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RadioWorld®

Complete AES Coverage See pp. 13-21

Vol 18, No 25

Radio's Best Read Newspaper

December 14, 1994

Decision On EBS Welcomed

by Thomas Pear

WASHINGTON The recent FCC decision to replace the current Emergency Broadcast System (EBS) with the new digital Emergency Alert System (EAS) left broadcasters scratching their heads because the commission did not get specific by mandating any one emergency broadcasting product, establishing equipment guidelines instead.

But until December 13, when the FCC formally publishes a report and order, Mum's the word as to exactly what the guidelines are.

Once the report is issued, said John Marino, an engineer and director of technical conferences for the National Association of Broadcasters (NAB), "we will know what the commission has in mind." However the FCC did release a written statement with an overview of the guidelines.

FCC Emergency Broadcasting Chief Dr. Helena Mitchell promised the forthcoming rule and order would not vary too much from the already released guidelines.

The statement said that EAS equipment must be compatible with a required FCC digital system architecture that will allow broadcast, cable, satellite and other services to send and receive alerting information; will have multiple source monitoring for emergency alerts; will reduce the alerting tones down to a minimum of eight seconds; will create unobtrusive weekly tests; will feature automated and remote control options; will have the ability to issue alerts in other languages; will make provisions for the hearing impaired; will prohibit the false use of the codes and the alert signal and will mandate a standard protocol for sending messages.

Stations have until July 1, 1996 to have equipment up and running that complies with the new regulations, a deadline that has the endorsement of

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GOP Congress Could Revive Spectrum Fee

by Thomas Pear

WASHINGTON Although Republicans are poised to take congressional leadership, a Republican House and Senate may not be a complete bed of roses for broadcasters, said the National Association of Broadcasters (NAB).

One threat the new leadership poses to broadcasters is possible spectrum fees, a type of tax for use of the airwaves.

The Republicans have promised to balance the budget and cut taxes at the same time, which means they have to get money somewhere, says NAB President and CEO and Edward Fritts.

"As we review the Republican agenda, part of what they have said is a balanced budget and that means the search for money will continue," he noted. "In terms of spectrum fees, clearly they have been on the table and we expect them back on the table."

Wish list

Actually, spectrum fees have been on the federal government's "revenue wish list for 12 years," said NAB spokesman Doug Wills. Fritts pointed out that even so-called tax cutting Republicans find potential spectrum revenue too great a temptation to ignore.

"Through the years in the Bush administration they proposed in every budget about \$10 billion in fees," Fritts said.

Other threatened radio revenue includes performance royalties and costly beer and wine disclaimers.

Senator Orrin Hatch (R-Utah) and Representative Carlos Moorhead (R-Calif.) are favorably disposed to the institution of performance rights fees, Fritts noted. Although the two Republicans leaders also support exemptions for broadcasters, when issues go before congressional committees and up for congressional votes almost anything could happen, so broadcasters prefer that performance royalties stay off the congressional agenda entirely.

Senator Strom Thurmond (R-S.C.) was the principal sponsor of the beer and wine disclaimer act, which could become an advertising disaster for radio stations. Citing compelled speech is a violation of free speech, beer and wine advertisers are prepared to yank advertising from the airwaves if they are forced to run disclaimers in their ads, Wills noted.

There was some speculation that cutting advertising tax deductions may also be considered as possible revenue enhancement,

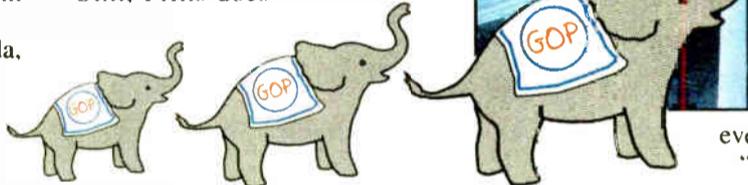
but Wills believes that scenario is unlikely in a Republican congress.

"Republicans have traditionally been less regulations and more jobs," Wills pointed out, adding that if businesses are forced to forfeit their advertising tax deductions, they will have to find another way to cut costs

Against the grain

"That seems to go against every Republican and Democratic philosophy there is," Wills said.

Still, Fritts does



not completely rule out the possibility of businesses losing the advertising tax deduction.

Overall, though, Republican leadership—with its hands-off approach to business—could be a healthy turn of

events for broadcasters. "Generally speaking, our belief is that the

Republican philosophy is generally less regulatory and more...free market," Fritts said. "I think there will be some changes in those areas as a result in the shifts of Republican vs. Democrat."

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NEWSWATCH

EIA Announces New Board

SAN FRANCISCO The Electronic Industries Association's Consumer Electronics Group (EIA/CEG) recently announced the results of its 1995 officers election, held at the 70th EIA Annual Fall Conference in San Francisco.

Joseph P. Clayton was elected EIA/CEG executive committee chair and Robert L. Borchardt was elected vice chair. Other executive committee members are F. Jack Pluckhahn, Jerry Kalov, John J. McDonald, Stephen C. Trice,

Kathy Gornik, Stan St. John, Darrell E. Issa, Gerald M. McCarthy and Gary J. Shapiro.

Gormik was also elected EIA/CEG Audio Division Chair. Issa was also elected mobile electronics division chair and Michael Shields was elected audio systems chair and national radio systems chair.

Communications Industry Expands

NEW YORK An expanding 1993 economy and widespread restructuring, creat-

ed a rise in the communications industry operating margins from the 1989-1991 recession years to the 1992-1993 growth years, said the recently released 12th Annual Veronis, Suhler and Associates Communications Industry Report.

The report, which covers 392 companies operating in 11 markets, also said that return on assets posted four year highs.

Radio and television broadcasting both posted operating income margins at 16.2 percent. That is up from 1991 where operating income margins were reported at 10.9 percent.

Also, The National Association of Broadcasters previously reported that it expects 1994 radio advertising revenue to exceed \$10 billion, a first for the radio industry.

Overall communications industry margins for operating income and for operating cash flow rose six-tenths of a point in '93, to 13.9 percent and 20.8 percent respectively, continuing a recovery profitability that started in 1992.

"Between 1989 and 1991, the U.S. recession precipitated a sharp decline in margins, said Veronis, Suhler and Associates President John Suhler, the operating income margin fell from 14.3 percent to 11.9 percent, and operating cashflow margin dropped from 21.2 percent to 18.9 percent."

Companies survived that recession by cutting cost, and the improved sales nearly made up "all of the lost ground between 1989 and 1990," Suhyer said.

Industry companies managed their asset base with even greater results, and operating cash flow return on assets rose to 15.3 percent."

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FCC Considers Unattended Operation

Commission Solicits Comments on the Possibility of Allowing Unattended Broadcast Transmitter Operation

by T. Carter Ross

WASHINGTON At the same time it issued a ruling on the new Emergency Alert System, the FCC asked for comments on the possibility of changing the rules that govern unattended transmitter operation.

Under current FCC rules every AM, FM and TV station must have an on-duty operator at either the transmitter site, a

remote control point or an alarm attached to an automatic monitor. Furthermore, the operator must hold a radio operator license or permit.

"They are just catching up with what a large number of radio stations have been doing for the last several years: Locking the doors at 5 p.m. and going home," said Ron Cole, chief engineer at KZEP-AM-FM in San Antonio, Texas.

As the FCC believes that "most broad-

casters will exercise due diligence" in automating their stations, the commissioners decided to solicit comments on allowing unattended operation.

According to the commission's statement, "the availability of modern monitoring and control equipment may have rendered unnecessary the continuous attendance of the duty operator for many, if not all, stations."

"Anything that allows unattended operation is a good thing. We have the technology to do it," said Rick Prime, technical director for Family Radio. "Modern technology and the computers that can be embedded in transmitters can monitor for conditions that cause interference and shut off the transmitter if they occur."

Under the proposed rules change, licensees must still maintain their stations in accordance with FCC technical rules, and equipment that could take a transmitter off the air in case of a serious malfunction would be required.

For stations that elected to retain a duty operator, the commission may waive the requirement for duty operators to hold a restricted permit.

"Generally, we feel stations should be given the opportunity to operate without operators in full-time attendance," said

John Marino, manager of technical regulator affairs for the NAB Department of Science and Technology. "The equipment is stable enough and of high enough quality that it shouldn't require an operator at all times."

Marino further stated that while it is reserving comments until the FCC releases an official notice of proposed rule-

making, the NAB does support allowing greater flexibility in unattended operation.

The FCC's move is both a continuation of the deregulation of broadcasting begun in the

1970s and a concession to the ever-increasing trend towards more automation. And while it frees board operators from having to take transmitter readings, there is a question as to how the change might impact station engineers.

"The practical effect will be quite minimal for us," SBE Vice President Terry Baun said.

"Our business is technical support, troubleshooting. Skills are skills, the kind of things that won't change, unlike specific federally mandated rules and regulations," Baun said.

In light of frequently asked questions, the FCC is likely to update and clarify various transmitter monitoring and control requirements as part of the change.

The FCC is expected to release a notice of proposed rule-making regarding unattended operation within a few weeks. ☺

The NAB does support allowing greater flexibility in unattended operation.

NEWSWATCH

► continued from previous page

AWRT Seeking Radio Entries for Program Awards

MCLEAN, Va. American Women in Radio and Television (AWRT) is inviting entries for its 20th annual commendation awards for news, features and advertising programs that are creative and realistic in their treatment of women.

To qualify, programs in radio, television, cable and advertising must have aired for the first time between Dec. 1, 1993, and Nov. 30, 1994. Entries must be postmarked by Dec. 20, 1994.

Winners will be honored in New York at an awards gala in April. Past radio winners include the BBC Radio Scotland's "Speaking Out" and Minnesota Public Radio's "Crisis Center."

For more information contact Terri Dickerson-Jones at 703-506-3290.

Patrick Communications Publishes SBA Loan Book

ELLICOTT CITY, Md. Patrick Communications Corp. this month announced its publication of "The Broadcasters Guide to SBA Loans," a comprehensive step-by-step guide to help broadcast entrepreneurs obtain

guaranteed Small Business Administration loans, which have recently become available to them.

The 90-page book discusses how to apply for loans and how to complete loan application forms. It has detailed instructions on what an effective business plan should include. To further assist readers with their loan application, the manual also gives examples of completed loan forms.

The book cost \$125, including shipping and handling.

For more information about the book call Susan Byers at 301-596-9814.

AFCCE Expands Focus, Members

WASHINGTON The Association of Federal Communications Consulting Engineers recently approved a plan to expand their broadcasting focus to encompass other communications areas regulated by the FCC, including wireless, land mobile, common carrier and personal technologies.

Likewise, the association will seek new members affiliated with companies engaged in these communication industries, and the organization is offering associate memberships to those practicing in allied fields like communications law. ☺

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Evolution of Global Radio Continues

WASHINGTON Even while digital radio proponents hash it out in Cleveland—testing, retesting and putting their various systems through their paces—Digital Audio Broadcasting discussions continue to roll right along in the rest of the world.

Radio World International correspondent, Mary Ann Seidler, covered the first DAB symposium held in Tunis, Tunisia, last month, and she reports some interesting tidbits from abroad (look for her story in our next issue).

It is funny, sometimes, to sit back and reflect on the inordinate amount of clout the good old U.S.A. has on a global basis. So much so, that, in many cases, it is easy to forget that our reality, as a country, is far different than the bulk of countries around the globe (I don't mean Europe, either).

Mary Ann reports that although interest is keen on what is happening with digital radio, many nations, particularly developing ones, are still struggling to put analog radio on the air. And while DAB may be of interest to them, that interest, at this point, is strictly an academic one.



Also, many developing countries view the U.S. as extremely imperialistic in a very mercantilistic way. (You know, "Money-grubbing gringos go home!" I know this is true from first-hand experience.) Perhaps to avoid seeming so, U.S. representatives at the Tunisia gathering were very low-key. So low-key, in fact, that NAB's Michael Rau, who presented two papers during the symposium on the U.S. in-band, on-channel (IBOC) system,

told delegates that IBOC is aimed at the U.S. market, and that there is no intent to export the



In some parts of the world, the decision to go to an in-band digital system or an out-of-band system is many years away.



technology.

Tactful statements from the NAB, to say the least, but when Rau was pressed on the point further once back in the States, he did not rule out the possibility that individual digital proponents could modify and market their equipment overseas.

Interestingly enough, Eureka-147 DAB was the only digital radio system to be demonstrated live during the symposium, although a videotape demonstration of the USA Digital system was also shown.

★ ★ ★

I've written in the past about the value of longevity in this business. And it is true that if you've lasted in radio then you've probably done something right. No one exemplifies the best in radio more than Warren Maurer, a 37-year veteran of Group W Radio.

Many of you may recall seeing his name associated with KYW Philadelphia or 1010 WINS in New York (many of you may in fact know him). During the past year, he has been vice president/development for Group W Radio, but he began his career in the promotions department. Along the way, Warren has served as vice president of the radio group and general manager of Group W flagships such as WINS(AM), KYW(AM) and WOWO(AM) Fort Wayne, Ind.

Warren also headed up all of Group W's AM stations. As of this writing, he is retiring from Group W and making the move back to Philadelphia. He'll be executive vice president and chief operating officer—Radio Group of Shadow Broadcast Services, a firm providing news, weather, sports and traffic reports to more than 250 stations in nine markets, including Philadelphia and Washington.

Warren will be running the day-to-day operations of the company while Mike Ambrose, Shadow president, will be overseeing the company's strategic plans and new projects. Congratulations to both Warren and Shadow Broadcast Services.

★ ★ ★

Closer to home, Bradley Broadcast Sales opened its doors for business at a new, larger facility in Rockville, Md. (a short 20 minutes up the beltway from RW headquarters in Falls Church, Va.) Bradley had been based in neighboring Gaithersburg during most of its 11-year history.

Bradley General Manager Art Reed said the move reflects the company's growth. Bradley, a supplier of professional audio and RF equipment, is now located in the same building complex as its sister companies, Veneman Music and Music Emporium.

It is important to note that although Bradley integrated a new and more sophisticated telephone system, its toll-free number remains 800-732-7665. Its new fax is 301-230-6526, and the new direct dial number is 301-231-7800.

And speaking of progress and growth, the Radio Advertising Bureau (you know, those guys who keep telling us how much money you are making) is extending a unique opportunity to general managers around the U.S. Any sales manager who registers to attend the RAB '95 Marketing Leadership Conference and Executive Symposium, to be held February 16-19 in Dallas, can bring his or her general manager along for half price.

For information on the RAB gathering, call 800-722-7355.



Patrick Courtin was appointed chairman and chief executive officer of ComStream Inc. Courtin joined Spar Aerospace Limited, parent company of ComStream, earlier this year as senior vice president, communications. He retains that position in addition to his executive responsibilities at ComStream. His responsibilities include all strategic development, with emphasis on sales and marketing.

ComStream is an international provider of satellite-based communications systems and networks for voice, data, imaging and video applications.

James D. Godfrey was appointed director of sales and marketing for Marti Electronics. Godfrey will report to George Marti, president. He previously served as vice president/product manager, Tracker Division of Radio Computing Services (RCS) in Scarsdale, N.Y.

Marti Electronics was recently purchased by Broadcast Electronics.

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Hi Yo Silver?

Dear RW,

I enjoyed Richard O'Donnell's piece on my buddy, The Lone Ranger.

You know, I have probably heard all of The Lone Ranger radio shows and probably have seen all the videos and big screen movies. I also was a member of The Lone Ranger Safety Club.

I cannot recall ever hearing him say "Heigh Ho Silver." My ears always hear "Hi Yo Silver. Away"

Ed Howell
Folly Beach, S.C.

Critique Offered

Dear RW,

Perhaps a criticism or correction may be in order to Cris Alexander's Oct. 19 article, "When to Use Electrically Short AM Antennas."

The use of an electrical short-tower and an "abbreviated" ground system will never produce the required FCC minimums of antenna efficiency, although under dire circumstances, the FCC will go along with the plan, the resultant poor signal with poor high frequency program quality will do nothing to regain listener image.

A grounded tower is a very handy choice if extra revenue is sought with two-way and cellular tower rentals, but adding the drop wires of a monopole system will never make up for a short tower. The best that can be said for this system is that the sign of the reactance at the feed point is reversed and a totally capacitor ATU can be installed with its attendant advantages. The slant wire feed system is no longer approved by the AM branch, thank goodness, a Mickey Mouse idea at best.

If a station owner is faced with the loss of his antenna site, I would first recommend a trap system as the cheapest so that a tower, preferable taller than the original,

be rented. A two-station trap system easily can be constructed by most engineers, at a cost less than \$5,000 for two, non-directional stations. Paying rent to a tower owner is much more practical for IRS and capitalization plans. Losses in radiation efficiency or audio quality are negligible. That station down the road may welcome tower rental fees more than you think.

Another alternative is to erect a four-tower array made out of the original tower sections so that if, say the tower is 300 feet, each new tower would be 75 feet. The tower manufacturer could supply four tower top plates and four grounded bases to complete the actual radiators. This is a paran, or a better explanatory name, a leaky coax system.

The towers would be set up in a 75-foot square. Perimeter and a cross system of copper cables connect together between the tower tops but are insulated from them and run down inside each tower to a loading coil at each base. Because the wave front is extremely wide from the four towers, high frequency response is as good as any quarter-wave radiator, and the efficiency easily meets the FCC requirements.

No painting or lighting is needed, and the original ATU may be modified to match the feed point at one of the towers. They are type-approved; the first was seven years ago at Kona, Hawaii (for KIPA), and a second came on the air about three years ago as KAPS at Mount Vernon in the state of Washington. Kona has 90-foot towers for 620 kHz; KAPS has 100-foot towers on 660 kHz.

Contrary to short-tower use, the vertical radiation is much less than that obtained from a quarter-wave tower. The ground conductivity at Kona is zero. A very deep lava flow covers the area around the towers—approximately 35 miles by 12 miles. Ground radials that are 150 feet long are laid out on top of the rocky surface. The KAPS site, by comparison, has a deep, loamy soil and a similar ground system buried in the usual manner. From a site about 100 miles away over open ocean, I have observed signals from the paran and two other stations using quarter-wave towers from darkness to sun-up and the paran's signal has always been stable while the other two station's signals ducked and dived for almost an hour, proving the paran's low vertical radiation.

The FAA has approved the Kona system which is within one-half mile of the Kona International Airport. Both KIPA and KAPS radiate a 10 kW signal.

If anyone is in the sad predicament of losing a tower site and feels that we may be of assistance, call Jim Keane at KAPS at 206-424-7676; or myself at 808-934-7114 at 7 a.m. or 7 p.m. Hawaiian Standard Time.

Alan Roycroft
KIPA(AM)-KHWI(FM)
Hilo, Hawaii

Cris Alexander replies: I disagree with Mr. Roycroft's statement that an electrically short tower and an abbreviated ground system can never produce the required FCC minimums of antenna efficiency. The FCC's minimum of 282 mV/m at 1 km for 1 kW of input power can, in fact, be met with radiators con-

Heeding the Road Signs

The FCC is looking into allowing unattended operation of broadcast transmitters. The move underscores the continuing technological evolution of the radio station, and makes sense given the realities of today's sophisticated radio equipment and the economic realities of the industry.

Under the proposed rules change, licensees must still maintain stations in accordance with FCC technical rules, and equipment that could take a transmitter off the air in case of a serious malfunction would be required.

That equipment is already inside most modern transmitters.

For stations that elect to retain a duty operator, the commission may waive the requirement for duty operators to hold a restricted permit. A restricted permit can be obtained without any proof of technical competency, so it won't cause an undue burden on stations making that election.

Years ago, radio transmitters required constant tending and inspecting. AM and FM frequency oscillator crystals were subject to drifting, and routine inspection was imperative for safe and non-interfering operation.

The last 10 or 15 years have borne witness to marked improvements in technology in all facets of the radio business. Transmitter technology has been no exception. Today, transmitting equipment is more reliable and far more stable than earlier models. A transmitter's design and its microprocessor and computerized monitoring of critical circuitry all but eliminate the problems of interference or illegal operation.

FM exciters have built-in loss of frequency lock circuits that shut an exciter off should it begin to drift. Most modern transmitters come with "auto power" circuitry designed to keep an FM transmitter working at 100 percent licensed power.

This continuing process, however, also underscores the broadcast engineer's evolving role in today's station. No longer is he sitting at the transmitter site preventing oscillator drift—today he or she requires far more demanding and sophisticated skills, including sufficient and varied enough knowledge to successfully interconnect a facility full of hardware and software, digital toys, old analog boxes, etc.—and then troubleshoot any and all equipment that fails in the chain.

So yes, unattended operation of broadcast transmitters makes sense. It also marks another step in the evolution of broadcast engineering. Engineers wanting a long and successful career in broadcasting should heed the road signs and buckle up for the ride ahead.

-RW

siderably shorter than 0.25 wavelength. The statement that the slant-wire feed system is no longer approved by the FCC also is not correct. For daytime operations, the FCC will accept slant-wire feeds. Such feeds are not acceptable on new night-time radiators because it is difficult to predict the vertical radiation characteristics of such antennas.

Diplexing is certainly a good alternative for stations needing to relocate (see RW, June 29, "Combined AM Transmissions Likely to Increase"). Whether a two-station system can be constructed for less than \$5,000 depends upon frequency spacing, tower height, station power and proximity to other AM stations.

The paran antenna is an excellent way to achieve FCC minimum radiation efficiency with four towers with heights as low as 50 to 100 feet.

Count to 10

Dear RW,

In reply to Mark Heller's disgust with the FCC's expanded band allotments, let me suggest that he just calm down long enough to think this through.

What did he expect? Did he want the expanded band to look like FM after docket 80-90?

I can assure you that this is not a "get rich quick" scheme for guys like me who bought off-the-air former daytimer in a big market in 1990, made it profitable—signal troubles and all—and are now faced with coming up with another \$150,000 to make the move.

With more than 40 signals in Tulsa, Okla., it will be my programming and not my signal which will keep me profitable. The idea was to remove the biggest sources of interference from the lower band. In my case, we had a night-time CP on 1270 issued under the old rules, which I would have cheerfully built but would have maxed out 1270 kHz for eternity,

making it impossible for any operator on that or several adjacent frequencies to ever make any changes.

The FCC wisely looked at the band, looked at the applicants and came up with an engineering scheme that evenly distributed the allocations based on those who applied.

As far as states being overlooked, I never saw in the original rule-making proceeding any reference to geographical quotas. I fail to see what automakers complying with the law has to do with Michigan getting an allocation.

If stations who got allocations do not want to build, I trust there will be a second round to distribute those open frequencies.

As far as "no activity at the very top of the band," that is the same problem. AM has had since the 1970s. It comes down to AM operators proclaiming that AM is dead; I remember at an NAB show back in 1987, I suggested that AM wasn't dead, AM operators were brain dead. All the folks in the room looked at me like I was crazy.

I'm still crazy. I can assure you that in Tulsa, Okla., not only will there be plenty of activity at the very top of the band (at least 1640 kHz) but we will not fail. Two of the top-rated stations in this market are AM stations and even those of us with no ratings are profitable.

This can only help a good situation get better.

Finally, I am going to tell you how much faith I have in my theory that if you put something on the air people want to hear, they will fiddle with the dial to tune in. I am going straight to 1640 kHz and getting rid of 1270 on the very first day which I hope to make happen even quicker through the use of an STA.

Fred Weinberg
President
KTRT(AM) Tulsa, Okla.

Radio World

Vol. 18, No. 25 December 14, 1994

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Radio World (ISSN: 0274-8541) is published bi-weekly by Industrial Marketing Advisory Services, Inc., 5827 Columbia Pike, Suite 310, Falls Church, VA 22041. Phone: 703-998-7600, Fax: 703-998-2966. Second-class postage rates are paid at Falls Church VA 22046 and additional mailing offices. POSTMASTER: Send 3579 forms and address changes to Radio World, P.O. Box 1214, Falls Church VA 22041. REPRINTS: Reprints of all articles in this issue are available. Call or write Regan Deatherage, P.O. Box 1214, Falls Church, VA 22041; (703) 998-7600; Fax: (703) 998-2966. Copyright 1994 by Industrial Marketing Advisory Services, Inc. All rights reserved.

—PRINTED IN THE USA—

Next Issue of
Radio World
December 28, 1994

DAB UPDATE

EIA DAB Tests Viewed as 'Unfair'

by Judith Gross

NEW YORK USA Digital proponents are crying "foul" over multipath DAB tests, but EIA representatives in charge of the tests say the issue is closed and there will be no re-testing.

The question is, do U.S. radio stations need to be concerned about whether the test process has been unfairly slanted against IBOC (in-band, on-channel)?

"We think there's a fairness issue, a technical competency issue," said Tony Masiello, vice president of engineering for CBS Radio and a USA Digital participant. "We still don't think that as it stands, the data reflects the real world of multipath faced by broadcasters."

At issue is the use of the Rayleigh fading model, a model of multipath based on cellular frequencies at 900 MHz which do not necessarily apply to FM frequencies, and the ability to simulate real multipath accurately with an H-P simulator.

Unusable Data

The problem first surfaced when the EIA committee in charge of the tests found that it could not use data collected from Salt Lake City to actually simulate multipath conditions along a stretch of terrain. Instead, 10 points along a road were chosen and an average obtained.

Technical experts for USA Digital contend that these averages do not correspond to actual multipath. They further maintain that the addition of Rayleigh fading to simulate what happens to FM reception in a moving vehicle has not been proven to be accurate for FM frequencies, although it has been used in cellular phone multipath models.

An additional argument rests on whether the fading profiles of the Rayleigh model

need to be correlated to the original frequency. USA Digital claims that path loss, scattering and other parameters in multipath must correlate to the original frequency. Robert Culver, the engineer in charge of the EIA tests, says that they do not have to be correlated.

What it boils down to is an argument over whether the lab tests on multipath are real world or unfairly severe.

"We still don't think that as it stands the data reflects the real world of multipath faced by broadcasters."

—Tony Masiello, CBS Radio

"This would be fair game if it accurately reflected multipath in the real world, but it doesn't," said Masiello.

But Culver disagreed: "Rayleigh is very appropriate to simulate a multipath environment in the lab. It accurately reflects the RF environment."

But he added that just to accommodate USA Digital, the tests were done with and without the Rayleigh fading.

Ralph Justus of the EIA said that at this point the only participants who are raising objections to test methods are USA Digital proponents. "Everybody else is in support of our procedures; no one else has said they are wrong."

But *RW* has learned that at least one other participant, who declined to be named, has sent a letter to the EIA questioning the procedure and asking that it be looked at more closely.

AT&T, with its Amati system being subjected to the same tests, has not questioned the multipath methods, but is in the midst of a request to alter its system because of a misinterpretation of FCC measurement rules (see sidebar).

Masiello said that USA Digital's objections are technically sound and not just a case of sour grapes.

"We're not worried about passing the tests. The battle will be won or lost in the mobile environment, and our system has already demonstrated how well it handles multipath in actual driving demos," noted Masiello. "But we have real-world data from San Francisco, New York and Chicago. Not to use any of this data is unconscionable."

Case closed

Still, at this point, Justus said the multipath tests are done and the issue is closed.

"We're not going to go back and re-address this issue. We've already held up these tests several weeks to do them a second time without the Rayleigh fading. It's closed unless someone presents a proposal for both re-testing and the funding of new tests," said Justus.

He said there will be a committee documenting the test methods as well as an opportunity for those who object to the methods used to include their views in "a compendium" to the test results.

But the argument is far from over as far as USA Digital is concerned. The issue now, according to Masiello, is to make the broadcast community and the NRSC aware of the problem. The NRSC is observing the tests and will analyze the results under the authority of the NAB, which is co-convenor of the NRSC with the EIA. The NRSC, like the NAB, supports IBOC DAB.

"It's time for us to bring it to their attention and find out how important the imprimatur of the EIA really is. We need to find a way to insure the fairness of the tests for all participants," said Masiello.

□ □ □

Judith Gross runs her own writing and public relations company, JG Communications. She can be reached at 718-392-3288.

RF Mask Not So Strict

by Judith Gross

NEW YORK A misinterpretation in the FCC's definition of the RF mask for FM frequencies might end up "unfreezing" the DAB systems currently undergoing EIA tests.

When DAB proponents submitted their systems to the EIA, the systems were "frozen" at that point, with no room to incorporate later upgrades or system improvements for testing.

Now proponents for the AT&T Amati IBOC (in-band, on-channel) DAB system say they have mistakenly penalized their own system by interpreting the FCC's requirement too strictly.

