadcast operations required. Computer knowledge a plus. Fax resume:
Roy Pressman
305-999-6100. EOE.

Assistant Engineer
Individual to maintain all aspects of 4 radio stations. Two years experience or AAS degree required. Send resume to:
WBBF/WBEE/WKIX/WQRV,
Heritage Media,
500 Forman Bldg,
Rochester NY 14604. Or
fax to 716-423-2947. EEO

POSITIONS WANTED

Big, friendly, adult voice, nice guy too, will add class to your station. News anchoring, production, air shift, board operation also maintenance. Alex, 513-777-8423.

Experienced pro worked all formats, avail now, Florida, Southeast, Western US. J.J. Shannon, 561-770-4749.

Jazz host/prod 15 yrs, seeks on-air position or syndication. Pro & proven, would like to remain in Florida or SE. Peter, 352-683-7488.

Where In The World Are You?



Reach radio professionals worldwide by advertising in **Radio World's** international edition. Call Simone for more information.
1-800-336-3045
Ext.154



ADVERTISER INDEX

This listing is provided for the convenience of our readers. Radio World assumes no liability for inaccuracy.

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Publication Manager	Heather Nicholson	Ad Coordination Manager	Simone Mullins
Classified Coordinator	Alex Frosini	Circulation Director	Sheryl Unangst
Showcase Coordinator	Vicky Baron	Circulation Manager	Robert Green
Ad Traffic Coordinator	Kathy Jackson	Accounts Receivable	Steve Berto

Advertising Sales Representatives

U.S. East: Skip Tash	703-998-7600 ext 160 Fax: 703-998-2966
U.S. West: Dale Tucker	916-721-3410 Fax: 916-729-0810
U.S. Midwest: Sandra Harvey-Coleman	317-966-0669 Fax: 317-966-3289
Other Regions: Stevan B. Dana	703-998-7600 Fax: +1-703-998-2966
Latin America: Alan Carter	+1-703-998-7600 ext 111 Fax: +1-703-998-2966
UK, Benelux, Scandinavia: Phil Guy	+44(0)1869-337508 Fax: +44(0)1869-337509
S. Europe, Africa, Middle East: Raffaella Calabrese	+39-2-7030-0310 Fax: +39-2-7030-0211
Asia/Pacific: Eji Yoshikawa	+81-3-3327-2688 Fax: +81-3-3327-3010

Free Subscriptions are available upon request to professional broadcasting and audiovisual equipment users. For address changes, send current and new address to RW a month in advance at P.O. Box 1214, Falls Church, VA 22041. Unsolicited manuscripts are welcomed for review; send to the attention of the appropriate editor.

ABOUT OUR EMPLOYMENT SECTION

HELP WANTED

Any company or station can run "Help Wanted" ads for \$2.00/word or buy a display box for \$69/column inch. Payment must accompany insert, use your MasterCard or VISA; **there will be no invoicing**. Blind box numbers will be provided at an extra charge of \$15. Responses will be forwarded to listee, unopened, upon receipt. Call 800-336-3045 for details.

POSITIONS WANTED

Any individual can run a "Position Wanted" ad, **FREE** of charge (25 words max), and it will appear in the following 2 issues of Radio World. Contact information will be provided, but if a blind box number is required, there is a \$15 fee which must be paid with the listing (**there will be no invoicing**). Responses will be forwarded to the listee, unopened.

Mail to: **BROADCAST EQUIPMENT EXCHANGE,**
PO Box 1214, Falls Church, VA 22041
Attn: Simone Mullins



ADVERTISING SPACE IS AVAILABLE!

Call **800-336-3045**
Ext.154
for more information!



CALL NOW!

CALL NOW!

FROM THE LARGEST FACILITY
TO
THE SMALLEST STATION
PEOPLE KNOW
THE
AUDITRONICS 210 SERIES



PEOPLE KNOW:

- ◆ classic style when they see it
- ◆ sturdy reliability when they feel it
- ◆ convenience when they operate it
- ◆ support when they need it
- ◆ affordability when they buy it
- ◆ longevity when they use it year after year
- ◆ thousands are in use right now

AND PEOPLE GET THE BEST AUDIO FROM:

AUDITRONICS

3750 Old Getwell Road, Memphis, TN 38118 (901)362-1350 Fax: (901)362-8629

GSA #GS-03F-4032B

Circle (58) On Reader Service Card

World Radio History

Some Countries Have It ALL!



WSIX - Nashville, Tennessee
"Country Music Station of the Year"

A-500 Studio Furniture delivered March 1993
A-500 Console S/N 20789 delivered April 1993
A-500 Console S/N 20792 delivered April 1993
A-6000 Studio Furniture delivered March 1995
A-6000 Console S/N 22536 delivered March 1995
R-16 Console S/N 22557 delivered March 1995
SP-5 Console S/N 22593 delivered April 1995

1995 Academy of Country Music Award
1995 Marconi Country Music Award
1995 Billboard Country Music Award
1995 Country Music Association Award
1995 Country Music Association SRO Award
1995 Gavin Country Music Award
1996 Gavin Country Music Award
1996 Academy of Country Music Award

Wheatstone Model A-6000 Audio Console shown

 **Wheatstone Corporation**
tel 315-452-5000 / Syracuse, NY.

Circle (51) On Reader Service Card
World Radio History