The Amati system uses an FM station's sidelobes to broadcast a digital signal. At that point in the RF mask, the FCC says the power of the signal must be 25 dB below the main signal. In measuring the power, Amati used the total energy in the sidebands, hoping to avoid first adjacency interference. The result was about a 5 dB penalty in power over the other IBOC system from USA Digital.

USA Digital interpreted the FCC's restriction less strictly: as a power spectral density specification, using a spectral density mask at a resolution bandwidth of 1 kHz. This measurement, at a discrete frequency with an unmodulated carrier, would allow signals of higher power in the mask. In this interpretation, some reasonable co- and first-adjacent interference is tolerated.

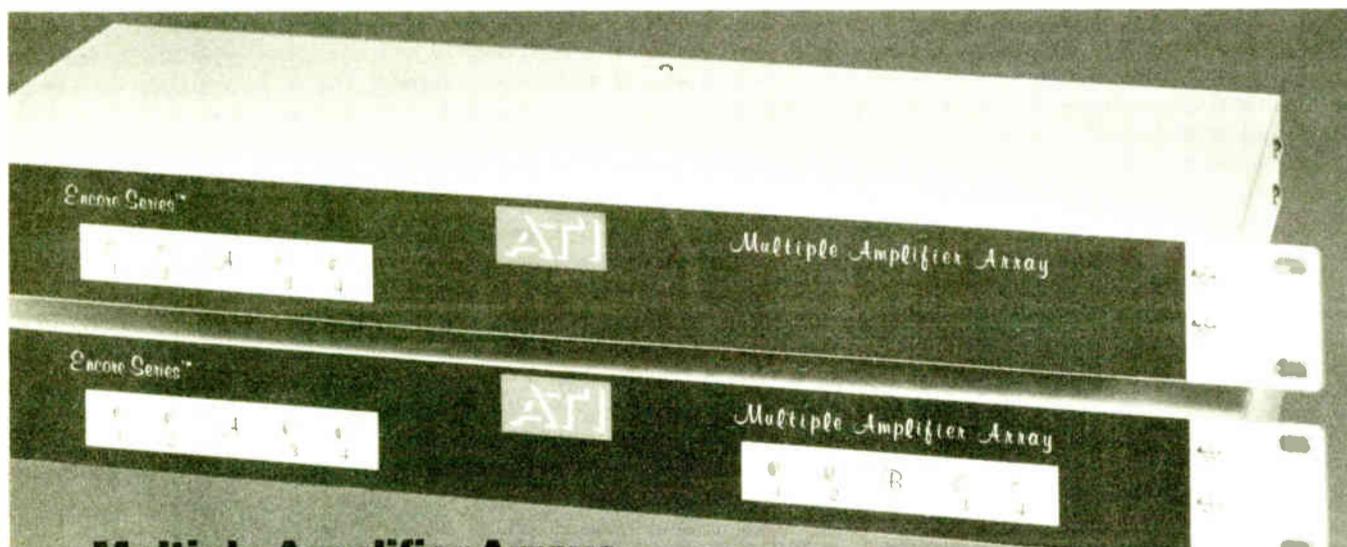
Bob Greenberg, of the FCC's Mass Media Bureau, informed the participants in a written opinion that the Commission applied the less strict method to the -25 dB restriction, basically agreeing with USA Digital's interpretation of the rules. "...the -25 dB specification is interpreted to apply to discrete (as measured) emissions. The -25 dB specification does not refer to the total energy in the -25 B region," Greenberg wrote.

Now AT&T/Amati have asked the EIA to let them modify their system to reflect the more accurate interpretation and to repeat tests already performed in the lab.

EIA engineer Ralph Justus said a letter to proponents would address the AT&T/Amati request and consider re-testing if AT&T agrees to pay for the tests. He said the re-testing would be done after all other tests are completed in order to avoid further delays.

But USA Digital proponents are saying if modifications to one system are allowed, perhaps all proponents should be given the chance to "unfreeze" their systems and make modifications.

Justus maintains, however, that he hopes to keep the issue from erupting into a full-blown request for do-overs. "AT&T has a very real concern. If we can restrain it to this very narrow issue we will consider it."



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Hall of Fame Grows in Prestige, Popularity

by Bruce Ingram

CHICAGO If Bruce DuMont has his way, the annual Radio Hall of Fame broadcast will become an event to rival the Emmy, Oscar, Tony and Grammy awards.

Starry-eyed as that may seem, DuMont, founder and President of Chicago's Museum of Broadcast Communications, can point to significant growth in awareness of the awards since the museum took over administration of the Hall of Fame from Emerson Radio three years ago.

In 1992, with Paul Harvey serving as master of ceremonies, the Hall of Fame awards were broadcast live from the museum's

Lynn "Angel" Harvey studio to 50 stations.

Last year, with Larry King as host, the show was picked up by 90 stations. This year, with Charles Osgood holding down the podium, the awards were carried on

part of the formula. He closed characteristically by saying, "I thank you for the honor. I wish you continued success. And may God bless."

Advanced age apparently prevented

News format and, with the late Todd Storz, the Top 40 format that galvanized the radio medium, won the Emerson Award for lifetime achievement in production, management or technology.

The award was accepted before the live broadcast by McClendon's son, Bart. He told a story about how his father bluffed his way through a baseball game he was re-creating, using crowd sound effects and information from a ticker tape, when the feed broke down for 20 minutes. Basically, McClendon described to the millions in his audience the longest series of foul balls and the most protracted manager/umpire argument in the history of baseball.

"That was the sort of situation he loved," he said. "My dad was in love with radio unlike anything I've ever seen."

DuMont plans to make next year's Hall of Fame broadcast the biggest yet, to coincide with the 75th anniversary of the first commercial radio broadcast: Nov. 2, 1920 on KDKA Pittsburgh.

On Nov. 2, 1995, DuMont hopes to assemble all of the living Hall of Fame inductees and link up a broadcast with major celebrities in all major markets for a big-time media event.

If all goes according to plan, the show could help him realize the ambitious goal he set for himself in September, 1991: to make the Hall of Fame awards radio's preeminent night within five years.

"We intend to put the Hall of Fame on the map," he said. "And make sure it gets the attention it deserves." ☺



From l to r: Garrison Keillor, Gary Owens, Paul Harvey and Charles Osgood

three satellite channels and picked up by more than 110 stations including 16 out of the top 20 markets.

"People in radio deserve to have their big night," DuMont said. "And that's what we intend to give them."

"At the very least," he joked, "I think we've shown our colleagues in television and motion pictures and on Broadway that you can do an award show and hold it down to one hour."

Indeed, with veteran NBC announcer Don Pardo goosing the audience and orchestrating the applause, the 1994 Hall of Fame Awards moved along swiftly and in high spirits.

Awards were presented to Garrison Keillor, creator and host of "A Prairie Home Companion," Gary Owens, whose long career included a highly visible stint in the '60s as the ear-cupping, over-modulating announcer on TVs "Laugh-In," radio pioneer Red Skelton, the "Burns and Allen Show" and programming innovator Gordon McLendon.

Once the broadcast began, the atmosphere became warm and sentimental with more than a touch of nostalgia. Garrison Keillor recalled his first moment on the air as a young newsman with "a voice I had borrowed from Lowell Thomas and Paul Harvey."

"I was scared," he remembered. "I was kind of trembling in the presence of the gods. But it was a lucky moment and there have been so many since."

Gary Owens, who was introduced by his "Laugh-In" cohort Joanne Worley, launched into a gag, '40s-style broadcast of band music "Live from the Lucille Ballroom in Chicago." Before leaving the stage, however, he revealed that radio had fascinated him since early childhood—particularly radio humorists, who helped him overcome juvenile diabetes.

Skelton, who was unable to accept his award in person due to poor health, sent a recording saying that for him, a performer who had worked in medicine shows, vaudeville, radio, film and TV, radio was "the most creative form of entertainment we ever had."

"It was almost spiritual," he said, because the listener's own imagination was a vital

George Burns from accepting the program award for the "Burns and Allen Show." Instead, impressionists Rich Little (who also presented the award for Skelton) and Jeannette Markey accepted the award by impersonating Burns and Allen and running through a few of their routines.

The late Gordon McLendon, who introduced the Easy Listening format, the All-

Historic Hall of Fame Awards Saved by Chicago's DuMont

CHICAGO The minute Bruce DuMont heard about Emerson Radio Corporation's Radio Hall of Fame, he wanted it.

DuMont, a veteran political correspondent who syndicates his own weekly two-hour "Inside Politics" program, was on a flight to New York in 1988 when he read a story reporting that Emerson was looking for a permanent home for the Hall of Fame it had inaugurated.

One year earlier, DuMont had founded the Museum of Broadcast Communications in Chicago: a permanent institution that boasted historic radio memorabilia such as Edgar Bergen's Charlie McCarthy, 50,000 hours of radio programming on tape and a state-of-the-art broadcast facility. He thought the museum and Emerson might join forces.

He also spoke with Emerson Chairman William Lane and offered the museum as a permanent home for the Hall of Fame. Lane declined, according to DuMont, saying the Hall would stay in New York "where it belonged."

DuMont was invited to the next two induction ceremonies, where he repeated his offer and finally "pleaded with them for seven or eight months to at least come out and see what we had to offer."

Early in 1991, Emerson announced that there would not be a 1991 induction ceremony. DuMont heard that the company was going through lean times financially and couldn't be bothered with the cost or work involved with the Hall of Fame.

"What started as a good, once-a-year publicity pop for Emerson had become an albatross around its neck," he said. "I asked them: 'Why don't you turn this over to someone who wants it and will nurture it?' It gave them a graceful way out."

The Museum of Broadcast Communications took over administration of the Radio Hall of Fame in September, 1991, grandfathering all of the Emerson inductees and naming one of its awards for the manufacturer.

DuMont immediately instituted a nominating process that he said would be "above reproach."

Now a steering committee of 42, chaired by DuMont, and the executive directors of the 50 state broadcasting associations make recommendations each February leading to five nominations in four categories each year. (The Emerson Award, for lifetime achievement in production, management or technology, is handled exclusively by the steering committee.)

After nominations are made, roughly 5,000 ballots are sent out in May to Hall of Fame Members, the steering committee and "virtually anyone who is in any position of authority remotely related to radio."

The ballots must be returned by Aug. 1 and winners are named Aug. 12. "Whoever finishes first is inducted, whether living or dead, whether they can come or not." ☺

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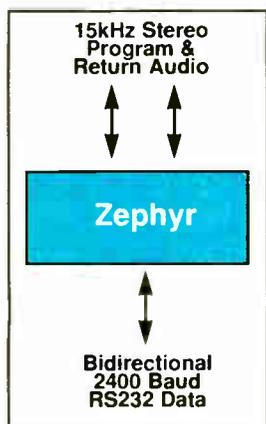
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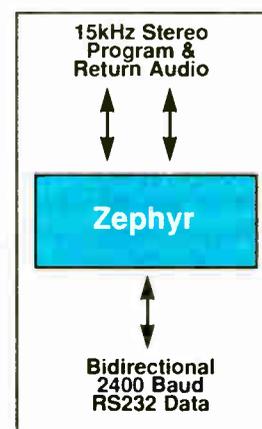


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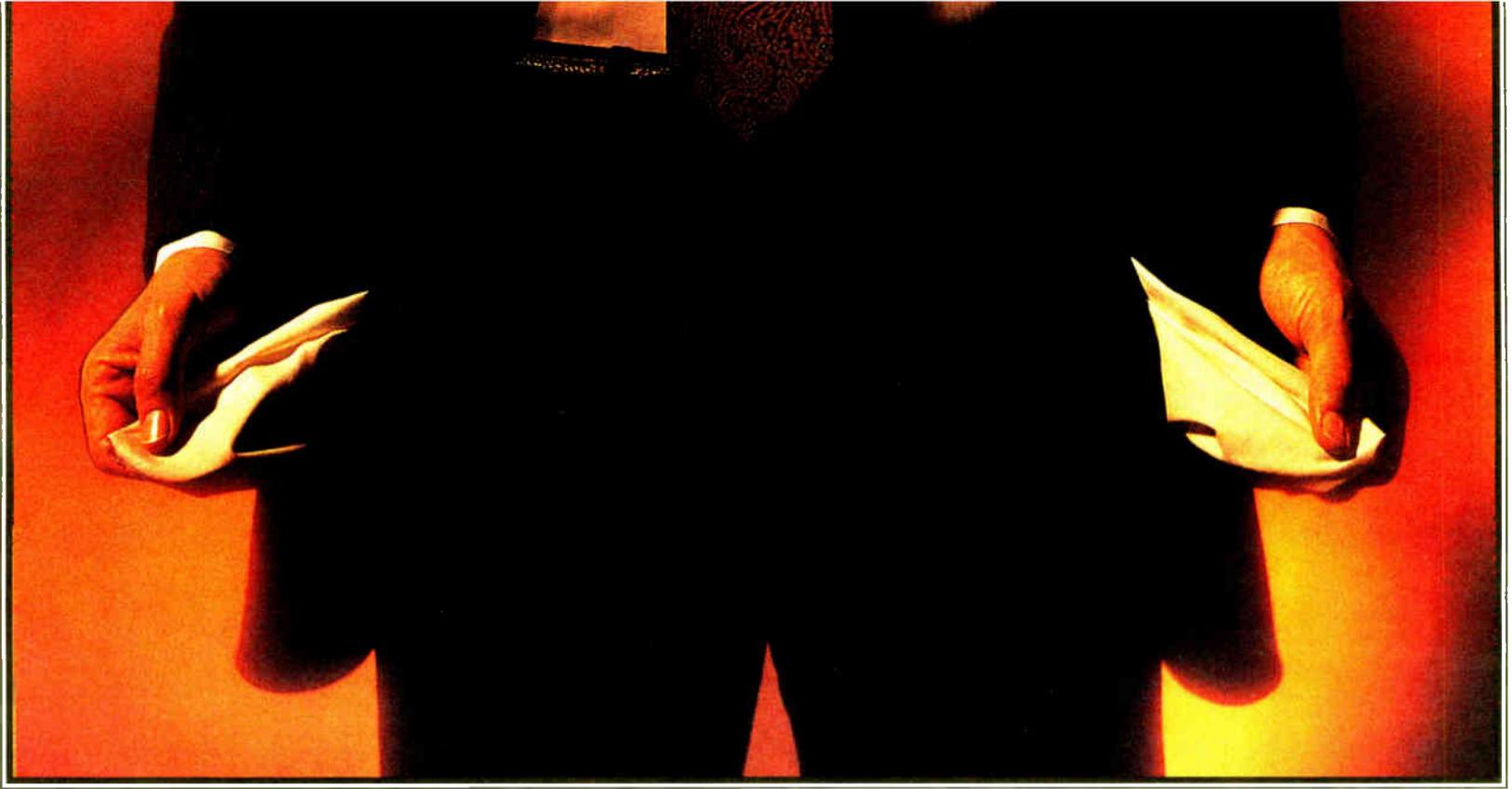


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Circle (89) On Reader Service Card
World Radio History

Loral RFR Workshop A Resource

by John Bisset

LAUREL, Md. Would you agree if you were told that the press spreads more myth than fact on the subject of RF radiation exposure? After attending a Loral one-day RFR "Safety in the Communications Industry" training course, it's no wonder the public suspects everything from a computer monitor to the tower being built down the road.

The Loral RFR safety workshops began as a sales force training program. The folks at Loral manufacture test instruments used to measure and detect RF radiation levels. They were finding RFR to be a complex subject, peppered with myths. A three-day, hands-on workshop was prepared and offered at the factory. During the workshop, health professionals were brought in to talk about RFR, as well as scheduling plenty of time to use the Loral RFR measuring instruments.

Broad cross-section

Last April, the program was taken "on the road," and the one-day workshop began. I attended the Loral Workshop, along with nearly 50 others, when it came to the Washington area. One of the most surprising things was the cross-section of participants. Not only did the audience contain broadcast consultants and engineers, but a healthy number of military officers and health and safety officials.

Everyone agreed that the public awareness to RFR issues, whether real or imagined, is on the rise. But worries of non-ionizing energy can be tempered with facts. For example, the biggest source of

non-ionizing energy is the sun.

The instructor, Richard Strickland, gave some very simple definitions of ionizing and non-ionizing radiation. When radiation is said to be ionizing, there is an electron change at the atomic level. The classic example is an X-ray. Non-ionizing radiation includes radio frequencies and on up the spectrum, to include infrared and ultraviolet light.

RF flu

In addition to explaining the effects of near field and far field radiation, RF exposure symptoms and effects were outlined. One of the more interesting effects is the "RF Flu." When someone is near a high power source and is over-exposed—but not too severely—the symptoms of warmth, perspiration, elevated body temperature, and even labored breathing can be written off as those for influenza. The individual goes home, rests, and the next day feels fine.

To explain the penetrating effects of radiation, the example of microwave hypothermia was used. This is a medical procedure that focuses a beam of RF energy on a tumor. When the temperature of the cells exceed 107 degrees Fahrenheit, they will die. In this procedure, the depth of penetration is determined by the frequency of the RF and the type of tissue.

Cancerous cells have poor blood flow, so they retain the heating effect of the RF longer. The procedure switches on the RF to heat the cells nearly to 107 degrees. Then the RF is switched off, and the cells allowed to cool. When the surrounding cell temperature reaches normal, the cancerous tissue is still warm. Repeated bursts of RF to heat the tissue eventually raise the temperature of the cancerous cells past 107 degrees, killing the tumor.

A number of studies on the effects of RFR on the human body were also discussed. One scientific study has determined the peak absorption frequency for the human body to be in the range of 80 to 90 MHz. The frequency drops to 40 MHz if the body is well grounded. Radio waves penetrate better into muscle, and not as well through fat. Another interesting fact is that the higher the frequency, the lower the depth of penetration. Although whole-body average exposure limits are useful, there are two exceptions—the eyes and the testes. Due to poor blood flow, one can't depend on the body to cool these tissues properly. The effect is non-reversible much more quickly when exposed in those areas.

Sideline radiators

In addition to discussions of RF safety, the seminar outlined the effects of power lines, video display terminals, cellular radios, and police radar and radios. The seminar was rounded out with a thorough discussion of the ANSI standards, how they are calculated, what they mean, and how to prevent overexposure.

Perhaps the most enlightening aspect of the seminar was how far reaching the topic of overexposure is. We tend to focus on broadcast or microwave RFR; however, the Navy has its own set of worries with their metal ships re-radiating RF energy from HF communications antennas. Something as innocent as a hand railing, if not RF grounded, can

cause exposure to HF if touched.

The problem of exposure is not just found in radio applications. Industrial heat sealers, which use RF energy to seal or melt plastic—like the little badge holders you wear at the NAB convention—can expose the operator when, unknowingly, the RF shields are removed to speed production.

The solution to overexposure is the development of an RF safety program, according to the speakers at the seminar. The guidance provided by the seminar to

develop this program makes the tuition worth every penny. This is the next area of concern for broadcasters, with OSHA leading the way in handing out fines for non-compliance.

The Loral safety seminar also included a display of the Loral RFR measuring equipment, but this was not a seminar billed as educational and turned into a sales demo. In addition to the valuable information gleaned from the instructor, a resource notebook was also provided. Although the three-day "factory" course gives engineers more hands-on instruction, the single-day seminar was very thorough and was well worth the investment of time and money. ☺

CD Radio Tests Antenna



NASA and CD Radio Inc. recently conducted joint tests using NASA's Tracking and Data Relay Satellite System in connection with Direct Broadcasting Satellite Radio (Satellite Radio).

The test vehicle, with CD Radio System President Robert Briskman,

uses a purpose-built satellite antennas to optimize satellite-to-car reception. This is accomplished via satellite spatial diversity transmission design. Once approved by the FCC, the new service will provide motorists national radio coverage via satellite.

New Concerns With GOP

► continued from page 1

Fritts also believes the NAB will be able to work well with both parties in the new Congress and he urged broadcasters themselves to establish relationships with House and Senate members.

"Our view is that it's important for broadcasters to establish those relationships," he said. "They may not know as much about the operation of broadcasting as we would like for them to and the importance of advertising and other potential revenue strings."

Establishing good relations with the new Congress should not be too difficult for the NAB, Fritts pointed out.

"For years in both the House and the Senate we have worked well with both Democrats and Republicans, Fritts said.

So has the FCC. During a recent appearance on Public Broadcasting's MacNeil/Lehrer NewsHour, FCC Chairman Reed Hundt said the federal agency has worked well with the now-empowered Republicans and some support the commission's goal of increasing market competition in the telecommunications industry.

"They are very committed to the policy of competition, so I don't see any fundamental changes," he said. ☺

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INTERNATIONAL UPDATE

Canada Pushes to Standardize Eureka

by James Careless

WINNIPEG, Manitoba Canada was aiming for Eureka-147 to be the officially recognized world standard for DAB technology by the end of 1994.

Canadian officials have reiterated this point over the past few weeks in preparation for the upcoming ITU meetings in Geneva, which will again tackle the issue of a world DAB standard.

Since 1991, attempts by the ITU to resolve this issue have been stalled by opposition from delegates that wanted more time to look at alternatives.

In previous years, Canada has sided with such dissidents, said François Conway, Canadian Broadcasting Corp. (CBC) supervising engineer of Broadcast Technology and vice-chair of the ITC working group examining terrestrial DAB systems, because the timing was "too premature" to lock the world into a single technology standard.

At the 1993 ITU meetings, Canada backed a U.S. proposal to again delay a decision on the grounds that "we would try to agree to a standard at the meeting in November '94," said Conway. "And that was agreed [to] by the U.S."

Now that the November deadline has passed, Canada expects the world to make a leap of faith and set Eureka-147 as the world DAB standard. There is no time left for delays, said Conway. "A lot of people are talking about 1995 or 1996 to start a service, and we need a standard [in place] by the end of '94."

In the end, any hopes IBOC supporters had for swaying Canadian broadcasters—particularly private broadcasters, who are not bound by government directives the way the publicly-owned CBC is—were apparently dashed at the 1994 annual Canadian Association of Broadcasters

(CAB) conference, held in Winnipeg November 6-8.

Outgoing CAB chair Bill Coombes threw down the gauntlet while moderating a pre-convention panel discussion "Digital Radio: Separating Hype From Fact."

"Canada and most other countries are moving ahead with a plan to implement digital radio broadcasting using Eureka-147 wideband technology, which should become a world standard by the end of this year," Coombes said.

The session featured Eureka-proponent Paul Ratliff, IBOC-supporter Glynn Walden and a member of USA Digital's technical committee.

The pro-Eureka sentiment in Coombes' statement did not bode well for Walden's IBOC presentation, which featured videotapes of IBOC trials at WBBM-AM-FM in Chicago. Given the prevailing environment, Walden was unlikely to seriously sway many delegates to his side, especially when IBOC has yet to match the performance of its rival.

This point was made clear in the days following the session by Brian Sawyer, another CBC engineer who has been heavily involved in researching L-band propagation. "There doesn't seem yet to be anything substantial there. I believe the [IBOC] system will work, but to what degree?" said Sawyer.

At the same time Walden showed videotapes of the Chicago IBOC demonstration, Canadian Eureka-proponents wowed delegates with L-band transmissions originating from local station CKY(AM). The DAB transmissions were clearly audible in the two delegate-carrying minivans that criss-crossed the city during the convention.

Even if IBOC supporters had mounted a similarly impressive demonstration, the fact remains that Canadian DAB interest has focused on Eureka for nearly five years now. Eureka-147 is considered a working system, while IBOC is still ironing out the wrinkles.

Also, Canadians have made considerable progress in mapping out L-band propagation in contrast to the transmission performance offered by the older bands. This means that no matter how good IBOC eventually turns out to be, it will never be good enough for engineers like Brian Sawyer.

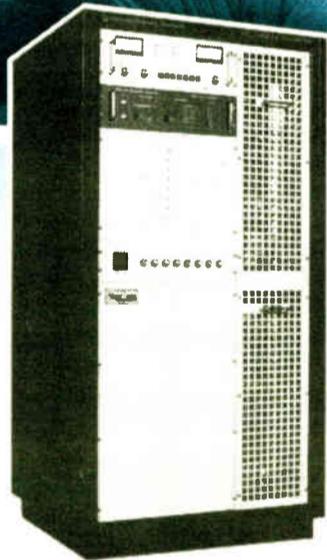
"In digital radio coverage planning, for instance, we are starting to use the criteria of 99 percent of the locations, 99 percent of the time as opposed to FM, which we made plans based on 50 percent of the locations, 50 percent of the time," Sawyer said. "I do not believe that the IBOC system, the way it was described to me, will be able to reach a criteria much more than FM."

Given the momentum created by the private-public broadcasters' DAB coalition since 1990, it is hardly surprising that the Canadians have finally planted their flag on the world standard issue.

As to whether this will result in progress at the 1994 ITU meetings in Geneva remains to be seen. But one thing is certain: In pursuing Eureka-147 as doggedly as they have, Canadian broadcasters have by and large committed themselves to the technology. No matter what is decided in Geneva, it is almost inconceivable that Canada will not put Eureka-147 into commercial use within the next few years, no matter what happens with IBOC. □ □ □

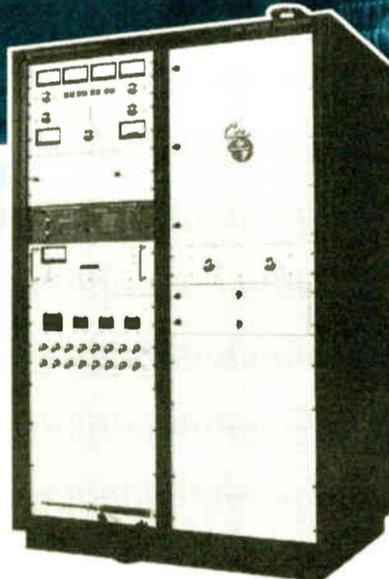
James Careless covers the radio industry for RW from Canada.

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AES Product Coverage

AES Show Serves up Broadcast Fare

by John Gatski

SAN FRANCISCO Radio station production folks are usually not in abundance at the annual Audio Engineering Society conventions. For the 1994 show, their absence means they missed out on the demonstrations of new digital audio workstations equipped with more capabilities and lower prices. In fact, three of the major workstation manufacturers have actually added "broadcast" to the title of their new low-cost versions.

The 16,500 attendees at the Moscone Center also saw an audio market that continues to merge into all production areas: broadcast, music production, multimedia production and audio-for-video production.

Broadcast oriented

The big news for broadcast production is the proliferation of downpriced digital workstations. Roland introduced the DM-800 "broadcast" workstation, Sonic Solutions showed the "Radio Station," and Studer demonstrated its Dyaxis Hbv "broadcast version" workstation. All

these machines are based on previous incarnations but have been designed with features for the broadcast production. Of the three, Roland is a standalone system. The Sonic and Studer are Macintosh-based.

Three of the major workstation manufacturers have actually added "broadcast" to the title of their new low-cost versions.

Of course, there were plenty of other workstations/workstation software making noise at the AES convention, including the acclaimed Orban DSE-7000, Korg Soundlink, Roland's DM-80, Spectral Synthesis' re-emergence, Digidesign's new ProTools III, the cost-effective MicroTechnology, OSC, the Fostex Foundation 2000 and many others.

With regard to digital recording equipment, Sony finally introduced its own Hi8 tape-based multitrack audio recorder *a la* the very successful Tascam DA-88. Sony invented the Hi8 format in the mid-

1980s for video recording, but Tascam began marketing an audio, multitrack version more than a year ago.

The \$5,900 Sony PCM-800 recorder, based on the Tascam platform, is very pro audio oriented. It utilizes eight indi-

vidual tracks, pitch control, AES/EBU digital I/Os and analog XLRs and can be synchronized with external timecode.

Speaking of the Tascam DA-88, the company reported brisk sales of the unit and announced new driver software, ver-

Portable gear

On the portable side, HHB touted its new PortalDAT, which sounded good and looks very robust. Sony had its TCD-D7 portable DAT and Scoopman mini-DAT recorders as well. Speaking of DAT, Sony also demonstrated the new software for the ECM-7700 DAT station, the expensive but versatile dual-deck DAT editor.

On the console/mixer side, Otari showed its B-10 broadcast/audio post

Plug and Play Devices Turn PCs into Editors

by Nancy Reist

SAN FRANCISCO The power of digital editing used to be limited to very expensive workstations, but today basic PCs can be upgraded with audio cards that can bring sophisticated digital tools to even low-budget studios. Jim Heckroth, of Crystal Semiconductor, described this development at the AES Convention in San Francisco in the paper, "An Overview of Audio Technology for the Multimedia Personal Computer" (Preprint 3875). He said he expects to soon see a migration of functions from adaptor cards onto the motherboard, the replacement of most FM synthesizers with waveform synthesizers, and the proliferation of Plug and Play devices.

Heckroth said PC Magazine has estimated that more than 3 million sound cards were sold in the United States in 1993, with average sale prices of over \$100. "So it's big business, and like most electronics, the trends are increasing quality and decreasing cost, so that business is probably going to grow even more. That's largely due to the higher integration in silicon of the functions on the audio adapters. They permit lower cost and higher quality."

Heckroth described some of the sound cards, which have established important standards. These include

the Ad Lib card; the Roland MPU-401, MT-32 and LAPC-1; and the Creative Labs Sound Blaster and Sound Blaster Pro. He said that currently cards like the Turtle Beach Multisound card are doing an impressive job at providing high-quality sound, despite some of the disadvantages of PCs, which he called "a pretty hostile environment for audio with power supplies that are running the disk drives are supplying your audio card. You may get plugged in right next to a video card that's radiating RF all over your audio circuits. It's tough to get upwards of 80 dB in the PC Market."

Heckroth said he anticipates an increasing use of wavetable synthesizers, rather than FM synthesizers, due to the availability of cheaper memory. He explained, "FM uses one oscillator, or operator, as a carrier and another oscillator to modulate the carrier frequency of the first oscillator. Generally, DOS applications write directly to the registers that control those oscillator frequencies, the amount of modulation, the amount of feedback for the four operator case, and that gives you a lot of flexibility... but the instrument quality you can get for real music reproduction is pretty poor with these low-cost FM synthesizers."

In order to improve the sound quality, continued on page 14 ▶

vidual tracks, pitch control, AES/EBU digital I/Os and analog XLRs and can be synchronized with external timecode.

Speaking of the Tascam DA-88, the company reported brisk sales of the unit and announced new driver software, ver-



San Francisco was host to Audio Engineering Society convention.

Photo: San Francisco Convention & Visitors Bureau

sion 3.03. The new software is said to offer improvements in the recorder's operation.

New ADAT software

The popular Alesis ADAT (40,000 units worldwide) gets an upgrade for 1995 with a software package. Alesis showed System 4 for the ADAT and Revision 2.01 for the BRC (Big Remote Control). Alesis also announced an alliance with Panasonic, a supporter of the S-VHS format.

Other digital recorders of note included

console, which features up to four-group channel grouping as well as AC and DC operation. Yamaha touted all the new software vendors that now support the "hot" Yamaha ProMix 01 desktop portable mix console (\$2,000). The vendors now include Mark of the Unicorn, Emagic, Steinberg, Opcode Systems, Voyager Sound and Lonewolf.

It looks as though Yamaha has taken aim at the console value leader Mackie with a new portable 14-channel mixer, the MM1402. This unit seems to be

continued on page 14 ▶

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Broadcast Products Displayed at AES

► continued from page 13

aimed at the dominant \$399 Mackie MS 1202. The Yamaha lists for \$499 but offers two additional balanced inputs, five-band EQ, pre-fader listen switch and other extras.

In the "box" category, there were plenty of new and existing products that could end up in a broadcast production studio.

Mackie, however, displayed its new LM-3204 32-input (16 stereo) line mixer that lists for \$995. This box is intended for the input-hungry studio folks. Mackie also unveiled Otto-34 Ultramix mixer automation package for its larger consoles. Soundcraft also had its full line of consoles at the show.

RW played around with the box and found just about every effect you could want for your voice, and of course, you can customize your own.

Yamaha introduced its ultra-inexpensive \$300 REV100 digital reverb unit that includes 99 reverb programs and very clean 20-bit digital sound. Symetrix showed the 528e Voice processor intended for broadcast, music and voiceover audio production. Alesis presented its new Quadraverb and MidiVerb processors.

Night Technologies was busy promoting its analog EQ3 "High Definition Audio" equalizer, which is claimed to produce no phase shift. In a brief audition, the box appeared not to add the phase anomalies of other EQs and provided a very clean enhancement of mid-range frequencies. Night Technologies said there are a number of

type sound without the meters. Retrospec said that a two-channel rackmount unit

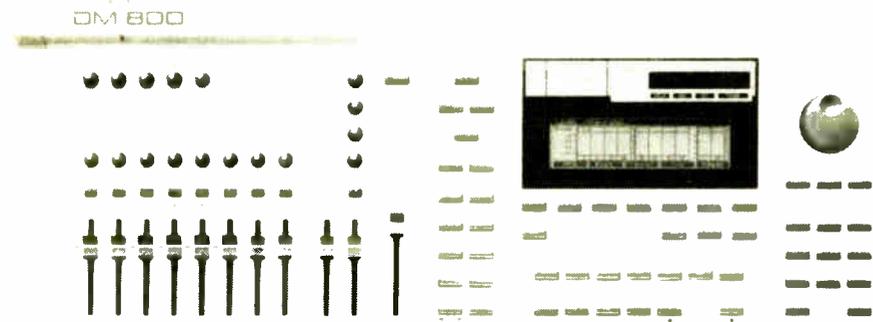
kinds of studio applications. AKG's C12VR, the tube microphone



Sony Digital Audio Recorder

will come at the end of 1995. Peavey's VMP2 is priced right as well with a \$1,000 list. It is a full-tube, two-channel microphone preamp designed for various

reissue of the canonized C12 that was produced in the 1950s and early 1960s, also was drawing a line of would-be auditioners.



Roland's DM-800

In the "box" category, there were plenty of new and existing products that could end up in a broadcast production studio.

From Eventide, came the lower-cost DSP4000B UltraHarmonizer, with more than 200 preset effects for your voice.

radio broadcasters, including KKAT in Salt Lake City, using the EQ3 in the production room and as part of the air chain—ahead of the primary processor.

Other products of note included Symetrix's under \$1,000 A/D converter, the 620. The 20-bit converter is dither-selectable with multiple sample rate selection. This box could squeeze up-to-date digital sound out of those older studio DAT decks.

DATEQ showed off its prototype Flexcom communications systems for two-way, stereo audio communications between studios and stations. On the digital codec front, Comrex, Telos and CCS all had their latest products that are capable of sending high-quality, compressed audio. CCS also gave demos of the MUSICAM-based PACE audio editor.

On the tube

Lastly, the proliferation of tube products continues to amaze the industry. RW visited all the companies that it found included Anthony DeMaria, Mesa Boogie, Groove Tubes, D.W. Fearn, Summit Audio, Demeter, Tube-Tech, Aphex and Retrospec Audio, Drawmer and AKG.

Aphex has created a lot of interest with its Model 107 Tubessence dual-channel microphone preamp. This hybrid actually does get tube sound (see review in Nov. 30 RW) for about \$500 (street price) through a patent-pending circuit that significantly cuts the cost.

Another "box" is the Retrospec Audio Squeeze Box, a \$395 single channel compressor that is said to deliver LA2A-

Abundance of Audio Cards for PCs at AES

► continued from page 13

he explained that many manufacturers are moving to sample-based wavetable synthesizers and offering them as options or add-ons with their new sound cards. In wavetable synthesis, samples of real sounds are manipulated with digital techniques such as loops and pitch shifts to get realistic sounds from as small a sample set as possible. The drawback is that these synthesizers require a lot of memory and so are more expensive and less flexible.

Heckroth showed a diagram of today's typical multimedia sound card. The card has a number of different registers and system requirements, which may make it difficult to install and configure.

"You plug one of these cards in, you've got this 16-bit Codec registers, the Sound Blaster registers, the MPU-401, the FM synthesizer, the CD-ROM ports, and everybody wants I/O space, memory, interrupt, DMA channels. It's up to the poor user to say what's available in my system? What have I already got installed? You get out all your old documents and try and get this thing installed. You've got conflicts for days. It's a real headache."

Help may be on the way, however with the new Plug and Play specifications published by Intel and Microsoft. Heckroth said that under these standards, new adaptor cards will each have three I/O ports in the same place. They also will have a

unique 72-bit serial identifier that will allow a Plug and Play operating system to isolate and communicate with each installed card individually. The memory stored on each card includes a list of functions available on the card and the system resources requested. On powerup or reset, the Plug and Play operating system individually checks the cards, builds a list of all the functions on each card in the system and all the resources requested. It then prioritizes them and allocates available resources on a prioritized basis to the cards.

If all of the devices in the system are Plug and Play, system configuration should be fully automatic. But Heckroth warned, "It'll be awhile until the whole system is operating that way. The Chicago operating system, I believe, will be the first one that will support Plug and Play. Of course, when you get your Plug and Play operating system, you're not going to go replace all the hardware in your system the first day. So what we'll have to deal with for awhile is a mix of Plug and Play-compatible devices and non Plug and Play-compatible devices or "legacy devices" as the Plug and Play spec calls them."

He added that the system appears to be smart enough that it should be able to identify legacy devices and the resources they're using and then assign conflict-free resources to the Plug and Play devices, but it's unlikely to be foolproof.

More than 3 million sound cards were sold in the United States in 1993...

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DESIGNS THAT MAKE THE DIFFERENCE

Studio Meets Exacting Acoustic Standards

by Nancy Reist

SAN FRANCISCO The assignment was straightforward enough: build a studio complex for four AM and three FM stations in Mexico City near a busy road and an airport. The noise level in all rooms should be NC 15 with a reverb time of .3 seconds. The complex should include an emergency power plant, an extensive ventilation system and a large parking lot. And yes, we expect the entire project to be completed in four months so we'll bring in crews of 120 workers in eight-hour shifts around the clock.

This is the project described by Sergio

Beristain, president of the Mexican Institute of Acoustics, in a paper delivered to the Audio Engineering Society convention here titled "Acoustical Design of an AM and FM Broadcast Center" (Preprint 3880). Beristain explained that Mexico is about to set a standard for broadcast studios and control rooms similar to the one currently established in Europe and that this complex was designed to be the first installation to meet the new standard.

He said the complex consists of 14 pairs of control rooms and studios. Most of these have a similar size and design, with studios averaging 5.75 meters long, 5.5 meters wide and 3.5 meters high, with

slightly larger control rooms.

All the rooms include a Faraday net to control RF induction. Every room has double brick walls with an independent foundation for each wall. The roof is also double and includes a 20 centimeter-thick concrete roof three meters above the 20-22 centimeter-thick ceilings of the rooms. Beristain explained that the space is used for the ventilation system, cabling and the lighting system. All the ducts are vibration-isolated from the walls and roofs with materials such as silicon, neoprene or different kinds of plaster.

Beristain said the windows between the studios and control rooms are triple-paned

and set in independent wood frames, sealed with neoprene and silicon. The inner and outer panes are slightly sloped. Each door consists of two glass panes separated by 12 centimeters of air. The panes are mounted in wooden frames with a double soft rubber seal. Control rooms each have one door, while two doors—separated by at least 40 centimeters—are used to enter the studios. "These doors are about 10-12 centimeters thick, and the attenuation is quite similar, only 2-3 dB less than the window itself, which is sealed all the time. You know the doors have always the problem that they open and close and the seal varies from time to time. But even so, the difference in noise isolation we got is roughly the same." Tests indicate that the overall isolation techniques were quite successful and met the project goals.

Beristain explained that they used a mix of proprietary and locally-designed diffusers to control the ambiance inside the rooms. Tests indicated that the reverb time in the rooms meets their goal and is similar across the frequency spectrum, even with the few standing waves they have. "The reverberation time is roughly the same and even a little bit lower, meaning that even that standing wave is not provoking what usually is expected, a lengthened reverberation time.... Actually we solved that problem very well. This was due to the heavy diffusion systems we have in the walls and ceilings and back

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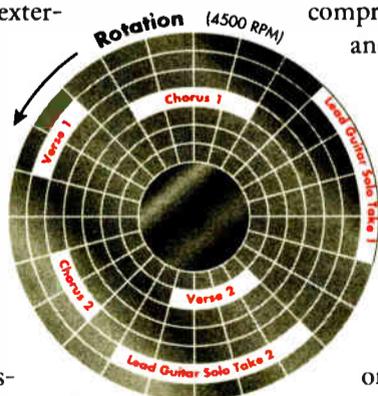
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and front. Also to a very slight tilt of the walls. Actually you cannot notice that they are tilted. It's only a few centimeters divided in six meters long, so it's very hard to see. We did that this way because we think that we shouldn't stress either the control room people or the studio people with walls with heavy inclinations or abnormal positions."

Finally, Beristain emphasized the importance of teamwork in finishing a complex project like this one successfully and on time:

"We had to do the whole thing in only four months. So we were working with over 120 people around the clock, three turns, every eight hours a new 120 people came: people from construction, wood workers, glazing people, the electricians, the engineers installing the cabling. So it was very demanding work. But everybody was so conscious of the results we wanted to achieve that the teamwork we actually got was really something to talk about. I have had some other experiences in other designs where, for example, the construction company or the architects do their work, the people from the ventilation systems do their work and so forth and at the end we got a mess, because nobody cares about everyone else's activities or results. But in this particular case, everybody, from the people who worked carrying the materials to the engineers to the administrators of the whole project, worked with one thing in mind: to have the very best studios for broadcast transmission in Mexico."

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World Radio History

Realistic Soundscapes Using Stereo Signals

by Nancy Reist

SAN FRANCISCO Remember those old Beatles recordings with Ringo's voice coming out of one speaker and John's guitar coming out of the other? It was a pretty nifty recording technique for its time, and it was fun to pan between the two, but one would hardly say it sounded natural. And then came the quadraphonic trains rushing through your living room, loud and impressive but hardly practical. More recently we've had more sophisticated multi-speaker surround sound: much more interesting, but expensive and complicated. Now, according to the panelists at the AES Workshop, "Three-Dimensional Stereo Sound," we can move one step further and construct realistic soundscapes with a stereo signal.

The panel featured ten speakers representing products which can produce this illusion. Some of the boxes were designed for specific uses like broadcasting, music recording, multimedia, or cinema. Others were touted as multipurpose processors. Though each product differed in the methods it used, they were all based on the notion that by digitally

manipulating signals, one can trick the brain into thinking they are sounds coming from different directions.

3D theories

Alan Kraemer, director of engineering for SRS Labs, said that stereo 3D technologies are based on theories of how the physical properties of sound waves influence our perceptions of sound. "As sound moves around the head, the spectral characteristic of the sound changes. Your brain system compensates for that and normalizes it from a perceptual level, so that if I'm speaking in front of you, you recognize my voice and if I'm speaking behind you, you recognize it as still my voice. But the correction information is used by your brain system to localize the sound as in front or behind or to the side. This is due to the effect of the outer ear, the pinnae, the shape of the head, the shoulders, the entire physical structure of the hearing system. We use those spectral changes to localize sound through 360 degrees and also elevation." The 3D processors are attempts to produce these same changes digitally.

In addition, Jerry Bock, a Phoenix consultant who has developed many aspects

of transaural stereo, said that if listeners wish to listen to a recording on speakers, rather than headphones, the 3D processing also must include a crosstalk canceler which compensates for the paths from the left speaker to the right ear and vice versa. This, of course, is dependent on the listener being in the sweet spot. Some of the panelists contended that 3D processing could increase the size of the sweet spot, while others argued that the sweet spot was so important for effective 3D sound that they recommended limiting its use to situations where the listener will not be moving out of it.

John Blair of Crystal River Engineering said that reverberation also conveys important location information which must be included in the processing. "You will hear things differently if you were in a room as opposed to if you were outside where there are no walls or anything that is reflecting. Even outdoors, you typically get a ground bounce that comes off the ground up to your head. So when you take this sound and process it, you also need to process the early reflections that arrive at the head in order to get the accurate localization cues to the individual."

While some of the 3D synthesizers work strictly by digitally manipulating mono signals that are fed into the processors, many also combine DSP with artificial head recording techniques. Allastair Sibbald, principle scientist at Thorn-EMI

Research, explained: "When you make a recording with an artificial head, the three dimensional sound cues which we use to locate sounds are automatically built into the recording. Provided that the correct equalization is applied and the correct crosstalk cancellation, when these recordings are played back on a two-speaker system, a three-dimensional sound field is recreated which spreads around and behind the listener."

Mic techniques

Sibbald explained that a recording from an artificial head can be combined with feeds from spot microphones to provide more clarity and detail for quieter instruments. If this is done, he said it is imperative to record the exact positions of the spot microphones relative to the artificial head. These measurements should include the x, y and height positions, as well as the angle of inclination.

Sibbald said that the placement of the artificial head is very important. "We find the best way to do it is to go out and listen during the rehearsal session with your head. Generally a good position for the head is what sounds ideal for your head. This is a very good way to start. Then come in and fine tune the thing, listen in the control room and ideally have one or two people in the studio move the thing gently. We find that even six inches,

continued on page 35 ▶

DAT Capabilities Touted At West Coast Gathering

by Nancy Reist

SAN FRANCISCO Pioneer's new "SuperDATs," which have the ability to sample at 96 kHz, were demonstrated here at the AES convention. A description of the DATs was presented in the paper, "Proposal of 96 kHz Sampling Digital Audio" (Preprint 3884) by Pioneer representatives Takeo Yamamoto and Kiichiro Koguchi.

The Pioneer D-07 is a consumer DAT that has been available in Japan since 1992 and Europe since 1993. Yamamoto said that it has been quite successful, even though there still are not very many tapes available that have been recorded at the 96 kHz sampling rate. He attributed this success to the D-07's "very natural sound quality." Pioneer has just introduced a professional 96 kHz DAT, the D 9601.

Yamamoto explained that Pioneer developed the new DAT for three reasons. First, the company conducted a frequency analysis of LPs and CDs with the same recorded material. Pioneer found that the LPs contained material between 40-50 kHz while the anti-aliasing filters restricted CDs to a high of 22 kHz. He said this could be the reason that many audiophiles prefer LPs. Therefore, increasing the sampling rate could be more important to improving the quality of digital recordings than going to 20 bits because it widens the frequency range.

Second, Pioneer wanted to increase the size of the total audio consumer market by developing high-end digital products for dedicated music listeners.

Third, Pioneer is anticipating the proliferation of on-demand digital services through optical fibers. Yamamoto explained that for any packaged music product to have a hope of competing with these services, it would have to be extremely high-quality.

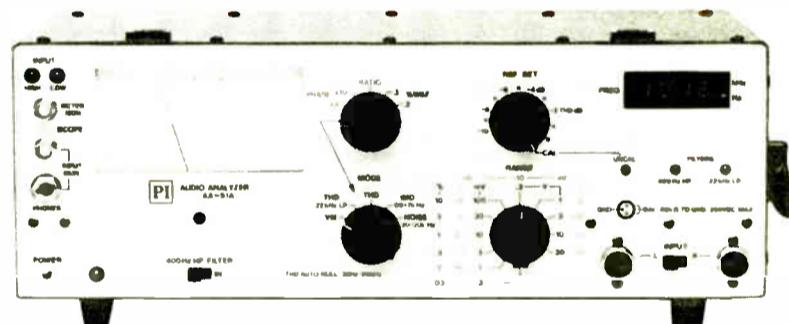
Yamamoto said Pioneer conducted a number of listening tests to compare 96 kHz and 48 kHz sampling. The company found that in blind tests, 70 percent of the listeners could distinguish between the two modes. The results suggested that the differences are particularly evident in specific kinds of recordings. For example, listeners found they could hear high musical instruments like the cymbal and the triangle more clearly; the attacks of sounds were sharper, and the low- and mid-range tones were richer. Pioneer also found that in 48 kHz recordings of fast staccato passages, the high notes were heard as a continuous sound, while in the 96 kHz recordings the notes could be heard separately. The 96 kHz recordings also excelled at localizing the sound sources. Yamamoto explained that this was due to the increased recording of minute reflections that carry location information.

These results were evident in the demonstrations Pioneer gave in a separate listening room. As one questioner pointed out, however, it is also possible that the difference could be explained by factors other than the sampling rate such as dithering. More independent tests need to be conducted to confirm these results.

The D-07 operates in three recording modes. "Long play" has a sample rate of 32 kHz, a bandwidth of 2 Hz-14.5 kHz and a maximum recording time of four hours. "Normal" mode, which samples at 48 kHz, has a recording and playback bandwidth of 2 Hz-22 kHz and a maximum recording time of two hours. The new "wide band" mode has a sampling rate of 96kHz, and is said to have a recording and playback

continued on page 24 ▶

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Industry Prepares to Comply with EAS

► continued from page 1
the NAB.

"We were... pleased by the long implementation period stations were given," NAB Spokesman Doug Wills said.

One certainty regarding the guidelines is that, product-wise, the FCC will remain neutral, Mitchell promised.

"We've stayed away from adopting one system," she noted.

Companies fight it out

Already, developers of emergency alert technology have hit the ground running, claiming they have the technology the FCC wants stations to install, and, in some cases, they are even lobbying the FCC to mandate their system.

Fred Baumgartner, a station engineer for KDRV-TV in

requiring his Sage system, a system already in place in Jefferson County, Texas, and the state of New Jersey.

The Baumgartner EAS system incorporates digital codes that are National Weather Services WRSAME compatible. It upgrades the daisy chain, which relays emergency messages from station to station, to a web network. Utilizing a TFT decoder, the system receives up to eight inputs from as many as eight different emergency sources, satisfying the "multiple source monitoring" requirement of the FCC.

With the EAS system, stations could receive input directly from local, state or national alerting sources and still be hooked into a radio chain alert.

A Denver study with the EAS system revealed that multi-input decoder prevents the information chain

systems, complying with the FCC guidelines for a multiple-medium "digital system architecture."

The Emergency Broadcast Satellite System, which is being developed by Information Systems Laboratories (ISL), may be a primary medium used by both RDS and EAS.

"We are a transmission medium," ISL Vice President Barry Shay said.

The ISL satellite warning system is compatible with both EAS and RDS, allowing emergency messages to be loaded onto the Ku band for transmission across oceans, over mountains and across vast amounts of land where relay systems would be inefficient.

In isolated or mountainous areas with downed phone lines, ISL would still be able to send messages via the airwaves, Shay noted.

ISL is also capable of customizing message processing equipment for broadcasters receiving satellite messages and emergency management officials sending emergency satellite messages.

"We customize the system at both ends," Shay said.

Despite the shared ability to receive different messages from different sources via different carriers, there are still many differences between EAS and the Sage I Emergency Alerting System. One advantage for broadcasters that EAS has over RDS is cost. Because Baumgartner's system is a non-propriety system, other companies besides TFT will be able to manufacture and market the necessary equipment, hopefully creating price-lowering competition. Open market guidelines already have the blessing of the NAB, which recently commended the FCC for creating guidelines that foster competition.

"It is the type of market approach that will ease the burden on small market broadcasters," Wills said.

Dollars and sense

In radio dollars the TFT encoder/decoder built for the EAS system hooks up to existing receiving equipment and is relatively inexpensive, costing about \$750, Baumgartner said.

LeBow's system, on the other hand, costs about \$2,500 and involves a PC. Stations that already have a PC could reduce that cost by about a \$1,000.

"You can use any PC 286 or better," LeBow noted.

EAS equipment must be compatible with a required FCC digital system architecture that will allow broadcast, cable, satellite and other services to send and receive alerting information.

Denver who developed the non-propriety EAS 911 decoder (formerly the EIS and 912 encoder) in conjunction with TFT and with the support of the Denver Society of Broadcast Engineers, said the FCC all but endorsed his system, claiming his in-band system fits into the FCC mandate perfectly.

Gerald LeBow, president of Sage Alerting Systems, disagrees that the guidelines are an endorsement of the EAS system, arguing that his RDS system, the Sage I Emergency Alerting System, also adheres to FCC guidelines.

"I could say they (the guidelines) sound like the Sage system because they do," LeBow said. "The FCC simply mandated a national emergency system."

LeBow admitted, however, that he would like to see the FCC take that mandate a little further, though, by

from breaking down even if 9 of 10 daisy chain stations are wiped off the system during a disaster because the eight different inputs assure the transfer of emergency messages.

Multiple inputs

The Sage RDS system, a propriety system, of course, also has multiple input capabilities.

"We have six inputs," LeBow said. And as the decoder is forwarding a message from one agency, the Sage system will record up to five other emergency messages at once. LeBow charged that "with the other system you lose all the other messages."

Both systems can receive emergency messages in their input channels through several different mediums, including broadcast, cable, phone and satellite

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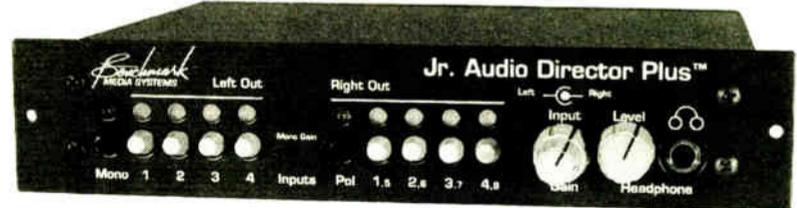
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LeBow argued that his system is worth the extra bucks. The PC keyboard allows the system to send text as well as codes, a feature not included with systems handicapped by code reading encoders and decoders, LeBow commented. Emergencies not preempted into the Sage system can still be typed in and transmitted.

Also, RDS features a micro alert that allows broadcasters to isolate emergency messages to just a few receivers. It can, for example, alert emergency chemical workers to get to a chemical spill.

EAS can isolate a signal down to 1/9 of a county, Baumgartner said. Each county has an individual code and can be broken down by adding one more digital code onto the signal.

Both systems fulfill the FCC requirement of "automated and remote control operations."

Baumgartner's EAS system has the ability to send a one-second message from an emergency alerting agency's encoder to receiving stations' decoders that describes what type of emergency is happening, where it's happening, and will let stations know whether a disaster is on-going or if the disaster is finished and emergency workers are dealing with the effects. The decoder also has the ability to interpret the message to see if it is pertinent to a particular station's listeners. If the message is serious enough, the decoder can break into a station's signal and voice-deliver an emergency message or merely alert the station's DJ.

The Sage system can also break into programming. A text message is sent with a countdown. If the DJ does not respond to the countdown, RDS will automatically cut into programming to send the message. The Sage system then alerts the sender as whether or not the message was carried.

Both systems are capable of doing unobtrusive weekly tests.

The EAS system is capable of an unobtrusive closed loop weekly test. Listeners will hear just a tiny digital burp instead of a 25-second tone.

"We can do it totally silently," LeBow said of the RDS system.

Monthly tests

In addition to the weekly tests, there will be a monthly on-air test using a shortened eight-second version of the tone. Both of these factors match the FCC requirement of "unobtrusive weekly tests and shortened eight-second tones."

Hopefully, killing the weekly test tone and reducing the monthly test tone to eight seconds will cure listener desensitization to current tone that causes them to change the station when they hear it.

The 25-second tone would be reserved for a real emergency, grabbing listeners' attention during an emergency break into programming during a real emergency.

A prototype of the EAS system was first installed in 1984 in Madison, Wis., in order to give the Wisconsin state police a way to access the state's EBS system. The next version of Baumgartner's brain child was moved in 1987 to Denver and shown to the Colorado Broadcasters Association.

The Sage system is already installed in Jefferson County, Texas, which is about 90 miles east of Houston. New Jersey has already adopted the Sage system for emergency broadcasting. LeBow noted that installation is about 80 percent

complete in New Jersey.

Also, more than 200 stations nationwide already have implemented RDS encoders as part for the primary text data, format search, alternative frequency and other capabilities possible via consumer RDS radios that are just starting to gain attention.

Tone deadline

The FCC said existing EBS equipment must be capable of decoding the shortened eight second version of the two-toned alerting signal by July 1, 1995. As soon as stations install the new equipment they may begin testing the system.

Already, Wind River Broadcast Center is offering EBS modification kits for about \$100 that will allow stations to immediately upgrade their existing EBS

equipment for the shortened tone. Stations could then still use their existing equipment between July 1995 and July 1996, giving them an extra year before paying for a new emergency alert system.

"It's for that one-year transition period," Wind River General Manager Jim McDonald said. "I think we can help stations out."

Broadcaster, however, may want to go ahead with purchasing and installing FCC approved emergency alert equipment. The FCC already authorized stations to purchase and install the new equipment and when an entire market becomes EAS ready, the FCC will grant authorization for early EAS deployment. In addition, the commission will also permit markets to replace their current technical and operating procedures

before the deadlines on a market-by-market basis.

This would come as a sigh of relief to stations that lose listeners as they blast the mandated 25-second warning tone over the airwaves.

The catch is, however, local cable companies, which are being included in emergency broadcasting for the first time, must also be EAS ready before markets will receive FCC approval for early deployment. Since cable companies are not required to interrupt their transmission with any emergency tone, early EAS deployment may not be in their interest, programming wise.

Cable companies also have an additional year—July 1, 1997—to upgrade their equipment for EAS readiness because they are a "new entrant" into emergency broadcasting, the FCC's Mitchell said. ☐

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World Radio History

WORKBENCH

Helpful Hints for the Workshop

by John Bisset

SPRINGFIELD, Va. A few columns back, I told you about the Comrex Fax on Demand hotline. The folks at Henry Engineering have a Fax on Demand service as well. Hank Landsberg has taken the idea a step further, offering schematics and instruction manuals on all his products via fax.

I found out about this quite by accident, trying to locate a schematic for a Matchbox that got misfiled. Hank informed me that the instruction sheets and schematics for all Henry products are available via fax. To use Henry Engineering's Fax on Demand service, dial 818-355-4210 from your fax machine and follow the voice prompts. (The schematic for the Matchbox is No. 201 by the way.)

In addition to the technical manuals and schematics, you can also obtain current pricing and data sheets on the full Henry line. This is a great service—and adding the product schematics is an engineer's dream come true—especially at 2 in the morning. For more information on Henry Engineering products, circle **Reader Service 147**.

★ ★ ★

I came across a little book the other day titled, "Mary Ellen's WOW—Ideas that Work." It's kind of like a compilation of Workbench column tips aimed at homemakers. There were a few, however, that were worth considering in the broadcast engineering environment.

The first concerns that bottle of Elmer's White Glue that has dried up. Before you toss it in the trash, remove the top and place the bottle in the microwave for 15 second intervals. After a few short bursts, the bottle of glue is like new.

If you get tar or pitch on tools, the hardened compound can be easily removed using oven cleaner. If you store a mini-toolbox either at the transmitter or in your trunk, you can prevent rust by placing a dozen mothballs in the tool box. The moth balls absorb moisture.

One of the funniest suggestions is one you'll have to try on your next deadbeat contract client. If you have done work, but have no signed contract to prove the work was authorized, Mary Ellen suggests sending a letter stating that the amount the client owes is double what is really owed. It has been the author's experience that the client may reply with a letter stating the correct amount that is due. Now you have written correspondence stating how much is actually due.

If you're looking for something different to give your better half this coming holiday, the book costs \$6.95 and can be obtained by visiting any craft store like MJDesigns, Total Crafts, Ben Franklin, etc.

★ ★ ★

Have you ever tried to put a shrink boot on a coaxial cable in cold weather? If so, you know how frustrating it can be—just as you get one portion of the shrink to heat up, it cools as you move your heat gun or torch to another section. The folks at Andrew Corporation have teamed up with the Post-It Note people at 3M, and developed Cold Shrink. These weatherproofing kits are pretty slick. You can form a weatherproof connection in just 3 minutes.

The Cold Shrink kit is a piece of rubberized tubing that has been expanded several times its size. It's held in this expanded form by a tube of spiralled plastic. Cold Shrink requires no taping, you simply slide the sleeve over your cable, and

begin pulling on the plastic tab. As you pull, the plastic spiral is slowly removed from inside the sleeve. As the plastic spiral unwinds, the tension that was keeping the sleeve expanded disappears. The result is the sleeve contracts to its original size, forming a very neat and tight waterproof connection.

If you've ever cut through the standard butyl-tape connections, you know how frustrating that can be. The Cold Shrink sleeve can be easily sliced with a knife or razor blade and peeled away. Andrew has kits that cover coax sizes from a half-inch up to 1 5/8" cables. All of the kits are priced under \$40 list, the half-inch sleeves list for only \$15. If you'd like a descriptive application note and price sheet, circle **Reader Service 90**.

★ ★ ★

The TI-101 telephone hybrid has found its way into hundreds of stations as a low cost, yet effective piece of equipment. Recently, Symetrix discontinued production of the TI-101; and the product was quickly snapped up by Radio Systems. Radio Systems made a few engineering modifications that will work just as well with the older TI-101s built by Symetrix.

The older units used a Motorola MC4558, which looks like CMOS nomenclature, but it's not. The chip is hard to come by and not cheap. The engineers at Radio Systems found a more common Raytheon RC-5532 opamp, which is pin-for-pin compatible, and, according to the company, of a higher quality.

The original TI-101 used pots by Noble. Again, these pots have become harder to find, and they aren't of the highest quality. Radio Systems found replacements for three of these pots in the Mouser Catalog. The most commonly replaced

pot is the one with the detent, used for EQ. It is a Mouser part number 313-2000-50K. The 500K pot used on the unit is a 313-1000-500K. And the regular 50K pot, with no detent, is a 313-1000-50K.

Note that these pots are not PC-board mount, you will have to solder jumper wires from the board to the lugs on the pots. But the pots are of higher quality and easily found.

Another missing piece to the TI-101 puzzle are the knobs. Selco does not make them any more (unless you want to buy very large quantities). Mouser to the rescue again, replacement knobs can be found under Mouser part number 450-2035. If you need a Mouser Catalog, circle **Reader Service 27**. For more information on the TI-101, give Garrett Conover a call at Radio Systems, 609-467-8000.

□ □ □

John Bisset is a principal with Multiphase, a contract engineering and special projects company based in Washington, D.C. He can be reached at 703-323-7180. Fax submissions for the Workbench column to 703-764-0751. Printed submissions qualify for SBE Certification credit.

Virtues of DAT Touted

► continued from page 21

bandwidth of 2 Hz-44 kHz and a maximum recording time of one hour on a 120-minute tape. The D-07 does not have a digital output when it operates at 96 kHz.

Koguchi, who was on the team that developed the D-07, explained that the basic structure is similar to existing DATs, but they had to address several problems specific to wide bandwidth requirements and the different sampling rates.

In existing DATs, resonance in the RF amplifier is not a problem because its frequency exceeds the working frequency band. In the 96kHz sampling mode, however, the working frequency band is doubled, so the resonance frequency can distort the digital signal. Koguchi said they solved this problem by decreasing the input capacity of the playback amplifier using a FET with low input capacity for the first stage. This doubled the resonance frequency and shifted it outside the working frequency band. In addition, the gain of the second stage was set so that the playback gain in the 96 kHz sampling mode is 4.5 dB lower than in the normal mode.

The servo circuit in the D-07 consists of drum servo and capstan servo circuits. Both of these servo circuits include a velocity servo to control the speed of motors; phase servo to synchronize the rotations of motors and reference signals generated in the signal processing circuit; and offset servo to compensate long-term variations of various parts. The drum rotating speeds for the three modes are 1000 rpm, 2000 rpm and 4000 rpm.

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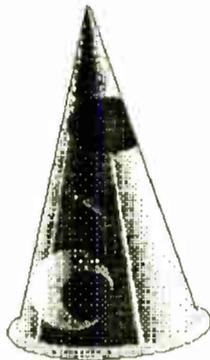
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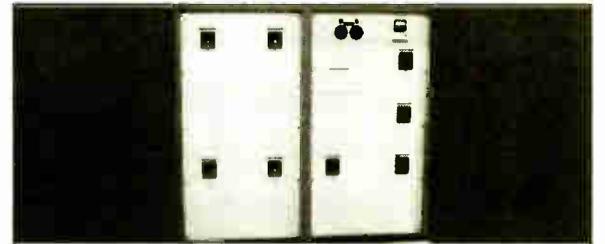
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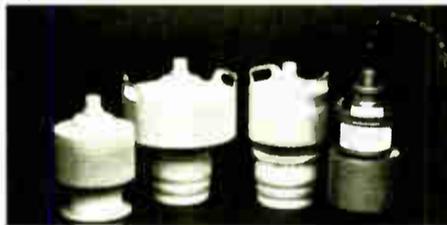
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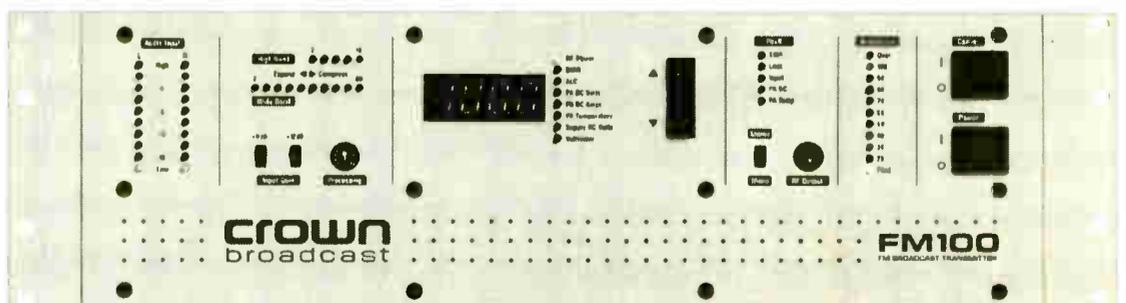
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READER SERVICE NO. 11

STATION SKETCHES

Maintenance Primer for Leased Lines

by Tom Vernon

HARRISBURG, Pa. There are still many small market and college stations that depend heavily on leased telephone lines for remote broadcasts or audio

Repeat coils are really high-quality audio transformers. The phone company refers to them as coils or repeating coils because their function is to "repeat" energy into a different circuit rather than transform it into a different state. Coils come in many configurations, but the most common ones for broadcast work are the 62, 93 and 173-types, as shown in Figure 1.

When installing coils, it is important to remember that the line side windings are precision wound for near perfect balance. These should be connected to the phone line. The drop connections should be wired to station equipment.

The most common coil is the 111C, and its connections match the 62 and 93 types. Each of its windings is 300 ohms, so they are connected in series for 600 ohms, and parallel for 150 ohms.

Installing coils at each end of your cable will result in a balanced line, giving improvement in noise characteristics. If it is a fairly long run, frequency response will suffer at the high end. In

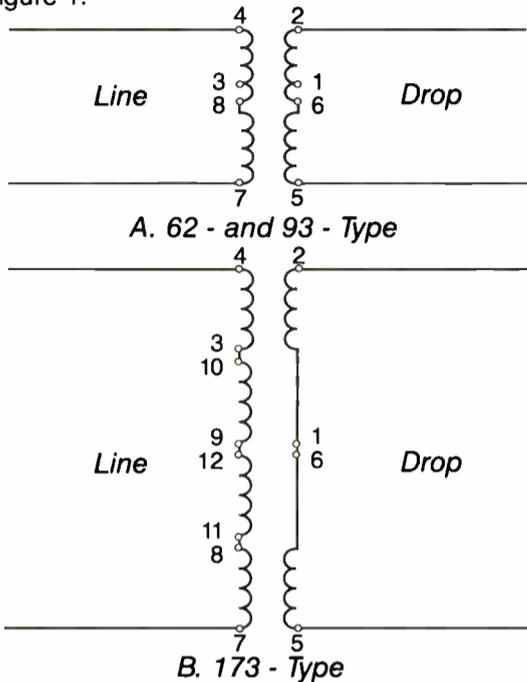
impedance, which brings us to the next area for improvement.

The response of a telephone line can be smoothed out substantially by lowering

quickly send a tone down the line by patching your oscillator into the "coil in" jack. This makes quick work of troubleshooting and touching up line equalization.

By having a jumper cord made up with a patch plug on one end and tip or banana plugs (whatever matches your VTVM) on the other, you may rapidly

Figure 1.



Terminal connections for popular repeat coils.

feeds to the transmitter(s). These leased lines need to be maintained and repaired quickly when trouble occurs.

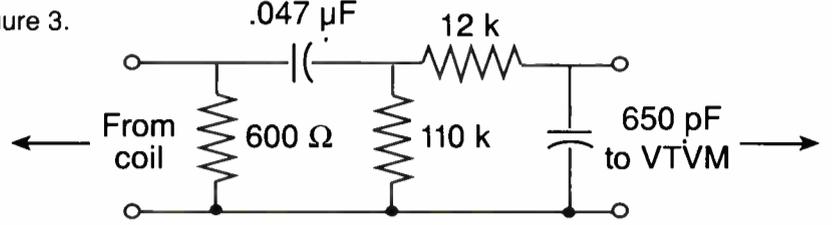
This month's column is a short tutorial on managing and installing telephone lines in a world gone cellular.

The most basic service obtainable is a leased pair. Such a circuit may be routed through the central exchange of the telephone company or run point-to-point in a more or less straight line. This is a popular choice, as it is the most affordable service, and you may do your own equalization for high-quality audio.

Alternately, you may order 3, 5, 8 or 15 kHz equalized lines and let the phone company do the work for you. In either case, repeat coils and equalizers are the tools of the trade, and you will need to understand how they work.

addition to length, this degradation is a function of cable type and terminating

Figure 3.



This simple circuit will terminate the line in 600 ohms and limit the bandwidth of the VTVM to the audio range.

its impedance from 600 to 150 ohms. Such a scheme is called coil equalization, and for shorter runs, it may be all that is needed.

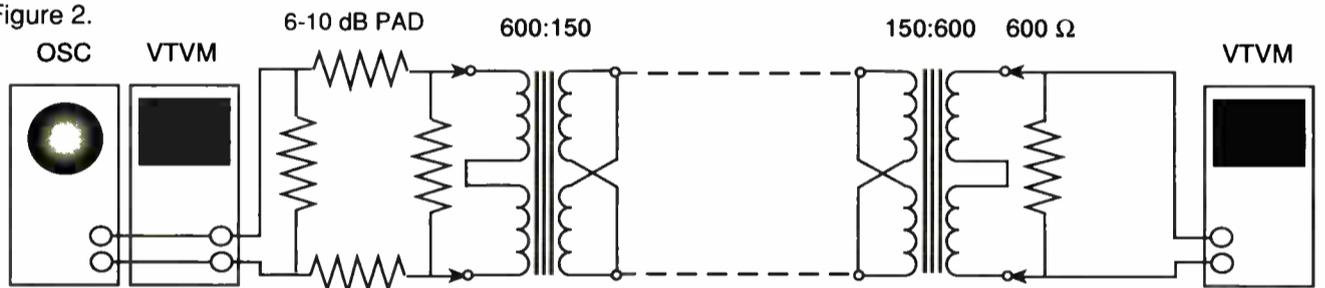
Measuring the audio performance of phone lines is fairly straightforward, provided a few precautions are followed. Figure 2 shows a typical test setup. Note the resistive pad inserted between the VTVM and the coil. Its purpose is to keep the varying impedance of the line from disturbing the accuracy of the VTVM. Otherwise, the level of the oscillator will be readjusted to compensate for line impedance changes.

Before putting the test equipment away, take the time to measure and record the resistance of the line (less coil) from the oscillator end. In telco vernacular, this is known as the loop resistance. It's an important thing to know if trouble occurs.

use your meter to verify the loop resistance. Simply plug into the "line in" jack and note the reading. A reading lower than your recorded loop resistance suggests a short on the line. The lower the resistance, the closer the short is to your end of the circuit. Allow for some seasonal variation of resistance with temperature. On the other hand, an infinite resistance reading tells you that the line is open somewhere. In a time of crisis, this valuable information will help the phone company to locate the problem quickly.

Sometimes leased lines are only used occasionally, such as those running to a sports arena for weekly games. These need to be "tagged" continuously to prevent accidental disconnection by telco linesmen. They will occasionally listen to a circuit, and reconnect it for another use

Figure 2.



Typical setup for measuring the performance of telephone lines.

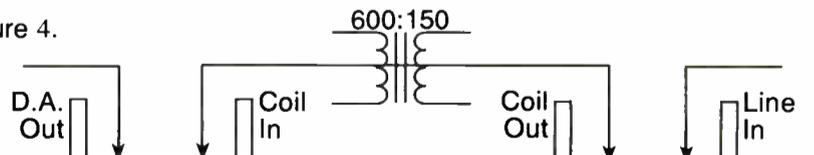
addition to length, this degradation is a function of cable type and terminating

For short hops, coil equalization should give a flat response (within ±1 dB) out to 10 kHz or beyond. Noise should be 60 dB or better. When checking for noise, remember to insert a filter ahead of the VTVM, so the measured bandwidth is

if nothing is heard. An inexpensive battery-powered oscillator connected to the line will help insure that it will be working when needed for the big game.

Lines whose response doesn't flatten out with coils will need to be equalized.

Figure 4.



By wiring the repeat coil and phone line through normalling jacks on the patch panel, lines can be quickly checked for both frequency response and loop resistance.

limited to the audio range. A simple filter is shown in Figure 3. Not using such a device may yield false high readings.

It is important to have provisions for isolating and testing phone lines in-house. When problems occur, they need to be handled quickly and efficiently. A little preparation goes a long way.

One of the best systems is to have all lines and coils wired through normalling contacts in a patch panel, as shown in Figure 4. Such a scheme makes it easy to

Also, there are a few interesting schemes for controlling devices with leased lines. These will be our topics when the next installment of Station Sketches arrives in your mailbox.

□ □ □

Tom Vernon divides his time between completion of a Ph.D. and engineering consulting. He is regularly found in the 19th century mansion that houses WXPB in Philadelphia. He can be reached at 717-367-5595.

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OFFBEAT RADIO

Better Health Through the Radio

by Dee McVicker

WOODCLIFFE LAKE, N.J. While national health care reform was being duked out by the Clinton administration and Congress during the last session, Health Radio Ltd. was quietly forming a first in national health care radio programming.

The radio programming service launched its first nationally syndicated health talk show on diabetes in late November and has plans to add other health-related topics to its program roster by the spring of 1995.

Bo Larsen, one of Health Radio's founders, said the programming service was started because there's every indication that the radio market is in need of nationally syndicated health-talk programs, both one-minute segments and full hour health shows.

Health issues

For one, he said, there's a growing number of local, filler-type health programs now being aired. And for another, health care has become almost a national obsession, if not an economic issue.

"Obviously more people are more aware (of health issues) because of what's happening in politics...it has come more to the forefront," he commented.

Since he began marketing his company's service, he has sold out the advertising on the Hispanic version of an hour-long series on diabetes, and he has received an overwhelming number of inquiries on an English version of the same topic.



"Controlando la Diabetes" was launched to several stations on Nov. 26 at noon from a satellite uplink in Philadelphia, which is close to Health Radio's headquarters in Woodcliff Lake, N.J.

Health Radio's debut program is targeting the female segment of the Hispanic market during weekends, a time when the listenership is up for the market's most influential buyer. A recently released Arbitron study revealed that 44 percent of all listening by Hispanics is to Spanish-language stations and that women of this ethnic group are more avid listeners than their male counterparts. About 49 percent of all listening by Hispanic women, 18 and older, was to

Spanish-language stations.

The study also revealed that weekend listening was strong in the Hispanic com-

Health Radio will introduce a new series on women's health and another on cancer in the near future as well.

munity; nearly 80 percent of all Hispanic men and 82 percent of all Hispanic women listened during this time frame.

In forming his business plan for the syn-



Mark Blatsein
Co-Host "Winning with Diabetes"

dication, Larsen related Arbitron studies to health statistics. His research tells him that Hispanics are twice as likely to develop diabetes than any other ethnic group, which is the impetus for Health Radio's recently launched "Controlando la Diabetes" show.

"You get floored when you see some of these statistics and then you think of

radio. Everybody has radio," he said, adding that diabetes alone "is a \$115 billion health care issue in this country."

Next up by Health Radio will be the English hour-long "Winning With Diabetes" and a one-minute segment on the same subject, as well another one-minute segment on prescription drug

advice hosted by James J. Rybacki, co-author of best-seller "The Essential Guide to Prescription Drugs." Health Radio will introduce a new series on women's health and another on cancer in the near future as well. Also in the offing are programs on arthritis and geriatrics.

Logical choice

"Those are the kinds of programs that are easily sponsored by national advertisers, and they're easy fillers for radio stations," said Larsen, who has a background as a producer and reporter for television and cable and more recently developed health care programming for large hospitals.

Given his background, Larsen initially considered syndicating the programs on his alma mater media but the numbers bore out a different decision. "It's taken



Susan Thom
Co-Host "Winning with Diabetes"

cable 30 years to just barely reach 60 percent of the TV audience...so you're really limited in the number of people you can hit, but especially with a targeted, focused audience that's dealing with health care," he said.

Health-talk radio, he said, falls in line with America's fascination with talk radio. "Talk radio is the hottest way to reach people in the nation right now. Pretty much every one under the sun has a talk show. Political radio is hot, that's the majority of it out there, and sports radio is hot. And those two basics of talk radio have been the forums for years and years," he said.

Larsen hopes to change that hierarchy by creating a mixture of health-related talk shows that mean as much to potential radio advertisers as they do to the people and markets listening.

□ □ □

Dee McVicker is a freelance writer and regular contributor to RW. She can be reached at 602-545-7363.

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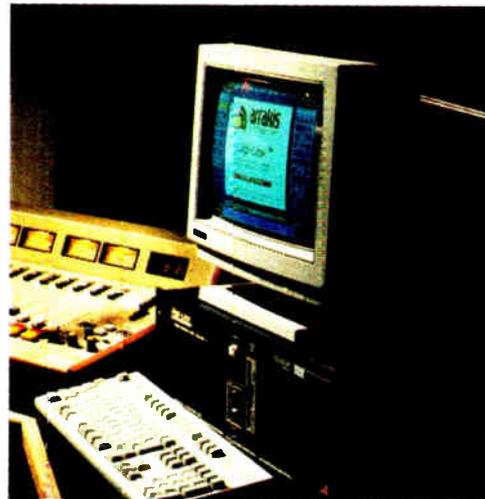
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FEEDLINE

RFR Concerns at AM Antenna Sites

by W.C. Alexander

Last year at the NAB's AM Antenna Seminar, one of the topics was "Radio Frequency Radiation Protection at AM Stations." Ben Dawson of Hatfield & Dawson made the presentation and gave an excellent overview of the problems associated with RFR compliance at AM stations. Included was a review of the new ANSI/IEEE standard, which was adopted Feb. 4, 1993. This standard specifies the permissible E- (electric) and H- (magnetic) field values for controlled and uncontrolled environments, as well as E-

and H-field power densities.

Techniques for measuring these fields were discussed, and one such technique has proven to be quite valuable in my experience. This technique involves the use of a field strength meter to measure H-fields close to tower bases, antenna tuning units and other locations likely to have high H-fields present.

Because the standard field intensity meter using a loop antenna in its lid is essentially a magnetic field detector anyway, all that is required to make it useful for measuring high level fields is to desensitize it. Ben Dawson has come up

with a simple means of doing this. Because the Potomac Instruments FIM-21 and FIM-41 seem to be the most popular MW field strength meters in use these days, the procedure described will pertain to those models. A similar procedure may work for other types of FIMs, but I have not tried it on anything other than the Potomac products.

Shorting the Shield

With the FIM lid open and the unit facing you, note there is an electrostatic break in the shield right in the center at the top of the lid. When making proof measurements within a few kilometers of an array, I use this break as a "gunsight" to see if there are any re-radiating sources, but that's another story. The idea in this procedure is to short across this electrostatic break. I have found that a good way to do this is to drill a small hole in the center of the gap and insert a short sheet metal screw. There may well be other ways of achieving a short at this point, but whatever method is used, be careful not to do anything that will alter the geometry or electrical characteristics of the loop.

The short screw, which can be easily removed, will not damage the loop or effect any permanent changes in the loop. When drilling the hole, be very careful not to allow the bit to penetrate too deeply; you could damage the innards of the loop and wind up with a big repair bill. Similarly, use a very short screw that will not penetrate to the point where it can damage the wires in the loop.

The next step is to calibrate the shorted loop. This procedure will tell us by what factor the loop has been desensitized. With the shorting screw removed, go to a location where the field strength from your station is about 300 mV/m. Carefully calibrate the meter in accordance with the manufacturer's instructions, then read and note the field strength. Now install the shorting screw and read the meter again. This reading will probably be on the 1 mV scale.

Divide the unshorted reading by the shorted reading to obtain the calibration factor, which we will call K. So far, all the meters I have tested have come up with K values in the neighborhood of 460.

Reading the H-fields

At this point you are prepared to make some H-field readings. Take the meter to the location of interest—say, in the vicinity of your tower base. With the shorting screw installed, read the meter at the location to be measured. Take that reading and apply it in the following formula:

$$H = \frac{(M \times K)}{377}$$

where: H = H-field in amps per meter (A/m)

M = field strength meter reading in volts per meter (V/m)

K = calculated calibration constant (usually about 460)

377 = impedance of free space

Because the H-field and H-field power density limits are the same for both controlled and uncontrolled environments

above and below 1340 kHz (the frequency break in the 1992 ANSI/IEEE standard), we can calculate the meter reading at which represents the ANSI/IEEE limit. The H-field limit specified is $16.3/f$, where f is the frequency in MHz. For example, the H-field limit at 1400 kHz is 11.6 A/m. The H-field power density limit is specified as $10,000/f^2$; at 1400 kHz the power density limit is $5,102 \text{ mW/cm}^2$. To find the meter reading which represents the ANSI/IEEE H-field limit, multiply the limit by 377 and divide by K. The value that represents the H-field power density limit will be so high as to be off the scale of the meter, even at the highest AM frequencies.

E-Field Limits

In my experience, most of the locations where occupational RFR exposure is high have a significant H-field rather than a high E-field. These locations have components or conductive objects that are grounded or have a low impedance. Some examples are the bases of towers that are

Be careful not to alter the geometry or electrical characteristics of the loop.

not electrically tall, inside tuning houses, phasors and grounded guy wires. ATU components in particular are capable of producing high H-fields because of the concentration of flux by coil turns. The very place where you must stand to read a base current may have an excessively high H-field, and you may have to limit your exposure time to maintain compliance with the ANSI/IEEE standard.

High E-fields occur in the vicinity of ungrounded objects or objects that have a high impedance to ground. Examples are the bases of electrically tall towers, unused (floating) array elements, insulated guy wire ends and the like. In these locations, our improvised H-field meter will probably show a low reading that is not at all indicative of the overall RFR exposure picture at that location. For our magnetic field meter to be useful, we must first be aware of what is likely to produce high E and H-fields and use our meter only in the high H-field locations.

There is no substitute for knowing the entire RFR picture at a site. This can only be achieved through measurement of both the E- and H-fields; H-field-only measurements will give you only half the picture. There are E-field meters available that, along with our improvised H-field meter, can complete the picture for us. I suggest renting, borrowing or buying such a device to find the areas with high E-fields.

It is incumbent upon the licensees of radio stations to maintain compliance with ANSI/IEEE RF radiation standards. Unfortunately, most stations do not possess the equipment needed to make needed measurements nor the funds to purchase this equipment. By converting the field strength meter that should be on hand at every station employing a directional antenna and likely on hand at many non-directional stations, licensees can gather much valuable data about the RFR picture at their sites.

Just remember to take the screw out before making MP measurements.

□ □ □

Cris Alexander is director of engineering for Crawford Broadcasting.



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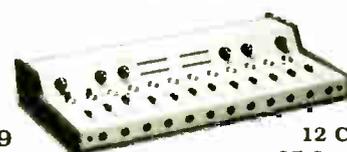
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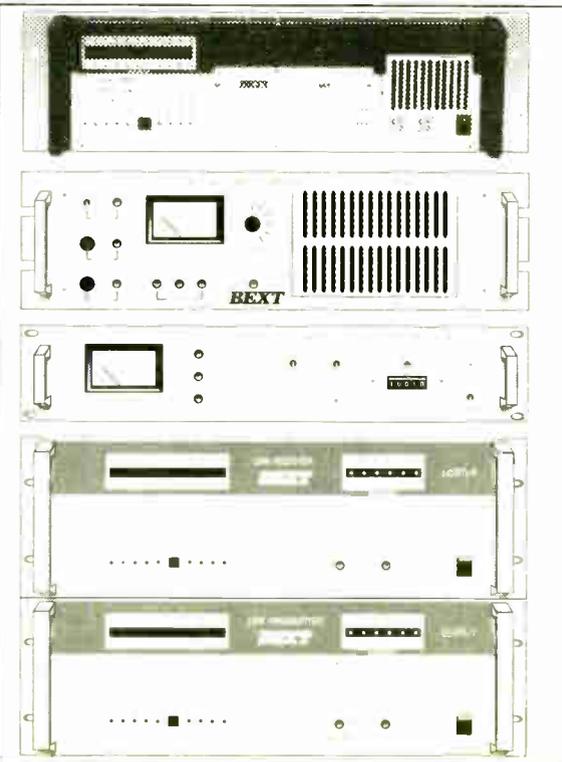
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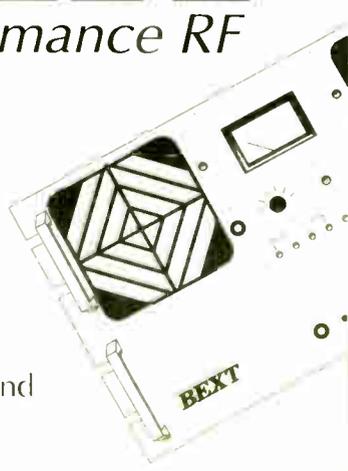
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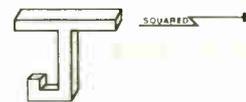
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Must-Know Engineering Definitions for Radio CEs

Dear Luci,

Wow... 1994 is about over, isn't it? Gotta admit, it went fast. But then again, you know what the frog said to his girlfriend, right? "Time's fun when you're having flies" (yeah, I know I used that line once before...it's still a goodie).

As my Christmas gift to readers everywhere, I thought this time out I'd share several helpful handy-dandy formulae I've picked up along the way. Because many Trench readers are engineers, it seems fitting that I devote a little space to making their job easier.

Once in a while, all of us experience a skip in the ol' brain-groove and find ourselves stopping to convert inches to centimeters, jotting down a quickie "E-I-R" to recall Ohm's Law or (don't let your jocks see you do this) looking through the yellowed memos taped up from three chief engineer's back to work out the indirect method... yeah, it has been awhile, hasn't it?

Because many "classic" equations are already part of a good chief engineer's tool kit, I'll concentrate instead on several lesser-known but technically accurate formulas. All are legitimate, taken off the Harris conversion chart with their kind permission.

Cubic feet per minute x 0.1247 = gallons per second. Helpful when you discover the fan used to cool the transmitter finals is actually pumping in rainwater

from the roof instead of air from outside.

1 Bushel = 1.244 cubic feet. When you're ready to send in that bushel basket of broken carts for repacking, tell the guy on the phone you're "shipping 1.244 cubic feet of cartridge shells"... then just mail him the whole mess, basket and all.

1 kilowatt = 1.341 horsepower. Can't start your backup generator? Four horses and a treadmill should keep most Class C FMs running until the power comes back

Once in a while, all of us experience a skip in the ol' brain-groove.

on. Keep a shovel handy.

Revolutions x 6.283 = Radians. Drive your music director nuts by going into his music scheduling computer and replacing "Revolution" by the Beatles with "6.283 Radians." And because Radians x 3438 = minutes, just watch him try to back-time to the hour.

Webers x 100,000,000 = Maxwells. Helpful only if you're calculating how many gas grills it takes to make a replica of Jack Benny's classic car. Not exactly a junk-box project.

1 Erg = 1 dyne-centimeter. Tell the truth...who the hell cares?

Gilberts x 0.7958 = Ampere-turns. See

FROM THE TRENCHES

by Alan Peterson



"erg" above.

1 Megaline x 1,000,000 = 1 Maxwell. Ditto. Let's get Mr. Maxwell together with Gilbert and Weber and let them fight it out.

Pounds x 453.6 = grams. Remember the good old days when we'd put a nickel on the tonearm to keep the record from skipping? At about 2 grams normal tracking weight you can at last see why that wasn't such a hot idea.

Bars x 0.0000009870 = Atmospheres. Proof enough that your copywriter should stop using the word "atmosphere" in bar commercials. Higher math proves bars have no atmosphere.

Pounds x 7000 = grains. Taken to its logical conclusion, it requires 7000 grains of sand when you're told to pound it by an insensitive general manager. Not to worry...guys like that barely have 2 ergs worth of brain power.

k = 0.647. This is my own contribution: Peterson's Copier Constant, if you will.

This is the reduction factor necessary to shrink the "help wanted" page of most radio publications down to letter size paper. Careless jocks always leave copiers set to this number.

Joules x 10,000,000 = Ergs. Another highly useful formula. Better we should ask how many ergs it takes to make an omelette?

Actually, if you can still get this conversion chart from Harris, you'll find it a great addition to the shop. There's a decibel chart, the formula for antennas, TV frequencies and, as you can see, great inspiration for the end-of-year Trench.

So I hope everybody has a chance to apply some of these handy tips, and that it'll hold us all until 1995. Until then Luci, have the usual Merry and Happy and we'll talk again in January.

-Al

□□□

Alan Peterson is Production Director for WNNK-FM "WINK 104" in Harrisburg, Pa. Call him at 717-238-1041.

Realistic Soundscapes

► continued from page 21

seven inches can make a significant difference for the sound quality that we get, and it really is quite important to get it absolutely right in the first 20 minutes of rehearsal."

Complicated sound

Some of the panelists said that 3D sound becomes more complicated when combined with other technologies such as digital data reduction. Wade Bray, founder and vice president of Sonic Perceptions Inc., warned, "The psychoacoustic masking calculation, I think, is being underrecognized. In human hearing if two sound sources which may be masked if they are co-located are separated, even by a small amount, they're clearly heard. The binaural or 3D sound presentation is the strongest test of these data compression schemes that rely on psychoacoustic masking characteristics, because the masking in the binaural sound situation is extremely different, on the order of 10 or more dB from the expected one from the monaural case."

Eric Small, president of Modulation Sciences, also warned that these 3D techniques may introduce problems for broadcasters who need to be concerned about mono compatibility. Small said he is very familiar with the broadcast environment. "As pervasive as stereo is today, in broadcasting it is still, for all intents and purposes, a mono world.... For FM radio, stereo may be dominant but especially in automobile listening, the radio spends a great deal of time in the monaural mode. You may not know it, the stereo light is still on, but it takes a relatively small amount of multipath in a mobile situation to force that radio into what is politely referred to as 'blend mode,' read that mono."

Not too much

Small also said that FM broadcasters should not use too much left minus right information—a staple of many 3D technologies. "If you are transmitting a great deal of left minus right information—difference channel information—there are going to be problems, multipath susceptibility. It's not that difference information causes multipath it's that the more difference information that you have, the more susceptible the signal becomes to multipath.... Another problem...is the loudness issue. Broadcasters spend an immense amount of money—and keep a bunch of us manufacturers very happy—wanting to be a dB or a dB and a quarter louder than their competitors. If you start broadcasting too much difference information that advantage is lost."

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12 Monday
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*LMA
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Advice on
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See pp. 40-42.

Your Resource for Business, Programming & Sales

G. Gordon Liddy Takes Chances On-Air and Off

by Alan Haber

WASHINGTON In a cramped broadcast studio in Fairfax, Va., a famous historical-figure-turned-radio-talk-show-host sits in front of his microphone looking dapper in his brown sports jacket, light blue shirt and brown striped tie. He looks at the computer screen set off a little to his left and sees that his next call is from a man in Birmingham, Ala., a law student who challenges the host on his views on women in the military. The host accepts the challenge.

Not all callers to the G. Gordon Liddy Show offer its gracious host a challenge; many simply call Liddy to say hello, to discuss current events. Pets. Just about any topic you'd care to mention, really.

Liddy kicks off his four-hour weekday show with an hour in which he offers his review and comment on the news (he calls this "the hour of sweet release"). Phone calls from listeners and frequent guests round out the Liddy talk show recipe, as does the man's patented discourse on past, current and future events.

Reality check

Who is G. Gordon Liddy, referred to on the air by his listeners as the G Man? These days, he's the host of a highly successful radio talk show produced by WJFK-FM in Manassas, Va. (Washington) syndicated by Westwood One and carried by around 210 stations nationwide.

The response from listeners is nothing short of truly astounding: according to producer John Popp, when 175 stations were carrying the show, AT&T estimated that Liddy was getting about 80,000 phone calls a month. Popp said that the show receives a couple of hundred faxes a day.

Liddy isn't shy about voicing his opinions. "It's been said to me once that, you know, your problem, Gordon, is that you're so vague and ambiguous because of the shy and retiring personality that has afflicted you ever since your youth," he said, laughing. He told a caller he is a lawyer, "among other sins I've committed in my lifetime." And what a lifetime: he spent two years as an Army artillery officer in the Korean war. He was an FBI Special Agent, an international law attorney, and a prosecutor. During the Nixon administration, he was Special Assistant to the Secretary of the Treasury, Enforcement Legislative Counsel, wrote the Explosives Control Act, and, in 1971, went to the White House as Nixon's Staff Assistant.

And, of course, he was involved in Watergate, one of the most famous political scandals in history: for his participation, and for choosing not to implicate other people, he was sentenced to more than 20 years behind bars (he served almost five years—many of them in maximum security).

A wealth of experience

Liddy's rich life experience makes him much more than simply an able conversationalist on any number of topics. But what qualifies him to be a radio talk show host? What's the secret to his radio success? "One of the things that contributes to (it) is that I really don't know anything about radio, and so I had no preconceived ideas as to what one could do, and what one could or ought not to do on a talk show," he said. He also noted that he draws answers to listeners' questions from his life experiences instead of from "a base of knowledge that comes from reading magazine articles or things of that sort." He said he doesn't take himself "with an excessive degree of seriousness. I think that those who do are kind of riding for a fall in this life."

And he considers someone who's gone to the trouble of calling him "to be a guest, and that guest may or may not agree with my positions. If the guest does not agree with my positions, I will attempt to persuade the guest to my point of view. My experience in life has been that you don't persuade people by calling them names, being rude, hanging up, etc. So a hallmark of my program is courtesy to the people who call in."

Radio origin

G. Gordon Liddy says he got into the radio talk show game by accident. He was working for the cable television network CNBC, in Fort Lee, N.J., at night. Meanwhile, popular WABC(AM) talk show host Bob Grant wanted to take a vacation from his Manhattan studio. Liddy sat in for Grant while Grant recharged his batteries. Fate entered the scenario in the form of Mel Karmazin, Infinity Broadcasting's president and chief executive officer, who, according to Liddy, was driving around Manhattan one day, heard Liddy on the Grant show, phoned WJFK-FM general manager Ken Stevens, and told him to give Liddy a shot at an open slot on the station. "The rest," as Liddy said, "is history."

While he said he had no preconceived notions coming into radio, Liddy did say he had

continued on page 45 ►

Creative Spot Course

NEW YORK StratiComm America, a creative marketing firm, just published the Essential Radio Spot, an educational course designed to teach both advertisers and established industry executives the art of creating effective and engaging radio commercials.

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All News Radio

Talkshows Stir Political Discussion

by Alan Haber

LOS ANGELES Say what you will about talk radio and politics, but don't say the two are divergent any longer. Like it or not, the quickly multiplying opinion-heavy soapboxes of the airwaves and the mass of politicians seeking office during the recent spate of nationwide elections could not be termed strange bedfellows—one hand tended to wash the other, with ratings the common cause for both parties.

Take New York Governor-elect George Pataki's relationship with radio's self-proclaimed "King of All Media," for example: Howard Stern has been crowing, since the election, that he was responsible for Pataki's win, urging his listeners to vote for Pataki in the days leading up to the election.

(Stern himself had been running for governor of New York and dropped out suddenly when he refused to declare his personal finances; he still maintains he would have won had he stayed in the race.)

Pataki has responded to Stern's efforts—it is assumed, with tongue firmly in cheek—by making Stern Commissioner of traffic (getting New York road crews to work at night in order to alleviate traffic problems during morning and afternoon commutes was one of Stern's platforms).

In noted company

Of course, Stern isn't the only radio talker dipping his toes into the vast political playing field—Imus is there, too, and so is G. Gordon Liddy. The idea of radio talk shows acting as a forum for all sorts of

issues, including those of the political variety, was one of the topics addressed at a session looking at Washington's view of the issues affecting the radio broadcast industry at the recent NAB Radio Show in Los Angeles.

Congressman Carlos Moorehead (R-Calif.), a member of the House Energy and Commerce Committee, which handles broadcast-related issues, said that he thinks talk shows are doing a lot of good in this country, and spoke about the diversity of ideas and voices heard on them. "I think that everybody can contribute something with ideas that are very important for the American people to have and discuss," he said.

Moorehead noted that he objects when people don't have their facts straight on the

air. "Sometimes their facts are so far off that they can mislead the public tremendously," he said, adding that other people will call in and straighten them out, so he doesn't think any real harm is done.

Congressman Xavier Becerra (D-Calif.), a member of the House Judiciary Committee and its intellectual property subcommittee, which handles copyright issues (he has been involved in such issues as performance rights and other intellectual property concerns affecting radio), said that, as a policy maker, he believes "We should give...talk show hosts and their host radio stations as much latitude as possible, because, whether I like them or not, it's not up to me to try to corral the radio show hosts... I think it's very important that we try to maintain that distance between government and the broadcaster, and in this case the radio talk show host as well, because I actually think it's good to be able to promote more dialogue."

Do a better job

Becerra also said that "we have to do a better job, obviously, of getting the public to be cognizant, and also to be questioning on what we hear on radio or see on TV. But I would hope that we keep our distance in Congress, at least when it comes to regulating or trying to tell radio stations and radio talk show hosts what to do."

Congressman Ernest Jim Istook (R-Okla.), a former radio journalist who is completing his first term on the House Appropriations Committee, said he thinks that a lot of people in Congress are "mad and upset at talk radio, because it challenges, it stirs the pot, it gets people riled up... There's a lot of people in Congress, frankly, that are scared of the talk radio phenomenon." Talk radio, he suggested, "gives people the opportunity to develop an issue more fully. It has a bigger news hole... than most newspapers do, and you can explore a topic in depth. Yes, you can find a subject discussed in depth through a trade publication or a news magazine and so forth, but it doesn't have the same immediacy, and, besides which, that usually goes to a specialized audience as opposed to a mass audience."

Free exchange

Istook brought the subject of talk radio into perspective by suggesting that, if this country's founding fathers were here today, they would see in talk radio "freedom of expression, the free flow of ideas, the opportunity to put something out on the table and have it either accepted or shot down in flames...Frankly, I think the founding fathers would love (talk radio), and they would say, 'This is what we had in mind. This is the kind of free exchange of ideas that we envisioned when we set up the United States.' And they would love it."

Addressing the responsibility of talk show programs, Becerra noted that "What always happens with legislation is (that) it gets to the point where policy makers think that they have to act because the industry is not. I think at this stage, because the whole phenomena with talk show hosts is expanding so much, that there will still be quite a bit of latitude permitted by policy makers, by legislators."

He added that if everyone in the United States gets to the point "where we start to have some real concerns about the way the industry's developing, you're going to see state legislatures, Congress, begin to talk about doing something. I think it's incumbent on the industry to talk about it and pre-empt any action by Congress."

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MANAGER'S NOTEBOOK

Planning, Preparation Key to Making Changes

by Sue Jones

BURKE, Va. Anytime you mention that there will be some changes in the station over the next few weeks, months or quarter, the staff starts to get nervous, edgy and worried. If you have not explained what will be changing, who will be involved and other general details, the staff will imagine them. Worse yet, they will tell each other their fears, and within a couple of days you will have an epidemic of staff paralysis.

Change is inevitable and vital to the continuing growth of a station. Consider the changes that have occurred in the last 10 years in radio broadcasting. Improvements

Do not consider managing your station today the same way that it was managed 10 years ago.

in electronic technology have brought many changes, such as satellite broadcasting.

The sophistication of the listener has changed as well, affecting programming and the on-air personalities. You would not consider managing your station today the same way that it was managed 10 years ago.

Looking for the edge

Besides the technological advances and audience changes, managers must look for ways to change stations to maintain a competitive edge. If you are not continually looking for ways to improve your station and make it more appealing to your listeners and more cost effective, the competition will. Instead of being the leader, you will be in a reactive catch-up mode.

Keep in mind that every change will have a reaction. Some changes can be very costly to implement. So plan changes after they have been carefully considered in terms of the impact on the staff. As a guideline, you should implement change when:

- 1) it will give the station an edge over the competition.
- 2) the change will have some significant benefit internally or externally, and/or
- 3) you believe the ensuing reactions can be handled and are beneficial.

Don't make changes as a reactionary move. If ratings are down one quarter, don't make wholesale changes without thinking through all of the above-listed reasons for change. One decline in the ratings may be the beginning of a trend or it could be a fluke. Three consecutive declines in the ratings clearly indicate change is required.

Accepting change

One of the most difficult parts of implementing change is getting the staff to accept and adopt the changes. Whether you are introducing digital workstations or implementing new policies and procedures, people are naturally resistant to change of any kind. If given a choice, some people would elect not to use a new piece of equipment or learn a different way to do their job.

Consider how much business has changed with the introduction of computers and

copying and facsimile machines. We had to learn how to use the new devices, but the payoff was worthwhile. It may have been necessary to pull some of us along kicking and screaming toward the new equipment. Changes must make sense and have a pay-back to be effective.

Because change is inevitable and vital to remain competitive but can create unnatural fears among the staff, there are several important management steps that can ensure smooth implementation of changes.

One key step is to anticipate the staff's reaction and to be prepared to respond appropriately. When implementing new technology, staff members may fear that

they may not master the new technology or be as good as another with the new equipment. Some may fear that the technology will replace their job. Others may believe that some of the new

programming policies may decrease spontaneity and creativity for the DJs.

Prepare a plan

Another key factor is planning. Prepare the staff for change with more than a statement that there will be some changes over the next few weeks. Because you know there will be some reaction to any change, plan enough time for changes to be implemented and include a learning curve and adjustment time. Think through a new plan and the reaction to it. Perhaps it would be easier for the staff to adjust if the changes were implemented in stages rather than all at once.

As part of planning, ask staff members for their input for needed changes. People adjust to change more easily when they have contributed to the decision-making or

continued on page 40 ▶

Survey Documents Experience With New Tapeless Technology

LONDON Independent consultants Sypha have just published the results of an extensive survey into the use of tapeless technology in radio.

Titled "Tapeless Technology in Radio Applications—the Users Point of View," the objective was to gauge the market's response to tapeless technology for applications such as cart replacement, automation and production. While tapeless systems promise many benefits in theory, the aim of the survey was to examine how the technology fares in practice.

The survey documents the experience of both owners and non-owners of tapeless systems and also examines attitudes toward digital technology and associated equipment. The format of the survey was an initial telephone interview in which more than 470 participants in the U.S. and U.K. took part, followed by an in-depth written questionnaire that was completed by more than 220 participants.

The issues examined included awareness and opinion of systems and technology, reasons for system selection and purchase, expectations of system performance, operational and technical support, applications and features required, investment decisions and future plans and sources of information and advice.

As an example of the results of one of the questions asked under the general heading "Awareness and Opinion of Systems," the level of awareness and knowledge of tapeless systems varied between system type and geographical samples.

For simple cart replacement systems (excluding systems owned), approximately 82 percent of the U.K. sample knew of at least one system, compared to only 44 percent of the U.S. sample. For cart or full automation systems (excluding systems owned), the level of knowledge was high, with approximately 74 percent of the U.K. sample and 70 percent of the U.S. sample knowing of at least one system.

For production systems (excluding systems owned), the level of knowledge was mediocre, with only approximately 54 percent of the U.K. sample and 55 percent of the U.S. sample knowing of at least one system. Not surprisingly, owners tended to be more informed than non-owners.

The full report provides the results and analysis of more than 100 questions, and as the first independent study of its kind in the radio market, "Tapeless Technology in Radio Applications—the Users Point of View," should provide useful feedback from which all interested parties can benefit.

In order to fund this extensive research, sponsorship was provided by AMS Neve, D-Cart, Broadcast Electronics, Computer Concepts, Harris Allied, Korg, RCS, Sony and Studer Digitec. However, the method and results were independently managed by Sypha, a consulting firm operated by Yasmin Hashmi and Stella Plumbridge.

□ □ □

The full report costs US\$380/UK£225 and is available from: Sypha, 216a Gipsy Road, London SE27 9RB, U.K.; telephone: +44-181-761-1042; FAX: +44-181-244-8758; or circle Reader Service 2.

A free two-page summary of the results is available. To request a copy, interested parties should contact Sypha at the above address.

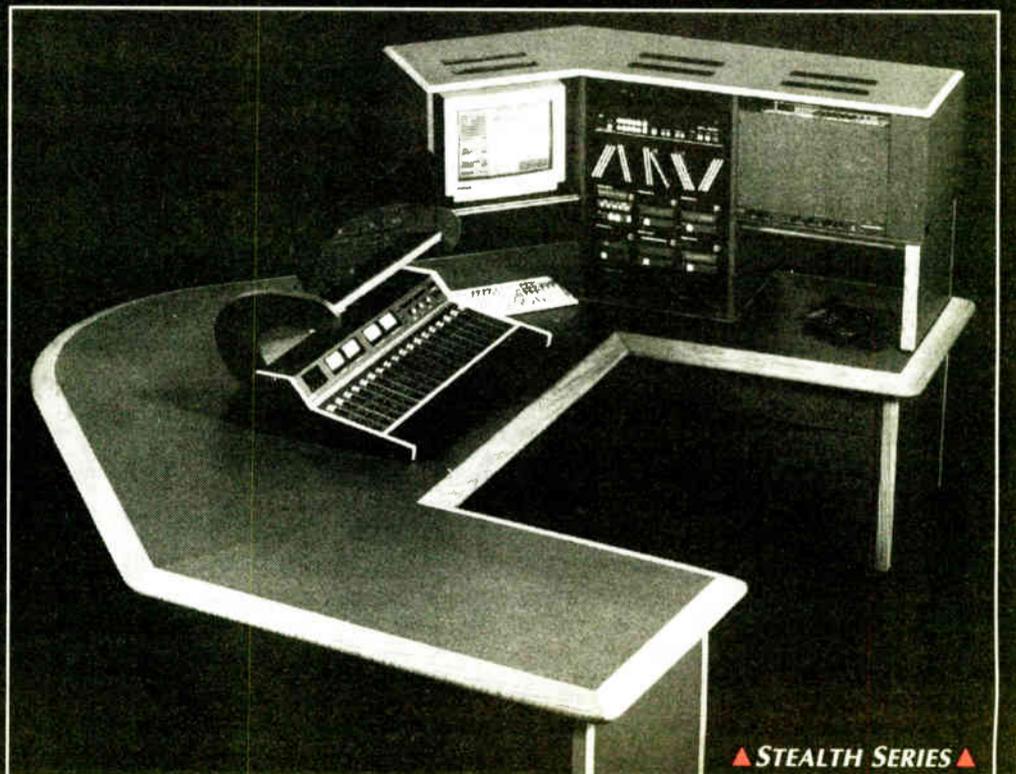
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Planning Eases Change

► continued from page 39
implementation process.

A fourth key to implementing change is to explain the reasons why that change in programming was necessary to remain competitive. Show the staff some of the revenue figures or reasons given for rating changes and the causes behind them. When staff members are aware of the reasons, they can better appreciate the need to change and adapt to it much faster.

Explain the reason behind the policy change that the sales department will not

participate in dress-down day once a week. The sales staff may feel like they are losing out on part of the relaxed mood of the rest of the staff, but they cannot expect to make sales calls on prospective advertisers in cutoffs and a T-shirt and get the sale.

Allowing the sales staff to dress down for one day of the week and therefore not be able to make sales calls on the dress-down day reduces the station's revenue and their commission by 20 percent. One day out of five is lost for sales calls. I do not know of any station that can voluntarily reduce its

revenue by 20 percent and hope to stay competitive and remain in business.

What is in it for me?

Yet another important key to implementing change is to identify the benefits to staff members. Describe or show how the change can be an opportunity for them to learn new skills and make them more valuable to the station. Increasing gross revenues through better engineering or programming can mean increased market share and job security.

A vital element to implementing change is communicating with your staff. It is critical in the successful implementation of any change. Be sure to explain why the change is necessary and important to the

station. Explain the benefits the change will bring. Keep communications with the staff on-going through the change. Encourage staff members to provide feedback and ask questions.

Negative feedback can be useful in giving you a warning that the implementation may not be going as smoothly as planned. You may need to modify the implementation somewhat or become more involved.

Managing change can be a bigger challenge than you expected. If you follow these guidelines, the planning and implementation should run more smoothly.

□ □ □

Sue Jones is a senior manager for Computer Data Systems Inc. in Rockville, Md. She can be reached at 703-323-0491.

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Reader Service No. 86

EEO Forfeitures to Be Reconsidered

by Alan Haber

LOS ANGELES This past July, the Federal Circuit Court in the District of Columbia issued a decision in a case that saw the United States Telephone Association (USTA) challenge the FCC's 1991 generic forfeiture policy statement. The court found that the statement should have been put out for notice and comment. Speaking at a session on EEO issues at the recent NAB Radio Show in Los Angeles, FCC General Counsel William Kennard said that the USTA case has some implications for the Commission's EEO efforts. Kennard said that the Federal Circuit Court's decision generated a lot of confusion at the FCC and among the industries the Commission regulates because those licensees that had been issued fines under

the 1991 policy statement were concerned about whether those fines could be enforced.

Not thrown out

Kennard said that the FCC has decided that it "will not throw out fines that have been issued since 1991 under the policy statement.... What we decided instead is that we would reconsider those forfeitures under policies irrespective of the policy statement.... Anyone who has a fine outstanding should not assume...that fine is going to be vacated because of the USTA decision; rather, we are going to be re-evaluating that fine under standards not necessarily in accord with the policy statement, but basically the way we did it before, which is we look at similar cases and we determine what the level of the fine should be."

The USTA case is important for EEO enforcement, he said, "because, earlier this year, in February, the FCC came out with a policy statement on EEO enforcement which is similar to the 1991 policy statement in that we set forth guidelines for the level of fines that should be imposed for various violations or deficiencies in a broadcaster's performance." Kennard added that the FCC has decided "that, with respect to EEO forfeitures, just like all other classes of forfeitures, they will be evaluated—reconsidered, really."

Kennard noted that the FCC is "going to take this opportunity to re-evaluate the (EEO) policy statement—there are petitions for reconsideration pending. We obviously need to get that policy statement out for notice and comment...." He said that the FCC thinks "that the policy statement, or the EEO rules in general, need some refinement, and we want to be doing that over the next few months." Among the areas he identified as needing to be looked at: guidance to broadcasters "as to what constitutes an adequate pool of applicants within the protected groups—minorities and women," and the impact of EEO rules on small stations and small market stations.

Emphasis on recruitment

Kennard said that, in his view, "in some instances, we have elevated form over substance in our EEO rules. We put a lot of emphasis on recruitment, but sometimes

we put too much emphasis on just sending out notices and calling organizations, when everyone knows that when you really want to hire for a position, you don't just send out letters to organizations you may not even have contact with. So I would like the Commission to take a hard look at giving more credence to efforts that licensees undertake that is not just paperwork shuffle, but really networking, putting together a consortia of broadcasters that do really meaningful recruitment and outreach efforts."

Year of change

Rod Porter, recently-appointed deputy chief of the FCC's new international bureau, said that "In many ways, 1994 has been the year of change in EEO." He noted that the USTA decision "was determined to affect only the methodology for determining what the ultimate sanction should be, and not the underlying basis of the rules."

He said that a report was filed to Congress in October of this year that addressed two scenarios: in the long term, looking at EEO "from the standpoint of communications industries in general, as opposed to our traditional approach, which is only broadcasting, and looking to see how our EEO approach should be modified for the year 2000." In the short term, the Commission's desire to "make more immediate changes to our rules as they impact broadcasting" was noted.

The obligation for broadcasters to "engage in efforts when job vacancies occur" has

continued on page 42 ▶

LMAs Do Not Relieve Station Licensees of Responsibility

by Alan Haber

LOS ANGELES Say a radio station—your station, perhaps—is providing programming to another station. Does your station have an attributable interest in the other station under the FCC's ownership rules if the city grade contours do not intersect?

According to Lewis Paper, a partner at the Washington law firm Keck, Mahin & Cate, speaking at a session at the recent NAB Radio Show in Los Angeles, "The rules are governed around... diversity, and address a situation in which the city grade signals do intersect. So in that kind of situation, there are situations in which you can have a time brokerage agreement and not have an attributable interest."

Option to buy?

What if your station has a option to buy the other station? Addressing the question of whether the FCC considers that to be an ownership issue, Paper said the short answer was no, "but having an option in an LMA, which is a very common feature, is a potential trouble spot for everyone concerned... It's very important, even if you have an option agreement or a sales agreement, to make sure that the licensee remains in control and that the LMA reflects that control through various provisions which the FCC has identified, principally having control over personnel, finances, and programming."

Paper offered that, in addition, the licensee "must maintain a main studio, which has been a real source of concern... to a lot of broadcasters whose stations are being brokered, but that still is a requirement, and that in turn requires the licensee to have some employees on hand who maintain that studio, even though for all practical purposes the manager may not be at the studio (and) may not be doing very much."

Roy Stewart, chief of the FCC's Mass Media Bureau, agreed with Paper's comments. Noting that the renewal process for radio begins in the middle of next year, Stewart said that "undoubtedly there are LMAs in those cities, in those states, that are in existence right now ...I don't want to see...broadcasters end up getting in trouble at renewal time." A station cannot tell the FCC, he noted, that it's got a contract that says that the station that was brokering it was supposed to take care of its responsibilities. "It's still your responsibility," said Stewart. "You cannot contract that responsibility away."

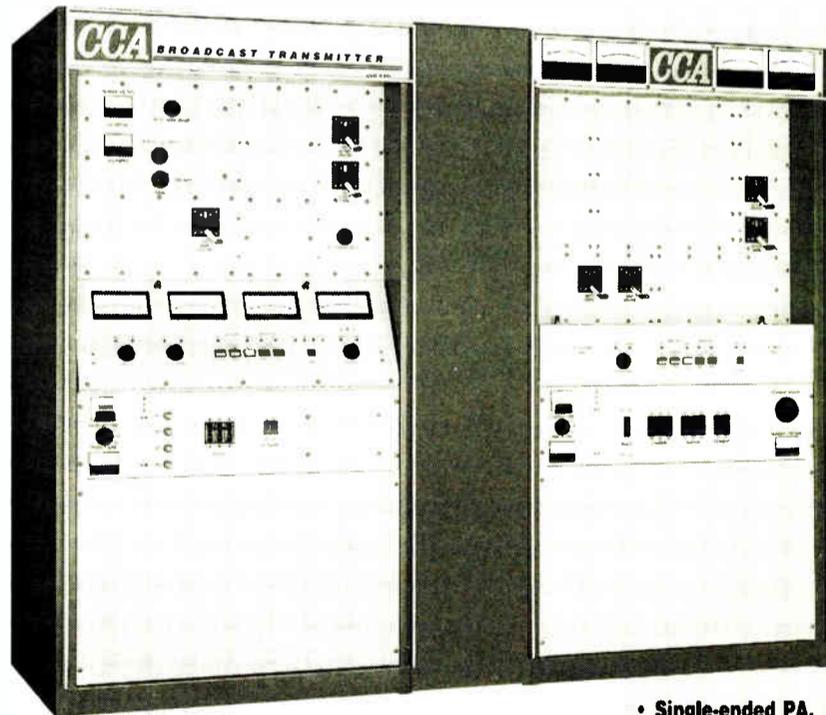
LMA turns to duopoly

There is a concern, he noted, that a lot of LMAs "end up in duopoly buys because they have an option to buy, but if the option to buy hasn't been exercised and the sale hasn't gone through before your renewal has filed, and you haven't paid attention to the station, then you've put yourself in a very vulnerable position...." Stewart added that he didn't want anyone to run the risk of losing a station because they misunderstood that "the Commission meant it when it said we will come down very hard on unauthorized transfers of control where a licensee abandons a station."

The upcoming renewal cycle for radio "is the first duopoly renewal cycle the Commission will have faced," said John Feore Jr., partner in the Washington, D.C. communications law firm Dow, Lohnes & Albertson. "If you own four stations in a market, are you safe if three of them are doing a great job in terms of news, public affairs, and programming addressing community issues, and the fourth station is your wall-to-wall music? You know, can you average it out and tell the Commission...if you add them all up together, it's a pretty good number? Doesn't each station have an obligation to address community needs?" Feore said he thinks the answer is probably "Yes."

What's a safe number? Feore said he doesn't think anybody knows, but he did say that "If you come up with a zero number, you probably ought to work real hard between now and June 1 or August 1 or October or December to get something done."

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PROMO POWER

Making Direct Mail Work for You

by Mark Lapidus

WASHINGTON More direct mail pieces for radio stations are created with a little something for everybody on your management team. For the sales manager, there is opportunity to plug clients and insert discount coupons. For the program director, there is promise of building both come and TSL. For the promotion director, there is a place for the jocks, contests, events and the building of a new marketable data base. For the general manager, it's all of the above, plus colorful graphics and the logical marketing plan that the direct mail company is offering. Everyone's happy, but there is something wrong with this picture.

The direct mail piece I am discussing has been created for too many purposes. In fact, one thing it does that works against you the most is so simple that most of us don't stop to analyze it: The piece has been made to entice you into doing business with the company that created it.

It's you they want

You are the real market that the direct mail producer needs to capture to make a profit. This is why most pieces include the elements listed above. For your direct mail piece to be effective, it needs to be created for only one target: your listeners.

Before the radio direct mail companies of the world start sending me hate faxes, let me say that this approach is not their fault. It is ours as a radio industry. Direct mailers do exactly what we want and, unfortunately, it's frequently wrong. If you don't believe me, take almost any radio direct mail piece produced lately and show it to a non-radio person. Let him or her study it for two or three minutes. Take it away and ask these questions: 1) What are you supposed to listen for and at what time should you listen? 2) What's the name and dial position of the station? 3) What kind of music or programming does the station do?

If it took more than three minutes to read, the plan is probably toast. When's the last time you looked at a piece of junk mail for three minutes? It's true: Listeners do not look at a direct mail piece the way we in the industry do. For most of them, it's just another piece of junk mail they have to sift through after a long day at work.

Where is the good news in all of this? Direct mail really can work for you. Here are a few suggestions that will hopefully generate some brainstorming during your next direct mail planning session.

What's the point?

• **Purpose**—Are you trying to increase listening? This is usually accomplished by means of a contest. The current vogue is to highlight a song a day with a cash incentive. Most stations put the title and artist in a calendar with a time to listen. Many will use this opportunity to boost TSL by giving a long window in which to listen for the song.

For example, listen to K--- for "Mr. Postman" between 2 and 6 p.m. today. Be the 10th caller and win \$1,000. Sorry, but not many (if any) adults have the time or desire to listen carefully to your radio station for four hours at the outside chance they could be the 10th caller and win. The TSL factor here is just not realistic. Even giving them a one-hour window won't stand much of a chance.

Would you be late for work just because

a radio station told you that sometime from 6-7 a.m. the song will play?

Another popular scenario is to have listeners tune in several times during a morning show to hear the exact time the song will play. Again, this is one too many hoops. Why not just tell them exactly when the song will play?

Be satisfied with the new cume you receive by making this simple and then use your radio station to create the TSL. How? Air something special just before and just after your contest. Remember, your station should be at its most entertaining whenever new cume could be coming through the door.

Are you bonding with your listeners? Many companies will send out birthday cards to listeners. If you do, make it more than a greeting card. Give them something to remember you by.

Remember the point

If your direct mail piece is in the form of an entertainment magazine, make sure it's filled with reasons to listen to your station. If your listeners love the magazine for its story content but never turn on your station, you lose.

• **Target/content**—Is the piece designed with your age/sex target in mind? A piece designed for a modern rock station should look very different than one made for a country format. Be careful not to jam too much information into any one mailer. Use your space instead for an extra-large logo.

bold, simple statements and attractive color pictures.

Overcome your natural desire to save money by adding another foldout that contains an ad or a different contest. Secondary pieces weaken your main message. If your company doesn't require you to publish full contest rules with a contest mailer, don't do it. Instead, state that full rules are available by sending a self-addressed stamped envelope to your station.

Never make someone cut a piece out of your mailer to participate in your contest. Most people are lucky if they remember their social security number, let alone a digit you assign them.

• **List**—Have you scheduled time to examine your mailing list? If your direct mail company won't allow you advance access to your list, find another company. Do the ZIP codes match your hot ZIPs?

Are you mailing to the correct age/sex? My father, now in his 70s, just got a radio piece for a station with a mix format. It makes me wonder how many others out of the target got the piece. Ask if this list has been used for any other radio or television stations in your market. Find out the last time the list was updated by the supplier.

There's so much more to say on this seldom-discussed topic. Too frequently the only question stations ask is, "should we or shouldn't we?" Next time you opt for direct mail, ask yourself how to make it simple, attractive and more likely to elicit action. You and your listeners will be glad you did.

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Mark Lapidus is director of marketing for Liberty Broadcasting.

Forfeitures Re-examined

► continued from page 41

not changed, said Porter. "What is widely misunderstood about the efforts policy is that there is no one factor that is detrimental. You can have a poor pool and still have an unconditional renewal with no sanction, depending upon how you perform with regard to the other efforts criteria."

Broadcasters should steer clear of several factors in order to avoid problems with the FCC at renewal time, said Porter. Avoid situations where you don't recruit for a substantial number of positions, and, where you have a potentially significant recruitment for all positions but your pools are very bad in terms of attracting women and minorities, you fail to go to specific sources that are likely to produce women and minority applicants for a substantial number of positions.

Porter also said that "If we find that in the renewal application you represent that you hire a number of full-time employees that is significantly less than what you actually hire, it's going to be a problem." Porter said that this last situation would result in a hearing, and is critically important.

A number of legal professionals were also on the panel. George Borsari, senior partner in the Washington law firm Borsari & Paxson, which represents radio and other communications clients, said that, in order to get a license renewed, you cannot discriminate, you should be in compliance each year with the numerical guidelines, which were originally established by the FCC as a processing tool, and you should "do...self-assessment before you get to the employment period and see how you stand." He also said that, when doing self-assessments, keep documentation, and "...recruit until you are able to show that you have an adequate pool of minorities and women that you've considered for that position."

M. Anne Swanson, a partner with the Washington law firm Koteen & Naftalin, which specializes in representing mass

media clients, said that if a renewal is challenged on EEO grounds, it's the broadcaster's job to prove he or she made those efforts. "If you want to have any chance at all of winning that challenge," she said, "(of) defending your record successfully, the name of the game is going to be records, records, records." It would be helpful to have the following in a renewal challenge, she said: documentation of recruiting efforts, and documentation of the self-assessment you made of those recruiting efforts.

Keep good files

Nancy Wolf, of counsel to the Washington law firm Leventhal, Senter & Lerman, which specializes in all aspects of regulatory matters before the FCC and in transactions involving broadcast acquisitions and sales, said that "Every hiring opportunity should have its own folder with information in it—the recruitment source that you used, (and) the race, the gender, (and) the referral source of each applicant and interviewee." Race and gender information, she added, "is really the most important, because, without that you can't prove that in your applicant pools you had minorities and females, and that race and gender information can be the hardest to get."

As for self-assessment, Wolf suggested that broadcasters perform this act twice a year on the management and staff levels. The first thing to do, she said, is to check the numbers and see if you have compliance with the numerical guidelines. Then, she added, evaluate if you're following your EEO program, and check your retention rate and review your promotion records.

"Self-assessment is up to you," she said. "You're not going to get any advice from the FCC on how to do it. Just adopt your own program, regularly follow it, and document the results."

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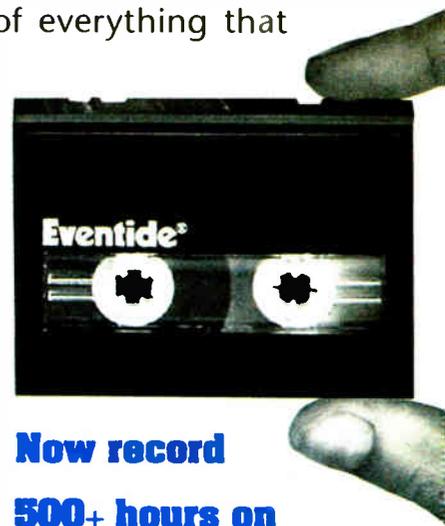
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World Radio History

Risk-taking Makes Liddy a Success

► continued from page 37

several assets: he'd been doing a lot of lecturing, which included a question and answer session, and he had Popp, "an experienced radio guy...he and I clicked right away." Liddy also mentioned assistant producer Cameron Gray and the "wonderful engineers" at WJFK as assets.

Entertain and inform

When asked if he agrees with Paul Harvey that broadcasters should both entertain and inform, Liddy said yes. "We get into some pretty heavy subjects on this show," he noted, "and that which we bring up is what is of interest to the audience. They'll call in about just about anything. And so I try to relieve that through the use of humor—usually self-deprecatory humor."

Liddy said he gets "a lot of expert information" from his listeners. Not only that,

(Buchanan)... and the rest of them. You know, we are voices crying in the wilderness against this hurricane of leftism, so, you know, God bless them, I wish them all the success in the world."

Is it obscene?

When asked if the FCC should be in a position to determine what is or isn't obscene on the air and then take action by fining stations, Liddy said no. "The law is...that which is obscene depends upon community standards, which vary widely in this country. What is not paid any attention to in New York City can be considered outrageous in, maybe, Idaho...So there really isn't a national standard, and for the FCC to attempt to impose a national standard, I think, is misplaced.

"The answer is the knob that is on the radio. If you don't like what you hear, you

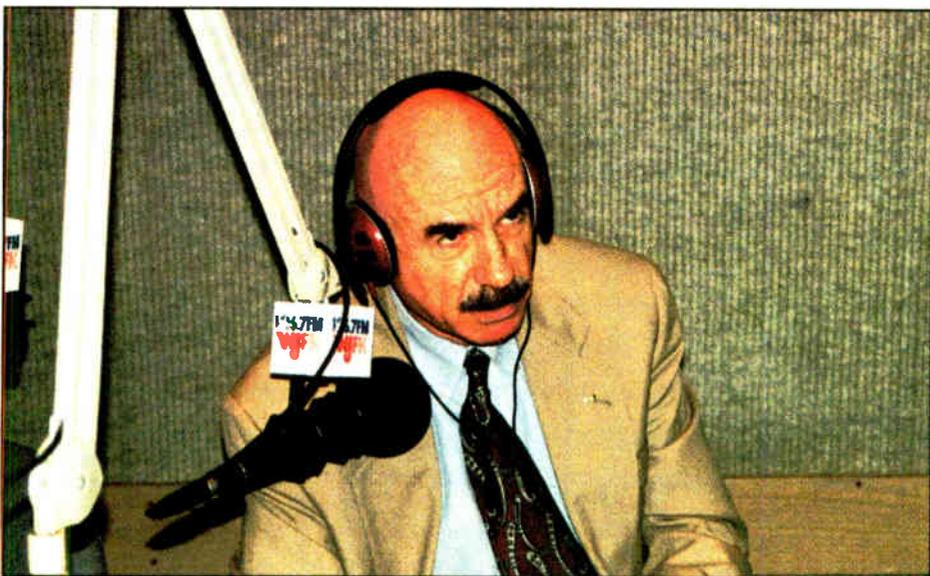
planes. He fishes off his dock, "preferably with my children or grandchildren." He runs a lot. And, he said laughing yet again, he drives a Corvette "at very high speeds."

If he had his life to live all over again, would Liddy change anything? Anything at all? "No," he mused, adding that "the only thing I would not do would be to associate myself with any kind of endeavor whatsoever with the likes of John Dean. Other than that, I probably would have taken the same decisions."

Because it seems he's done it all, is there anything else he would like to

have tried? "Oh, I really enjoy doing what I'm doing," he said. "The only big missed experience in life, as far as I was concerned, is that I was 15 when World War II ended, and I had fully expected that the war would still be going on when I was 17, when I could get into it. And then Harry Truman dropped the atomic bomb without consulting me—ended the war two years prematurely, as far as I was concerned—and really pissed me off. But other than that, no."

A man such as this would surely have some advice to impart to his listeners on how to get the most out of life. And, in fact, he does: "I do what other men fantasize about. If you've got a dream, do it. Don't sit around bemoaning the fact that you're not doing it. Get out and do it."



Gordon Liddy on the air at WJFK-FM

but, he said, "listeners help other listeners, so we have sort of a network, a self-help network out here... they help out the G Man."

Liddy believes he has credibility with his listeners. "When Watergate happened, I refused to commit perjury, lie...and even talk," he said. "I mean, John Dean talked, but he also committed perjury. And so my word is still good. I didn't say read my lips and then turn around and do something else. My word is still good."

Radio is superior

For a man who professes to know nothing about radio, Liddy has a lot of opinions about the medium. For example, he feels that radio is superior to television "for the same reason that a book is superior to a motion picture... a skilled author can sketch in, if you will, the outlines of a room or, say, the Royal Palace, with a few phrases, and then your imagination fills in the blanks. And that's often the reason why people who have read the book will be disappointed in the movie, because there is nothing so glorious and powerful as the human imagination... Television, hey, what you see in that little box is what you get... Radio stimulates the imagination, the way reading does."

Bring 'em on. "People say, well, gee, you know, you're competing with Rush (Limbaugh) and everything like that," said Liddy. "Look, the mainstream media in this country is so far to the left that there's plenty of room over on the right to have balance, and there's plenty of room for me, and for Rush, and for Pat

don't turn it to that setting at that time, or you turn it off. And therefore you have total control over what you're exposed to, or your children are exposed to."

Guests

One of Liddy's frequent on-air guests is an audience favorite: Mrs. Liddy. "She's... very good for me, because she always pops my balloon regularly," he said, lovingly. "You know, I go home and she'll say, 'Oh, I was listening to the program today, and you were clearly talking through your hat again, weren't you,' you know, and I say, 'Well, I didn't think so.'" Mrs. Liddy's answer? "Well, you were," said Mr. Liddy, "and then she'll tell me why. And I figure, well, that's good, that's good for me, that's good for the audience. She's very popular (with them)."

Liddy says he gets "an awful lot of mail saying, you know, more Mrs. Liddy, more Mrs. Liddy." The man laughed.

As for other guests, Liddy says return receipt requested letters have gone out "to all the heavy hitters in the Clinton administration. I disagree with them, but I would love to debate it on the air with them. And we get very polite letters back, saying the Secretary would love to come on the show, but, unfortunately, it's Tuesday, and he's just had his shoes shined and so he can't appear." Another laugh.

When he's not in the guise of G. Gordon Liddy, public figure and radio talk show host extraordinaire, Liddy parachutes out of airplanes. He flies air-

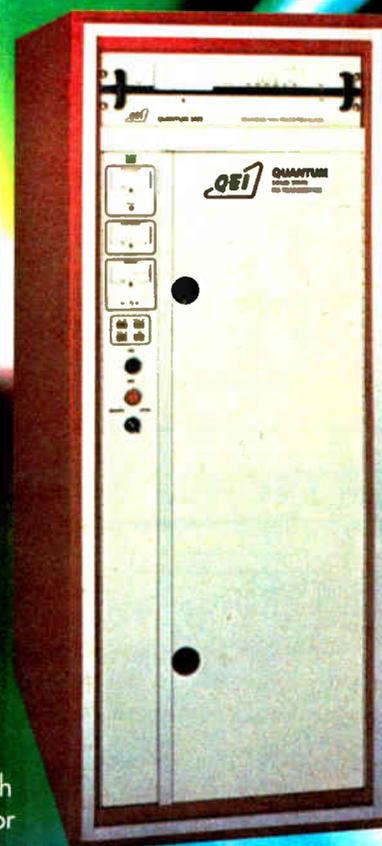
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STATION SERVICES

News and Services for Business, Programming and Sales

Rush Alternative Offered

BOULDER, Colo. USA Talk Network is offering stations a liberal talk show-response to Rush Limbaugh.

Democratic activists Aaron Harber on Aug. 15 began broadcasting "After Rush," a direct response to conservative talk shows led by hosts like Rush Limbaugh, G. Gordon Liddy, Michael Reagan and Pat Buchanan.

For more information call Jack Tyson at 303-443-2626; or circle **Reader Service 206**.

Sports Network Kicks Off

DALLAS Prime Sports Radio, a new 24 hour-sports radio network, recently premiered through affiliate stations across the country.

Programming includes interviews with the industry's top personalities, continuous updates, play-by-play actualities, in-depth features and an assortment of additional sports information.

For more information call Christal Aycock at 214-401-0069; or circle **Reader Service 44**.

Sports Byline to Broadcast USA TODAY Sports writers

SAN FRANCISCO Sports Byline

USA recently announced that it has entered into an exclusive agreement with USA TODAY newspaper for USA TODAY's sports writers to make regular appearances on Sports Byline's nationally syndicated radio show.

The agreement will make the complete line-up of USA TODAY's sports writers available to Sports Byline listeners on a weekly basis.

For more information call Charles Coane at 800-783-7529; or circle **Reader Service 21**.

ABC Radio to Broadcast Court TV

NEW YORK ABC News Radio and Courtroom Television Network (Court TV) recently entered into an agreement giving ABC sole access to all audio trial covered by Court TV.

Under the new agreement, ABC News will distribute via satellite a daily audio news-call of Court TV material. A court TV update, produced by Court TV and distributed by ABC, will also be fed to ABC Radio affiliates on a daily basis.

The agreement, which became effective immediately, includes a weekly court feature, produced by Court TV correspondent Fred Graham and broadcast by ABC News Radio.

For more information call Lloyd

Trufelman at 212-818-9151; or circle **Reader Service 114**

ABC Teams Up with Business Week

NEW YORK ABC Radio and Business Week magazine are hooking up to provide "The Business Week Radio Network," a new radio business network.

ABC Radio will begin broadcasting the new 60-second "Business Week Business Reports" hourly, during morning drive time through the west coast afternoon drive time, Monday-Friday.

The report, covering business news from Wall Street to Tokyo NK, will be delivered by ABC News correspondent Gary Nunn and from the editorial offices of Business Week by business broadcaster Ray Hoffman.

For more information call Lesley Halpern at 214-448-3342; fax 214-991-1071; or circle **Reader Service 92**.

Science Fiction Dramas Offered

FORT EDWARD, N.Y. The ZBS Foundation, which has been producing radio drama since 1972, is offering Ruby 4: The Turban of El Morya stories, a science fiction detective story.

It is a continuation Ruby 3: The Moon Coins of Sonto Lore.

Stations will be able to broadcast the Ruby 4 series at an undetermined future date. The Ruby series parts 1-3 are already available for public broadcast.

For more information call Anne Erwin at 800-662-3345; fax 518-695-4041; or circle **Reader Service 133**.

Crowley Goes Digital

FORT LAUDERDALE, Fla. Crowley Broadcasting recently announced all-digital production and downlinking of its weekend "Money and Lifestyle Show."

Both a Saturday morning live show or a tape delay specifically for weekend programming are available for barter arrangement.

Two-minute personal finance drop-ins are also available for broadcasting anytime.

For more information call Steve Crowley at 800-553-7424; fax 305-735-5226; or circle **Reader Service 123**.

Jack's Back

WASHINGTON Liberty Broadcasting recently announced its syndication of a Wolfman Jack live broadcast from the Washington Hard Rock Cafe every Friday night from 7 to 11 p.m.

"Baby it's great returning to the national scene just down the street from the White House," Jack said. "The party's so loud Bill and Hillary can't even get any...sleep."

For more information about receiving the program call 813-253-4500; or circle **Reader Service 102**.

CBS Americas to Present Disney Holiday Specials

NEW YORK CBS Americas will present Fiestas Navideñas, Estrellas, Música y La Magia de Disney (Holiday Festivities, Stars, Music and the Magic of

Disney), a Spanish language Disney holiday special.

The festive package consists of two four-hour specials and a daily feature. The first special already aired on Thanksgiving weekend from Disney World in Florida, but another special is scheduled to air from Disneyland in California Dec. 24 and 25.

For more information call Sina DeVito at 212-975-3773; or circle **Reader Service 26**.

Jones Satellite Picks Up Spanish Programming

ENGLEWOOD, Colo. Z Spanish Radio Network, Inc. and Jones Satellite Network (JSN) recently announced that Z Spanish Radio will program the eight satellite radio format for Jones.

"Spanish radio is one of the hottest formats throughout America and we are delighted to be working with an industry leader in adding it to the JSN portfolio," said Gregory J. Liptak the president of JSN's parent company, Jones Spacelink, Ltd.

For more information call Andy Holdgate at 303-792-3111; fax 303-799-0966; or circle **Reader Service 4**.

Skylight Satellite Picks Up Two More Affiliates

ST. PAUL, Minn. The SkyLight Satellite Network, a ministry of Northwestern College in St. Paul, a music intensive inspirational network, recently announced the addition of two new affiliate stations.

WWGN-FM in Ottawa, Ill., is now broadcasting hosted inspirational music from the network and the non-commercial version of the Standard News.

WSCT-FM in Springfield, Ill., is now broadcasting the non-commercial version of the Standard News via SkyLight.

For more information call Wayne Pederson at 612-631-5000; fax 612-631-5010; or circle **Reader Service 61**.

World Radio Network Now Available in North America

LONDON World Radio Network is now offering programming in North America.

The available programming, which is in English, includes BBC Europe Today, Radio Canada International, Radio Vatican and Israel Radio. Programming dealing with other parts of Europe is also available.

For more information call World Radio's London office at 44 71 304 4343; fax 44 71 304 4347; or circle **Reader Service 38**.

Background Country Music Now Available from Energetic Music

SEATTLE Energetic Music is now offering "Country #1," a selection of country background music that stations can use for a variety of promotions.

"With our Royalty Free Music Library, our clients are licensed for unlimited use of the music on all of their projects, avoiding red tape and lawsuits in the process," said Energetic President Monty Smith.

For more information call Sandy Klem at 206-467-7101, fax 206-467-6931; or circle **Reader Service 105**.

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See page 1 for complete details

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READER SERVICE NO. 53

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READER SERVICE NO. 19

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 AVCOM's PSA-65A Portable Microwave Spectrum Analyzer covers a frequency range from less than 2 MHz to 1000 MHz. The broad frequency coverage and high sensitivity of the PSA-65A make it ideal wherever a low cost, compact spectrum analyzer is needed. The light weight, battery or line operated PSA-65A Portable Spectrum Analyzer from AVCOM is the perfect instrument for field testing of RF systems, classroom instruction, satellite system alignment, electronic countermeasures, cable TV maintenance, cellular and production use



SPCPC-2000E SCPC Satellite Receiver - \$1875
 AVCOM's Single Channel Per Carrier Receiver, model SPCPC-2000E, has been developed for the reception of FM SCPC signals from satellites operating in the 3.7 to 4.2 GHz band. The SPCPC-2000E is a complete receiver that can tune up to 4 specific crystal controlled audio or data channels from a given transponder and adapt to a variety of de-emphasis requirements. The SPCPC-2000E is available in either wide or narrow band models and may be used with the SS-1000 (\$1027) Slave for simultaneous reception of additional channels.

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READER SERVICE NO. 200

Picking the Right Scheduling System

by Edward Ford

ANAHEIM, Calif. How many times have you been to a restaurant and discovered that the food tastes a different way each time you visit the establishment? Usually an establishment like that doesn't stay in business long (hopefully they didn't buy a schedule from you).

Some radio stations exhibit a similar tendency with their music selection. Listeners can be like fast food consumers. They choose the "music menu" of your station because they have certain expectations about what they will find (or hear) on it.

You should be striving to give them consistency and variety within your "music menu." Given today's climate of increased competition from satellite-delivered formats and digital music on cable, now is the time to make sure your music is consistent. Remember, it's consistency, not predictability that matters.

Use a computer

One of the best ways to help ensure consistency is with music scheduling software. Unless you or one of your staff has hours upon hours to hand-schedule music, programming music by computer is the way to do it.

If you leave it up to each different air staff member to schedule with index cards, your music menu is going to change with each shift. One DJ won't play songs or artists that he or she does not like, while another will play too much of what he likes. Music scheduling software contains the clocks, rules, and song/artist type coding that defines your music formula.

A music scheduling program can also serve as a database for your music library. It can give you the ability to edit a music log before it is printed. The software can also guard against artist/group problems like Phil Collins/Genesis.

The ability to review a previous day's music log and make changes to it is another important feature; reflecting if songs were dropped or added for various reasons.

The right fit

The next step is to choose the best music scheduling software for your station. Unless you have hours to program each day's music log manually, any music program on the market will surpass the index card or similar manual system you may use now. Your choices for music scheduling software then come down to two groups, lease-based or buy-out programs.

Functionally, not much can be said negatively concerning the major lease-based programs. The "Big Three" all have great features and produce outstanding music logs. Their only drawback is the monthly lease fee, which is based on market size.

Lease prices start at about \$150 per month. Your station usually has to sign up for a minimum amount of time. If

the price and length of a lease are too much, the alternative is a buy-out program. Just like Lotus 1-2-3 or Wordperfect, you buy the software and it is yours. Prices on buy-out programs range from \$300 to \$1,500.

Many of the buy-out programs don't have all of the features that the major lease-based programs do, but not every station needs all of those features. Some major market program and music directors never use many of the bells and whistles on the top-of-the-line lease-based programs.

What you really need

Acquire music scheduling software that has the day-to-day features you need, and enough of the optional ones

Unless you have hours upon hours to hand schedule music, programming music by computer is the way to do it.

to do your occasional special programming needs (blocks, featured years/artists, etc.). Make sure the software is supported by updates to the program or you have the opportunity to upgrade from your current program to an advanced program that the company may also offer.

Leased-based programs include updates free. It's part of your lease. Some buy-out programs charge an annual upgrade or maintenance fee. If you paid \$1,000 for a buy-out program that had a \$100 yearly maintenance fee, the cost for two years of music scheduling would be \$1,200.

Two other factors could influence your decision about what music scheduling software you go with: computers and digital storage/automation systems. If you've bought a new computer for traffic/billing and have decided to use the old Turbo XT to do the music, your choices will be narrowed. Only a couple of the buy-out programs will work on an XT. You might even have trouble with an early AT that doesn't have 640KB of RAM. The faster your CPU, the faster your music will schedule. Going from a 286 to a 386 will make a big difference.

A PC purchase

If you have to buy a computer, go with one with at least 4MB of RAM because some music programs can use extended memory. A 386SX or DX will run most of the music schedulers quickly, but finding a new 386 might be difficult because the 486SX is the "low-end" CPU. Just like any computer purchase, buy the fastest, most reliable unit

that fits into your budget.

Most music scheduling programs are DOS-based. Macintosh users will be limited to one or two programs, unless you can run your Mac in a DOS emulation mode.

Even though you might not need it immediately, you should get a music program that interfaces with a digital storage/automation system. If you plan to go digital soon, then you would want to purchase music scheduling software that can download music logs to your digital system.

Some music software companies can load the data from the popular CD

libraries like Halland, RPM, and TM Century directly into your program. This saves you from the time consuming task of entering the information yourself. Ask what options are available to make it easier for you to get up and going in the shortest time, and save you some work.

With a base of solid, consistent music scheduling, you can build on the other factors that truly make your station a winner: Personalities, community involvement, and client service.

□□□

Edward Ford owns La Palma Broadcasting which sells music scheduling software and provides AC programming services. He can be reached at 714-778-6382.



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The BTE 29SPR features a dual-power setting switch to conserve energy and a foot-operated erase control. At low power, this model can continuously erase VHS and Beta tapes.

For information, contact Kent McGuire in Arizona at 800-227-8887; fax: 602-483-9357; or circle **Reader Service 9**.



Near-field Monitor

The Tannoy PBM 5 Mark II near-field monitor features polypropylene capacitors, air core inductors and polyolefin low-frequency cones. The speaker elements of the monitor are suspended with a single roll of nitril rubber.

Weighing nine pounds and standing less than 12 inches tall, the PBM 5 Mark II allows for flexible placement in various mixing environments.

Frequency response for the monitor is rated at 63 Hz to 20 kHz, ± 3 dB. Nominal impedance is 6 ohms, with a peak power rating of 85 W and sensitivity of 88 dB.

For information, contact the company in Ontario, at 519-745-1158; fax: 519-745-2364; or circle **Reader Service 32**.

Digital Mini-automation System

The DER-100 by Craver Software Solutions is an event-driven mini-automation digital system. All recorded feeds play back through one module on the user's console. DER-100 can switch an external audio switcher and allows 10 different record start pulses that correspond to the audio channel. The unit internally adjusts the computer's clock each hour, down to one hundredth of a second. Disk usage is as little as 1.8MB per minute.

For information, contact Steve Craver in Ohio at 614-487-2486; fax: 614-766-5025; or circle **Reader Service 140**.

Power Tubes

Richardson Electronics offers a wide variety of power grid tubes and is the worldwide master distributor for Varian Eimac power grid tube products, cavities, sockets and accessories.

A supplier of electron tubes since 1947, Richardson also offers transmitting tubes from Burle, Siemens and other manufacturers. Richardson manufactures the Amperex line (formerly the Philips transmitting tube line). Types available include the NL347, YL1430, YL1440 and YL1631.

For information, contact Bob Birkeneder in Illinois at 800-348-5580; fax: 708-208-2550; or circle **Reader Service 201**.

PC-based Automation System

New from WireReady NSI, makers of the WireReady newswire capture electronic newsroom system, comes CartReady, a PC-based automation system for news, on-air studio, production and satellite automation applications.

CartReady runs on any standard IBM 386/486 compatible computer with 4MB of RAM. An interface with XLR I/O allows the computer to connect to a station's existing board, console or mixer, or directly to the transmitter inputs.

With CartReady, audio is digitized at any standard sampling rate from 16 to 48 kHz, compressed or uncompressed, mono or stereo, then stored on the computer hard drive. Cuts, such as local news or promo copy, can be archived on diskettes or a second drive.

For information, contact David Gerstmann in Massachusetts at 800-833-4459; fax: 508-879-1199; or circle **Reader Service 78**.

Automation Software And Audio Card

By adding Auto-Mate Systems' SoundBlaster audio card and Auto-Mate software, any IBM-compatible 286 or above can be converted to a fully working automation system. This PC-based system is designed largely for stations that do not want to invest in a full-fledged automation system but want something to fill programming gaps. With a sufficient amount of hard drive space, the system can be loaded with music, spot and liner material which can play back on an unattended random basis. Using data compression, about 10 hours of 22 kHz mono audio can be stored for every 400MB of disk capacity.

For information, contact John Zolkoske in Oregon at 503-769-2886; fax: 503-769-4085; or circle **Reader Service 160**.

Production Library

Manhattan Production Music has released Apple Trax, a production music library featuring '90s sound, with such themes as hip-hop, new age jazz, hot country and "guitar trio." Each CD cover has its own colorful design. The first two releases from Apple Trax are AT1 Guitar Music and AT2 Keep It Up.

Guitar Music features three different acoustic guitars alternating between solos and melodies. Keep It Up offers a blend

of techno-pop/hip-hop tunes and pop themes. Alternative rhythm track versions are also included. Both releases are available for free to MPM blanket license subscribers.

For information, contact Ron Goldberg in New York at 212-333-5766; fax: 212-262-0814; or circle **Reader Service 197**.

Chip Resistor Series

International Components Corp.'s new series of chip resistors are available in four sizes—0603, 0805, 1206 and 1210—and feature nickel barriers for leaching control, solderability and tight tolerance with available TCR.

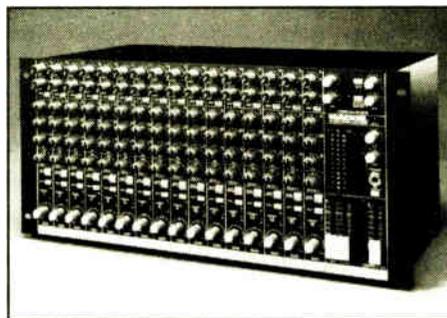
Resistances offered range from less than 1 ohm to 20 Mg ohms, with a ± 5 percent tolerance. Power ratings range from 0.031 to 0.25 W. Maximum working voltage ranges from 50 to 200 V. Operating temperature is -55 to 125 degrees Celsius. All sizes are available in tape and reel configuration for automatic mounting.

For information, contact OEM Sales Dept. in New York at 516-293-1500; or circle **Reader Service 155**.

Professional Audio Components

This Town Productions has announced its new company, Desert Island, which is taking orders for a line of five new audio components. This line of professional audio gear comprises the Hurricane, a mic pre with limiter functions; the Cyclone transformerless solid state mic pre; the Typhoon Jensen transformer input mic pre; the Light Speed photo-optic compressor/limiter; and the Northpole magnetic compressor/limiter. Each of these components offers fully discrete signal paths.

For information, contact Tom Hilbe, This Town Productions, in California at 805-927-1001; fax: 805-927-1002; or circle **Reader Service 183**.



Line Mixer

The LM-3204 line mixer from Mackie Designs is ready for shipping. This 8-bus console features 16 stereo line input channels. All 32 inputs are electronically balanced and accept either -10 or +4 sources. Each input channels comes with two stereo aux sends, two mono aux sends, balance pot, solo switch, LEDs for signal presence and overload, and a mute button that doubles as a routing switch to a discrete, alternate stereo output bus.

The LM-3023 also offers a separate control room monitor section for sending signals to the headphone jack and control room outputs without affecting the main L/R mix.

For information, contact Ron Koliha in Washington state at 206-488-6843; fax:

206-487-4337; or circle **Reader Service 14**.

Data Acquisition And Analysis System

The NetDAQ from Fluke Corp. is a PC-based data acquisition and analysis system which offers a combination of distribution front-end measurement modules and Windows-based trending and analysis software. Its portable, 20-channel modules may be linked together to support up to a 400-channel system and may be connected directly to PCs or interfaced with existing LANs. The complete NetDAQ system includes NetDAQ Logger for Windows trending analysis software.

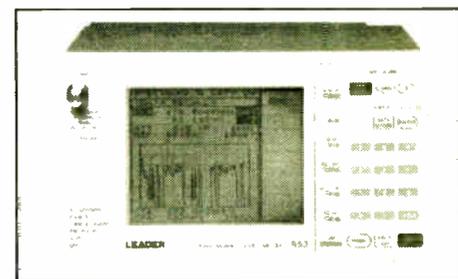
For information, contact Debby Coyne in Washington state at 206-356-5671; fax: 206-356-5116; or circle **Reader Service 107**.

Software Upgrade

VoxPro 1.5 is an enhanced and more powerful version of Audion Laboratories' digital sound editing system specifically designed to replace reel-to-reel tape recorders in on-air broadcast studios. VoxPro has been updated to run as a native application on Apple's Power Macintosh line.

The new version of VoxPro employs an ultra-high speed, control room-oriented user interface. It can be configured for operation in 16-bit stereo or 16-bit mono. Another enhancement to VoxPro is the Time Slip feature, which allows the user to separate the left and right channels in a stereo recording so that one channel plays first with the other channel following.

For information, contact Charlie Brown in Washington state at 800-869-7765; fax: 206-842-6029; or circle **Reader Service 69**.



LCD-display Spectrum Meter

Model 953 CATV spectrum meter from Leader Instruments features both analog bargraph and spectrum displays with digital readouts on an LCD screen. Frequency coverage ranges from 5 to 1030 MHz. Model 953 contains all U.S. broadcast and cable channel formats and can also be programmed for customized channel schemes for each local cable operator.

The bargraph mode sets up single and multiple-channel displays to cover one to a maximum of 128 channels per display field. In the spectrum mode, resolution selections of 110 kHz, 330 kHz and 1 MHz are simultaneously coordinated with frequency span choices.

For information, contact Joe Fisher in New York at 800-645-5104; fax: 516-231-5295; or circle **Reader Service 81**.

There are many reasons for choosing AEQ products. Here are just a few.

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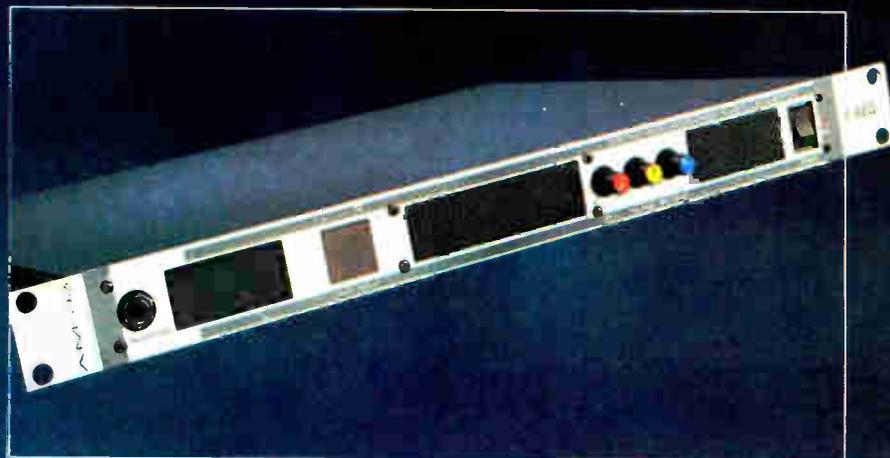
The AEQ Portable Mixer MP-10

- ▶ Ideal for remote event transmission.
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Special features:

- ▶ Five transformer balanced inputs selectable Mic / Line.
- ▶ Front panel input controls.
- ▶ Capable of linking mixers together to increase number of inputs.
- ▶ Transformer balanced outputs.
- ▶ Internal Ni-Cd rechargeable batteries provides 4 hour autonomy.
- ▶ Automatic switch to battery if power fails.
- ▶ Dialing keypad, dual mode Tone / Pulse.
- ▶ Three headphone output jacks.

Stereo Quality Monitoring at Mono Price



The AEQ AM-03 Stereo Audio Monitor

- ▶ Designed to meet the monitoring needs of technicians working in VTR rooms, OB vans, radio and TV controls, etc.
- ▶ All the controls are in the front panel to facilitate easy and accurate operation:

Input selector (three selectable stereo inputs).
Output channel selector and balance.
Gain control and power switch.

Features:

- ▶ Three way audio system (mono for low and stereo for mid and high frequencies), consisting in five speakers. All contained in one unit 19" rack space.
- ▶ Electronically balanced inputs and output, with XLR connectors.
- ▶ Incorporated limiter for speakers protection.
- ▶ Audio phase meter.
- ▶ Headphones connector with automatic speakers disconnection.

The Ideal Combination



Digital Telephone Hybrid AEQ TH-02 EX

- ▶ Frequency Extender Mode as standard feature.
- ▶ Works with one or two telephone lines.
- ▶ The second line provides full Multiconference Mode. The operator and two callers can talk and listen to each other simultaneously.
- ▶ Hybrid null of 30 dB's.
- ▶ No adjustment required.
- ▶ Ideal companion to work with AEQ Portable Digital Line Extender TLE-02.

Portable Digital Line Extender AEQ TLE-02

- ▶ On Air phone call with audio presence, depth and clarity of voice. No "telephone sound".
- ▶ Easy to use. Designed for the non-technical user.
- ▶ Ideal for field reporters, totally portable. Light weight: 3.3 Lb.
- ▶ Great operation autonomy, using 8 AA batteries.
- ▶ Dialing pad in front panel, and Pulse / Tone selectable.
- ▶ Independent level control of Mic / Line input, auxiliary input and headphones.

Value & Performance



AEQ Mixing Console BC-500

- ▶ The AEQ Mixing Console BC-500 is designed for those radio stations seeking great audio quality at a competitive price. Its designers paid great attention to the control layout; the logical control design ensures a quick learning period as well as a trouble free operation.
- ▶ Advanced true modular design allows total flexibility. The module chassis has built-in meters and speakers and comes in a standard configuration with the following capabilities:
- ▶ Six dual stereo inputs.
- ▶ Four mono inputs Mic / Line selectable.
- ▶ One Telephone Hybrid interface.
- ▶ Studio control Intercom monitor.
- ▶ One main stereo output plus mono sum output.
- ▶ Power supply for On Air signaling.
- ▶ The AEQ BC-500 comes with 4 blank modules to enhance this configuration.



AEQ AMERICA, Inc.: 2211 South 48th Street, Suite H - Tempe, AZ USA 85282
Phone: 1 (602) 431 0334 - Fax: 1 (602) 431 0497

Radio ID Jingles: Basics Remain the Same

by Ken R.

NEW YORK "We Play the Hits... KIIS-FM" (1994)
"Music Radio, WABC" (1970-1978)
"Ten-Ten WINS New York" (1963)

Those are slogans that are remembered about two minutes if an announcer says them... and they're remembered forever if they're sung in a catchy jingle.

Radio ID jingles are those little six-second items you run between spot breaks and music, or sometimes as a transition between songs. If you take away the records, the commercials and the liner cards, you find that jingles are what provide the color and personality of your radio station. They're how your listeners "grab" your identity quickly and remember your call letters at ratings time.

Jingles today are still produced by a handful of specialists, just as they always have been. But they have an interesting history that dates back to 1947 to Dallas, Texas.

How it happened

In those days, most stations were affiliated with one of several radio networks. Those that weren't were referred to as "music, news and sports" stations, and their personalities played records, gave community announcements and aired local interviews.

It was the opinion of Bill Meeks, a staff musician at KLIF(AM) and later WFAA(AM) in Dallas, that people weren't sure which station they were listening to. Bill had recorded some musical jingles for local advertisers and tried his hand at writing little "songs" for the radio station as well.

The idea caught on, and he later parlayed this success into an advertising agency called PAMS, which in the early 1950s began to syndicate these

jingles to top-40 stations owned by the likes of Todd Storz and Gordon McLendon.

The secret was that Bill recorded one set of background music tracks, then had singers re-record different call letters for each city. Once objections from the local musicians union were overcome, this became a standard practice and an industry was born.

Early jinglers

Another early pioneer was Tom Merriman, founder of CRC, which stood for Commercial Recording Company. In the late 1960s, CRC evolved into TM, which was later purchased by Century 21 and is now known as TM Century.

Another early jingler was Anita Kerr, whose vocal group provided backgrounds for many of the hits of the early '60s ("Big John," etc). Anita recorded several packages for WLS(AM) Chicago when it switched from middle-of-the-road music to rock and roll, and these packages were made available to other stations of that era as well.

While technological improvements have revolutionized the recording industry, the basic jingle concept has not changed drastically. Someone writes the cuts, background tracks are still recorded first, and singers add vocals customized for each market as they listen to the pre-recorded tracks in their headphones and sing along. But there are some differences.

In the early days, tape recorders only had one or two tracks to work with, while today one can easily have 36 or 48. Prior to 1966, the instrumental recording process was pretty simple. Microphones were strung in a big studio, and the whole jingle band set up and played all the instruments simultaneously (rhythm, brass, strings, per-

cussion, etc.). A good "take" was saved onto another tape, which became the working master for the singers.

Somewhere around 1962, a three-track machine was built that allowed one track for the band (these were the days of mono radio, remember) and two

set the pace. To a great degree, the vocal blend of today is a throwback to that time.

The full seven-voice blend you hear today even in CHR and Hot A/C jingles is an anachronism in that it hasn't been the vogue in popular music since the early 1960s. Yet this style lives on in

Great singers preserve the art of jingle singing. And radio stations, although unaware of their history, still use jingles to help people remember their call letters.

tracks for vocal. Then a four-track machine became the standard until 1968 when PAMS purchased a specially-built 10-track machine. Around 1969, the new format was 16 tracks on a 2-inch tape.

Producers found they could cut all the rhythm instruments first (drums, bass, guitar, keyboard), then "overdub" brass next onto a separate track, adding strings and other touches later. This allowed the engineer greater flexibility in mixing and opened the door for special effects and processing to help the jingles stand out on the radio.

Overdubbing as an art

The album "Sgt. Pepper" by the Beatles used a four-track Ampex machine to the utmost of its capabilities and raised overdubbing to an art. After that, the recording industry was never the same.

In 1947, the jingles of the day used musical styles made popular by the big bands of the 1940s. The vocal blends of Glenn Miller's Modernaires, Vaughn Monroe's Moonmaids and the all-male sound of the Four Freshmen

jingles of the 1990s. True, some jingles today use soloists or smaller and more intense five-voice blends. However, the majority of ID jingles today owe their vocal heritage more to Mel Torme's Meltones than to Pearl Jam.

In the wild '60s, a number of gimmicks were employed for the first time to help the listener remember the station call letters. A device called a SONOVOX had its roots in the 1940s, when Walt Disney used it as the voice of a locomotive ("I think I can I think I can").

It's simply a pair of small speakers held up to the throat of the "singer." A modulating tone is fed into these speakers (a trombone, a synthesizer, a sound effect). The singer doesn't use his or her vocal chords, but utilizes his lips and mouth to articulate the words soundlessly. The result is a mechanical voice that takes on the characteristics of whatever instrument or sound is used. PAMS was the first to capitalize on this in its famous 1962 Series 18 "Sonosational." KFWB, WABC and KLIF were among the stations that bought the series.

Bill Meeks also tried everything else he could to make PAMS jingles sound unique. Drums and guitars recorded backwards, voices fed through an organ's Leslie rotating speaker, slap-back echo ("Superhit one...hit one...hit one... hit one...") In 1966, the first wobbly steps were taken with a Moog synthesizer. Whitey Thomas was the keyboardist who first hooked it up at PAMS, and Series 32 ("Swizle") and Series 33 ("Fun Vibrations") incorporated this weird electronic sound along with the more traditional instruments.

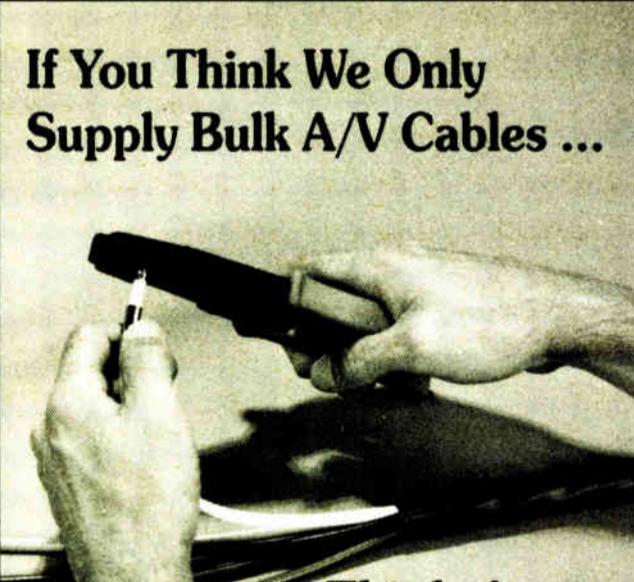
At one time or another every unusual instrument was used, including bagpipes, bass clarinet, boom bams (African percussion instruments), clavinet, pedal steel guitar and even giant chimes. Vocal groups were all-male, all-female, and even little twin girls were used on PAMS Series 25 ("The Happy Difference"). The names of the early jingle series were often adapted by programmers as station positioning lines: "Radio Au Go Go," "Music Power," etc.

Today talented writers and arrangers still produce ID jingles. Great singers preserve the art of jingle singing. And radio stations, although unaware of their history, still use jingles to help people remember their call letters.

□ □ □

Ken R. is principal of Ken R Productions in New York. Reach him care of RW.

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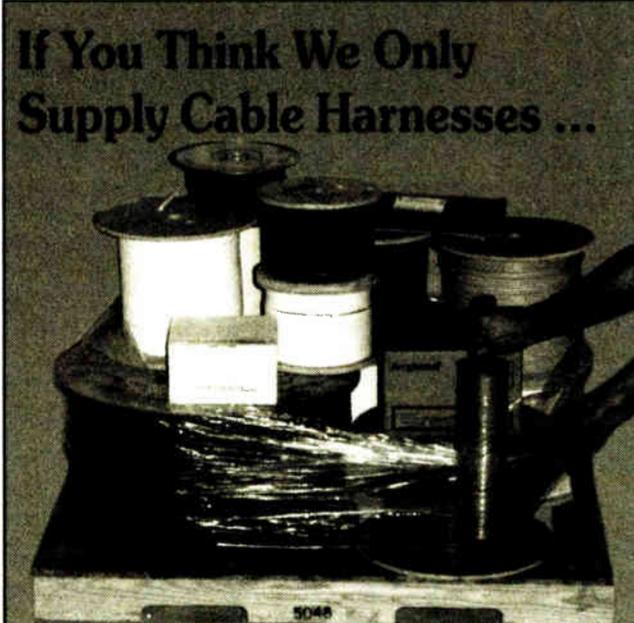


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CCS CDQ-1000, Motorola TA220, both used once, sold as pkg only, \$3700/BO. G Nord, Soundhound, 45 W 45th St, NY NY 10036. 212-575-8664.

Kintek KT-904 stereo synthesizer, exc cond, \$1350. R Beierle, KFYZ, 200 N 4th St, Bismarck ND 58501. 701-255-5757.

Shure M67, SE30 mixer, patch bays, Tadco 440 reverb; BBE Sonic 822 Maximizer; Foster Digital 3050. Jim, 414 Washington Ave, Defiance OH 43512. 419-782-8591.

Shure SA-1 headphone monitor amp, phono or line inputs, 2 headphone outputs, \$20 + shpg. D Tonelli, Aquarius Audio, 679 Calmar Ave, Oakland CA 94610. 510-444-3094.

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SMC TS-25 tone sensors (2), each cntrls 2 tape devices, \$100/ea or BO. B Williams, KQLL, 5314 S Yale, Tulsa OK 74135. 918-455-9522.

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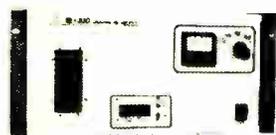
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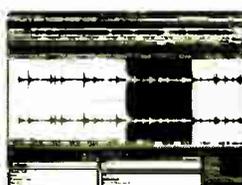
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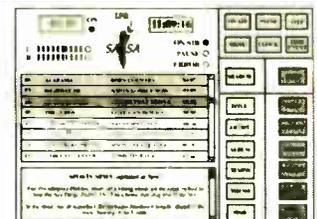
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BE 5300C tripledeck, stereo, PB, mint less than 50 hours, BO. R Kaufman, Pams Productions, POB 462247, Garland TX 75046. 214-271-7625, after 3PM CDT.

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ITC, BE, Fidelipac cart machines: single, triple, mono, stereo, play & record/play. Call M O'Drobinak @ 619-758-0888.

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Want To Sell

Ampex 350 mono with Inovonics electronics, solid state, rack mount, \$300; Ampex AG 350, mono, solid state, rack mount, \$500. A Baker, Bdct Prod, 804 E 38th St, Indianapolis IN 46205. 317-925-7371.

Nakamichi BX-125, cam drive with 3 motors, \$250; Teac X-1000R, computer controlled, bi-directional R-P. \$780. R Schweppe, WTMV, 7155 Clark Rd, Sarasota FL 34241. 813-923-8239.

Otari MX-70 w/CB-117 remote control and CV-119 autolocator, dbx-180A NR sys, UREI 535 EQ, Eventide H949 Harmonizer, Crown D-75 speaker amp, JBL 4408 spkrs (2). J Book, WOC, 3505 E Kimberly Rd, Davenport IA 52807. 319-344-7000.

Pentagon CP-4010 sequential 4 deck player, new; Pentagon CP-4010 (4) sequential 4 deck player; Teac X300R stereo reversing rcdrs. R Schuh, KSMG, 210-646-0105.

Otari 8 track, 1" recorder, very low hours, hds exc, 15/30 ips, with remote, \$2500; Studer/Revox PR99, 2 track, 7.5 and 15 ips, low hours, exc cond, \$1600; Teac 4 track. L Wagner, POB 1788, Orlando FL 32802. 407-299-1299.

Recordex CS-2500 1 master, 5 slave, recorder cassette duplicator, 15:1 dup speed, \$1000 + freight. W Feinberg, Totallape Pub, 9417 Princess Down, Tampa FL 33619. 813-621-6200.

Revox PR99 (4) rolling cases w/wired remote, esc cond, 2 trk w/ 7 1/2 and 15 ips, \$2000 + shpng. W Feinberg, Totallape Pub, 9417 Princess Down, Tampa FL 33619. 813-621-6200.

Scully 270 (4) need some adjustments, also one for parts, \$150. B Williams, KQLL, 5314 S Yale, Tulsa OK 74135. 918-455-9522.

Tascam 34 R/P 10.5 reels, 1/4 4 trk w/all new heads. Larry, WXP, 1229 Brady St, Davenport IA 52803. 319-326-2541.

Teac A-3300-SX 3.75 and 7.5 ips, 7" & 10 1/2" reel modes, 1/4 track stereo, excellent condition, \$450. KAK Productions, 928 Hyland Dr, Santa Rosa CA 95404.

Telex CD1 duplicator, 1:3, \$750 + shpng. W Feinberg, Totallape Pub, 9417 Princess Down, Tampa FL 33619. 813-621-6200.

MCI JH110B, 2 trk, roll around cabinet, gd cond. J Gelo, J & H Music, POB 1697, Marcos Island FL 33937. 813-642-6899.

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Scully 284B-8, 1" 8trk, 3 3/4 - 30 ips w/V576 var speed mod, manuals, exc cond, \$2000. Tom, 415-969-3030.

Metro-tech 525P r-r, stereo/in, preamp out, \$150/BO + shipping. R Perrine, Imagination Ind, 2475 State Rd, Cuyahoga Falls OH 44225. 216-929-3712.

MCI JH-100 (2). M Young, WJON, Box 220, St Cloud MN 56302. 612-251-4422.

Otari MX5050 MK III 1/2" 8 trk, \$1500; Otari MTD 12, 1/4" tape, 2 trk w/time code board, \$2000. D Gaydos, WNYU, 721 Bdway, NY NY 10003. 212-998-1663.

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Revox B-77 1/2 trk 3 3/4 x 7 1/2 ips, \$600; 1/4 track 3 3/4 x 7 1/2 ips, \$450; Tascam 22-2 (2), very low hrs, \$450/ea; Teac X-300, new, \$350; Tascam 234 syncuset, new, \$700; Tascam 234 syncuset, used, \$450. G Grassie, RNTC Bdctng, POB 146, Dexter NM 88230. 505-734-5565.

Scully 280B servo (3), 2 tracks, 2 with Scully digital varispeeds, Scully 280B servo FT; Scully S80B servo 4 track; misc motors, spare parts, excellent condition, \$3500 for all/BO. J Danis, Audio Dept Ind, 119 W 57th St, NY NY 10019. 212-586-3503.

Tascam MS-16 16 channel rec with synchronizer, excellent condition, under 75 hrs use, \$5000/BO. Carey, Concordia Lutheran College, 512-406-3180.

Tascam MSR-16 1/2" 16 trk, dbx-1 parallel and serial ports, \$3200. D Lewis, 4th St Studios, 88 4th St, Bangor ME 04401. 207-941-0810.

Ampex 601 portable tape recorders (3) & Ampex 620 portable speaker/amps (3). Working when retired, BO + shipping. Mel Crosby, 408-363-1646.

Ampex ATR800 mono, Tascam 25-2, Tascam 7300, Ampex ATR700, \$695 ea, Scully 16 trk 2" \$3450, Tascam 52 top of line, \$1150, Ampex AG350 electronics \$75, 3M M56 16 trk \$5500, M79-24 fully rebuilt \$11500, Tascam locator for 85-16 \$495. Sony TCD-5 & Marantz stereo 3 head portable cassettes both \$475, Fostex E22 1/2" center trk time-code deck \$1800, Fostex A80 8 trk & 450 mixer \$1950, Tascam 80-8 & M5 \$1950, Nagra 10" reel adaptor \$1400, Nagra 4.2 sync mono, Haliburton case, Tote, AC ps \$2500, Tascam 38 8 trk w/dbx \$1650. W Gunn, POB 2902, Palm Springs CA 92263. 619-320-0728.

Ampex ATR 100 (2) 4 trk \$3500 ea, 2 trk 1/2" \$4000, (2) 2 trk 1/4" \$2500 ea. 212-343-0265.

Otari 5050-SHD 8 trk 1/2" newly rebuilt, heads have full, life left, \$1800. W Gunn 619-320-0728.

Otari Mark II-IV 1/2" 4-track, multi-track, mint, less than 50 hours, Best Offer. R Kaufman, Pams Productions, POB 462247, Garland TX 75046. 214-271-7625, after 3PM CDT.

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Scully '100' recorders, record/play amplifiers, 8, 16, 24 track heads. Sequoia Electronics, 4646 Hounds-haven Way, San Jose CA 95111. 408-363-1646.

TEAC reel models 35-2B, A3340, A3300 (3 units), 12 input stereo console, racks, mikes, much more. Excellent cond. \$4000 buys all. Must pick up in SW Ohio. 513-825-1648.

Want To Buy

Ampex ATR100 taperecorders for parts. Circuit cards, heads, motors, machine parts, or electronic parts. Call 818-907-5161.

CD PLAYERS

Want To Sell

Pioneer PD 6050; Denon DCM; Shure D600; Technics SL-P1300, as is, \$100; Denon 950, as is, \$950. Jim, 414 Washington Ave, Defiance OH 43512. 419-782-8591.

Advertising
deadline for the
January 11 issue of
Radio World is:
December 16, 1994

ABOUT OUR EMPLOYMENT SECTION

HELP WANTED: Any company or station can run "Help Wanted" ads for \$1.50/word or buy a display box for \$60/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 \$10. 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 \$10 fee which must be paid with the listing (there will be no invoicing). Responses will be forwarded to the listee, unopened.

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CONSOLES

Want To Sell

Tascam 106 6 input, 4 output w/EQ. C Springer, KLMF, POB 890, Lamar CO 81052. 719-336-2206.

Auditronics 310, 8 trk w/cabinets, furniture, Yamaha DX-7 keyboard, Yamaha RX-21 drum box, pre-wired Genthner patch panels (9), much more, BO. J Book, WOC, 3505 E Kimberly Rd, Davenport IA 52807. 319-344-7000.

Collins 808A-1 portable, w/dual TT, mono, \$400. Larry, WXP, 1229 Brady St, Davenport IA 52803. 319-326-2541.

Gately 16 x 8 w/EQ 4 effects buss quad monitoring, Cannon connectors for line & mic inputs and Cannon connectors for outputs, \$850. A Baker, Bdct Prod, 804 E 38th St, Indianapolis IN 46205. 317-925-7371.

Neve consoles: any condition or parts
Also: UA, UREI, Teletronics, Fairchild, RCA, Puhec, API, any TUBE GEAR or COMPRESSORS
Call 201-798-2745 or fax 201-963-4764

Harris Stereo 80, \$500 + shipping; Collins prod board, \$150/BO. B Pitts, WJBV, POB 930, Gadsden AL 35902. 205-442-1222.

Ramae 8616, never used, 7 mono & 4 stereo modules, BO. R Baur, KUTT, 414 4th St, Fairbury NE 68352. 402-729-3382.

AmeK/TAC 16/8/2, 8 trk monitor section; 60 pt prewired patchbay, \$2000/BO. R Friedman, 1137 Rec, 1137 Fillmore St, Baltimore MD 21218. 410-889-4228.

Auditronics 110-8, 10 I/O modules, stereo mixout, mono mixout w/2 52 jack 1/4" patchbays, exc cond, \$1500/BO. J Danis, Audio Dept Ind, 119 W 57th St, NY NY 10019. 212-586-3503.

EMPLOYMENT

To place ads in this section, use the ActionGram form.

To respond to box numbers write Radio World, PO Box 1214, Falls Church, VA 22041. Attn: _____

POSITIONS WANTED

Ohio air-talent seeks FT hot AC or classic rock midday gig. Rick, 216-773-1549.

Pro Bdct Engineer with 25 years experience, CE/Director of Engineering position with stable, debt-free station, prefer IL, IN or WI others possible. Jeff, 719-380-1198.

20 years small market experience, wants oldies or country midday or PM drive, satellite and automation experience, MO, KS or OK. Rob, 515-682-7678.

HELP WANTED

Assistant Chief Engineer for St. Louis FM/FM/AM trombo. Prior experience in all areas of studio and transmitter maintenance required. FCC license, SBE certification and computer knowledge a plus. Resume and references to Bob Hoffman at WKXX-FM/WKBQ-FM/AM, 111 West Port Plaza, Suite 1000, St Louis MO 63146. EOE. M/F.

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Someone gave you a chance, now take that chance on Airel Foxx, on-air, production, news. 405-677-1698.

If you have position, I have talent, new graduate, creative, love production and news, will relocate. Kitty, 405-685-1814.

Country morning A/T attitude, phones, brains, topical and humorous. Mike, 608-723-2723.

Immature broadcasting school graduate, plus additional experience, seeks on-air with production, Christian station, need to relocate. Dale, 405-634-8794.

Pro Bdctr seeks combo pos in sm or med mkt, 27 yrs exp, pref NW or somewhere in pines. E Puchalski, 909-881-3812.

Recent bdct grad seeks entry level pos, prod, board op, etc. Clint, 405-333-2379.

HELP WANTED

Pacific Recorders & Engineering Corporation is a firmly-established company with an industry-wide reputation for building the highest quality products and systems in the broadcast market. Located in the coastal community of Carlsbad in southern California, we provide a positive working environment and exceptional benefits, including the opportunity for unlimited personal growth. Pacific Recorders is an equal opportunity employer. We maintain a multicultural workplace and encourage qualified women and men of all backgrounds to apply for these positions.

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CONSOLES...WTS

Audiotronics 110-2 special 48 trk + dual foldback mixing board, as is, BO. U George, Ugly George Satellite, 600 W 58 St, NY NY 10019. 212-969-0240.

BE 4M50A new, \$625. G Grassie, RNTC Bldg, POB 146, Dexter NM 88230. 505-734-5565.

Fostex 2016 8 input, 2 output, sub/monitor, new, w/manual, \$110 + shpng. D Tonelli, Aquarius Audio, 679 Calmar Ave, Oakland CA 94610. 510-444-3094.

Harris Medalist 12 chnl, 5 VU meter, UREI 10 slider, stereo: Gates Statesman, stereo, 6 chnl; BE 8M150 8 pot, dual mono; LPB ch mono Signature II. Jim, 414 Washington Ave, Defiance OH 43512. 419-782-8591.

Opamp Labs 2008-RS, 20 input, 8 buss + stereo out, 2x16x2 remix/cue sections, \$1500. L Wagner, POB 1788, Orlando FL 32802. 407-299-1299.

Shure SE-30 2 chnl; + aux mixer, non-std VU meter, clean, exc cond, \$75 + shipping. W Haley, Rec Maching Svcs, R12 Box 362-B, Gordonsville VA 22942. Fax 703-832-5247.

Soundcraft 200B 8x4x2 8 chnl rk mt, 4 aux busses, 8 returns, w/ext pwr sup, \$500 + shpng. M Novelli, Maya Sound, 1089 Curtis St, Albany CA 94706. 510-526-6090.

Ward-Beck 24x4x2, P+G conductive plastic faders, 3-band, fully parametric, 2 dynamics modules, 288 point sidcar patchbay, many spares, \$3000. R Friedman, 1137 Rec, 1137 Fillmore St, Baltimore MD 21218. 410-889-4228.

MCI 528 was \$82,000 new, excellent condition \$16500, Quantum 32x16x24 as used by LA Philharmonic \$4950, Audiotronics 501 \$3500. W Gunn, POB 2902, Palm Springs CA 92263. 619-320-0728.

Ramko DC5AR 5 channel mixers, very good condition, \$175 each. 916-725-2434.

Want To Buy

WE 23C, mixer. W Davies, Virgo Prod, 5548 Elmer Ave, N Hollywood CA 91601. 818-761-9831.

Neve console, any type and parts. 212-343-0265.

DISCO-PRO SOUND EQUIPMENT

Want To Sell

dbx 118 compressor/expander, excellent condition with box, \$125. R Glenn, WJGR, 1718 Shenandoah Dr, Wimauma FL 33598. 813-634-1940.

Lights Fantastic 10 x 1200 16 channel light chaser, \$200. W Feinberg, Totalltape Pub, 9417 Princess Down, Tampa FL 33619. 813-621-6200.

LinnDrum classic drum machine w/MIDI update, \$250. Mark, Prod Block Studios, 906 E 5th St, Austin TX 78702. 512-472-8975.

Sequential Circuits Tom 9 keybrd style programmable, MIDI compatible, 2 removable carts w/sound effects, \$200. W Feinberg, Totalltape Pub, 9417 Princess Down, Tampa FL 33619. 813-621-6200.

Want To Buy

JBL 4343 studio monitors, any cond. R Glenn, WJGR, 1718 Shenandoah Dr, Wimauma FL 33598. 813-634-1940.

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LIMITERS

Want To Sell

dbx 140A new, dbx type III w/r input video mixer, \$200. W Feinberg, Totalltape Pub, 9417 Princess Down, Tampa FL 33619. 813-621-6200.

CRL System, SMP-900, SPP-800, SEP 400B (2), with NRSC, sharp 10 kHz audio filter, clean manual, \$3195. B Walker, 306 S Church St, Murfreesboro TN 37130. 615-893-5373.

RCA BA147A mono, good condition, \$450. R Beiere, KFYP, 200 N 4th St, Bismarck ND 58501. 701-255-5757.

Want To Buy

Orban 424 or eqv, must be in good condition. J Moser, J & N Rec, 520 Roebing Ave, Trenton NJ 08611. 609-695-3418.

Orban Optimod 8000, also XT2 chassis, Texar Audio Prisms and Texar card for 8100. P Slatton, WBTG, POB 518, Sheffield AL 35666. 205-381-6800.

CBS Volumax stereo FM, slimline version. B Caihrier, WMBI, 820 N LaSalle Drive, Chicago IL 60619. 312-329-4304.

Fairchild 670 or 660 tube compressor/limiter, Teletronics LA-2A tube compressor/limiter or UREI LA-3A solid state compressor/limiter, call after 3PM CST. 214-271-7625.

MICROPHONES

Want To Sell

Audio-Technica AT831 lavalier mic (5). C Springer, KLMR, POB 890, Lamar CO 81052. 719-336-2206.

Electro-Voice 660 super cardioid variable-D, exc cond, BO. A Wodel, WHF, 9A Alexander Rd, Estherville IA 51334. 712-362-4119.

EV 183, gd cond, XLR mt, many avail, \$35 ea. U George, Ugly George Satellite, 600 W 58 St, NY NY 10019. 212-969-0240.

Sony CRT-5/CRR-4C, tube type wireless mic & rcvr, mint cond, \$150. W Haley, Rec Maching Svcs, R12 Box 362-B, Gordonsville VA 22942. Fax 703-832-5247.

Sennheiser MKH-805, studio mic system with all acces, \$300 + shipping; Audio Technica AT-855, unipoint condenser mic, new, \$100 + shipping. D Tonelli, Aquarius Audio, 679 Calmar Ave, Oakland CA 94610. 510-444-3094.

I've sold my FM station, now I am selling my RCA microphone collection, please call with a bid for: BK5B with wind screen; SK46; 77B; 77DX TV Grey; 91B horseshoe type desk stand; 44BX with original 3 leg floor stand; RCA KS.3A floor stand; BK6B miniature; BK12A subminiature; BK.1A "Icecream Cone"; 44BX chrome & black; 44BX NBC switch plate on bottom; 44BX NBC cast aluminum flag; junior 44 chrome & black; junior 44 stainless with WMRI flag; program stand 90 satin chrome-cable guide' 44BX in box; remote amps, etc. All mics are new or as new, new ribbon, all work excellent. J Phillips, 414 Washington Ave, Defiance OH 43512. 419-782-8591 FAX: 419-782-3299.

RCA 77-44 BK-5 etc. W Davies, Virgo Prod, 5548 Elmer Ave, N Hollywood CA 91601. 818-761-9831.

Sony ECM377 large dia cond mics (2) \$495 ea, RCA 77DX \$950, 44BX matched set of 3 \$3950, Shure SM5 \$325, SM7 \$295, AKG D12 \$195, Crown GLM200 lavalier like new \$125. W Gunn, POB 2902, Palm Springs CA 92263. 619-320-0728.

Want To Buy

77-DX's, 44-BX's, WE KU-3A's On-Air lights, recording lights & audition lights. Top price paid. Fast response. Bill Bryant Management, 2601 Hillsboro Rd, G12, Nashville TN 37212. 615-269-6131, FAX: 615-292-3434.

RCA ribbons, AKG 451's, Neumann KM84's, EV 635A. W Gunn, POB 2902, Palm Springs CA 92263. 619-320-0728.

RCA 77DXs/44BXs ribbon, chrome/TV grey, good condition, BO. R Kaufman, Pams Productions, POB 462247, Garland TX 75046. 214-271-7625, after 3PM CDT.

MISCELLANEOUS

Want To Sell

26 Foot Boom Box, new airon speakers, both sides new audio equip, \$20,000. D Bryan, POB 485, Carthage IL 62321. 217-357-6610.

Comdial Executech 8 line phone system w/13 phone, \$700. Larry, WXLPL, 1229 Brady St, Davenport IA 52803. 319-326-2541.

Switchcraft patch panels wired to punch blocks. M Young, WJON, Box 220, St Cloud MN 56302. 612-251-4422.

XLR connectors, male & female, 1/4", \$2/ea or \$3/set. W Feinberg, Totalltape Pub, 9417 Princess Down, Tampa FL 33619. 813-621-6200.

AT & T partners, 2 line by 6 sets telephone system, incl 5 sets, new in box. C Springer, KLMR, POB 890, Lamar CO 81052. 719-336-2206.

Conex UM-33 switcher-amp; Bird 72R coax switch rack mount; Harris 2.5K spare blower. Jim, 414 Washington Ave, Defiance OH 43512. 419-782-8591.

Giant Boom Box, 28' long, 8' wide, 13' tall, Wells Cargo chassis, dual axle, detachable hitch, 50' pneumatic mast, Rockfor Fosgate stereo spkrs, stereo mixer, 110 A/C, \$15000. KXGO, 707-445-8105.

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206-454-2040

Circle (93) On Reader Service Card

Tascam 1/2" alignment tape, 250 Nw/m, IEC EQ, also rack mount for model 38, BO. P Cibley, Studio C, POB 767 Murray Hill Stn, NY NY 10156. 212-532-2980.

Want To Buy

Radiotelegraph study guide or QEZ book for FCC license, used manuals in gd cond. J Book, WOC Radio, 3535 E Kimberly Rd, Davenport IA 52807. 319-344-7000.

Jazz record collections, 10" LP/12" LP be-bop, swing, dixie, highest prices paid. B Rose, Program Recordings, 228 East 10th, NY NY 10003. 212-674-3060.

MONITORS

Want To Sell

Reppo SCA port radio, \$20. E Mitchell, KSNM, 214-495-8122.

Belar FMMI; Belar FM52; TFT mod monitor with preselector + SCA; McMartin 3500, 2000B, 2200A with preselector. Jim, 414 Washington Ave, Defiance OH 43512. 419-782-8591.

McMartin TBM 10050 FM rebroadcast receiver, new, for rebroadcasting, simulcasting, translators or monitoring of RF, modulation, or injection. Also: (used) AM/FM modulation monitors. Buy or Sell, Repair & Calibrate McMartin, Belar, Call Goodrich Int'l Inc., 11435 Manderson St., Omaha, NE 68164. 402-493-1886 fax 402-493-6821

Modulation Sciences DSCA-188, data Sidekick, \$1800. R Humphrey, WWVA, 1015 Main St, Wheeling WV 26003. 304-234-0057.

TFT 730A SCA monitor. Very little use. Excellent condition, \$850. Wayne L. 615-251-3003.

Want To Buy

EBS encoder/decoder, FM mod monitor stereo. J Powley, WAOM, 1512 Sherwood Dr #3, Reidsville NC 27320. 910-342-1843.

McCurdy tube consoles wanted, AU-300 line modules power supply, monitor amps, card cages etc. Also interested in RCA, Collins, Langevin tube modules. Wayne L. 615-251-3003

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| CD Players | Receivers & Transceivers | Turntables |
| Computers | Remote & Microwave Equip. | Positions Wanted |
| | Satellite Equipment | Help Wanted |

Classified Advertising Rates Effective January 1, 1994

	1x	3x	6x	12x
1-9 col inch (per inch)	\$60	58	54	49
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Distributor Directory	100	95	90	85
Professional Card	65	60	55	50
Classified Line Ad		\$1.50 per word		
Blind Box Ad		\$10 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 \$180, at the 3x rate \$174, at the 6x rate \$162, at the 12x rate \$147, etc.

RECEIVERS/TRANSCIVERS...WTS

Standard GX 3000 mobile 800 MHz 2 way radios (2) and Astron SL-11A power supplies for base; Standard HX-400 (2) handheld 800 MHz 2-way (2); Standard CSA-40 (2) rapid chargers for handhelds. R Schuh, KSMG, 210-646-0105.

GE Superadio III, custom modified w/noise free SCA w/improved selectivity & sensitivity, \$95. Other modifications avail. Performance guaranteed **800-944-0630**.

Carver TX-2 FM stereo w/18 presets and multipath NR, \$120 + shpng. D Tonelli, Aquarius Audio, 679 Calmar Ave, Oakland CA 94610. 510-444-3094.

SCA RECEIVERS—ALL TYPES

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General Industries home disc rcdng unit w/2 spd and Shure magnetic cutter head, \$35 + shpng. D Tonelli, Aquarius Audio, 679 Calmar Ave, Oakland CA 94610. 510-444-3094.

REMOTE & MICROWAVE EQUIPMENT

Want To Sell

Moseley TRC-15 \$900 + shpng. R Petersen, KDMO, 221 E 4th, Carthage MO 64836. 417-358-6054.

Moseley MRC-2 remote control system, loaded; Moseley TRL-1 TSL system, 1 W. R Schuh, KSMG, 210-646-0105.

Cellcast RBS 400, new, \$1600. J Fez, KSCA, 213-845-1625.

Marti RPT-15 remote pickup transmitter, on 161.76 MHz, excellent condition, \$575. Sunflower Radio Products, 9421 Ballentine Rd, Overland Park KS 66214. 913-492-9000.

Marti STL-10 stereo, 2 trans, 2 rec with combiner; mono STL-10, mint condition. Jim, 414 Washington Ave, Defiance OH 43512. 419-782-8591.

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Moseley 1620, \$2000; Moseley 1600, \$800 for phone line. W Sowers, KXRA, 1312 Broadway, Alexandria MN 56308. 612-763-3131.

Want To Buy

Rust manual, esp of wiring harness. S Weber, POB 453, Oakridge OR 97463. 503-782-2901.

SATELLITE EQUIPMENT

Want To Sell

Wegener 1601 Rcvr rack mount, 1645 tone decoder card, 1610 and 1610-01 Panda II demod cards and 1606-05 block conversion card, excellent condition, manuals, BO. A Atkinson, KRLE, SW 345 Kimball, Pullman WA 99163. 509-332-3545.

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Want To Buy

15D 111A SCPC demod/downconverter, freq agile, low cost for new 501(c)3 public stn. E Truax, KEOS 89.1, POB 78, College Stn TX 77841. 409-779-5367.

SOFTWARE/ DATABASES

Want To Sell

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STATIONS

Want To Sell

Central AR, small AM on 690', no real estate, only stn in county, possible contract wpa, \$125,000. B Bottenberg, 102 W South, Benton AR 72015. 501-778-6677.

MUST SELL: FM radio station in Marshall, Illinois. 2-story bldg with 17 acres property. Studio and all transmitting equipment. \$55,000 cash. 1-800-231-5171 ext 102.

Profitable small market AM daytimer in SW Virginia. Excellent owner operator opportunity. Market at two times billing, with or without, \$160,000.00 in real estate. Currently family operation with principals planning retirement. Contact: JCS, POB 354, Wytheville, Virginia 24382.

Want To Buy

Lesse manage AM or FM in NE, Boston/Providence pref, new format needs home. B Alley, RLM, 272 Union St, New Bedford MA 02740. 508-991-2007.

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7 1/2 & 10 1/2" reels, thousands in boxes, 7" 50c/ea + shpng; 10 1/2" \$1/ea + shpng. W Feinberg, Totaltape Pub, 9417 Princess Down, Tampa FL 33619. 813-621-6200.

Audiopak A2, hundreds in various lengths and cond, \$1/ea. M Young, WJON, Box 220, St Cloud MN 56302. 612-251-4422.

Classic Rock AOR library, all on 7 and 10.5" reels, 1960's and 70s, \$600; 105 x .25" empty reels w/boxes, \$50. D Pulwers, Dave's Price Audio, 310 N Howard St, Alexandria VA 22304. 703-751-9346.

Voice grade whiteshell, 30 min, 20c/ea in lots of 500 only; 60 min, 25c/ea in lots of 500 only, 90 min, 30c/ea in lots of 500 only; chrome tape (200) 90 min, \$140 + shpng or 70c/ea. W Feinberg, Totaltape Pub, 9417 Princess Down, Tampa FL 33619. 813-621-6200.

1000+ LP's, big band, MOR, rock and contemporary, 1100+ 45's. J Gelo, J & H Music, POB 1697, Marcos Island FL 33937. 813-642-6899.

Kustom Kraft (4), 100 cart capacity, mint condition, \$100 ea; 50 cart capacity, \$50. B Penn, WKXD, 259 S Willow, Cookeville TN 38501. 615-526-6860.

C-90s, duplication overrun, 1st qual, 20c ea in 1000 qty, 25c ea in 500 qty. L Wagner, POB 1788, Orlando FL 32802. 407-299-1299.

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TAPES/CARTS/REELS/CDS...WTS

Pams Jingles ref tapes, 1951-1976, BO. R Kaufman, Pams Prods, POB 462247, Garland TX 75046. 214-271-7625.

New public stn seeks no-cost/low cost FM broadcast equipment, including STL, EBS & studio equipment, 501(c)3 non profit. E Truax, KEOS 89.1, POB 78, College Stn TX 77841. 409-779-5367.

Leader LSG-231 FM sig gen, never used, in box, \$200. J Moser, J & N Rec, 520 Roebling Ave, Trenton NJ 08611. 609-695-3418.

Heathkit linearity LP-1 sweep generator, TV & FM precision, serial F-400 and pattern generator, \$75 ea. R De Mars, 222 Lakeview, Ste 160, W Palm Beach FL 33401. 407-832-4607.

Tepco/Jones J-318 FM booster, 10.7 MHz down converter, all docs, \$2000. J Stanley, 612-373-0104.

Bauer 707 1KW, nice, extras, \$3200. J Stanley, 612-373-0104 (days), 612-431-2855 (evenings).

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Potomac FIM21 field strength meter. A Sutton, WBCU, POB 70, Union SC 29379. 803-427-2411.

TRANSMITTERS

Want To Sell

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Bauer AM 5000 W, good condition, \$5500/BO. KCNO, POB 570, Alturas CA 96101. 916-233-3570.

Broadcast Electronics FX30, exciter, excellent condition with manuals, \$2500. J Gallagher, WBEC, 211 Jason St, Pittsfield MA 01202. 413-499-3333.

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Solid State RF amplifiers from 100W to 500W prices start at \$999. Call Bill Hoffman for details. 518-743-1601.

Tepco/Jones Model J-318 FM booster, extras, \$2000. J Stanley, 612-373-0104 (days), 612-431-2855 (evenings).

TRANSMITTERS - TV/FM/AM, new and used. Tubes, xmtr parts. 305-757-9207.

Used equipment for sale: Belar SCM-1, Belar RFA-1, Belar FMS-2, Belar FMM-1, Moseley MRC 1600 system, Orban Optimod 8100A, dbx 160 & 160X compressor/limiter, Dielectric coaxial switch with switch panel, TFT EBS receiver/generator, Gentner patch panel, Electro Impulse 5 kW dummy load and Harris racks. Call Transcom Corporation 800-441-8454 or 215-884-0888.

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TUBES

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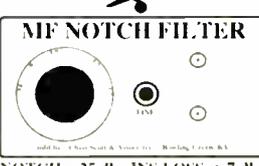
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501(c)3 org seeks old analog equipment, will ship, forward tax docs. B Thompson, 5831 N 60th St, Omaha NE 68104. 402-573-6550.

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Collins 20V-1, good condition, Best Offer. E Pendergast, KAOK, POB 19090, Lake Charles LA 70616. 318-436-7541.

Collins 550 very good condition, \$1500; Marti T/R, rack mount, tube type, \$200. W Sowers, KXRA, 1312 Broadway, Alexandria MN 56308. 612-763-3131.

Collins 3102 exciter 20W AM; Wilkeson exciter 10 W, 1 5/8" 4 port relay. Jim, 414 Washington Ave, Defiance OH 43512. 419-782-8591.

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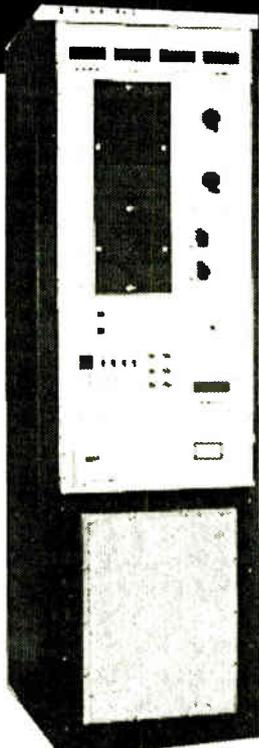
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Technics SP-15 (2), TT, new. R Schuh, KSMG, 210-646-0105.

Want To Buy

Technics 5L-D3 manual. G Fitzgerald, 718-446-3857.

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E. Network/group owner	I. Mfg. distributor or dealer
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008 030 052 074 096 118 140 162 184 206
009 031 053 075 097 119 141 163 185 207
010 032 054 076 098 120 142 164 186 208
011 033 055 077 099 121 143 165 187 209
012 034 056 078 100 122 144 166 188 210
013 035 057 079 101 123 145 167 189 211
014 036 058 080 102 124 146 168 190 212
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